Advanced Technological Education Survey 2011 Fact Sheet

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In 2010, the National Science Foundation's Advanced Technological Education projects and centers

- educated more than 70,750 students—60 percent at two-year colleges and 33 percent at secondary schools[1]
- offered programs at more than 1,250 educational institutions across the country—50 percent at two-year colleges and 40 percent at secondary schools
- developed more than 2,300 curriculum materials
- offered more than 2,780 professional development opportunities, which served more than 58,260 educators—roughly 40 percent were two-year college faculty and 40 percent secondary school teachers
- had more than 1,000 articulation agreements in place, which involved more than 870 institutions and helped more than 2,760 students matriculate
- served a student population that was 45 percent nonwhite and 23 percent female
- collaborated with more than 9,800 groups that provided more than $7 million in monetary contributions and $9 million worth of in-kind support

This fact sheet summarizes data gathered in the 2011 survey of National Science Foundation (NSF) Advanced Technological Education (ATE) grant recipients. Conducted by EvaluATE, the evaluation resource center for the ATE program located at The Evaluation Center at Western Michigan University, this was the twelfth annual survey of ATE projects and centers. Included here are findings about the program's grantees and their activities, accomplishments, and impacts during the 2010 calendar year.

The 2011 survey was a census of active ATE program grantees (N=234 principal investigators).[2] Survey responses were received from 220 grantees, including 179 projects, 36 centers, and 5 targeted research projects. In keeping with expectations, most survey recipients completed the sections on Grantee Characteristics (94%), Organizational Practices (94%), Collaboration (94%), and Special Topics (new this year) (93%). More than 30 percent of grantees completed—beyond an initial screening question—the sections on Materials Development (40%), Professional Development (41%), and Program Improvement (46%). Whether grantees completed these sections depended on the nature of their grant work. Those who allocated at least $100,000 or 30 percent of their budgets in 2010 to the activities in question were expected to complete the sections. PIs who spent less had the option to complete each section. About 50 percent of respondents for Materials Development and Professional Development and 25 percent for Program Improvement indicated that they did not meet the budgetary requirement, but wanted to report data in those areas anyway.

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[1] Reported numbers of people (students and professional development participants) throughout this report are rounded to the nearest ten. The 'N' indicated in table and figure titles represents the number of respondents for a given item.

[2] Prior to 2010, survey population included PIs for all current ATE projects and centers that had been active for at least one year as of January 1 in the year the survey was conducted.

The ATE program was established by NSF in response to the *Scientific and Advanced-Technology Act of 1992*, which was intended "to establish a national advanced technician training program, utilizing the resources of the nation's two-year associate-degree-granting colleges."[3] Consistent with that mandate, the ATE program solicitation states that "the ATE program focuses on two-year colleges and expects two-year colleges to have a leadership role in all projects." As such, one would expect two-year colleges to figure prominently as both grantees and beneficiaries of ATE activities. The survey findings regarding the types of institutions receiving ATE grants (Figure 1), their use of grant funds to serve different audiences (Figure 2), and other indