

The Characteristics of Occupational Sub-Baccalaureate Students Entering the New Millennium

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Executive Summary

This report is a quantitative analysis of postsecondary occupational education students using national data sets. It provides a detailed description of the demographic characteristics, enrollment patterns, and goals of sub-baccalaureate occupational students in comparison to both academic sub-baccalaureate students and baccalaureate students. It is the first of three reports submitted as part of the National Assessment of Vocational Education (NAVE), called for by the Carl D. Perkins Vocational and Applied Technology Act of 1998. These reports contribute to the purpose of NAVE to help Congress improve occupational and technical education in the United States by providing a descriptive and analytic understanding of occupational students within the broader context of all postsecondary education.

Datasets and Analytical Categories

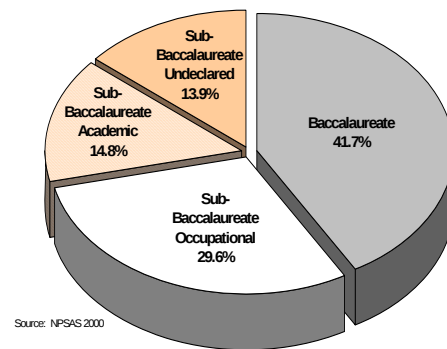
The findings in the report are based primarily on the 1999-2000 National Postsecondary Student Aid Study (NPSAS00), a nationally representative sample of for-credit students enrolled in a selected sample of postsecondary institutions. For comparison and trend analysis we use comparable data from the 1995-96 NPSAS (NPSAS96). These data are supplemented with data collected in other national surveys, including the 1995 and 1999 National Household Education Surveys (NHES), the National Education Longitudinal Study of 1988 (NELS), the 1980-1992 High School and Beyond study, and the 1989-94 and 1995-98 Beginning Postsecondary Students Longitudinal Studies.

Our analysis concentrates on sub-baccalaureate students. *Sub-baccalaureates* are students taking for-credit courses and either in a two-year or less institution or pursuing an associate degree, certificate, or no degree. Within the population of sub-baccalaureate students are occupational students. *Occupational* students are sub-baccalaureate students whose self-reported major is in a vocational field of study. There are two primary comparison groups for occupational students. *Baccalaureate students* are those taking for-credit courses toward a bachelor's degree at a four-year institution. *Academic* students are sub-baccalaureates whose self-reported major is in an academic field of study.

Figure 1 shows the percentage of postsecondary undergraduate students by level of enrollment – baccalaureate or sub-baccalaureate, and at the sub-baccalaureate level, by type of major. Observe that sub-baccalaureate students represent nearly 60 percent of all postsecondary undergraduate for-credit students.¹ Over half of sub-baccalaureates and nearly 30 percent of all postsecondary undergraduate students are occupational sub-baccalaureates.

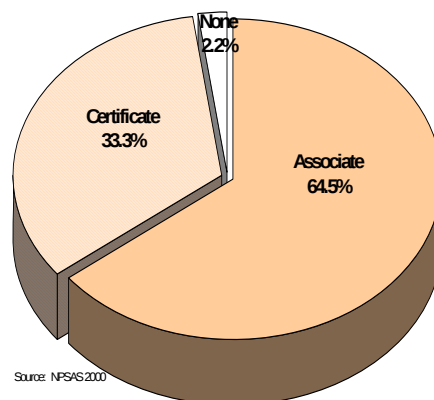
¹ All figures cited in the executive summary are from NPSAS00 unless otherwise noted.

Figure 1: Percentage of Postsecondary Undergraduate Students by Level and Major Type



The two main credentials pursued by sub-baccalaureates are associate degrees and certificates. The distribution of occupational students by degree program is shown in Figure 2. At nearly two-thirds, associate degree programs are by far the most popular for occupational sub-baccalaureate students.

Figure 2: Percentage of Occupational Students by Degree Type



Nearly nine out of ten (89 percent) sub-baccalaureate students attend public institutions of higher education, with more than three-quarters (78 percent) alone attending public two-year schools. The remainder attend private for-profit and not-for-profit institutions. While occupational students are more likely to attend private postsecondary schools than their non-occupational peers, still over 82 percent are educated at public institutions.

A final postsecondary education population is students in non-credit courses. *Non-credit* students are typically seeking very specific job skills, preparing to take certification exams, or simply motivated by the desire for personal enrichment. They may be taking anything from a single course that lasts a few hours to multiple courses requiring several days' work for completion. According to NHES, in 1999 over 110 million people were enrolled in non-credit courses, as compared to 32 million in for-credit courses. And among all students in some form of occupational education, only 18.3 percent were enrolled in for-credit coursework. These non-credit students are increasingly being served by traditional for-credit institutions. The NHES data indicate that 3.3 million students were taking job-related non-credit courses at community colleges or public two-year vocational schools.

Statistical Description of Sub-Baccalaureate Students

We provide a statistical description of sub-baccalaureates in comparison to baccalaureate students to highlight important demographic and enrollment differences between the two populations. Many of the differences between the two population are greater than the differences between occupational and academic sub-baccalaureates, which are featured in the next section.

- Comparing the relative proportions of sub-baccalaureates and baccalaureates in various demographic measures, we find that sub-baccalaureate students are slightly more likely to be female (57 percent versus 55 percent), more likely to be from a minority population (35 percent versus 29 percent), and much more likely to be older (52 percent versus 29 percent are age 24 or over).
- Relative to baccalaureates, sub-baccalaureate students are disadvantaged in the socioeconomic (SES) measures of household income (dependent student median parental income is \$45,267 versus \$55,752), parents' education (only 45 percent versus 63 percent had a parent with at least an associate degree; fully 44 percent of sub-baccalaureates had parents with a high school diploma or less as their highest level of education), and single with dependent status (16 percent versus 7 percent are single with dependents).
- Sub-baccalaureate students are much less likely than baccalaureates to have taken a rigorous academic curriculum in high school (16 percent versus 37 percent), yet more likely to have taken a curriculum that includes a vocational focus (15 percent versus 4 percent) or is non-focused (14 percent versus 5 percent).² Furthermore, they are less likely to be in the top quartile of high school class rank (20 percent versus 52 percent) and less likely to be in the highest quartile of combined scores from standardized reading and math tests (13 percent versus 46 percent).

² High school data comes from 1992 NELS high school graduates. High school curriculum categories include rigorous academic, rigorous academic and vocational, academic, academic and vocational, vocational, and none of the above (non-focused).

- Sub-baccalaureates students are more likely to have non-traditional enrollment patterns and identity. A larger proportion of sub-baccalaureates than baccalaureates (50 percent versus 22 percent) delayed their initial postsecondary enrollment by at least a year after high school completion, a much smaller proportion (26 percent versus 62 percent) attend on a full-time and full academic year basis, and among students who worked sub-baccalaureates are much less likely than baccalaureates to self-identify as a student (48 percent versus 80 percent) than as a worker.

Statistical Description of Occupational Students

Occupational students comprise approximately 51 percent of all sub-baccalaureate students. The remaining 49 percent are divided between academic majors (25 percent) and undeclared majors (24 percent). In this section we outline briefly the demographic and enrollment characteristics of sub-baccalaureate occupational students, using sub-baccalaureate academic students as the comparison group. We find that in most descriptive measures academic students hold an intermediate position between baccalaureate and occupational students. That is, the proportion of academic students exhibiting a particular demographic or educational characteristic usually lies somewhere between the two other populations. Evidence from our educational outcomes report and other research indicate that many of the characteristics that are more common among occupational students are associated with lower rates of postsecondary completion.

- We find that occupational students, when compared to academic students, are less likely to be female (54 percent versus 64 percent), more likely to be from a minority population (39 percent versus 32 percent), and more likely to be older (55 percent versus 46 percent are age 24 or over).
- Occupational students are economically disadvantaged by household income (dependent student median parental income is \$42,241 versus \$47,385), parents' highest level of education (41 percent versus 49 percent with at least an associate degree), and single with dependent status (20 percent versus 12 percent are single with dependents).
- Occupational students are less likely than academic students (20 percent versus 23 percent) to have taken a remedial course in college. However, this does not necessarily imply better preparation for postsecondary education, but may suggest lower academic requirements for occupational programs.
- When compared to academic students, occupational sub-baccalaureates are not very distinct in measures of high school program and achievement. That is, occupational students are about as likely as academic students to have taken a rigorous academic curriculum (16 percent versus 15 percent) or a non-focused curriculum (14 percent versus 13 percent), though they are more likely to have taken a curriculum that includes a vocational focus (19 percent versus 11 percent). Furthermore, occupational students are only slightly less likely to be either in the top quartile of class rank (19 percent versus 22

percent) or in the highest quartile of combined scores from standardized reading and math tests (11 percent versus 14 percent).

- Occupational students are more likely than academic students to have non-traditional enrollment patterns. A larger proportion of occupational students (53 percent versus 42 percent) delayed their initial postsecondary enrollment by at least a year after high school and a slightly smaller proportion (28 percent versus 31 percent) attend on a full-time and full academic year basis.
- The NPSAS00 survey asked students in two-year and less institutions their primary reason for enrolling. We found that the identical proportion (36 percent) of occupational and academic students gave degree or certificate attainment as their primary reason. However, proportionally more than twice as many occupational students than academic students (33 percent versus 15 percent) cited the attainment of job skills as a primary reason, while proportionally fewer occupational students cited transfer to another institution (15 percent versus 31 percent). Among only occupational students grouped by age, there is a nearly universal pattern that the proportion citing degree/certificate attainment and transfer declines from the younger to the older age categories, while the proportion citing job skill attainment increases with the older age categories.

Statistical Description of Certificate Students

Occupational students in certificate programs are a sub-population distinct from other sub-baccalaureate occupational students and can be seen as outliers within the whole postsecondary universe. We highlight those background and educational characteristics that provide evidence for their uniqueness.

- Certificate students have the highest proportion of minority students (44 percent) and students age 24 or older (65 percent) of any postsecondary sub-population.
- Certificate students are the most economically disadvantaged (dependent student median parental income of \$39,441), have the highest proportion of parents with a high school diploma or less as their highest level of education (56 percent), and are the most likely to be single with a dependent (25 percent).
- In measures of postsecondary readiness, certificate students are the least likely to have taken a rigorous academic curriculum in high school (8 percent) and the most likely to have taken either a vocational (23 percent) or non-focused (24 percent) curriculum. They are also the least likely to be either in the top quartile of class rank (10 percent) or the top quartile of combined scores from standardized reading and math tests (6 percent).

- Certificate students have the highest proportion of students with previous degrees (37 percent) and the highest proportion having each type of previous degree: certificate (22 percent), associate (7 percent), and bachelor's (8 percent).
- Certificate students are far more likely to have non-traditional enrollment patterns than other postsecondary students: 64 percent delayed their postsecondary enrollment after high school and only 20 percent attended on a full-time and full academic year basis.
- A final example of the outlier status of certificate students is their primary reason for enrolling. Almost half (48 percent) say their primary reason is to obtain job skills, while 32 percent cite the attainment of a degree or certificate and a mere 4 percent are enrolling for transfer.

Non-Credit Occupational Education: Student Characteristics

We also investigated that portion of the postsecondary education population who are enrolled in non-credit courses. The non-credit student population dwarfs that of all for-credit students. According to NHES, in 1999 over 110 million people were enrolled in non-credit courses, as compared to 32 million in for-credit courses. And nearly 54 million of the non-credit students are in job-related occupational courses. Non-credit occupational students are typically seeking very specific job skills or preparing to take certification exams. They may be taking anything from a single course that lasts a few hours to multiple courses requiring several days' work for completion. There are 2.3 million of these job-related occupational non-credit students

enrolled in community colleges and another one million in public two-year vocational schools. Though a relatively small proportion of all non-credit occupational students, they represent an important and growing segment of the community college market. The 1999 NHES indicates that non-credit students accounted for 36 percent of all occupational students at community colleges and 42 percent of all occupational students at public two-year vocational schools.

The demographic and background characteristics of non-credit students in job-related occupational courses in postsecondary institutions are very different than those of their for-credit counterparts. In general, when compared to for-credit occupational students, non-credit job-related occupational students attending postsecondary institutions are more likely to be male, less likely to be from a minority group, more likely to be older, more likely to have an income above \$25,000 per year, and much less likely to be single with dependents. They are also much more likely to already have a previous degree – 40 percent alone have bachelor’s degrees.

Conclusions and Policy Considerations

Occupational education, despite its prominence within the postsecondary universe, is still perceived as a second-class program in a higher education system predicated on the academic baccalaureate model of education. The federal government must recognize the size of this important component of American higher education and take an active role in supporting it and encouraging innovation and improvement in its implementation and administration.

Sub-baccalaureate students (when compared to baccalaureate students), occupational students (when compared to academic students), and certificate students (when compared to all occupational students), are more likely to enter postsecondary education less well-prepared academically, economically, and socially than each of their peer populations. While Perkins funds often target institutions and programs where such disadvantaged students attend, the unique demographic and enrollment characteristics of these students necessitate innovative targeting of funds to maximize student benefit and to promote student success.

We have provided evidence of the magnitude of non-traditional postsecondary enrollment. Federal policies must recognize this new reality as a greater variety of students pursue higher education. As such, measures of institutional accountability must be reevaluated or new measures should be developed. Alternatively, policies could be redesigned to encourage institutions to promote more traditional enrollment patterns (which our two outcomes reports suggest is more conducive to educational success).³

In light of institutional accountability we examined student reasons for enrollment and found vast numbers who enroll with a primary intention other than degree attainment or transfer. As community colleges are criticized for low completion and transfer rates, should they be expected to redirect students toward credentials or further education or should students' own definitions of educational success be the yardstick by which institutions and the educational system are measured? The outcomes reports that accompany this one provide insights that help

³ See Bailey et al. (2003a and 2003b).

move us toward a constructive answer to this question and the other issues addressed by this report.

I. Introduction

This report is the first part of a comprehensive quantitative analysis of postsecondary occupational education based on national datasets. The comprehensive report is part of the National Assessment of Vocational Education (NAVE), created by the Carl D. Perkins Vocational and Applied Technology Act of 1998 and henceforth referred to as Perkins. The analysis will contain three broad components. The first, presented here, includes a detailed description of the number, characteristics, and goals of postsecondary occupational students. It also presents some information on the types of institutions that educate them. The second and third components of the comprehensive report analyze the educational and economic outcomes of postsecondary occupational students (see Bailey et al., 2003a and 2003b).

The broad purpose of NAVE is to help Congress improve occupational and technical education, and to assess whether the Perkins Act fulfills Congress's particular federal objectives in supporting occupational education at the state and local level. Certainly one important role that this report can play is simply to provide a solid understanding of the size and nature of occupational education at the postsecondary level. Policymakers, for example, need to know whether this type of education involves a handful or a multitude of students. Basic descriptive information forms the foundation of any discussion of federal policy in this area.

Our report can also aid Congressional deliberations in some more specific areas:

- First, we provide some insights into the particular role that the federal government might play in promoting postsecondary occupational education. Although education is a state responsibility, since 1917 the federal government has given itself a role in funding occupational education. So, by describing occupational education students and institutions, we attempt to help Congress evaluate the federal role.
- Second, our report can be particularly useful in evaluating the role of Perkins in achieving the goal of promoting educational access and opportunity for “special populations.” We do this by presenting the characteristics of students enrolled in postsecondary occupational education and in the institutions that tend to receive Perkins funding.
- Third, much of the discussion and research on postsecondary policy is informed by the traditional view that college students enroll full-time and continuously beginning in the fall following their graduation from high school. This image of the college experience characterizes only about one-quarter of all students, and is particularly misleading for sub-baccalaureate occupational students. These students follow an extremely diverse set of pathways through postsecondary education. Congress must take this diversity into account both for the purposes of targeting occupational students as well as for setting performance standards.

- Fourth, ultimately, we attempt to provide information on the educational and economic outcomes of postsecondary occupational education which Congress will want to know. Is this type of education a good investment for the individual student? The answer to this question will be the subject of subsequent parts of our comprehensive report, but here we will provide crucial background information by identifying the goals of occupational students and comparing them with those of students in other types of postsecondary educational programs. In recent years, Perkins has increased its emphasis on performance measurement. Degree completion has traditionally been the most important indicator of performance, yet, at the postsecondary level, many students may have goals that do not include degree completion. Therefore, any discussion of a performance accountability policy must be based on an understanding of student objectives.

In the next two sections of the report we briefly discuss the sources of data (a detailed description is presented in Appendix A) and describe the definitions that we use. We then present our findings on each of the four subject areas presented above and end with a summary and discussion of policy-relevant conclusions.

II. Data Sources

Most of the analysis presented in this report is based on the 1999-2000 National Postsecondary Student Aid Study (NPSAS00). This dataset draws on information collected from a sample of institutions and from samples of for-credit students enrolled in those institutions. It has extensive information on a cross section of student characteristics and goals. For comparison and trend analysis we also use comparable data from the 1995-96 NPSAS (NPSAS96).

We supplemented the information from NPSAS with analyses of the 1995 and 1999 National Household Education Survey (NHES95 and NHES99). NHES is a survey of a sample of the population (and therefore not institutionally based, as is NPSAS). NHES is the best source of information on the characteristics and experiences of the large and growing number of non-credit students.

For a select number of specific questions which cannot be answered using NPSAS or NHES, we have also made use of three other longitudinal datasets. The National Education Longitudinal Study of 1988 (NELS) tracks a sample of students who graduated from eighth grade in 1988. Information was collected from these students in 1990, 1992, and 1994, and thus provides some data on their postsecondary experience. We use data collected in 2000 in our reports on educational and economic outcomes.

The 1980-1992 High School and Beyond (HS&B) study includes longitudinal data for a sample of students who were high school sophomores in 1980. Information was

collected last from these individuals in 1992. The advantage of this dataset is that it provides a relatively long time period for the postsecondary educational histories of a sample of students, although these data are now quite old. The HS&B trend analysis supplements that of the shorter time frame between NPSAS96 and NPSAS00. More recent data comparable in scope to HS&B will be available with the publication of the NELS postsecondary transcripts.

Finally, we also used the 1989-1994 Beginning Postsecondary Students Longitudinal Study (BPS89) and the 1996-1998 BPS (BPS96). BPS89 provides data on a sample of students who started postsecondary education for the first time in 1989. The dataset includes educational and employment information through 1994, thus providing a five-year window on the postsecondary experience of several thousand students. BPS96 provides data for first time postsecondary students in the 1995-96 school year, but it only follows them for three years, through the 1997-98 school year. While we make sparing use of NELS, HS&B, and BPS for this report, primarily to answer specific questions that cannot be addressed by NPSAS or NHES, they will play a much more prominent role in the reports containing our analyses of educational and employment outcomes.

A detailed discussion of the datasets can be found in Appendix A.

III. The Sub-Baccalaureate Occupational Student: Terms and Definitions

This report is about the education of occupational students as defined by the Carl D. Perkins Vocational and Applied Technology Act of 1998. Perkins defines occupational and technical education as “organized educational activities that offer a sequence of courses that provides individuals with academic and technical knowledge and skills the individuals need to prepare for further education and careers (other than careers requiring a baccalaureate, master’s, or doctorate degree) in current or emerging employment sectors...” (Carl D. Perkins, 1998).

This definition focuses on preparation for occupations at the sub-baccalaureate level, so our first criterion for identifying occupational students is an educational goal that does not include a baccalaureate degree or higher. *Sub-baccalaureate students*, thus, are defined as students who are taking for-credit courses and either (1) are attending a two-year or less than two-year institution, (2) are enrolled in a program that culminates in a certificate or associate degree, or (3) are not enrolled in a degree program, or (4) have indicated the *goal* of attaining an associate degree, certificate, or no degree at the institution in which they are currently enrolled. (See Table 1.)¹

¹ In NPSAS, information about degree outcomes comes from both the student’s *degree program* (obtained from the institutional questionnaire and, if unavailable, from the student) and the student’s *goals* (obtained from the student interview). The distinction is apparent in the questions asked: “During [the first term enrolled], in what type of degree program was the student enrolled?” (institutional questionnaire) and “What is the highest level of education you expect to complete at [the school where you were sampled]?” (student interview).

Table 1: Definition of Sub-Baccalaureate Students

Institution Type	Degree Program	Degree Goal	Student Type
Four-year	Bachelor's	Bachelor's	Baccalaureate
		Associate or less	Sub-Baccalaureate
	Associate or less	Any	Sub-Baccalaureate
Two-year or less	Any	Any	Sub-Baccalaureate

Among sub-baccalaureate students, we have also defined *occupational students*. Our classification is based on the student's major in the first semester of the NPSAS survey year (95-96 or 99-00), as reported by the student.² To identify occupational students, we apply the taxonomy that has been used by the National Center for Education Statistics (NCES) and was originally developed by Choy and Horn (1992). By this definition, an occupational student is a sub-baccalaureate student whose self-reported major is in one of the following vocational fields of study: agricultural business and

² When we need to use a different dataset, the classification is based on different questions. But in all cases, we have tried to make it as consistent as possible with the classification based on NPSAS.

production, agricultural sciences, business, business management, communication technologies, computer and information science, construction, engineering, engineering technologies, health professions, health related, home economics, mechanics and repair, personal services, precision production, protective services, science technologies, transportation, or vocational home economics. (See Appendix B for a complete list of majors and their classification.)

Our report describes the characteristics of sub-baccalaureate occupational students, but these characteristics make most sense if they are compared to the characteristics of other student groups. For the most part, we compare sub-baccalaureate students to baccalaureate students and occupational sub-baccalaureate to academic sub-baccalaureate students.

- *Baccalaureate students* are defined as students who are taking for-credit courses and: (1) are currently enrolled in a four-year institution, (2) are enrolled in a program that culminates in a bachelor's degree, and (3) have indicated the goal of attaining a bachelor's degree at the institution in which currently enrolled.
- *Academic sub-baccalaureate students* are those sub-baccalaureate students whose self-reported major is in one of the following academic fields of study: mathematics and science; letters, humanities, and communication; social science; art and design; or education. (See Appendix B.)

Much of our report is based on the occupational categorizations described here, so it is important to ask whether those categorizations are stable. Young students, especially, may change their majors. The NPSAS00 sample includes students at all levels of their postsecondary education, but since it is a cross-sectional dataset we do not know whether students had already or subsequently changed their majors. Using longitudinal data from BPS96, we were able to conclude that about four-fifths of all occupational students remain within the occupational category throughout their postsecondary experience.³ Thus we conclude that our analysis does present a reasonable picture of occupational education in the United States as defined by Perkins. Nevertheless, since the extent to which students change their majors does introduce some fluidity within the sub-baccalaureate categorization, it makes sense to supplement our analysis of occupational students by comparing all sub-baccalaureate students to baccalaureate students.⁴

Sub-baccalaureate students, as defined in this report, include students pursuing any type of two-year or less than two-year degrees. Two broad classes of degrees or credentials dominate sub-baccalaureate education: associate degrees and certificates.

- The *associate degree* is the most common degree given by community colleges and it generally includes both academic and occupational for-credit coursework

³ BPS96, which tracks first-time beginning postsecondary students, contains first and last major declarations over the three-year period 1995-98. We found that during that period 78 percent of all occupational students did not change their major and 18 percent changed to an academic major. Students in academic majors were somewhat more likely to change—28 percent switched to an occupational major, while 65 percent stayed in an academic field.

⁴ Although Perkins targets occupational programs, academic students at institutions supported by its funds may benefit as well since there are no eligibility requirements or other restrictions on who may enroll in the Perkins-assisted courses. Therefore, since Perkins can influence the education of all students at institutions that receive support, it makes sense to compare all of sub-baccalaureate to baccalaureate students.

totaling roughly 60 credits. Occupational associate programs lead to either an Associate of Arts (AA), an associate of science (AS) or an associate of applied science (AAS) degree. The actual degree awarded is determined on an institutional basis. Depending on how quickly a student accumulates credits, these programs may take two or more years to complete. While AA program credits usually are transferable to a baccalaureate degree program, credits earned in AS or AAS programs tend not to be. Although most public sub-baccalaureate institutions have open enrollment, a student may need to apply separately for acceptance into a particular occupational program.

- Throughout this report, we focus attention on one particular subcategory of sub-baccalaureate students: *occupational-certificate students*. Certificate programs tend to be shorter than those for associate degrees, usually requiring only about 24-30 credits for completion, although the actual time for completion varies widely.⁵ Generally, they are designed to teach or upgrade specific job skills in a wide array of fields and require fewer academic courses than their associate degree counterparts. Examples of occupational certificate programs include cosmetology, carpentry, dental assisting, and airframe and power plant mechanics, to name just a few. Certificate students account for 24 percent of all sub-baccalaureates, and occupational students account for 73 percent of all

⁵ Like associate degree programs, institutions award certificates based on credits accumulated. They are distinct from the increasingly popular *skill certifications* recognized by many industries and professions. Certifications are broadly-accepted identifiers of proficiency or job skills in a particular field. They are usually awarded by demonstration of the skill (often a test) rather than completion of a set of requirements. However, postsecondary institutions and other educational providers are involved in the training and preparation of students for certification attainment.

certificate students. If Congress wants Perkins to target occupational sub-baccalaureate students, then the legislators should pay particular attention to certificate students since 33 percent of all occupational students are pursuing this credential.

As Congress increasingly emphasizes performance accountability, certificates and other types of non-degree credentials may take on more importance as colleges look for ways to certify achievement for learning that takes less time than attaining a full degree. Therefore it is important to evaluate the experience that colleges have had with certificates to ascertain whether there are lessons for the design of new and shorter-term credentialed programs.

While many important distinctions can be made among students seeking different types of degrees, many students who are learning job-related skills in institutions receiving support from Perkins are enrolled in programs and courses in which they do not earn credit towards a certificate or degree. Thus, we must consider non-credit students as a third category of occupational education student.

- As indicated by their responses on the NHES surveys, *non-credit students* are typically seeking very specific job skills, are preparing to take certification exams, or, in many cases, are motivated simply by the desire for personal enrichment. Thus, students may be learning how to use Windows XP, taking a course in catering and food preparation, or preparing for a real estate licensing exam or one

of the many information technology certifications. Study may entail a single course or a full sequence of courses, which may be not unlike for-credit occupational programs providing a formal award (degree or certificate). It may require only a few hours or several days for completion.

Non-credit instruction appears to be growing at many postsecondary institutions such as community colleges. In many cases, services for economically disadvantaged students or students facing serious barriers to education or employment are offered on a non-credit basis. For example, when taught in community colleges, ABE/GED/Basic Skills, and ESL (English as a Second Language) are non-credit courses.

IV. The Federal Role in Postsecondary Occupational Education

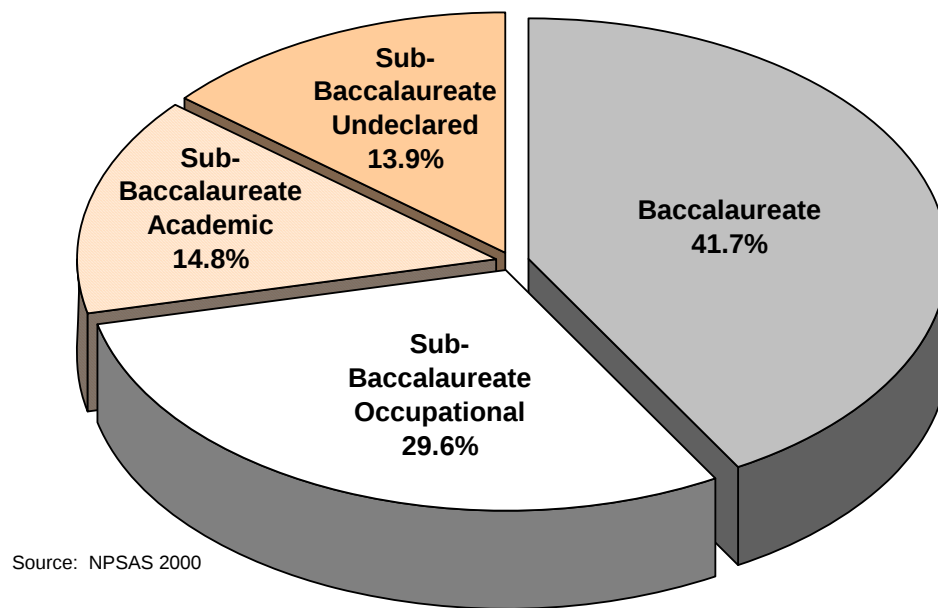
Federal support for occupational education has a long history. In 1917, the Smith Hughes Act was passed with the support of a coalition of educators, business people, and politicians. Members were not convinced that high schools, on their own, which were dominated by an academic perspective, would provide the type of occupational education that the country needed to compete internationally, especially with Germany. The group was also concerned with the potential problem of absorbing large numbers of immigrants into the mainstream economy (Jacobs & Grubb, forthcoming). In the intervening 85 years, much has changed. Certainly occupational education is well established in the public education system, and there has been a steady shift of occupational education from the secondary to the postsecondary system. Indeed, at the beginning of the twenty-first century, some educators question whether occupational education designed to prepare students for immediate work belongs in high school at all. Although few question that occupational education should be an important part of postsecondary education, the tension between occupational and academic education that motivated the Smith Hughes Act still remains. And that tension is reflected in the public perception of postsecondary education.

When most people imagine a postsecondary student they are generally thinking about a baccalaureate student, often in a liberal arts curriculum. Hence, the demographic and background characteristics of baccalaureates, as well as features of their enrollment, more closely represent the “typical” college student in the minds of most people.

However, only 42 percent of all credit-earning students enrolled in postsecondary institutions over the course of a year are baccalaureates; the remaining majority (almost 60 percent) are sub-baccalaureate students.⁶ (See Figure 1.) Therefore, the stereotype of the postsecondary student is dictated by the images of this minority, at the expense of the much more diverse yet unfamiliar characteristics of sub-baccalaureates, who more closely represent the norm of today's postsecondary student.

⁶ Data on enrollment can be reported in different ways. These figures are most commonly reported as fall enrollments by individual institutions of higher education, as in the Integrated Postsecondary Education Data System (IPEDS), produced by NCES. Limiting enrollment data to the fall greatly reduces the number participating at the sub-baccalaureate level, where many students enroll throughout the year. Reporting by institution type (four-year and two-year) does not allow a direct comparison of program participants because some sub-baccalaureate participants are enrolled at four-year institutions. On the other hand, a head-count measure, as used here, treats part-time and full-time participation the same. Participants in sub-baccalaureate programs are much more likely than those in baccalaureate programs to attend part-time.

Figure 1: Percentage of Postsecondary Undergraduate Students by Type and Major



Among sub-baccalaureates, more than a half have majors that are classified as occupational; therefore, nearly 30 percent of all students enrolled in postsecondary school over the course of a year are occupational sub-baccalaureate students. Fifteen percent are sub-baccalaureate academic students and another 14 percent are undeclared.⁷ In contrast to the 30 percent of all postsecondary students who are sub-baccalaureate occupational students, only 15 percent of all postsecondary students are enrolled in baccalaureate liberal arts majors—humanities, science, mathematics, and social science.⁸

⁷ The undeclared category includes students who reported no major, an unknown major, basic/personal skills major, and those for whom the response was missing because they had an undeclared major. Students who are missing because they failed to answer the question on the survey are excluded from the undeclared category. An analysis of data from BPS96 suggests that about one quarter of students who start as undeclared students declare an occupational major within three years. Therefore, occupational sub-baccalaureate students probably account for more than 35 percent of all postsecondary students.

⁸ Calculated from NPSAS00.

What are the most popular occupational majors? In the NPSAS00 survey, the fields of study with the largest percentage of sub-baccalaureate occupational students are: business and office (27 percent), Health (26 percent), computer and data processing (17 percent), trade and industry (10 percent), and engineering and science technologies (7 percent).

More than three-fourths of all sub-baccalaureate education takes place in public, two-year community colleges, as shown in the second column of the row totals on Table 2. A slightly lower proportion of occupational students attend community colleges (73.2 percent), but that is due to an overrepresentation of occupational students in for-profit institutions, especially for-profits with highest degrees of less than two years. Nearly six percent of all sub-baccalaureate occupational students are enrolled in this type of for-profit school.⁹

Table 2: Sub-Baccalaureate Major Types by Institution Type

		Institution Type									Column Total
		Public			Private not for Profit			Private for Profit			
		Four-year	Two-year	Less than Two-year	Four-year	Two-year	Less than Two-year	Four-year	Two-year	Less than Two-year	
Major Type	Undeclared	9.6	86.2	0.3	2.6	0.4	0.1	0.1	0.3	0.4	23.9
	Academic	11.6	78.3	0.2	5.6	1.5	0.1	0.9	1.6	0.4	25.4
	Occupational	7.4	73.2	2.1	3.5	1.5	0.2	0.9	5.4	5.8	50.8
	Row Total	9.0	77.6	1.2	3.8	1.2	0.1	0.7	3.2	3.1	100.0

Source: NPSAS 2000.

Note: All cells are row percents except Column Total.

⁹ The reader should note that undeclared students are highly concentrated in community colleges.

The NPSAS00 dataset used for Table 2 is based on data from students enrolled in rigorously defined educational institutions. (See Appendix A.) But education takes place outside of this universe, and in many cases students are accumulating credit towards some kind of credential or certificate at institutions that would not be included in NPSAS. Data reported on Table 3 are drawn from the 1999 National Household Education Survey (NHES) and use a broader definition of sub-baccalaureate occupational students and institutions. Here we classified students who were seeking an associate degree or certificate in occupational fields as occupational sub-baccalaureate students.¹⁰ These data show that community colleges and public two-year vocational schools are still by far the largest providers of occupational education. The most important difference between the two categorizations is that private vocational schools appear to play a much larger role when a broader definition of educational institutions is used, suggesting that many of these schools would not qualify as an institution of higher education for the purposes of NPSAS.¹¹

¹⁰ The categorization of majors in NHES and NPSAS do not correspond exactly so match is only approximate.

¹¹ The NHES data suggest a much higher share for for-profit (proprietary) schools than the NPSAS data. This difference is probably accounted for by the broader definition of “degree or certificate” used by NHES. For example, NHES states that a student is earning credit if over the last 12 months if he or she answered yes to questions about taking “any courses that are part of a program, or a series of courses associated with a program leading toward (a) a college or university degree, such as an associate, bachelor’s, or graduate degree? (b) a diploma or certificate from a vocational or technical school after high school or a formal vocational training program?” Students could answer “yes” to this questions for enrollment in a school that is not be eligible for the NPSAS sample.

Table 3: Provider Percentage of For-Credit and Non-Credit Sub-Baccalaureate Occupational Education

Provider	For-Credit	Non-Credit
Elementary school, junior HS, or HS	0.9	4.2
Two-year community college	40.4	4.3
Public two-year vocational school	13.5	1.9
Four-year college or university	5.2	12.0
Private vocational school	22.6	9.2
Adult learning center	2.2	1.3
Business or industry	5.2	36.7
Professional association/labor union	2.0	10.4
Government agency or public library	4.9	11.5
Community, religious or other organization	3.1	8.6

Source: NHES 1999.

Note: All cells are column percents.

As we have seen, the size of sub-baccalaureate occupational education dwarfs the size of baccalaureate-level liberal arts education; nevertheless, the latter dominates the structure and philosophy of postsecondary education. Another indication of this domination is the fact that two-year institutions are also funded at significantly lower levels than four-year schools. In the public sector, instructional expenditures per full-time equivalent (FTE) student at universities are between 27 and 137 percent higher (depending on the type of university) than at community colleges¹² (Voorhees & Zhou, 2000). Within community colleges and the state offices that oversee them, the role of academic education within occupational programs, the relationships between two- and four-year colleges, and the transferability (to four-year schools) of two-year occupational

¹² Instructional expenditures at public baccalaureate colleges (those that confer bachelor's but not higher degrees) are slightly lower than those at community colleges, but public baccalaureate colleges account for a very small and shrinking sphere of public higher education. FTE expenditures at *private* baccalaureate institutions are significantly higher than at community colleges.

programs all continue to be controversial issues that are difficult to resolve (Dougherty, 1994). In a postsecondary echo of the issues that motivated the authors of the Smith Hughes Act, contemporary undergraduate institutions are still dominated by an academic model within which occupational education holds an uneasy place (Cohen & Brawer, 1996). Thus, despite the evident need for education to prepare students for a wide variety of occupations, occupational education, especially at the two-year level, continues to flounder in an academic sea. This is not to suggest that resolving these issues is easy, or that academic content or culture needs to be de-emphasized. Quite the contrary, progress probably requires better synthesis and integration. Given this situation, the federal government retains an important potential role in helping to develop creative and productive solutions to the continuing tension between academic and occupational instruction.¹³

¹³ This brief discussion touches on only some of the issues associated with the federal role in vocational education. See Jacobs & Grubb (forthcoming) for a more extensive analysis.

V. Characteristics of Baccalaureate and Sub-Baccalaureate Students

In the previous section, we indicated that the federal government has a role in improving the functioning of sub-baccalaureate education, and traditionally the federal government has sought to strengthen the education system as a source of opportunity for all of the country's residents. Federal support usually takes the form of encouraging access to educational opportunities for population groups that face particularly serious obstacles to continued education and employment. In Perkins this support is articulated through an emphasis on "special populations," and our report can provide information particularly about two of them: "individuals from economically disadvantaged families" and "individuals with other barriers to educational achievement." We also have some information on "individuals with disabilities" and "single parents," but the sample sizes in the datasets that we are using are generally too small for definitive analysis of these two groups.

We start with a comparison between baccalaureate and sub-baccalaureate students to provide background data on the population (sub-baccalaureates) from which occupational students are drawn and highlight important demographic and enrollment differences between this population and baccalaureates.¹⁴ Perkins, in effect, extends support to educational institutions that provide postsecondary occupational education. Even if support is targeted to occupational programs, in many cases all students at the funded institutions benefit at least indirectly from Perkins funding. Because sub-

¹⁴ In this report postsecondary students refer to for-credit baccalaureate and sub-baccalaureate students only; post-graduate, professional school, and non-credit students are excluded.

baccalaureate postsecondary occupational education primarily takes place at community colleges, by comparing sub-baccalaureate to baccalaureate students we can develop some insight into the implications of the Perkins emphasis on occupations that require less than a bachelor's degree. Because of potential demographic differences between baccalaureate and sub-baccalaureate students, this Perkins stipulation is a *de facto* demographic targeting policy.

We argue that the differences between baccalaureate and sub-baccalaureate students are greater than the differences between sub-baccalaureate occupational and academic students. In addition, the characteristics of occupational students diverge more from those of baccalaureate students than they do from the academic sub-baccalaureate population alone. Generally speaking, academic sub-baccalaureate students lie between their occupational colleagues and baccalaureate students, but are closer to the former.

Gender, Race/Ethnicity, and Age

Relative to the overall postsecondary population, baccalaureate students are more likely to be male, White or Asian, and younger. Females constitute the majority of students in postsecondary education; they are 55 percent of all baccalaureate students, compared with 57 percent of sub-baccalaureates.¹⁵ Similarly, White students are over-represented among baccalaureates relative to sub-baccalaureates (71 percent as compared with 65 percent), as are Asian/Pacific Islanders (though only 6 percent as compared with

¹⁵ All data in this section are from NPSAS 2000.

5 percent), while all other racial and ethnic groups are under-represented among baccalaureates.

The most prominent demographic difference between baccalaureates and sub-baccalaureates is age. Baccalaureate students are much more concentrated in the traditional college age range of 23 and under.¹⁶ As shown on Figure 2, over 70 percent are in this range while fewer than half of the sub-baccalaureate students are in this traditional college student age. And among the oldest group of students (age 30 and over), the proportion of sub-baccalaureates is well over twice that of baccalaureates. However, as older students tend to be enrolled part-time, we would expect that an age distribution based on full-time equivalent students would exhibit a smaller disparity between baccalaureates and sub-baccalaureates. Figure 3 shows this not to be the case. While a greater proportion of FTE students are in the age 23 and under range for both baccalaureate and sub-baccalaureates, the relative proportions between the two student types generally persist across all age groups.

We found no significant difference in the proportion of students with either learning or other disabilities between baccalaureates and sub-baccalaureates. Less than one percent of either population report a learning disability while about 7 percent of baccalaureates and 10 percent of sub-baccalaureates report some other disability.

¹⁶ Measured by age at a fixed date (12/31/99) during the NPSAS survey period.

Figure 2: Percentage of Baccalaureate and Sub-Baccalaureate Students by Age

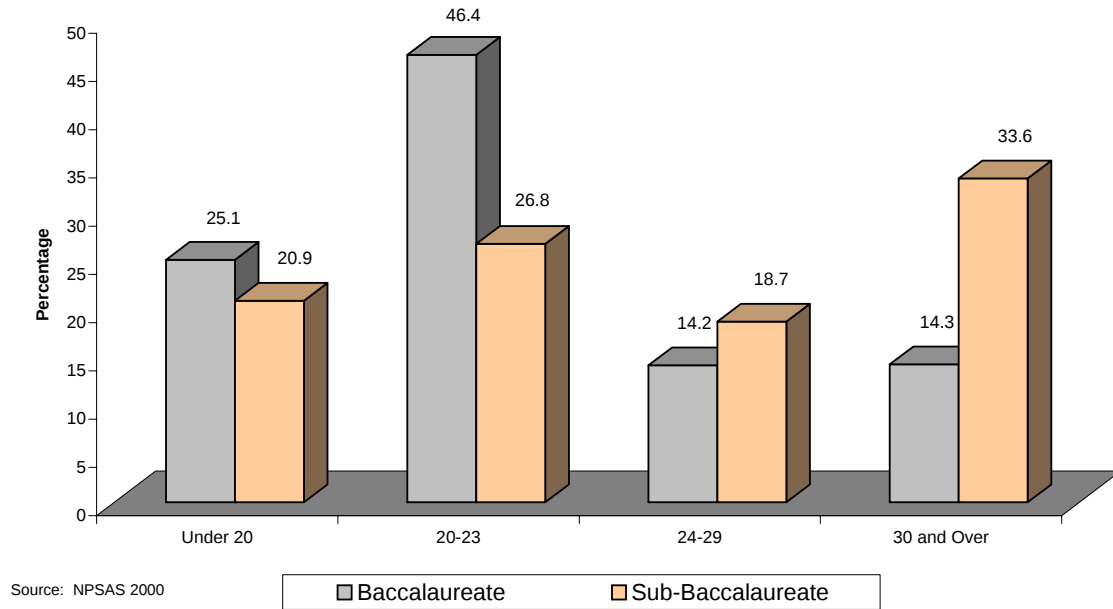
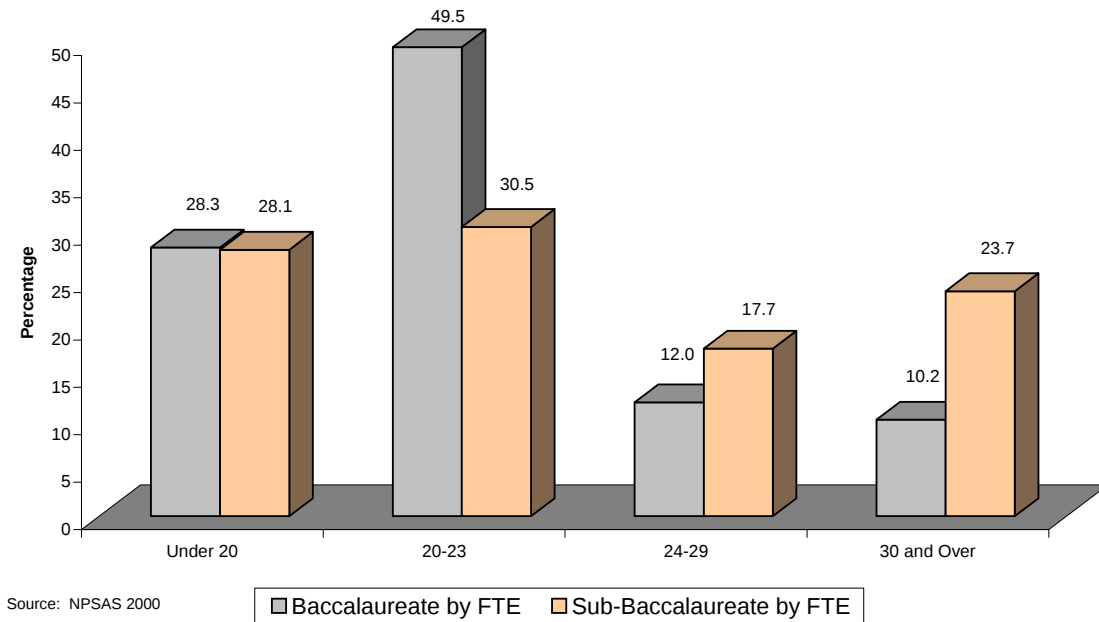


Figure 3: Percentage of Baccalaureate and Sub-Baccalaureate FTE Students by Age



Socioeconomic Status

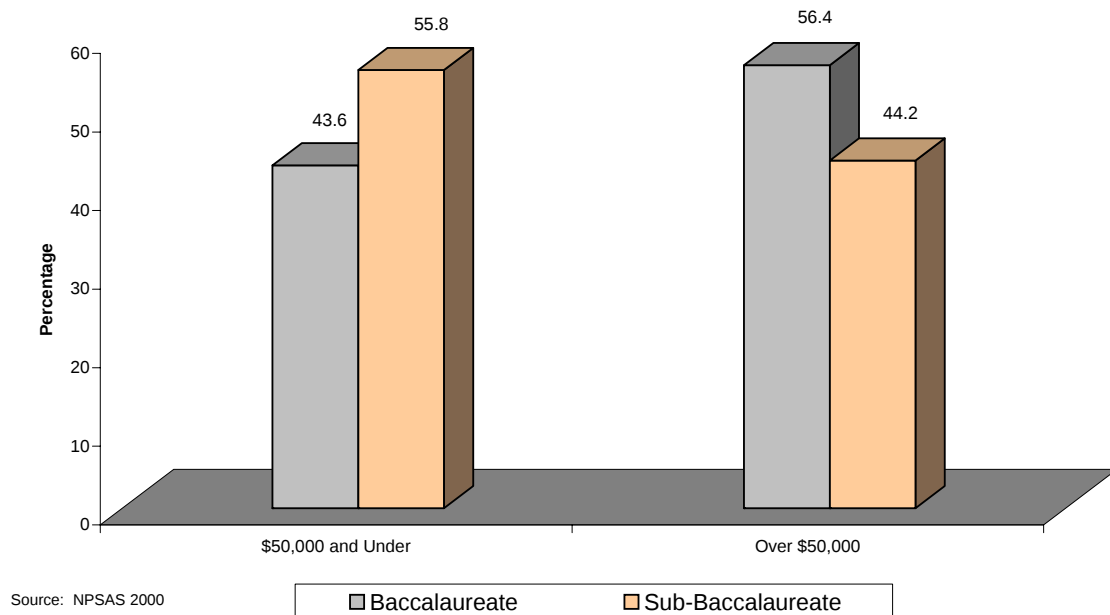
Given the demographic differences between baccalaureates and sub-baccalaureates, distinctions in socioeconomic status (SES) characteristics would be expected as well. We used income and parents' education to measure student SES. To determine income, annual parental income was used for dependent students and the student's household income was used for independent students. We categorized annual income into less than or equal to \$50,000 and more than \$50,000. For parents' education we used the highest level of education attained by either parent and placed it into one of three categories: high school diploma or less; some college but no degree; and associate degree or higher. Finally, we considered one additional background characteristic linked to SES that may impact postsecondary enrollment and goal attainment: being single with a dependent.¹⁷

Well over half of all dependent baccalaureate students fall into the higher income bracket, while fewer than half of all sub-baccalaureates do, as Figure 4 shows. Furthermore, the difference between the median parental incomes (which avoids the skewing effects on the mean by very high incomes) for the two groups is substantial. For baccalaureates the median was \$55,752 and for sub-baccalaureates it was \$45,267 (1994 dollars). For dependent students, baccalaureates come from higher income families than sub-baccalaureates. In contrast, financially independent students tended to be much less well off than dependent students and did not show any distinction between baccalaureates

¹⁷ Single with dependent includes all students who reported not being married and having a dependent for which they provided at least half the financial support.

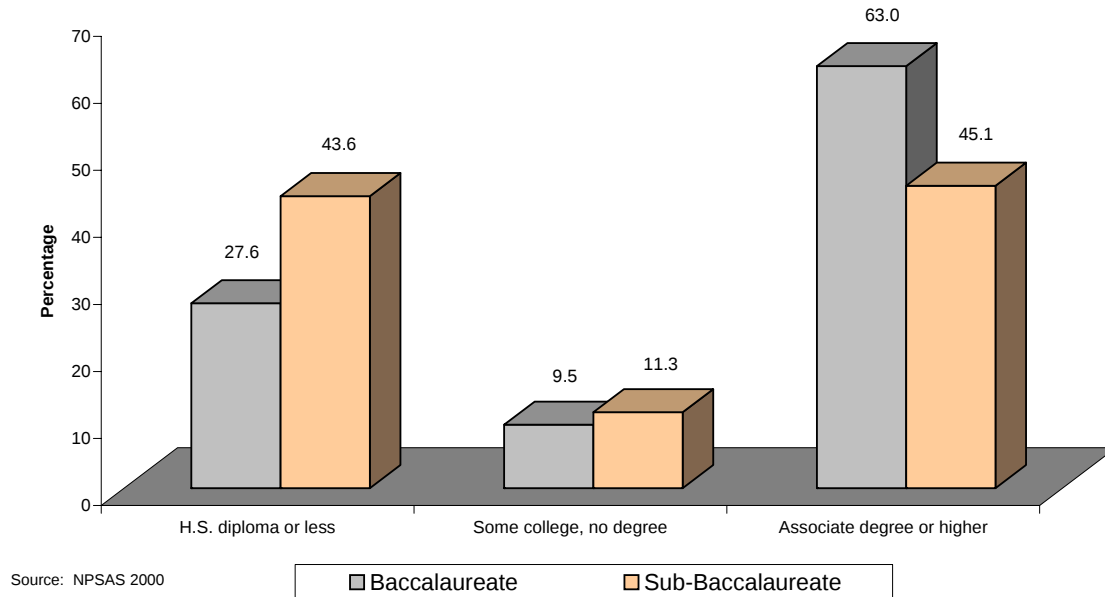
and sub-baccalaureates. Over 80 percent of independent students earned \$50,000 or less for either student type. In fact, close to half of all independent baccalaureates and sub-baccalaureates reported earning less than \$20,000 per year.

Figure 4: Percentage of Baccalaureate and Sub-Baccalaureate Students by Parents' Income (Dependent Students Only)



The educational level of the students' parents reflects even more strongly the differences in SES between student types. Figure 5 shows the breakdown of students by parents' education. A much higher percentage of baccalaureate students have a parent with an associate degree or higher. In contrast, nearly as many sub-baccalaureate students have parents with a high school diploma or less as have parents with an associate degree or higher. While level of parental education increases with each generation, that of sub-baccalaureate students still lags behind that of their baccalaureate peers.

Figure 5: Percentage of Baccalaureate and Sub-Baccalaureate Students by Parents' Highest Level of Education



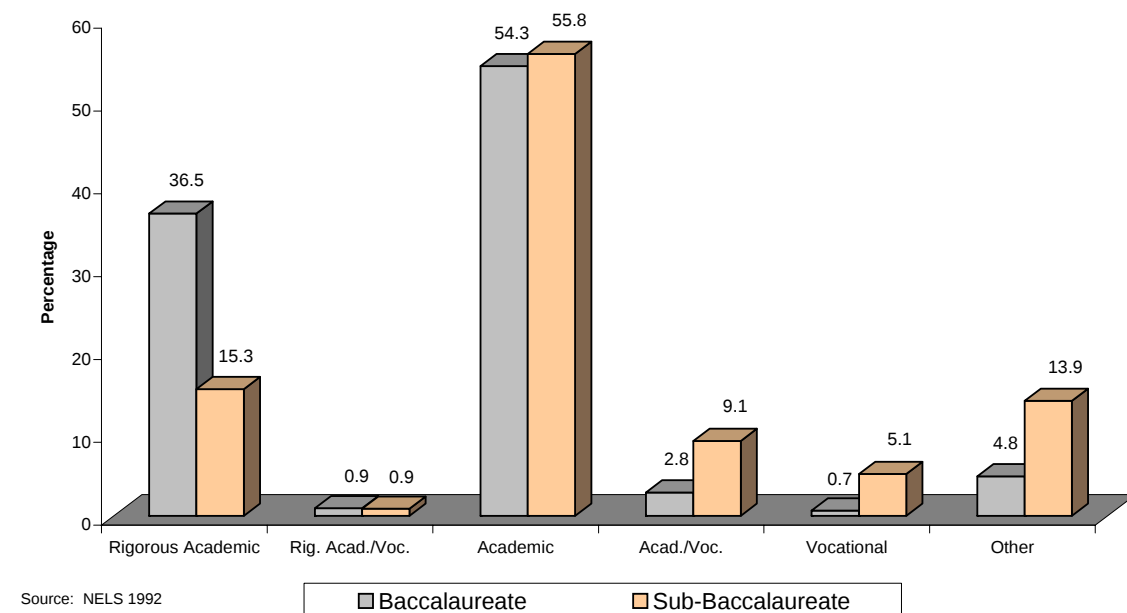
The final SES measure indicates that only 6.6 percent of baccalaureate students report being single with a dependent, which is much less than half that of sub-baccalaureates (15.6 percent). And as we will show later, occupational students generally diverge even more from baccalaureates in all these measures of SES.

Academic Readiness

In addition to demographic and SES differences between baccalaureate and sub-baccalaureate students, there are distinctions in their academic readiness, as measured by high school curriculum, achievement, and ability. High school data are unavailable in NPSAS; therefore, we relied on the National Education Longitudinal Study of 1988 (NELS) second follow-up survey (1992). High school curriculum was determined from

the credits earned listed on high school transcripts. Types of curricula were the following: rigorous academic, rigorous academic/vocational, academic, academic/vocational, vocational, and other.¹⁸ High school achievement was measured by class rank in quartiles. The ability measure reflects the combined results of standardized reading and math tests and grouped into quartiles. The results for baccalaureate and sub-baccalaureate student populations are shown below with the discussion following.

Figure 6: Percentage of Baccalaureate and Sub-Baccalaureate Students by High School Curriculum



The most striking difference revealed on Figure 6 is the much greater proportion of baccalaureate students who took a rigorous academic curriculum in high school. Also,

¹⁸ A *rigorous academic* program consists of 4 credits of English, 3 credits of social studies, 3 credits of science, 3 credits of math, 2 credits of foreign language, and ½ credit of computer science. An *academic* program consists of 12 credits total in English, social studies, science, and math. A *vocational* program consists of 3 credits in one of the following: agriculture, business, introductory vocational, health and human resources, home economics, marketing and distribution, technical vocational, or trade and industry. *Other* consists of a program that fulfills none of the above requirements.

sub-baccalaureate students have a higher probability of taking a vocational curriculum, although the standard used here—three credits in a list of vocational fields—does not suggest extensive vocational preparation in high school. (Indeed, these data reveal the low level of vocational preparation in high school, even for sub-baccalaureate students.)

The large majority of students in both postsecondary groups had either academic or rigorous academic programs in high school. The most problematic difference is that, in their four years of high school, almost one-fifth of all sub-baccalaureate students do not even earn 12 credits of basic academic course work (English, social studies, science, and math).

The differences between the two groups are much more striking when comparing high school rank and test scores. (See Figures 7 and 8.) Baccalaureate students are overwhelmingly represented in the highest quartiles for class rank and composite test scores, while sub-baccalaureate students dominate the lowest two quartiles. Thus, while baccalaureate students tend to take somewhat more rigorous curricula in high school, the two groups are more clearly distinguished by measures of achievement. As they start their postsecondary careers, sub-baccalaureate students are certainly less well prepared for college.

Figure 7: Percentage of Baccalaureate and Sub-Baccalaureate Students by High School Class Rank Quartiles

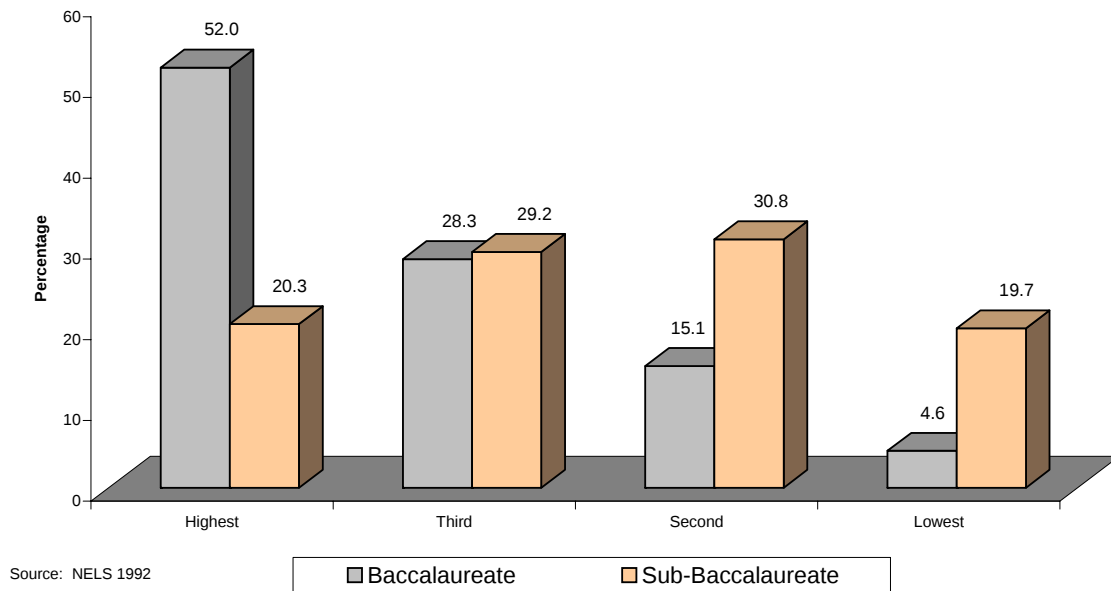
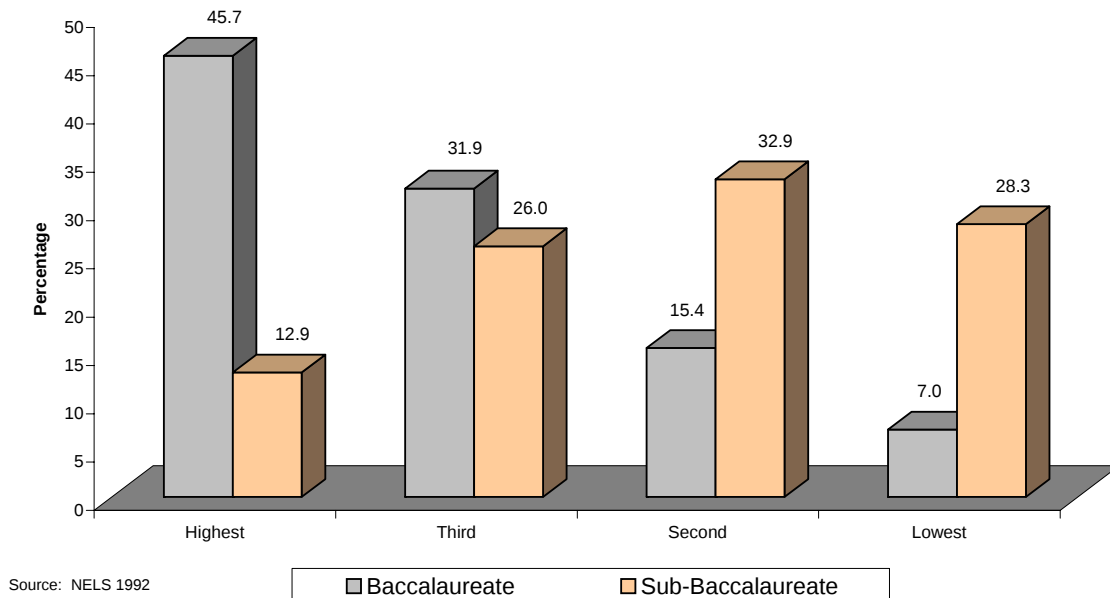


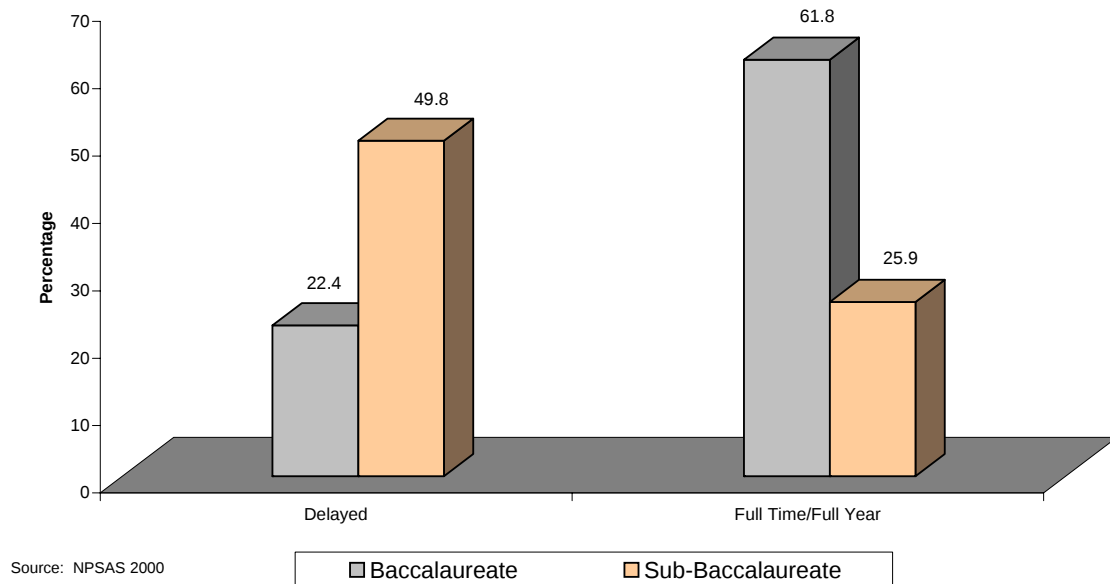
Figure 8: Percentage of Baccalaureate and Sub-Baccalaureate Students by High School Combined Reading and Math Text Quartiles



Non-Traditional Pathways

A misleading stereotype of typical college students is that they enroll in postsecondary education immediately following high school graduation and attend full-time for the full academic year. While this generalization may hold true for baccalaureates, of whom 78 percent had immediate postsecondary enrollment and 62 percent attended full-time and full year, it is clearly untrue for sub-baccalaureates, who are more likely to follow non-traditional pathways in postsecondary education. (See Figure 9.) Exactly half of sub-baccalaureates delayed their enrollment in postsecondary education and a mere 26 percent attended full-time and full year.¹⁹

Figure 9: Percentage of Baccalaureate and Sub-Baccalaureate Students by Delayed Enrollment and Traditionality



¹⁹ Delayed enrollment occurs when a student waits a year or more after high school graduation before beginning postsecondary education. Students who earn a GED are also considered to have delayed enrollment.

Another non-traditional pathway entails an interruption in a student's enrollment, defined as four or more months between periods of enrollment.²⁰ To measure interruptions we used the BPS89 dataset, which tracks students for five years from their initial postsecondary enrollment. While only one-fourth (25.2 percent) of all baccalaureate students ever interrupt their enrollment, one-third (33.2 percent) of sub-baccalaureate students interrupt. This difference is more striking given that the total length of sub-baccalaureate enrollments tend to be shorter due to the shorter length of the program. We will see that these non-traditional pathways are even more common among occupational sub-baccalaureates.

Self-Perception

A student's self perception with respect to working and studying is another characteristic that differentiates baccalaureate from sub-baccalaureate students. The large majority of both baccalaureate (77 percent) and sub-baccalaureate (83 percent) students work while they are enrolled. Although there are some differences in the nature of the work that these two groups do,²¹ the most striking difference is in the primary identity held by working baccalaureates and sub-baccalaureates. NPSAS asked all those students who were working while enrolled to identify themselves either primarily as workers (i.e., a worker who studies) or as students (i.e., a student who works). Less than half of the

²⁰ Four months was chosen because it is roughly equivalent to a full semester and longer than the standard summer break period.

²¹ Only 55 percent of baccalaureates who worked reported working every week while enrolled whereas over 70 percent of sub-baccalaureates reported doing so. Furthermore, working baccalaureates are more than four times as likely to have an on-campus job than working sub-baccalaureates (25.6 percent versus 6.4 percent).

working sub-baccalaureates identified themselves as students who worked (48 percent) while the rest saw themselves as workers who were studying. In contrast, over 80 percent of the baccalaureates identified themselves as students who were working.

In summary, we have found that on many measures baccalaureate students more closely represent the “traditional” or stereotypical image of a college student than do sub-baccalaureates. Demographically, baccalaureate students are younger and less likely to be from a minority population, and they tend to have more advantageous SES backgrounds. The parents of sub-baccalaureate students have, on average, lower incomes and lower education levels while the students themselves are more likely to be single parents. Thus these demographics and background characteristics suggest a combination of opportunity and privilege not available to the whole population of postsecondary students (to say nothing of non-college students); baccalaureate students exhibit stronger academic records in high school, and their enrollment patterns and identity are more aligned with what would be expected of full-time students than the patterns and identities of sub-baccalaureate students. Yet, as sub-baccalaureates actually represent the majority of postsecondary students, their background and enrollment patterns necessarily extend the boundaries (boundaries which were created by stereotyped notions drawn primarily from the baccalaureate population) of what constitutes a college student and how an individual attends college in contemporary America. The differences in educational preparation and parental education suggest that by targeting sub-baccalaureate institutions, Perkins has increased the probability that funds will reach students with more serious barriers to education.

VI. Characteristics of Sub-Baccalaureate Occupational Students

Occupational students comprise approximately 51 percent of all sub-baccalaureate students. The remaining 49 percent are all non-occupational sub-baccalaureates and are fairly evenly divided between academic majors (25 percent) and undeclared majors (24 percent).²² (See column totals on Table 2.)

Gender, Race/Ethnicity, and Age

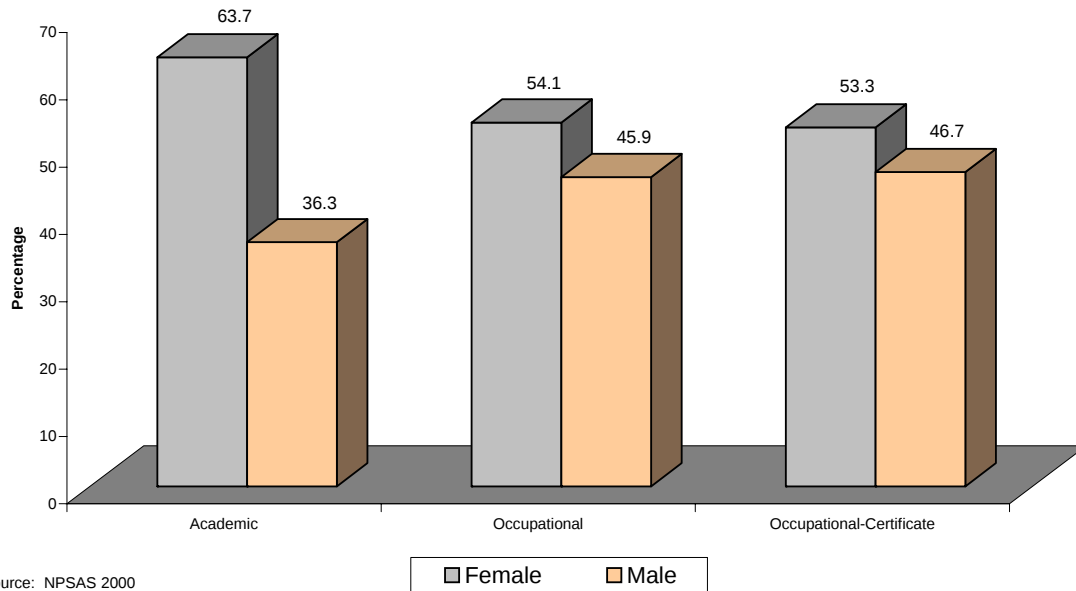
In general, more females than males are enrolled in all postsecondary education. Although occupational sub-baccalaureates are no exception to this pattern, the predominance of females is not as strong. That is, only about 54 percent of all occupational students are female, whereas they represent 64 percent of all academic students.²³ (See Figure 10.²⁴)

²² The proportion of undeclared majors in 1996 was 18 percent. The increase in the 2000 proportion is at the expense of the proportions of occupational and academic sub-baccalaureates, both of which declined from 1996 to 2000.

²³ Gender differences in the economic outcomes of occupational education also need to be considered. This is more fully addressed in the accompanying earnings report (Bailey et al. 2003b), though see Appendix D below for gender distributions in occupational programs preparing students for high-wage occupations.

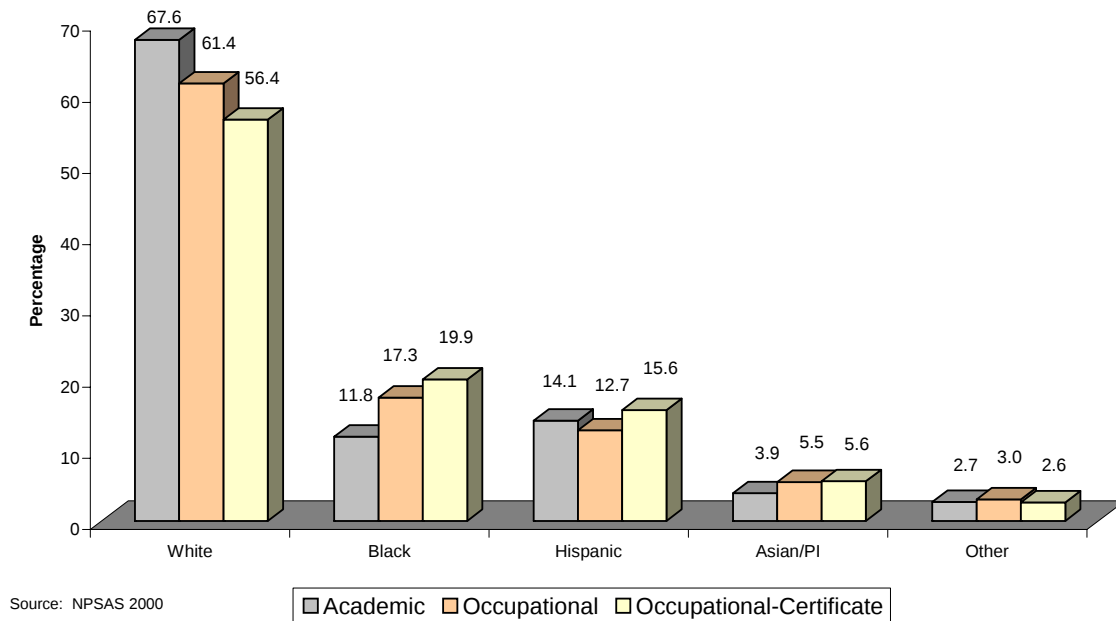
²⁴ While occupational-certificate students are also shown in this and subsequent figures, that sub-population will be discussed in the next section.

Figure 10: Percentage of Academic, Occupational, and Occupational-Certificate Students by Gender



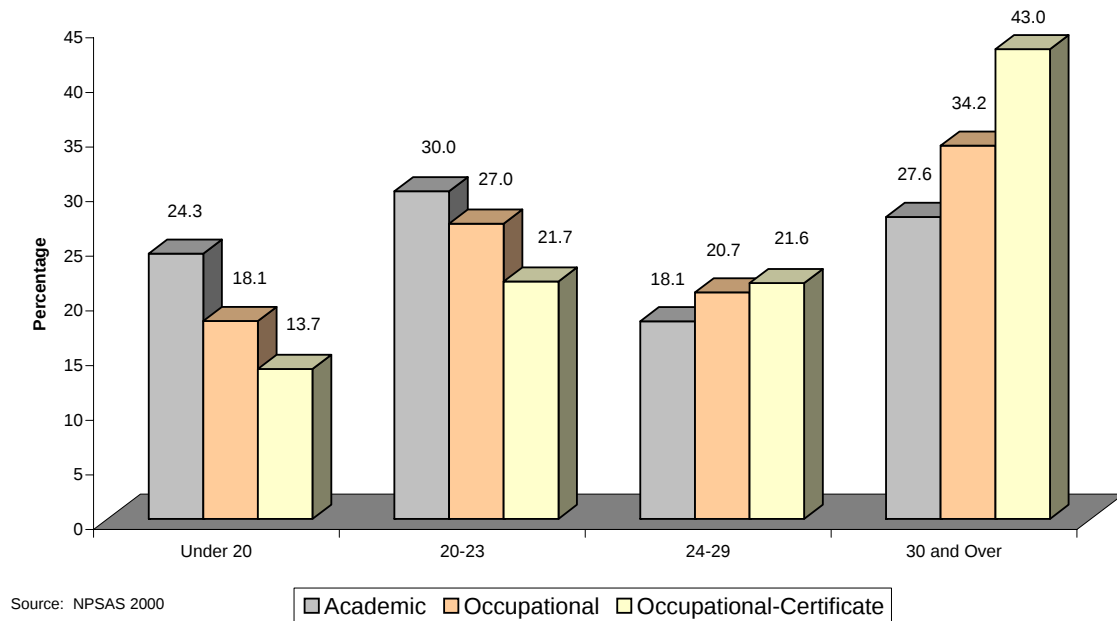
The race and ethnic distributions among occupational students are shown in comparison to academic students on Figure 11. The relative distribution between the two populations is similar, though Blacks tend to be more strongly represented among occupational students than academic students and Whites and Hispanics exhibit lesser representation among occupational students than academic.

Figure 11: Percentage of Academic, Occupational, and Occupational-Certificate Students by Race/Ethnicity



The current age distribution of occupational students in comparison to academic students is rather distinctive, as exhibited on Figure 12. The general pattern is for occupational students to be slightly older than their academic peers, based on the percentage of students falling within particular age ranges. Notice that among occupational students there are smaller proportions in the under 20 and 20-23 age groups than among academic students, and larger proportions in the 24-29 and 30 and over age groups. It should be noted that enrollment is measured by headcount. When measuring enrollment by FTE, the proportions for older students decline (revealing their preponderance among part-time enrollees). However, the relative proportions between sub-populations remain.

Figure 12: Percentage of Academic, Occupational, and Occupational-Certificate Students by Age



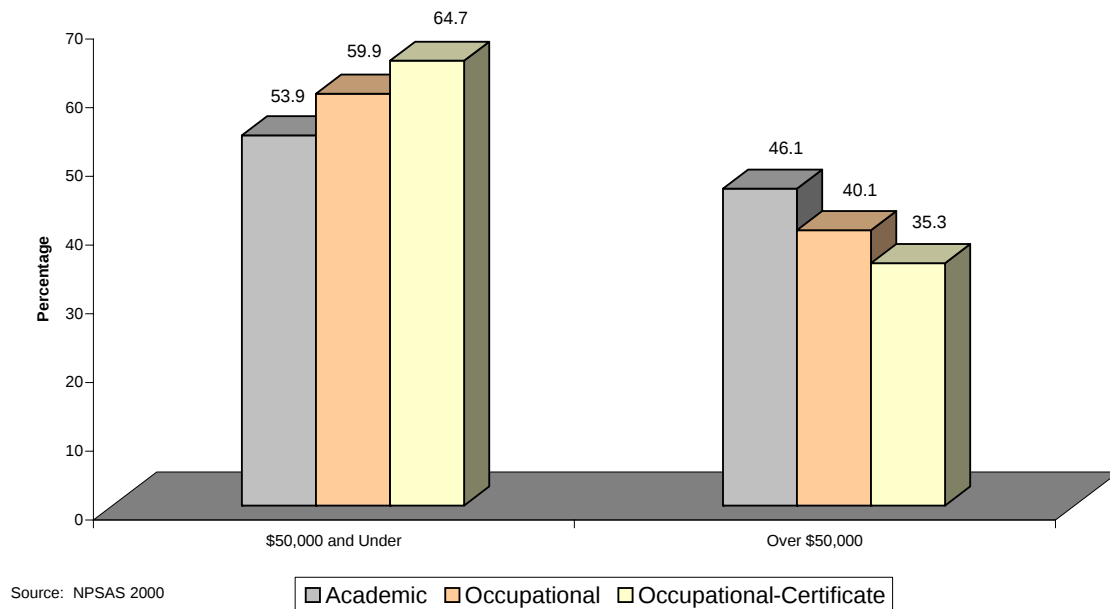
Distributions of students with a learning disability or any other disability (grouped together) proved inconsequential and statistically insignificant—with only minor variations between sub-groups of sub-baccalaureates and occupational students. The percentage of students with learning disabilities among various sub-baccalaureate student populations generally ranged below 1 percent, while those with some other disability were generally in the 10 percent range.

Socioeconomic Status

As before, we used household income and parents' education to measure SES. For dependent students we calculated the mean parental income for 1994 and also provided a distribution of students equal to or below and above the \$50,000 parental income

threshold. We found that dependent occupational students are more likely to be from households with lower incomes than their academic counterparts, and that the median parental income strongly favors academic students: \$47,385 to \$42,241. This is corroborated by the relatively larger proportion of academic than occupational students with parental income over \$50,000, as shown on Figure 13. Furthermore, more than one out of five (21.2 percent) dependent occupational students fall into the most economically disadvantaged category (parental income less than or equal to \$20,000), while only 15.8 percent of dependent academic students are in this category. In comparison, independent student households are noticeably less well off than dependent student households across all student types, and they exhibit similar proportions within the occupational and academic student categories. For example, among independent occupational students, fully 43.5 percent have incomes of \$20,000 and less, which is very close to the 44.6 percent of independent academic students in the same financial category.

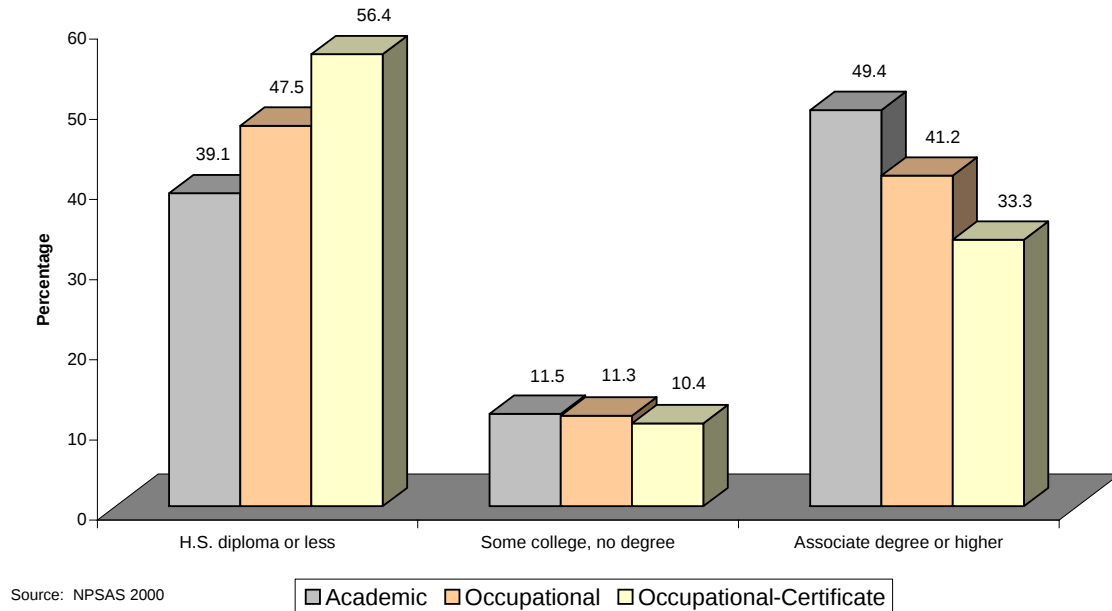
Figure 13: Percentage of Academic, Occupational, and Occupational-Certificate Students by Parents' Income (Dependent Students Only)



The parents of occupational students tend to have lower levels of education than the parents of academic students, as shown in the distribution on Figure 14. Almost one-half (47.5 percent) of the occupational students have parents whose highest level of education is a high school diploma or less.²⁵ This may indicate that occupational education provides individuals with a channel through which to have higher educational attainment than their parents. However, low levels of parental education may prove detrimental if financial support, moral support, and a family history of higher education are unavailable to help ensure postsecondary educational success.

²⁵ In comparison, in the 1996 NPSAS survey fully 55.9 percent of all occupational students had parents whose highest level of education was a high school diploma or less.

Figure 14: Percentage of Academic, Occupational, and Occupational-Certificate Students by Parents' Highest Level of Education



The final background characteristic measure is being single with a dependent, a potentially inhibiting factor for degree attainment. Occupational students have a higher propensity to be single with a dependent than their academic peers. Nearly one out of five (19.7 percent) occupational students exhibit this characteristic while only 12 percent of academic students are single with a dependent.²⁶

In summary, the general demographic picture in terms of gender, race/ethnicity, and age of occupational students exhibits similar patterns as academic students, but with the slightly greater likelihood of being male, older, and from a minority ethnic group. For

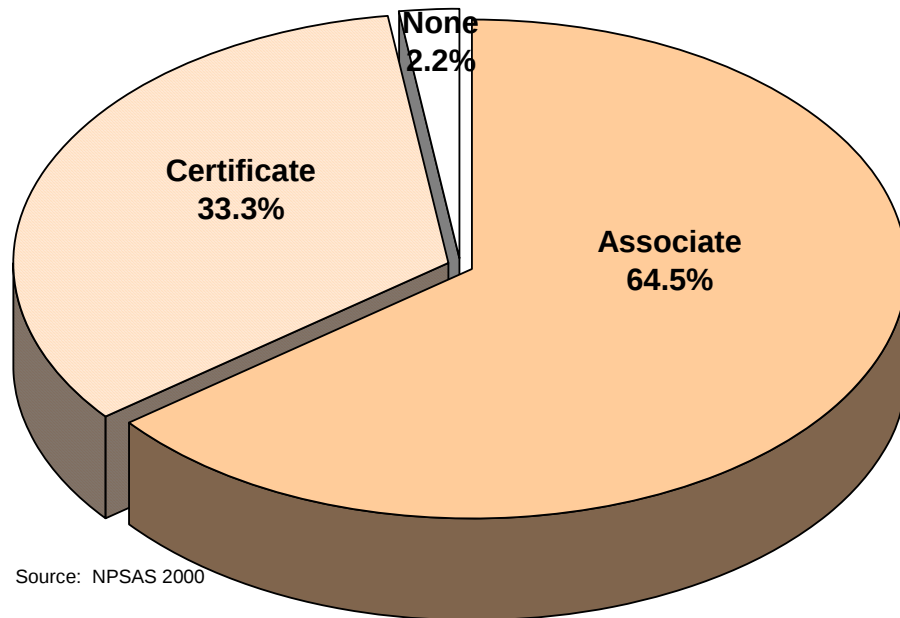
²⁶ These percentages are up slightly from 1996, when 16.1 percent of occupational and 11.4 percent of academic students reported being single with a dependent.

background characteristics that more directly affect educational success, the picture for occupational students is somewhat bleaker than for academic students. The measures of SES (including being single with dependent) present a picture of occupational students entering their sub-baccalaureate education with lower resources than their academic peers—conditions that may inhibit goal attainment and degree completion. As we look at other data measuring what occupational students bring to their postsecondary education we will see this pattern of disadvantage exhibited repeatedly.

Certificate Students as Outliers

Occupational students in certificate programs constitute a unique sub-population of occupational students, in part because of the distinctive demographic and background characteristics they exhibit. We discuss those differences here and contrast certificate students with occupational and academic sub-baccalaureates in the remainder of the report to highlight other important distinctions. We intend to show that certificate students represent outliers within the postsecondary universe. Even other occupational students (non-certificate-seekers) exhibit more similarities with academic students than they do with their certificate-seeking peers. As a result, we will argue in the concluding sections of this report that occupational certificate students need to be addressed as a distinct sub-population of occupational sub-baccalaureates for policy and program considerations. As shown on Figure 15, certificate-seekers comprise one-third of all occupational students.

Figure 15: Percentage of Occupational Students by Degree Type



Certificate students exhibit distinct characteristics among the demographic and background variables and, as shown below, with respect to enrollment and goals. As Figure 11 on race/ethnicity shows, all identified ethnic minorities are represented in greater proportion among occupational certificate-seekers than they are among occupational and academic students as a whole. Although race may be operating indirectly here, in that a number of other factors might be at work (e.g., educational background, SES), the dominance of minority groups indicates an apparent and disturbing trend of either self-selection or guidance toward a lower credential.

Like the race/ethnicity breakdown, occupational-certificate students accentuate the age distribution among occupational students. (See Figure 12.) That is, certificate students are represented in greater proportions among the older age groups and in lesser

proportions among the younger. This difference highlights the distinctive feature of age among occupational students. Those who are younger tend to favor degree programs and academic or professional majors, whereas older students appear to be inclined more toward certificates (perhaps due to the brevity of the programs). Here, as elsewhere, we are presenting observed tendencies in an effort to illustrate a general picture of different types of students rather than rigid categories of students.

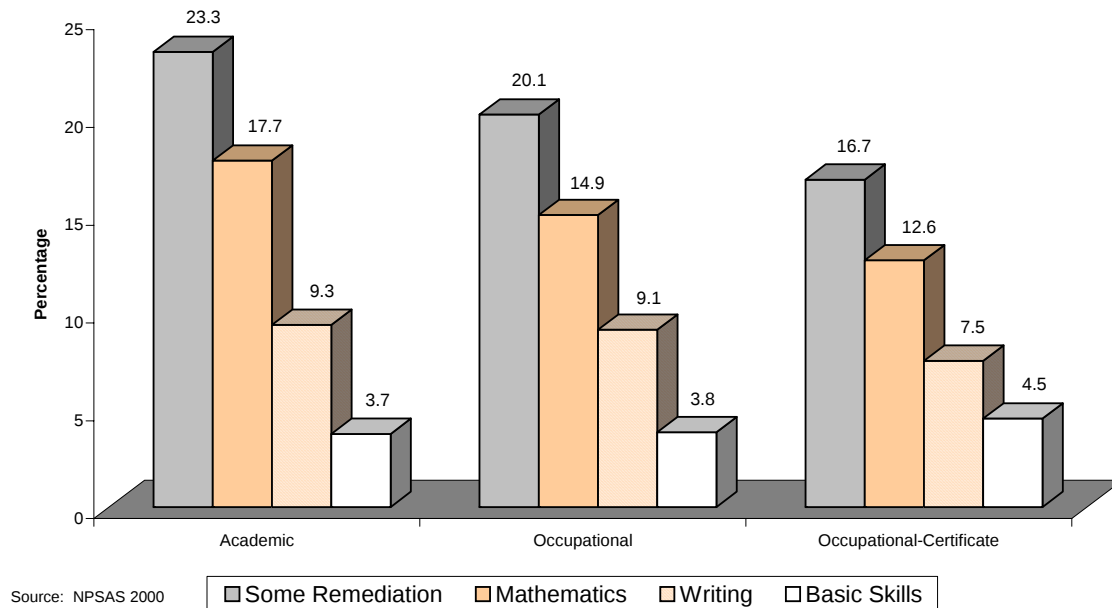
Figure 14 demonstrates that occupational-certificate students also accentuate the pattern that occupational students are more likely to have parents with a high school diploma or less and less likely to have parents with an associate degree or higher. Significantly, they also come from households with fewer financial resources, as barely one-third of such students have parental income above \$50,000. (See Figure 13.) In fact, the median parental income for dependent occupational-certificate students, at \$39,441, is by far the lowest of any student population. However, while these demographics may suggest some form of tracking (as with minority groups) they may also indicate that a number of students achieve loftier goals than their parents. Occupational-certificate students also have the highest rate of single parent status among any sub-population of sub-baccalaureates. One out of four (24.9 percent) is single with a dependent. In general, the occupational-certificate population enters postsecondary education with lower family economic and background resources than other sub-baccalaureates.

Academic Readiness

How well prepared for college-level work are sub-baccalaureate occupational students? We have shown that baccalaureate students, when compared to all sub-baccalaureates, tend to have stronger high school programs, higher class rank, and higher test scores. In this section, we compare the academic preparation of occupational associate and certificate sub-baccalaureate students to the preparation of academic students at the same level.

The widespread need for remediation at community colleges is one indication of the weak academic preparation of many sub-baccalaureate students. Figure 16 shows the percentage of different types of students who reported that they took various types of remedial courses during their first two years in college. Contrary to expectations, the proportion of occupational and occupational-certificate students who took remedial courses was lower than for their academic peers. While over 23 percent of academic students took remediation, only 20 percent of occupational sub-baccalaureates and a relatively modest 17 percent of occupational-certificate students took some remediation. The same relative proportions exist for mathematics and writing remediation specifically, while basic skills remediation shows similar proportions across the three populations.

Figure 16: Incidence of Remediation Among Academic, Occupational, and Occupational-Certificate Students



We suspect that the lower incidence of remediation does not necessarily imply better preparation for postsecondary education, but rather lower academic requirements in the program or major field of study. In many states and colleges, enrollment in many terminal (those that do not transfer to four-year schools) occupational and particularly certificate programs does not require specified scores on achievement tests. This may be why poorly prepared students are found in greater numbers in these programs.

And, indeed, other measures of academic preparation, such as high school curriculum and achievement, indicate that certificate and occupational students are less well prepared than academic students. In this analysis we use the NELS data since high school information and test scores are not available in the NPSAS dataset on which we have based most of our report. The NELS data were collected eight years earlier than

NPSAS00, yet produced a similar percentage of occupational students and a lower percentage of occupational-certificate students.²⁷ The latter difference may be explained partly by the youthful age of the NELS cohort as compared to the cross-sectional age distribution among the NPSAS00 survey participants. Older students are more likely to be in certificate programs than their younger peers.

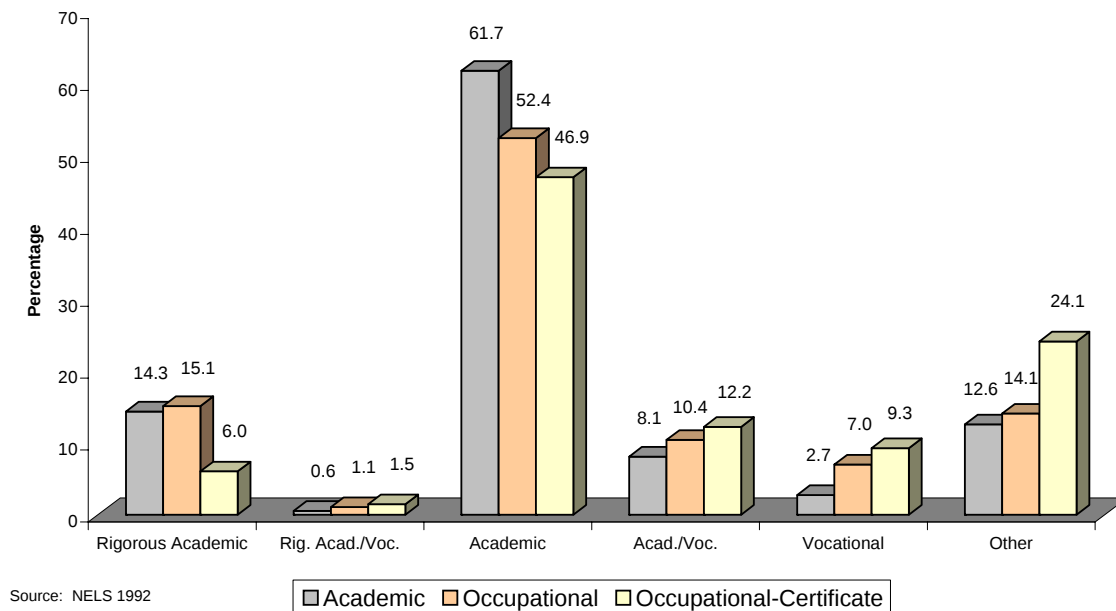
Educators believe that the best preparation for college is a strong academic foundation in high school (Adelman, 1999). However, students preparing for an occupational program of study may benefit by completing a vocational program in high school in addition to the academic preparation. With these beliefs in mind, it is instructive to observe the distribution of high school curricula by the three sub-baccalaureate populations. (See Figure 17.) Although small percentages of students completed a rigorous academic high school curriculum, well over 60 percent had an academic program (academic or academic combined with vocational). Overall, the differences in the curricula between these two groups are small. The occupational students are slightly more likely to enroll in a vocational curriculum that does not include the standard level of academic preparation. Fewer occupational students take a pure academic curriculum but more combine an occupational sequence with a standard academic program.

The strongest contrast revealed on Figure 17 is between occupational-certificate students and other sub-baccalaureate students. Nearly one-fourth (24.1 percent) of all occupational-certificate students had neither an academic nor vocational program in high

²⁷In NELS, 53.9 percent of the sub-baccalaureate students were occupational (as compared with 54.1 percent in NPSAS00) while only 24.1 percent were occupational-certificate students (as compared with 33.3 percent in NPSAS00).

school. Nearly 10 percent fulfilled only the requirements for a vocational program. Thus more than one-third of students in certificate programs did not have even the modest academic high school preparation represented by at least 12 credits in core academic courses.

Figure 17: Percentage of Academic, Occupational, and Occupational-Certificate Students by High School Curriculum



The comparison of class rank on Figure 18 shows a similar pattern. There are only modest differences between the occupational and academic students, but those who enroll in certificate programs have significantly lower achievement in high school. On the other hand, occupational students have much lower scores on achievement tests and the certificate students are even farther behind. (See Figure 19.) Occupational students are less well prepared than their academic peers, and the certificate sub-group, of whom over

three-fourths are in the lower half of the combined test score results, are generally even less well-prepared for the rigors of postsecondary education.

Figure 18: Percentage of Academic, Occupational, and Occupational-Certificate Students by High School Class Rank Quartiles

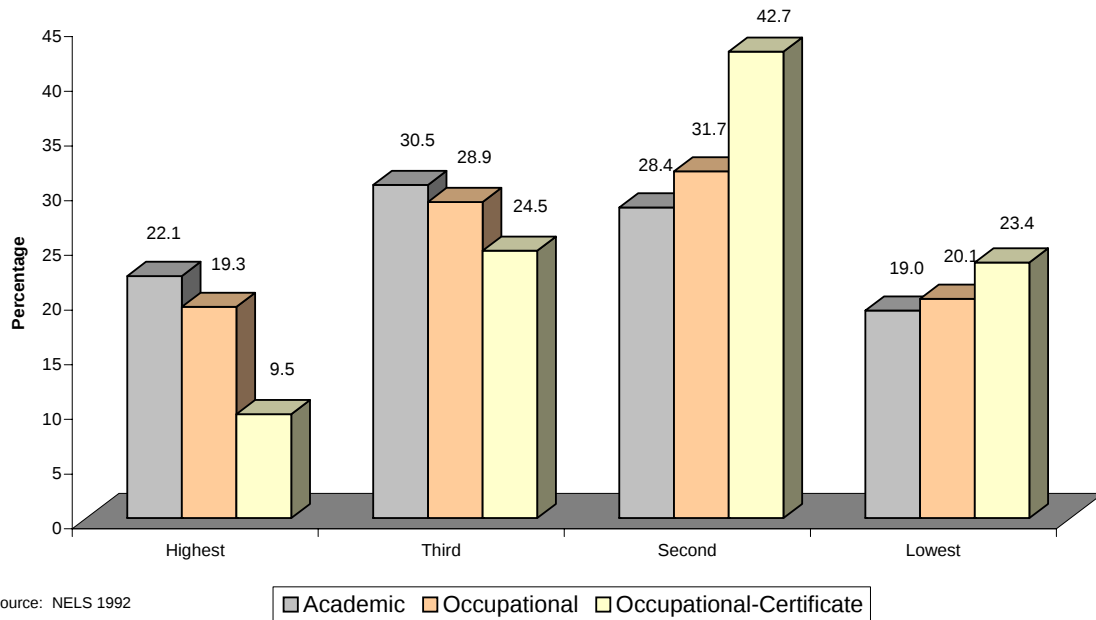
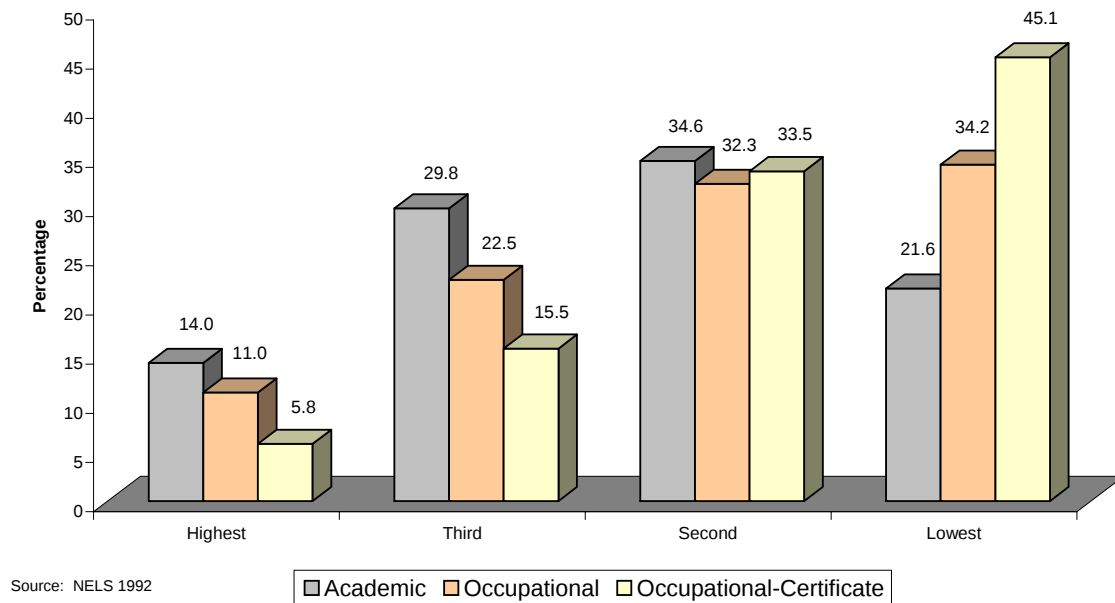


Figure 19: Percentage of Academic, Occupational, and Occupational-Certificate Students by High Combined Reading and Math Test Quartiles



Such findings beg the question of whether students pursue a particular high school curriculum because of their postsecondary expectations or whether they are guided into such postsecondary programs because of their high school curriculum. Regardless, lower levels of readiness of occupational students suggest the need for assistance and support to help them meet the demands of postsecondary education and achieve their educational goals. At the same time, the data on remediation suggest that rather than focusing on improving basic skills, students with weak preparation end up in programs that at least do not formally require particular levels of academic competency. Whether these students would be more effective in the jobs for which they are being educated if they had stronger academic skills is a question that is beyond the scope of this report.

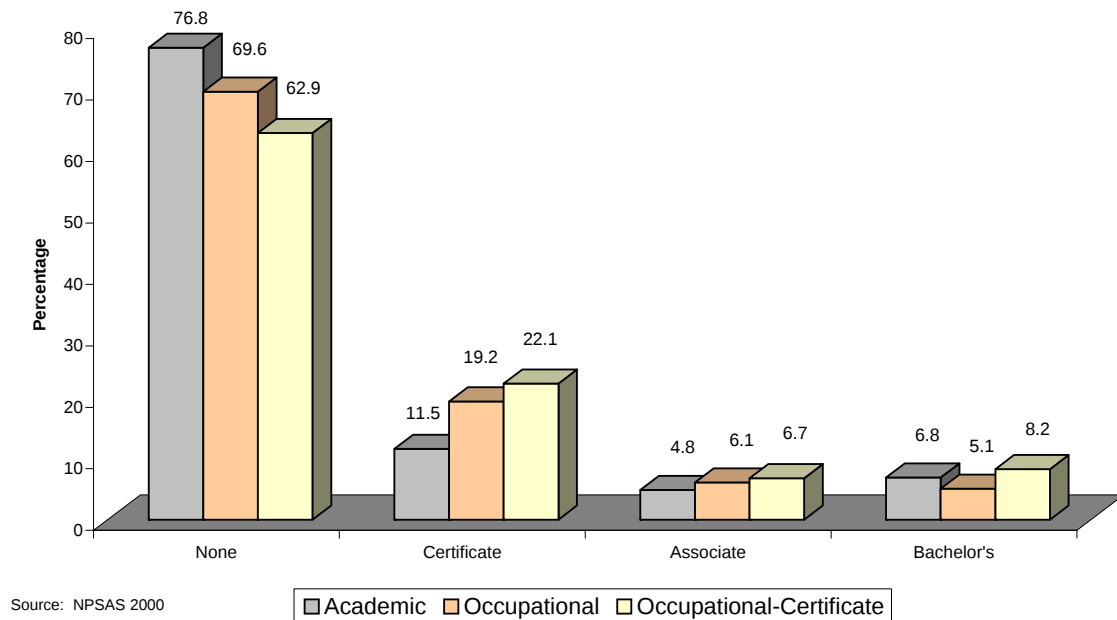
Allowing students to proceed through these lower level degree and certificate programs with weak academic skills may facilitate their immediate enrollment and perhaps even their employment in the short and medium term. Requiring students to sit through remediation classes, especially if they use very traditional pedagogy of the type that did not serve these students well in high school, while in college in order to prepare for a particular job may discourage them from pursuing any degree (Grubb & Associates, 1999). Nevertheless, it is safe to say that continued weak academic skills would limit students' ability to pursue higher-level degrees and certifications.

Previous Degrees

Some postsecondary students have already earned a postsecondary degree. Thirty percent of all sub-baccalaureate students already hold either a certificate, associate, or bachelor's degree, with certificates being the most common. Fifteen percent of sub-baccalaureates already have a certificate and among those sub-baccalaureates who already have a degree, a certificate is the highest award for about half of them. This is at first not surprising since certificates may be a stepping-stone to an associate degree, much the same way that an associate degree may lead to a bachelor's degree. Yet it is students in certificate programs who are most likely to have a prior degree, and that degree is most likely to be another certificate. Nonetheless, many community college personnel argue that a significant percentage of their enrollment is made up of "reverse transfer" students who already have a bachelor's degree or who have at least attended a four-year school

(Townsend, 2000). However, Figure 20 indicates that bachelor's degrees are relatively rare and the least common previous degree among occupational students.

Figure 20: Percentage of Academic, Occupational, and Occupational-Certificate Students by Highest Prior Degree



Occupational-certificate students once again are an unusual and interesting group. Not only are they the most likely to have a prior degree, but that degree is most likely to be another certificate. This hints at the continuity of certificate students. To further investigate this conclusion, we looked at degree combinations earned by students in the HS&B dataset, which allowed us to track the educational history of students for ten years after high school graduation. We found that, of the students who earned at least one degree in the period, 28 percent earned a certificate as their first award. Among this group of certificate-earning students, only 13 percent earned a higher degree (associate or bachelor's) during the period. Contrast this with the 22 percent of students who earned

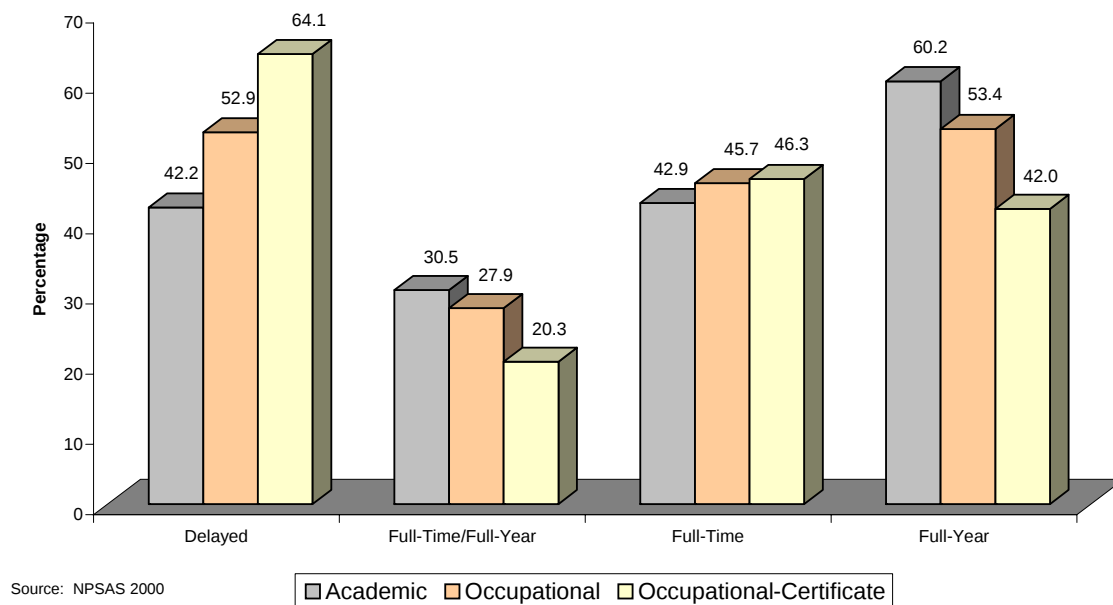
associate degrees as their first degree; nearly one-fourth (25 percent) of these students obtained a higher degree (bachelor's). Note that the results include only those who actually obtained degrees, not just pursued them. However, “stepping up” the degree ladder is an important measure of postsecondary success. These findings from the HS&B data tend to support the conclusion that certificate students usually pursue another certificate rather than a higher degree. This tendency suggests that few students use certificates as stepping-stone awards to higher credentials, indicating the unique nature of certificates. It is also consistent with our previous finding that certificate students have low academic preparation *and* low levels of remediation. Despite earning a certificate, they still may lack the academic skills to move on to a higher degree.

Non-Traditional Pathways

We showed in an earlier section of the report that baccalaureate students were much more representative than sub-baccalaureate students of the traditional view of the postsecondary pathway. We defined that traditional pathway as continuous, full-time, full year postsecondary enrollment without delay after high school. Working while enrolled is also somewhat at odds with the most traditional view. In this section we compare the “traditionality” of academic and occupational sub-baccalaureate students, focusing on delayed enrollment, full-time and full year attendance, interruptions and working while enrolled (Scott & Bernhardt, 1999).

In our analysis, students are considered to have delayed enrollment if they waited at least one year between high school graduation and first postsecondary enrollment or they obtained a GED (regardless of the time between GED and postsecondary enrollment). As shown on Figure 21, over half (53 percent) of occupational students delay their enrollment while only 42 percent of academic students delay. This is not surprising since occupational students are generally older than their academic peers. Even more certificate students (64 percent) delay their enrollment.

Figure 21: Percentage of Academic, Occupational, and Occupational-Certificate Students by Delayed Enrollment and Traditionality



The characteristic that often occurs concomitant with delayed enrollment is enrollment intensity—whether the student is enrolled full-time or part-time and for a full year or part of the year. For this analysis we measured the student’s enrollment intensity

during the year in which the NPSAS data were collected. Students who attended full-time for the full academic year were deemed traditional. Those who attended part-time during any portion of the year or for only part of the academic year were categorized as non-traditional. Figure 21 shows that academic students are slightly more likely to follow a traditional enrollment pattern than occupational students (31 percent traditional as compared with 28 percent traditional). In total, nearly three-fourths of sub-baccalaureate students are non-traditional by attending either part-time or part year. Here is a case where the contrast between baccalaureate and sub-baccalaureate students is much more significant than contrasts between sub-groups of sub-baccalaureates. What is most important is that very few sub-baccalaureate students actually have what is considered to be the typical postsecondary experience.

Certificate students exhibit an even less traditional enrollment pattern than their sub-baccalaureate peers. Only one-fifth (20.3 percent) attended full-time and full year. This may be explained in part by the nature of certificate programs which, at normally a year or less, are relatively short when compared to degree programs. Thus, many students who take less than a year to complete a certificate may report less than full year attendance. This pattern is confirmed by the relatively low 42 percent of full year occupational-certificate students when compared to other sub-baccalaureate students. However, conversely, we would expect those students who attend part-time likely to attend full year as both part-time and part year enrollment in a short program might be highly discontinuous and detrimental to persistence and completion.

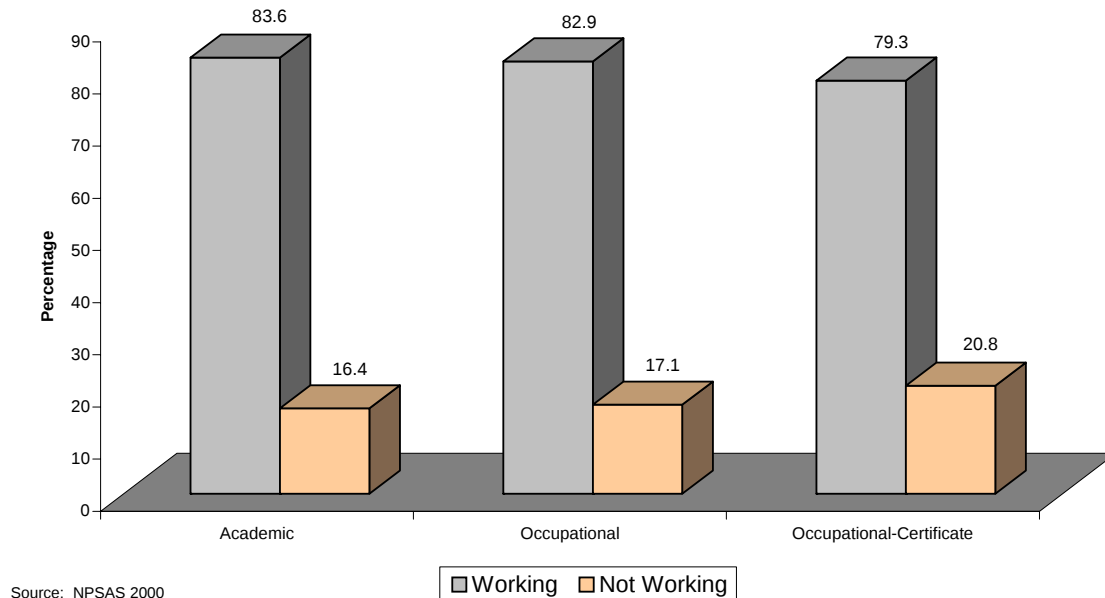
As NPSAS measures only one year of a student's enrollment, we used longitudinal datasets to measure student interruptions over a longer period. Over the five years of enrollment tracked by BPS89, we found that interruptions in enrollment are actually more common among academic sub-baccalaureates than among occupational sub-baccalaureates. While only 30 percent of the latter ever interrupt their enrollment (measured by four or more months between periods of enrollment during the five-years of BPS89), nearly two-fifths (39.8 percent) of academic students interrupted. The higher percentage among occupational students may be due to the inclusion of certificate students, who, as we noted earlier are overwhelmingly occupational and are less likely to interrupt due to shorter length of programs. Furthermore, the incidence of interrupted enrollments has increased dramatically among occupational students since the 1980s. For example, among students in HS&B (high school graduation in 1982) who initially enrolled as occupational sub-baccalaureates only 15.9 percent interrupted their postsecondary education. In contrast, 33.3 percent of the occupational students under 24 in BPS89 interrupted.²⁸

Most sub-baccalaureate students work while enrolled, regardless of major type. (See Figure 22.) While the difference in number working between occupational and academic is small, certificate students once again demonstrate their uniqueness. Fewer occupational-certificate students as opposed to other sub-baccalaureate students work while enrolled. Over one-fifth of such students never work while enrolled. Certificate

²⁸ The two datasets are not strictly comparable since BPS follows a sample of all beginning postsecondary students (regardless of age) for five years, while HS&B follows a cohort of high school students for over ten years. In order to make them more comparable, we restricted our sample in BPS89 to young students and we followed HS&B students for only five years after they enrolled.

students may be more likely to take a complete break from work while pursuing a certificate—a realistic option given the brevity of many certificate programs. Interestingly, among students who do work while enrolled, occupational-certificates report the highest rate of off-campus job location of any sub-population, although the difference is relatively modest, given that over 90 percent of working sub-baccalaureates have off-campus jobs. However, there is a pattern of certificate students generally working less relative to their other occupational and academic peers. Perhaps the shorter duration (and consequently lower cost) of certificate programs allows them to take more time off from working while in the role of student.

Figure 22: Percentage of Academic, Occupational, and Occupational-Certificate Students by Working while Enrolled



Finally, we considered whether the incidence of non-traditional pathways increased in recent years. Adelman (1999) points out that the share of students who attend multiple institutions grew dramatically between the early 1980s and the mid 1990s. By comparing data for the early 1980s from HS&B and for the early 1990s from BPS89, we observe a sharp decline in traditional students, and especially among sub-baccalaureate students.²⁹ Indeed, almost 40 percent of sub-baccalaureate occupational students were categorized as traditional students in the early 1980s, but a decade later, that share had dropped to 20 percent. Therefore, not only are there relatively few students who fit the dominant image of the young traditional college student enrolled full-time and without interruptions, but that number is shrinking.

²⁹ We define a traditional student as one who starts postsecondary education under the age of 20, attends school full-time and for the full academic year, and does not interrupt his or her schooling by leaving for one or more semesters.

VII. Non-Credit Education

While this report has so far concentrated on for-credit students, nevertheless, a vast amount of education takes place in the United States on a non-credit basis (Phillippe & Patton, 1999). According to NHES, in 1999 over 110 million people were enrolled in non-credit courses compared to 32 million in for-credit courses. (See Table 4.³⁰) To measure total occupational education students, we added together the number of students who reported taking non-credit courses for “job-related” reasons to the number of occupational sub-baccalaureate students.³¹ Figure 23 shows that over four-fifths of this group was not earning credit for their education.

³⁰ The numbers displayed on Table 4 are duplicated headcounts. Some students could be taking more than one type of education. Nevertheless, the differences are so immense that we are confident that these numbers give a strong sense of the relative sizes.

³¹ See Appendix C for a complete explanation of the categorization of NHES students.

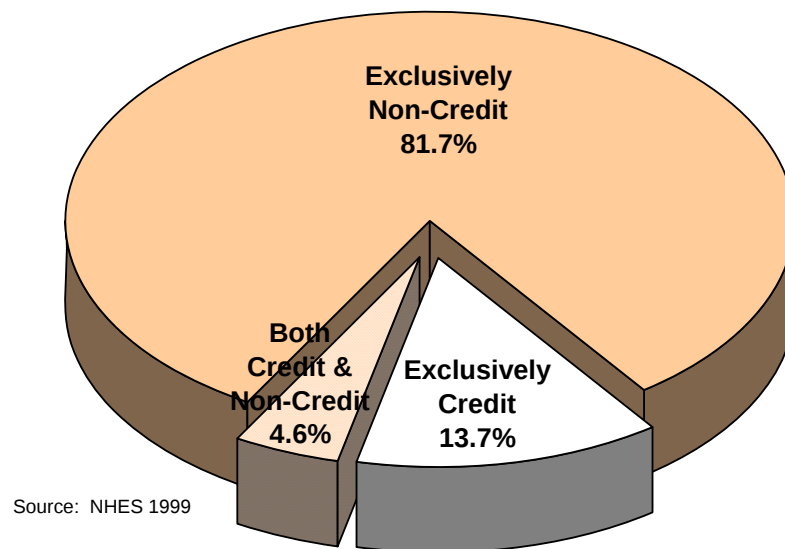
Table 4: Non-Credit and For-Credit Students by Provider (in millions)

	Non-Credit					For-Credit		
	ESL/ABE/ GED	Apprentice- ship	Job- Related	Personal Development	Total	Occupational Sub-Bac	All Sub-Bac	Total
Elementary school, junior HS, or HS	1.6	0.0	2.3	2.2	6.1	0.1	0.1	0.4
Two-year community college	0.6	0.0	2.3	3.1	5.9	4.1	6.5	6.5
Public two-year vocational school	0.2	0.0	1.0	0.6	1.8	1.4	1.7	1.7
Four-year college or university	0.1	0.0	6.4	3.5	10.0	0.5	0.9	16.0
Private vocational school	0.2	0.0	4.9	4.1	9.2	2.3	2.7	2.7
Adult learning center	0.5	0.0	0.7	0.9	2.1	0.2	0.3	0.3
Business or industry	0.2	2.0	19.6	7.4	29.3	0.5	0.7	1.5
Professional assoc./ labor union	0.0	0.7	5.6	1.4	7.7	0.2	0.2	0.5
Government agency/ public library	0.6	1.6	6.2	4.5	12.8	0.5	0.9	1.4
Community, religious or other organization	0.4	0.4	4.6	23.9	29.4	0.3	0.6	1.4
Total	4.4	4.7	53.6	51.5	114.3	10.1	14.6	32.3

Notes: For-credit total includes baccalaureate and post-baccalaureate. All cells are weighted totals.

Source: NHES 1999.

Figure 23: Credit and Non-Credit Participation Rates in Occupational Education



Traditional higher education institutions are relatively minor players in the non-credit market, serving only 27 percent of all job-related non-credit students. This proportion contrasts sharply with the dominance of higher education institutions in providing for-credit occupational education (over 82 percent of the students).³² Public sub-baccalaureate institutions,³³ which receive the large majority of postsecondary Perkins funding, serve only six percent of the non-credit students. Preparation for work is a fundamental motivation for much of both credit and non-credit education. Thus by targeting public sub-baccalaureate institutions, Perkins fails to have much of an impact on a large proportion of students in work-related education.

³² Percentages calculated using rows 2-5 on Table 4.

³³ Rows 2 and 3 on Table 4.

For community colleges, non-credit education is, however, an important and growing segment of their services. Many colleges report that they have more students enrolled in non-credit and continuing education courses than they do in their credit offerings (Bailey, 2002.)³⁴ The NHES data indicate that 3.3 million students were taking job-related non-credit courses at community colleges or public two-year vocational schools. (See Table 4.) Another 3.7 million were taking non-credit courses for personal development at these institutions. In contrast, over 8 million sub-baccalaureate students reported taking credit courses and 5.5 million were in the category that we have been referring to as occupational sub-baccalaureates at these institutions. Thus, credit students at community colleges still outnumber non-credit students. Yet, in private vocational schools, some of which are eligible for Perkins funding, the non-credit students outnumber those earning credit by more than a two-to-one margin. And community college presidents often see non-credit education as one of their most innovative and exciting activities, so the significance of non-credit education to the institution is understated by the enrollment ratios. Furthermore, much of the community college work with students who face particularly serious academic or economic problems involves non-credit courses.

How do non-credit students pursuing job-related courses at postsecondary institutions compare to sub-baccalaureate occupational students (by definition attending postsecondary institutions)? Table 5 provides a statistical comparison for various

³⁴ Since most non-credit students take only one course while credit students may take several, the headcount ratio of non-credit to credit students is much higher than a full-time equivalent ratio.

demographic measures. The non-credit students are slightly more likely to be female and less likely to be a minority group member (except Asian/Pacific Islander). Furthermore, over three-fourths of the job-related non-credit students are 30 and older, whereas only about 34 percent of occupational sub-baccalaureate students are over 30. Non-credit job-related students are much less likely to come from lower income families. Only 12.5 percent (one in eight) of the non-credit students come from families earning less than or equal \$25,000 per year while nearly 30 percent of occupational sub-baccalaureate students do. Finally, the for-credit occupational students are more than five times as likely to be single parents.

Table 5: Demographic and SES Characteristics of Non-Credit Job-Related Students and For-Credit Sub-Baccalaureate Occupational Students

	Gender		Race/Ethnicity					Current Age				HH Income		Single w/Dep ³	
	Male	Female	White	Black	Hispanic	Asian/PI	Other	under 20	20-23	24-29	30+	<=\$25K	>\$25K	No	Yes
Non-Credit Job-Related at Post-Sec Institutions ¹	40.1	59.9	76.6	10.0	6.2	5.8	1.4	2.3	8.0	14.0	75.8	12.5	87.5	96.5	3.5
For-Credit Sub-Bac Occupational ²	45.9	54.1	61.4	17.3	12.7	5.5	3.0	18.1	27.0	20.7	34.2	29.0	71.0	80.3	19.7

1. Source: NHES 1999.

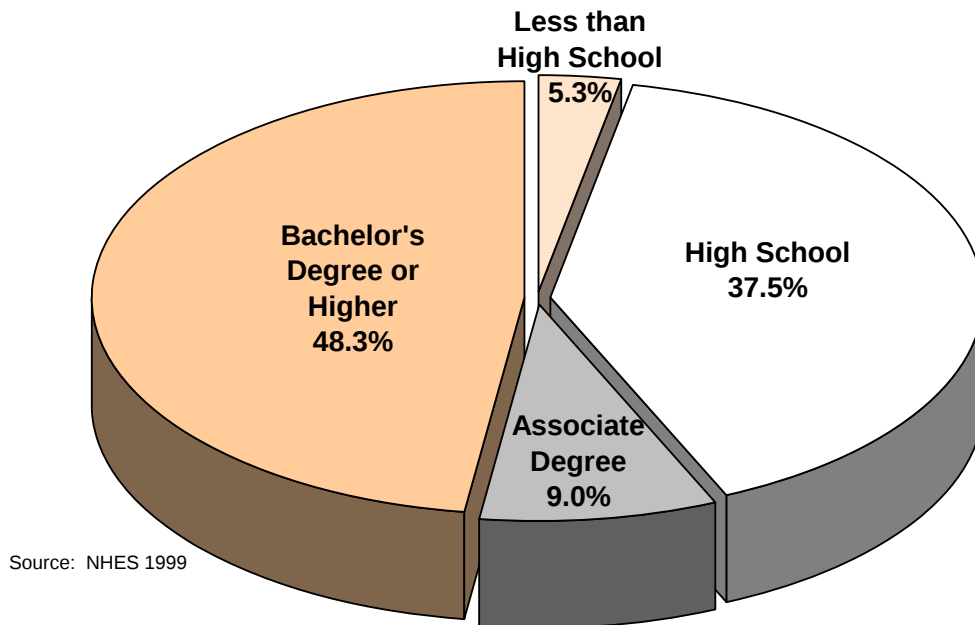
2. Source: NPSAS 2000 (except household income which is NHES 1999).

3. Single with dependents percentages for NHES reflect individuals who reported not being married but living in a household with members who are younger than 18 years old. They are an upper bound estimate.

Perhaps the most striking contrast between the for-credit and non-credit occupational students is the students' educational history. As shown on Figure 20, few sub-baccalaureate students (of any type) already had bachelor's degrees. Yet Figure 24 shows that almost half of all job-related non-credit students had bachelor's or higher degrees and another 9 percent had associate degrees. If we only look at non-credit students attending a community college or two-year public vocational school, then the

share of students who already have bachelor's degrees or higher drops only to 39.9 percent, while the proportion with associate degrees increases to 16.8 percent, percentages which are still much larger than the comparable proportion of for-credit community college students.³⁵

Figure 24: Highest Educational Degree of Job-Related Non-Credit Students



Clearly, the demographic characteristics of non-credit students seeking job-related instruction contrast sharply with those of for-credit sub-baccalaureate occupational students attending the same institutions. In sum, the non-credit students are older (much older), have much more previous education, are somewhat more likely to be White, and

³⁵ Proportions cited are from NHES 1999. As with for-credit students, the proportion of non-credit job-related students with degrees and attending postsecondary institutions increased from previous years. Comparable proportions from NHES 1995 are 38.8 percent with bachelor's or higher degrees and 13.6 percent with associate degrees.

come from households with more economic resources. From the point of view of demographic targeting, these data argue against reorienting Perkins to relate more to the non-credit world. Still, non-credit education is a vehicle for working with severely at-risk students. As shown on Table 4, over four million students (about eight hundred thousand in community colleges and vocational schools) a year are in ESL/ABE/GED courses. In addition, 43 percent of all job-related non-credit students have no more than a high school degree. This represents a large number of students simply because the overall category is so large.

VIII. Goals and Reasons for Enrollment of Postsecondary Occupational Education Students

In the end, Congress would like to know whether postsecondary occupational education opens up opportunities for the students who enroll. In our two other reports we examine educational and economic outcomes for these students, but here we will use the NPSAS data to develop a picture of student objectives. Accountability policy tends to consider completion or graduation a sign of personal and institutional success (Wellsfry et al., 1995). Nevertheless, it is possible that many students enroll in college without planning to graduate. Certainly many community college administrators and faculty argue that this is one reason why these institutions have low completion rates. A student may want to learn a particular skill that could be learned in one or a small number of courses, and then leave when that is accomplished. This approach is an accepted practice for non-credit students and a student enrolled in a class to learn a skill may not even be aware of the distinctions between credit and non-credit classes.³⁶ Therefore, in evaluating the performance of colleges, it is important to take account of student objectives (Voorhees & Zhou, 2000).

Figure 25 shows the educational goals of academic, occupational, and occupational-certificate students as measured by their reported primary reason for

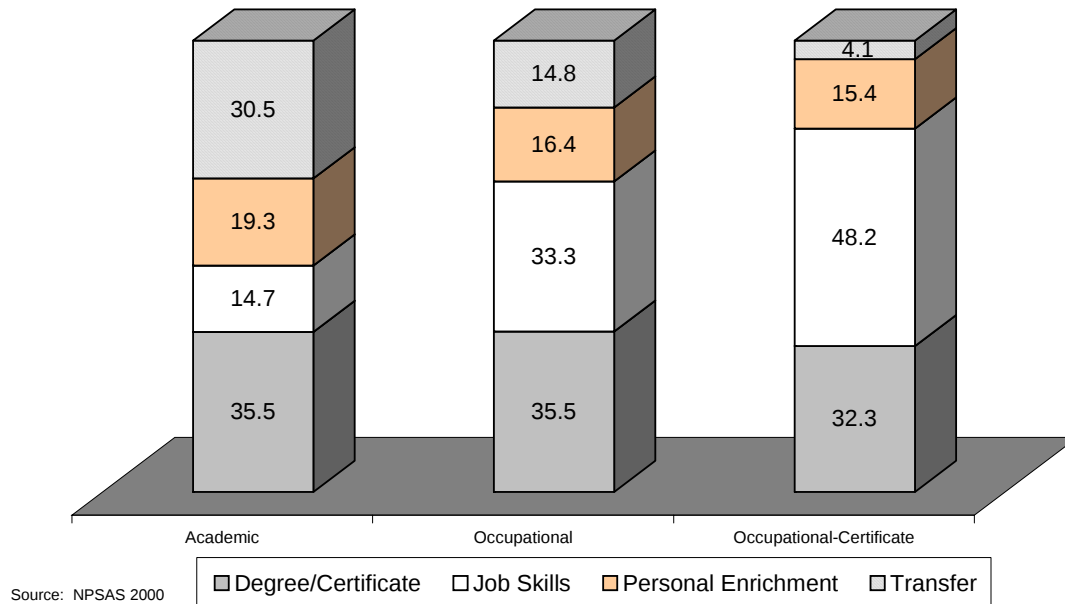
³⁶ Indeed, the distinction between non-credit and credit classes is not always well defined. For example, in states that reimburse community colleges for non-credit instruction, it would not be surprising for colleges to have large non-credit programs. This would be particularly true in states where there are matriculation requirements for enrolling in credit courses. But in states that do not reimburse for non-credit classes and that have weaker matriculation requirements, then it is in the interest of the college to make every course a credit course.

enrolling.³⁷ We should note that there is some ambiguity about this question because a student may be simultaneously seeking a degree, transfer, and job skills. Nevertheless, the question does give a comparative sense of the different perspectives on their education held by various student populations.

The most notable difference is in the percentage of each population that listed job skills as the primary reason for enrolling. Over twice as many occupational students as academic students (33 percent as compared with 15 percent) indicated this goal, making it the most common reason for enrolling among occupational students. Of occupational-certificate students, almost half (48 percent) were enrolled primarily to obtain job skills. In comparison, about one-third of any of the sub-baccalaureate sub-populations indicated obtaining a degree or certificate as their primary objective. Notice the relative importance of the degree/certificate reason for enrolling to the job skills goals across student type. The proportion of academic students citing a degree goal dwarfs the percentage citing job skills while for occupational students the proportions are comparable. However, as nearly half of all occupational-certificate students cited job skills as their primary reason for enrolling, this proportion far exceeds the 33 percent who are primarily seeking a degree or certificate. These findings may help explain low graduation rates of sub-baccalaureate students since for many occupational and certificate students graduation (as measured by the earning of a formal award) is not the stated primary goal of their postsecondary education.

³⁷ This question was asked only of students in two-year or less than two-year institutions. This restriction excluded sub-baccalaureates enrolled in four-year institutions.

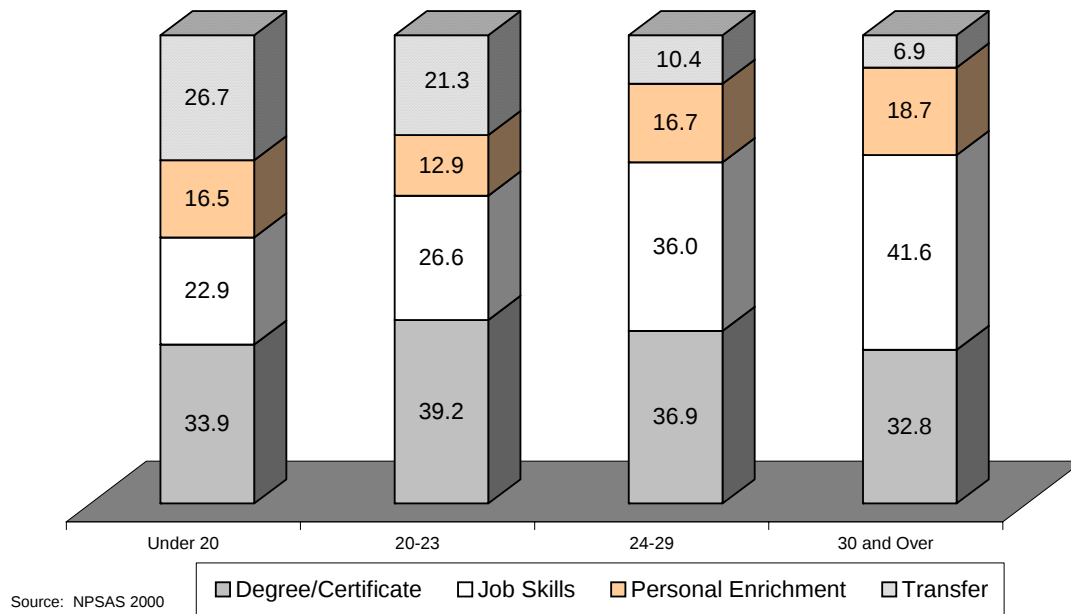
Figure 25: Percentage of Academic, Occupational, and Occupational-Certificate Students with Primary Reason for Enrolling



It is also instructive to notice the high proportion of academic students (31 percent) expecting to transfer from their current institution to another institution. It may include a large number of students who are utilizing their sub-baccalaureate enrollment as a stepping stone to a four-year school and bachelor's degree—following the path envisioned by the traditional view of community colleges as inclusive institutions designed to help prepare students for higher education at the more traditional four-year colleges. Proportionally far fewer occupational students (15 percent) and even fewer occupational-certificate students (4 percent) are primarily interested in transferring. Also, fewer of these populations cited personal enrichment as their primary purpose for enrolling. Occupational students may be more utilitarian in their objectives, which might be expected given the practical nature of occupational majors.

One additional figure on the primary reason for enrolling is informative here. Figure 26 shows the proportion indicating each primary reason for enrolling among different age cohorts of occupational sub-baccalaureates. There appears to be a strong correlation of age with reason for enrolling. The pattern of higher percentages of students enrolled primarily to obtain job skills increases with age, while the percentage of those who are enrolled primarily for the purpose of transferring declines with age. Younger occupational students may be enrolling with the intention of pursuing a higher degree at a four-year institution. In fact, breakouts by destination (two-year, four-year, or unknown) indicate that transfer to a four-year institution is the only one that exhibits significant difference between age cohorts. Age appears instrumental in defining an individual's goals (so far as indicated by primary reason for enrolling) among occupational students in their current enrollment.

Figure 26: Percentage of Occupational Students by Age Group with Primary Reason for Enrolling

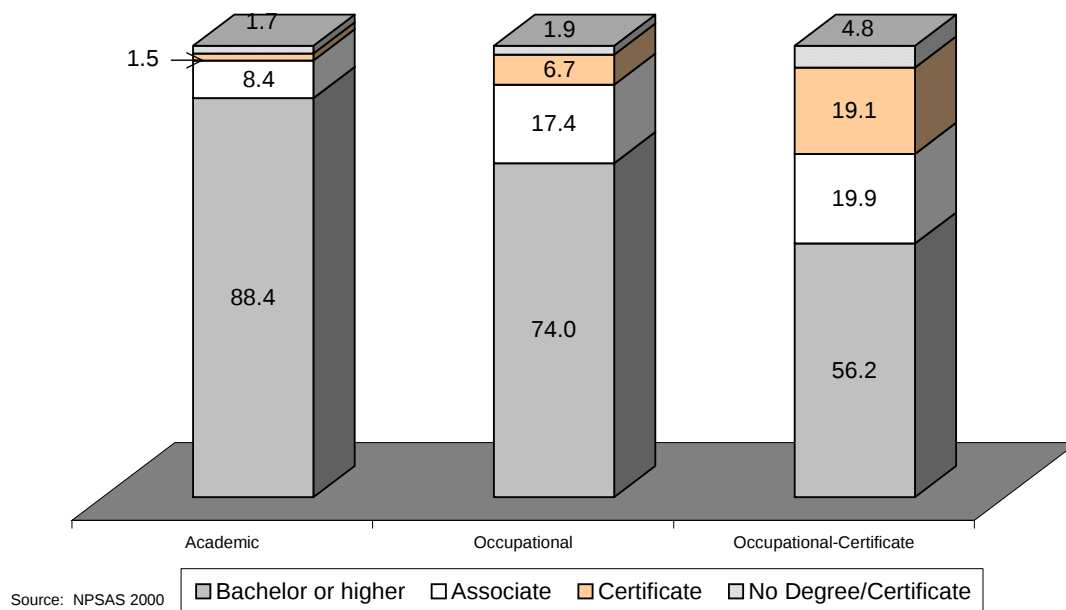


The data displayed on Figures 25 and 26 might seem to justify relatively low completion and transfer rates, especially for occupational and certificate students. Nevertheless, when students are asked to state the highest level of education that they expect to receive in their lifetime, degree completion takes on a much more important role. Their responses suggest more lofty educational goals than simply preparing for work. As seen on Figure 27, the vast majority of sub-baccalaureate students (occupational and academic) expected to obtain at least a bachelor's degree at some point in their life. Nearly 90 percent of academic students expected that outcome, while fewer, but still nearly three-fourths of occupational students, expected the same. Over 75 percent of occupational-certificate students stated that they wanted either an associate or a

bachelor's degree, and yet we have seen that relatively few students with certificates move on to any subsequent degree except another certificate.

To be sure, students can plausibly differ on their primary reason for enrolling in the current institution and their lifetime educational goals. Nevertheless, a vast discontinuity remains. This is an issue we will take up in greater detail in our other reports.

Figure 27: Percentage of Academic, Occupational, and Occupational-Certificate Students with Highest Education Expected



IX. Observed Trends in Sub-Baccalaureate Student Characteristics, 1996 to 2000

We performed an identical statistical analysis on the NPSAS96 survey data as that on NPSAS00. Due to the similarity in survey design, selection, and inclusion criteria between the two surveys, the findings from the two years are directly comparable. While only four years passed between the 1996 and 2000 survey iterations a number of significant observed shifts occurred in the characteristics and enrollment of sub-baccalaureate and occupational students.³⁸ Each is discussed here with reference to the applicable data.

Trends

There was an increase in the gap in household income between dependent baccalaureate and sub-baccalaureate students.

The median annual parental income for dependent baccalaureate students increased over \$3,000 from \$52,430 to \$55,752, while that for sub-baccalaureates rose by only a few hundred dollars: from \$44,523 to \$45,267.^{39,40} While both groups experienced

³⁸ All differences cited are statistically significant unless otherwise noted. Significance was determined by non-overlapping 95 percent confidence intervals around each relevant statistic.

³⁹ NPSAS00 parental income was for 1998. We adjusted it to 1994 dollars to make the results comparable to NPSAS96, which used 1994 income.

⁴⁰ We were unable to calculate the confidence interval around weighted medians using the Stata software package, so we could not determine significance for the shift in median incomes.

a greater percentage of students with annual parental incomes above \$50,000, the proportion increased by nearly 4 percentage points for baccalaureates but only 1 percentage point for sub-baccalaureates.⁴¹ Now, while only 44 percent of dependent sub-baccalaureates come from families with incomes over \$50,000, fully 56 percent of baccalaureates do.

Baccalaureates have generally always come from households with higher incomes than their sub-baccalaureate counterparts, but these findings indicate that the gap has grown between 1996 and 2000. This trend indicates an even more critical need for Perkins funds to target for assistance sub-baccalaureate populations to help ensure equal opportunity for upward mobility for all of America's college students.

There was a large increase in the proportion of computer and data processing majors among occupational sub-baccalaureates.

While the proportion of students in all other occupational majors remained stagnant or declined, students with computer and data processing majors jumped from 9 percent in 1996 to 17 percent in 2000. The reason is most readily attributable to the rapid proliferation of computer, specifically internet, technology in the late 1990s.

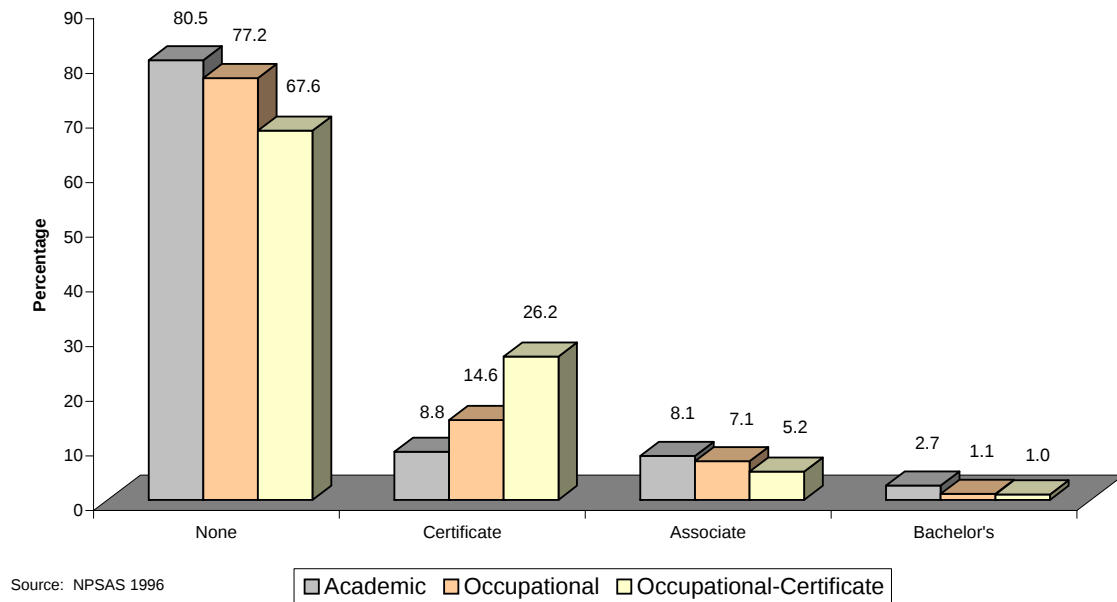
⁴¹ The increase for sub-baccalaureates is not statistically significant while that for baccalaureates is.

There was an increase in sub-baccalaureate students with prior degrees.

We observed an increase in the proportion of students with prior degrees (including baccalaureate) who are returning to school as sub-baccalaureates (compare Figure 28 below with Figure 20). In 1996, less than 20 percent of all sub-baccalaureates held another degree. By 2000 that proportion grew to over 30 percent. Most surprisingly, the gain was highest among those who held a bachelor's as their highest prior degree: from 2 percent to 9 percent among all sub-baccalaureates.⁴² This large shift occurred within the occupational and occupational-certificate populations as well. In fact, among certificate students, the proportion with bachelor's degrees grew phenomenally: from a mere 1 percent in 1996 to over 8 percent in 2000.

⁴² These percentages include sub-baccalaureates with undeclared majors, 19 percent of whom held a bachelor's degree.

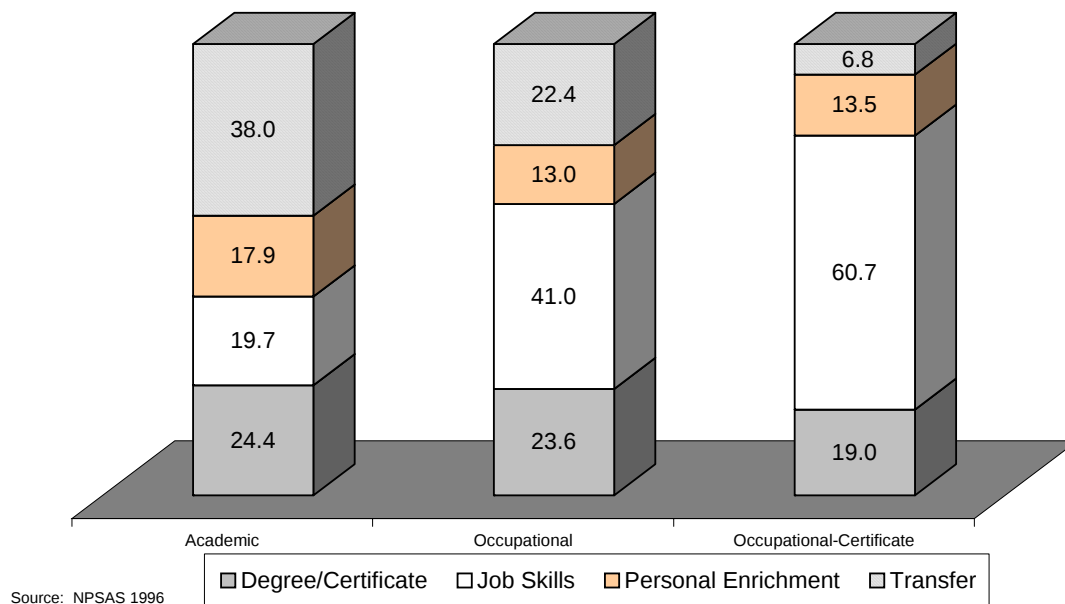
Figure 28: Percentage of Academic, Occupational, and Occupational-Certificate Students by Highest Prior Degree, 1996



There were shifts in the primary reason for enrolling among sub-baccalaureate students.

Earning a degree or certificate is now the most commonly cited primary reason for enrolling among both occupational and academic sub-baccalaureates at two-year institutions. This represents a shift from job skills as the most common reason in NPSAS96 among occupational students, and from transfer as the most common reason cited by academic students (compare Figure 29 below with Figure 25)

Figure 29: Percentage of Academic, Occupational, and Occupational-Certificate Students with Primary Reason for Enrolling, 1996



Whereas less than one-fourth (23.6 percent) of all occupational students cited degree/certificate as their primary reason in 1996, well over one-third (35.5 percent) did so in 2000. There was a concomitant drop from 41.0 to 33.3 percent of students citing job skills and a decline from 22.4 to 14.8 percent citing transfer. It appears that credentials have become more important relative to just earning skills, perhaps due to the expectations of employers in a competitive job market. Under such conditions, it might be expected that transfer to a four-year institution would be a similarly desirable objective; yet, the transfer goal and its potential for a higher degree has declined in popularity for occupational students. The shift favoring a credential is even more pronounced when segregating occupational students by age cohort. Whereas in 1996 it was only the third most popular reason for enrolling (behind transfer and job skills) for all of the three age cohorts under 30, by 2000 it had become the most cited reason for

enrolling among all three groups.⁴³ Like their occupational peers, academic students show an increase in the proportion citing degree/certificate and a decline in those citing job skills and transfer (although the latter two shifts are statistically insignificant).

We observe a clear pattern of change toward the attainment of a credential as the primary purpose that students cite for enrolling in two-year institutions. This change bodes well for greater persistence and degree completion in the future. However, it may portend a shift in emphasis of community college education (at least from the students' perspective) away from the traditional function of preparing students for further education at a four-year institution and toward providing them with a credential in preparation for entering the job market immediately.

There was a convergence of occupational-certificate students toward other sub-baccalaureates in background characteristics.⁴⁴

As the proportion of certificate-seekers among all occupational students increased from 29.8 percent in 1996 to 33.3 percent in 2000, their demographic distinctiveness became less conspicuous. For example, the proportion of male certificate students increased from 38 percent in 1996 to 47 percent in 2000; this proportion now exceeds that of all occupational students. Similarly, the proportion of White certificate students

⁴³ Recognizing a credential's importance, students age 30 and over also cited degree/certificate in a greater proportion in 2000 than 1996. However, this increase is not statistically significant and still lags behind job skills as the most commonly cited primary reason for enrolling for this older cohort.

⁴⁴ Most of the shifts described in this section are statistically insignificant (as determined by our conservative 95 percent confidence intervals); however, they are included here because they contribute to the emerging picture of certificate students.

grew slightly, despite a decrease of over 5 percentage points of the proportion of Whites among all occupational students. These changes make the demographic characteristics of the certificate population appear more like those of all sub-baccalaureates. However, the one demographic characteristic of certificate students that continues to be distinct from their peers is age. Certificate-seekers have higher proportions among the oldest age cohorts. In fact, while all other sub-baccalaureate groups exhibited a slight decline from 1996 to 2000 in the proportion of students age 30 and over, the proportion of certificate students in that cohort increased from 39 to 43 percent.

In both survey years, occupational-certificate students are economically disadvantaged relative to all occupational and sub-baccalaureate students as measured by parents' income and level of education. However, those gaps shrank from 1996 to 2000. Median parental income, the proportion whose parents earned more than \$50,000, and parents' highest level of education all saw greater increases for certificate students than for all occupational or sub-baccalaureate students.

Finally, the distribution of occupational-certificate students' reasons for enrolling looks more similar to that of all occupational students in 2000 than it did in 1996. While job skills continue to be the most popular reason, less than half of all certificate students (48 percent) cited it in 2000 (compared to over 60 percent in 1996). Finally, those indicating earning a credential as their primary reason grew to almost one-third, only slightly lower than all occupational students in 2000.

These trends in the characteristics of occupational-certificate students may foreshadow a new type of certificate student entering sub-baccalaureate education. These new certificate-seekers are not drawn from the traditional certificate student population (i.e., predominantly disadvantaged and low-achieving high school students in high school vocational programs); rather they have relatively more socioeconomic and demographic advantages, and many have prior degrees (including bachelor's degrees). While this trend makes certificate students appear to be less of an outlier population in 2000 than they were in 1996, we rather suspect that it reflects the development of a dichotomous certificate student population.

Analysis of the Trends

Several of the observed trends cohere around recent economic and technological developments, particularly the new wave of high tech jobs in computers due to the expansion of the internet and attendant technologies, as follows.

Responding to the demand for new types of technical computer skills, more students choose to study a relevant sub-baccalaureate major in computers and data processing. While the popular perception is that degrees are unnecessary in the computer industry as long as an employee has the applicable skills, the reality is that most technical computer careers require a credential to enter the field. Hence, we observe more prominence given to credentials as the primary reason for occupational sub-baccalaureate enrollment. Indeed, certificates are the credential that has grown in popularity among

occupational students from 1996 to 2000: from 29.8 percent to 33.3 percent. Furthermore, many students who are entering such programs are those returning to school after having already earned other degrees, as evidenced by the rise in the proportion of students with previous degrees (particularly bachelor's degrees). This prominence of returning students also helps explain the increase in the proportion of older certificate students. Finally, these new certificate-seekers are not drawn from the traditional disadvantaged certificate student population, but are increasingly drawn from men, Whites, and students with high SES backgrounds. Hence, we observe a convergence between occupational-certificate students and their sub-baccalaureate peers in student characteristics, background, and reason for enrolling.

Comparing the results of the two NPSAS surveys enables us to observe the enrollment effects of the new vocational education at the forefront of the emerging information-based economy. We see this technology-based vocational education establishing a new segment of vocational education as measured by not only its content but also by the type of students who enroll in it and their patterns of enrollment. We expect that the trends observed with this new vocational education will persist well into the new millennium.

XI. Conclusions and Policy Considerations

In this section we return to the four broad policy issues that were raised at the beginning of this report and draw together the central conclusions of our analysis. The four areas were comprised of: (1) the significance of postsecondary occupational education and the federal role, (2) the characteristics of occupational students and Perkins targeting, (3) the significance of non-traditional pathways and its implications for targeting and accountability, and (4) the goals of occupational students and implications for outcomes assessment.

Significance of Sub-Baccalaureate Occupational Education and the Federal Role

We have shown that sub-baccalaureate occupational education is an immense area of education. More than twice as many sub-baccalaureate students are enrolled in these majors than baccalaureate students in the core academic majors—sciences, social sciences, and the humanities. Nevertheless, occupational education, particularly at the two-year level, is still considered inferior in a higher education system that has been organized and structured on an academic model. The relationship between academic and occupational programs and even between academic and occupational content within programs is in flux and remains controversial. At the same time, to some extent, the focus of occupational education is shifting away from high schools towards higher education, community colleges in particular. The size of the postsecondary occupational enterprise, its importance to the nation's economy and social structure, and the uncertainty and

controversy associated with it all suggest an important role for the federal government in encouraging innovation and improvement.

Characteristics of Sub-Baccalaureate Occupational Students

By emphasizing sub-baccalaureate occupational education, Perkins does tend to direct resources towards the group of postsecondary students from the most disadvantaged backgrounds with the greatest barriers to educational achievement. These students, when compared to academic sub-baccalaureate and particularly to baccalaureate students, have parents with relatively less education, have weaker high school programs, rank lower in those programs, and earn lower scores on academic achievement tests. But this overall conclusion about the constituency for Perkins obscures several additional issues that are relevant for policy consideration.

Occupational sub-baccalaureates are different from their academic peers; nevertheless, the strongest contrast is between baccalaureate and sub-baccalaureate students in general. Students enrolled in four-year programs are younger; come from families with higher SES (measured by parents' education and income); have stronger high school records and test scores; are more likely to enter college immediately after high school and to attend full-time without interruption; and are more likely to see themselves as students, rather than as workers who are studying. Therefore, as a rough generalization, while academic sub-baccalaureates tend to look more like four-year college students than do occupational sub-baccalaureates, academic and occupational

sub-baccalaureate students still have more in common with each other than they do with students pursuing a bachelor's degree.

As we have emphasized, occupational students tend to be somewhat older than academic students and they are particularly older than baccalaureate students. Therefore, if Congress would like to target young students, then some targeting within the sub-baccalaureate student population may be worth considering. The information on whether a student is working while enrolled might also prompt a similar refinement in the approach to targeting. As we have seen, sub-baccalaureate students are more likely to work longer hours, to work off campus, and to view themselves as workers. A greater incidence of working may reflect simply a need to earn income while studying or it may result from adult workers returning to school to upgrade their skills. Thus a greater prevalence of students working while enrolled may reflect two different worker/student situations that merit different policy considerations.

We have also emphasized the difference between students seeking certificates and other occupational sub-baccalaureate students. Certificate students account for almost one-third of the sub-baccalaureate occupational group. First of all, certificates and the students who seek them need much more attention since certificates and other types of shorter-term certifications of learning will become more important if the current emphasis on accountability and outcomes continues to grow. Second, from a targeting point of view, certificate-seekers, even more than occupational associate degree students, have weak academic preparation and face significant educational barriers. Certificates are

particularly popular among single parents, for example. But certificates do not appear, in the large majority of cases, to lead to higher levels of educational attainment. We have argued that this outcome may result from the failure of certificate programs to strengthen the academic skills of students whose skills are poor when they enroll. These students may go back for additional certificates, but they would have much more trouble achieving higher levels of postsecondary education.

Thus the certificate students appear to be a large pool of students with the characteristics emphasized by Perkins, yet the degree represents only limited educational opportunity. Certificate programs, therefore, seems to be an area where federally encouraged innovation might be particularly productive. The only reason why Perkins might not focus on certificates is that older students are particularly concentrated among certificate-seekers. Many younger students do enroll in certificate programs although only slightly more than one-third of them are 23 years of age or younger. So once again, some adjustment would need to be made to integrate the older certificate students if Congress preferred to target younger students.

Non-Traditional Pathways

Throughout this report, we have argued that the common view of the young student who enrolls in college full-time immediately after high school and whose attendance is not interrupted is misleading, probably increasingly so. The traditional student is even more rare among occupational sub-baccalaureates. Almost all sub-

baccalaureate students work, as do most college students. The majority of sub-baccalaureate students attend part-time. About one-half of them delay their enrollment after high school. In terms of policy considerations, the prevalence of non-traditional pathways is perhaps most important for planning financial aid policy. A policy that favors full-time enrollment could be at odds with the realities of sub-baccalaureate education. On the other hand, it may be that a financial aid policy that encourages traditional attendance would be a good idea, and this is an issue which we will address in our companion report on educational outcomes.

From the point of view of Perkins, the magnitude of non-traditional enrollment has important implications for accountability. Targets that reward high graduation rates within a given period of enrollment will be more difficult to achieve for institutions with high part-time and interrupted enrollment. This reality might suggest that alternative measures should be devised—perhaps the period of attendance before graduation should be calculated as full-time-equivalent enrollment. On the other hand, it is reasonable to ask whether accountability policy should be designed to encourage institutions to promote more traditional enrollment patterns. Perhaps Congress should view high levels of part-time and interrupted enrollment as an indication of institutional failure or weakness. We cannot resolve this issue here, but in our reports on the determinants of educational and economic outcomes we measure the costs to students of following non-traditional pathways and assess whether the economic value of occupational education and the probability of graduation are reduced when a student strays from the traditional postsecondary educational path.

For-credit higher education involves perhaps 15 million students, but in any year many times that number take non-credit courses. According to NHES, over 50 million people enrolled in non-credit work-related courses in 1999. But the institutions that traditionally receive Perkins funding are relatively small providers in the non-credit universe. Nevertheless, over 7.7 million students took non-credit courses at community and two-year technical colleges,⁴⁵ and over three million of those students are in work-related courses. The characteristics of non-credit students contrast sharply with those earning credit. Most importantly, non-credit students are older and have much higher levels of education—nearly half already have bachelor’s degrees. At first glance, the non-credit pool does not seem like a priority for targeting. Nevertheless, there are still many non-credit students who have no more than a high school degree. We know that in some states students who fail placement assessments are steered towards continuing education. After all, a relatively small share of a very large group of students still amounts to a large number of individuals. Furthermore, the non-credit ABE, ESL, and GED programs are often the vehicles through which community colleges serve the most at-risk groups of students. One of the potential benefits of serving these students in community colleges is that they can potentially move into regular credit courses and eventually earn higher degrees. But we know very little about this type of movement and, judging from the experience of certificate students, we suspect that it is rare. Therefore, while the non-credit programs do not seem like a high priority for Perkins, there does appear to be some potential to meet Perkins goals by serving these students, suggesting a justification at

⁴⁵ This is a duplicated headcount since students could be enrolled in more than one category.

least for further exploration and perhaps some innovative programs to connect some non-credit students to for-credit programs.

Student Goals

Ultimately, Congress wants to know if postsecondary occupational education “works.” Are the outcomes worth the time and cost borne by the student and by society? Community colleges in particular have been criticized for low completion and transfer rates, but college faculty and administrators argue that many students are not seeking to transfer or graduate. The data presented in this report are ambiguous on this issue. Many students do state that gaining skills (not earning a degree) is their primary reason for attending the institution where they are enrolled. The patterns of these responses also seem reasonable. Certificate-seekers are the most likely to cite skills as their primary reason for enrolling. Occupational sub-baccalaureates are less likely than academic students to state that they want to earn a degree or transfer, and sub-baccalaureates in general are more likely than students in four-year programs to identify gaining skills as their primary enrollment reason. Thus these different groups of students may have different reasons for enrollment and different conceptions of educational success. This variation seems to be consistent with lower completion and transfer rates. But at the same time, when students are asked about their ultimate educational goal, the large majority of students state that they want a bachelor’s degree. This is true even for certificate students who have an extremely low probability of ever earning such a degree.

Why do so many students in community and technical college fall short of their long-term goals? Why do the institutions where they are enrolled fail in so many cases to help students earn the degrees that the students say that they want? We cannot resolve these contradictions here. Clearly a much more subtle understanding of student goals and aspirations is needed before definitive judgments about the effectiveness of sub-baccalaureate programs are possible. In our accompanying reports to this one, we address this issue in more detail and focus our attention more broadly on the educational and economic outcomes of postsecondary occupational education.

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Appendix A: Datasets

National Postsecondary Student Aid Study (NPSAS)

The National Postsecondary Student Aid Study (NPSAS) is a comprehensive nationwide study to determine how students and their families pay for postsecondary education, and to describe some demographic and other characteristics of those enrolled. The study is based on a nationally representative sample of all students enrolled in postsecondary education institutions. Students who receive financial aid as well as those who do not receive aid participate in NPSAS. Comprehensive student interviews and administrative records, with exceptional detail concerning student financial aid, are available for academic years 1986-87, 1989-90, 1992-93, 1995-96, and 1999-2000. Our analyses focus primarily on the last iteration of NPSAS (with some comparisons to NPSAS96).

The design for the NPSAS sample involves a two-stage selection process of a nationally representative sample of postsecondary education institutions and then students within those institutions. Part-time and full-time students enrolled in academic or vocational courses or programs at these institutions, and not concurrently enrolled in a high school completion program, are eligible for inclusion in NPSAS. NPSAS generates data on factors associated with choice of postsecondary institution, participation in postsecondary vocational education, parental support for postsecondary education, and

occupational and educational aspirations. To be eligible for NPSAS00 an institution needed to meet the following criteria during the 1999-2000 academic year:

- (1) provide an educational program designed for persons who have completed secondary education;
- (2) provide more than just correspondence, avocational, recreational, or remedial courses;
- (3) provide at least one academic, occupational, or vocational program of study lasting at least three months or 300 clock hours;
- (4) provide courses that are open to more than the employees or members of the company or group (e.g., union) that administers the institution;
- (5) be located in the 50 U.S. states, the District of Columbia, or Puerto Rico;
- (6) not be a U.S. Service Academy; and
- (7) have a signed Title IV participation agreement with the U.S. Department of Education.⁴⁶

⁴⁶ The Title IV restriction was not a part of the NPSAS96 criteria. This change primarily affects students enrolled in less than two-year and private for-profit institutions. In NPSAS96 only about 1 percent of the sampled undergraduates were attending non-Title IV-eligible institutions. This population is excluded from the NPSAS00 survey.

In the second stage, students were sampled within eligible institutions using stratified systematic sampling. The student sampling strata included first-time beginning students, other undergraduate students, graduate students, and first-professional students. A total of 61,767 students were selected from among 999 eligible institutions. To be eligible for NPSAS00 a student must have attended a NPSAS-eligible institution during the NPSAS year (July 1, 1999 through June 30, 2000) and must be:

- (1) enrolled in either (a) an academic program, (b) at least one course for credit that could be applied toward fulfilling the requirements for an academic degree, or (c) an occupational or vocational program that required at least three months or 300 clock hours of instruction to receive a degree, certificate, or other formal award; and
- (2) not be concurrently enrolled in high school; and
- (3) not be enrolled exclusively in a GED or other high school completion program.

Of the students included in the NPSAS00 dataset, 35,080 met our criteria for a baccalaureate or sub-baccalaureate student and are included in our master dataset used in the analysis. Of these, 13,242 were sub-baccalaureate students and 7,273 were occupational sub-baccalaureates.

National Household Education Survey (NHES)

The National Household Education Survey (NHES) is a random-digit-dialed, computer-assisted telephone interview. It is designed to collect information from households on a variety of education-related issues. The Adult Education surveys, conducted in 1995 and 1999, ask persons age 16 and older about their participation in basic skills courses, English as a Second Language (ESL) courses, credential (degree or diploma) programs, apprenticeships, work-related courses, and personal development/interest courses. The 1995 survey contains 19,722 observations, and the 1999 survey has 6,697 observations. Adults participating in educational activities, which accounted for 48.9 percent of all 1995 respondents and 50.4 percent of all 1999 respondents, provided information about the programs or courses they participated in, including the subject matter, duration, cost, location, sponsorship, and employer support. Moreover, extensive background, employment, and household information were collected for each individual. Therefore, the NHES surveys provide useful information on the participants in non-credential educational courses, which is not covered by NPSAS. It is important to mention that the NHES sample design over-samples minorities in order to increase the reliability of the estimates for these groups. Weights are used to estimate participation rates that are representative of the overall U.S. population.

High School and Beyond (HS&B)

High School and Beyond (HS&B) describes the educational attainment, employment outcomes, and family formation of the 1980 sophomore class in 1992, ten years after most of the students in that cohort graduated from high school. The survey also collected data on the family status, employment outcomes, voting behavior, and activities of that 1980 class in 1992, as well as additional information about their educational experiences. The study design provided for a highly stratified national probability sample of over 1,100 secondary schools as the first stage units of selection. In the second sampling stage, 36 seniors and 36 sophomores were selected from each school and, overall, more than 30,000 sophomores participated in the base year (1980) survey. Longitudinal information was collected for less than half of the 1980 sophomore cohort and no data were collected for 1980 seniors after the base year.

National Education Longitudinal Study of 1988 (NELS)

The base year of the National Education Longitudinal Study of 1988 (NELS) represents the first stage of a major longitudinal effort designed to provide trend data about critical transitions experienced by students as they leave elementary school and progress through high school and into postsecondary institutions or the workforce. The 1988 eighth grade cohort is followed at two-year intervals until 1994, and a fourth follow-up is conducted in 2000. Data were collected from students and their parents,

teachers, and high school principals, and from existing school records such as high school transcripts. All dropouts were retained in the study.

The study captures the population of early dropouts (those who leave school prior to the end of tenth grade), while monitoring the transition of the student population into secondary schooling. The second follow-up took place early in 1992, when most sample members were in the second term of their senior year. The second follow-up provides a culminating measurement of learning in the course of secondary school, and also collects information that will facilitate investigation of the transition into the labor force and postsecondary education after high school. Because the NELS sample was freshened to represent the high school class of 1992, trend comparisons can be made to the high school classes of 1972 and 1980 that were studied in NLS-72 (National Longitudinal Study of the High School Class of 1972) and HS&B. The NELS second follow-up returned to students who were identified as dropouts in 1990, and identified and surveyed additional students who had left school since the prior wave. The third follow-up took place in 1994, when most sample members had completed high school. The primary goals of the 1994 round were: (1) to provide data for trend comparisons with NLS-72 and HS&B, (2) to address issues of employment and postsecondary access and choice, and (3) to ascertain how many dropouts have returned to school and by what route.

Beginning Postsecondary Students Longitudinal Study (BPS)

To complement the high school cohort longitudinal studies and to improve data on participants in postsecondary education, the Beginning Postsecondary Students Longitudinal Study (BPS) was used. Because older students, in addition to recent high school graduates, are increasingly included in postsecondary education, high school cohort studies are not representative of all postsecondary participants at a given point in time. BPS includes these non-traditional as well as traditional students and is representative of all beginning students in postsecondary education. The BPS survey enhances and expands the base of information available regarding persistence, progress, and attainment from initial time of entry into postsecondary education through leaving and entering the workforce. By starting with a cohort that has already entered postsecondary education, BPS is able to address issues of persistence, progress, and attainment, as well as issues related to transitions between undergraduate and graduate education and transitions between postsecondary education and work. By following a postsecondary cohort (rather than a single age elementary or secondary school cohort), BPS is able to determine to what extent, if any, students who start postsecondary education later differ in their progress, persistence, and attainment. Because students who delay entry into PSE have different experiences prior to entry than students who enter immediately after high school, their transitions between levels of education and work may also be different.

The BPS is based on the National Postsecondary Student Aid Study (NPSAS). BPS89 followed first time beginning students from the NPSAS conducted in 1989-90. The BPS96 cohort is based on NPSAS96 with the first follow-up in 1998. At the time of this investigation, the 2000 follow-up to BPS96 was unavailable.

Appendix B: Major Fields by Type

The classification of occupational and academic field of study is based on Choy and Horn (1992). The code is the major code assigned in the NPSAS dataset.

Type: O = occupational

A = academic

Code	Major	Type
	Undeclared	n/a
0	Unknown	n/a
10	Agriculture	O
20	Agriculture Science	O
30	Natural Resources	A
31	Forestry	A
40	Architecture	A
50	American Civilization	A
51	Area Studies	A
52	African-American Studies	A
53	Ethnic Studies	A
60	Accounting	O
61	Business: Finance	O
62	Business: Business/Mgmt Systems	O
63	Business: Management/Business Admin	O
70	Business: Secretarial	O
71	Business: Business Support	O
80	Business: Marketing/Distribution	O
90	Journalism	A
91	Communications	A
100	Communication Technology	O
110	Computer Programming	O
111	Data Processing Technology	O
112	Computer and Information Science	O
120	Consumer Services: Cosmetology	O
121	Consumer Services: Mortuary	O
130	Education: Early Childhood	A
131	Education: Elementary	A
132	Education: Secondary	A
133	Education: Special	A
134	Education: Physical Education	A
135	Education: Other	A
140	Engineering: Electrical	O
141	Engineering: Chemical	O
142	Engineering: Civil	O
143	Engineering: Mechanical	O
144	Engineering: All Other	O
150	Engineering Technology	O
160	Spanish	A

Code	Major	Type
161	Foreign Langs: Non-European	A
162	Foreign Langs: European/General	A
170	Health, Allied: Dental/Medical Technician	O
171	Health, Allied: Therapy and Mental Health	O
172	Health/PhysEd/Recreation	O
173	Nursing: Nurse Assisting	O
174	Health, Allied: General & Other	O
175	Nursing: Nursing, Post-R.N.	O
180	Health: Audiology	O
181	Health: Clinical Health Science	O
182	Health: Dentistry	O
183	Health: Medicine	O
184	Health: Veterinary Medicine	O
185	Nursing: Registered Nurse	O
186	Health: Health/Hospital Administration	O
187	Health: Public Health	O
188	Health: Preparatory Programs	O
190	Health: Dietetics	O
191	Textiles	O
192	Home Economics: All Other	O
194	Health: Pharmacy	O
195	Health: Podiatry	O
196	Health: Optometry	O
197	Health: Osteopathic Medicine	O
200	Vocational Home Econ: Child Care/Guidance	O
201	Vocational Home Econ: Other	O
220	Law: Para-Legal/Pre-Law	A
221	Law	A
230	Letters: English/American Literature	A
231	Letters: Creative/Technical Writing	A
232	Letters: All Other	A
240	Liberal Studies	A
250	Library/Archival Science	A
260	Biological Science: Zoology	A
261	Biological Science: Botany	A
262	Biological Science: Biochemistry	A
263	Biological Science: All Other	A
264	Biological Science: Biophysics	A
270	Mathematics: Statistics	A
271	Mathematics: All Other	A
280	Military Sciences	A
300	Women's Studies	A
301	Interdisciplinary: Environmental Studies	A
302	Interdisciplinary: Biopsychology	A
303	Interdisciplinary: Integrated/General Science	A
304	Interdisciplinary : All Other	A
310	Leisure Studies	A

Code	Major	Type
320	Basic/Personal Skills	n/a
380	Philosophy	A
381	Religious Studies	A
390	Clinical Pastoral Care	A
400	Physical Sciences: Chemistry	A
401	Physical Sciences: Earth Science	A
402	Physical Sciences: Physics	A
403	Physical Sciences: All Other	A
420	Psychology	A
430	Protective Services	O
440	Social Work	A
441	Public Administration	A
450	Anthropology/Archaeology	A
451	Economics	A
452	Geography	A
453	History	A
454	Sociology	A
455	Political Science	A
456	International Relations	A
457	City Planning	A
460	Industrial Arts: Construction	O
470	Mechanics: Transportation	O
471	Industrial Arts: Electronics	O
472	Mechanics: All Other	O
480	Arts: Commercial Art	O
481	Precision Production	O
490	Transportation: Air	O
491	Transportation: All Other	O
500	Arts: Design	A
501	Arts: Speech/Drama	A
502	Arts: Film Arts	A
503	Arts: Music	A
504	Arts: Visual/Performing/Fine	A
505	Arts: Crafts, Folk Art, Artisanry	A
900	No Major	n/a

Appendix C: Definitions of Terms Used in the NHES Analysis

Student Type

For-credit: are students who reported haven taken courses that are part of a program leading towards a college or university degree, or a diploma or certificate from a vocational or technical school or a formal vocational training program.

Non-credit: are students who reported being involved in any of the following educational activities: ESL, ABE/GED/Basic Skills, apprenticeships, job-related or career programs, or other courses (personal development/interest).

Sub-baccalaureate: are students who reported having taken courses for-credit at a two-year community or junior college, at a public two-year vocational school or technical institute, or at a private vocational, trade, business, hospital or flight school; or who reported having taken courses for-credit in any other type of institution but who stated working towards a vocational/technical diploma after high school but below a bachelor's degree, or towards an associate degree.

Sub-baccalaureate occupational: are sub-baccalaureate students who reported one of the following as their major field of study: agricultural business and production, agricultural sciences, business, business management, communication technologies, computer and information science, construction, engineering, engineering technologies, health related,

health professions, home economics, mechanics/repair, personal services, precision production, protective services, science technologies, transportation, vocational home economics.

Non-credit occupational: are students involved in an apprenticeship and/or in a job- or career-related program.

Postsecondary occupational education: are job-related students, apprenticeship students, and sub-baccalaureate occupational students.

Exclusively non-credit: are occupational students involved in apprenticeship and/or job-related programs only. That is, they are not involved in occupational credential courses (but they could be involved, for example, in academic credential courses).

Exclusively for-credit occupational sub-baccalaureate: are students involved only in for-credit occupational courses that are leading towards a certificate or associate degree and are taken at two-year or less than two-year schools or in other type of institutions that are leading towards a certificate or associate degree. That is, they are not involved in non-credit occupational programs (but they could be involved, for example, in personal development courses, which are of non-occupational non-credential nature).

Both credit and non-credit: are students simultaneously involved in an occupational for-credit course (that is, they are in a sub-baccalaureate occupational course) and in an occupational non-credit program (apprenticeship and/or job-related programs).

Major Field of Study

We classify sub-baccalaureate students according to Choy and Horn (1992), as follows.

Academic: architecture, area/ethnic studies, biological sciences, communications, education, English, foreign language, law/legal studies, leisure studies, liberal arts, library science, mathematics, military technologies, multidisciplinary studies, natural resources, parks/recreation studies, philosophy, physical sciences, psychology, public administration, religion, social sciences, theological studies, visual/performing arts.

Occupational: agricultural business and production, agricultural sciences, business, business management, communication technologies, computer and information science, construction, engineering, engineering technologies, health related, health professions, home economics, mechanics/repair, personal services, precision production, protective services, science technologies, transportation, vocational home economics.

Other: Basic skills and indeterminable.

Appendix D: Gender Distribution in High-Wage Occupational Majors

Table 6 lists all occupations that require sub-baccalaureate occupational education which had an average annual wage of more than \$35,000 in 1998. The table shows the proportion of male and female students in the majors that prepare students for those occupations in 1996 and 2000. A clear pattern of gender bias is evident in most fields, with only computer, general allied health fields, finance, and design as those majors with any semblance of gender equity among these high-wage occupations.

Table 6: Percentage of Male and Female Students Enrolled in Fields Preparing Them for High-Wage Occupations

Major Field	1996		2000	
	Male	Female	Male	Female
Precision Production	96.3	3.7	94.2	5.9
Mechanics: Transportation	96.2	3.8	94.4	5.6
Industrial Arts: Electronics	93.1	6.9	87.6	12.5
Engineering Technology	83.8	16.2	84.7	15.3
Communications Technology	81.6	18.4	65.7	34.3
Computer and Information Sciences	51.7	48.4	64.2	35.8
Computer Programming	51.4	48.6	55.4	44.6
Health, Allied: General and Other	50.1	49.9	34.7	65.3
Business: Finance	49.2	50.9	52.7	47.3
Arts: Design	47.3	52.7	44.2	55.8
Consumer Services: Mortuary	41.2	58.8	57.8	42.2
Data Processing Technology	30.4	69.6	--	--
Social Work	28.0	72.0	11.4	88.6
Health, Allied: Therapy and Mental Health	27.9	72.1	24.7	75.3
Health, Allied: Dental/Medical Technician	19.6	80.4	19.2	80.8
Nursing: Registered Nurse	9.7	90.3	9.3	90.7
Nursing: Nurse Assisting	4.3	95.7	11.6	88.4

Source: NPSAS 1996 and NPSAS 2000.

Notes: All cells are row percents for students in Major Field.

High-wage occupations are defined as those with average annual wages in 1998 that were greater than \$35,000.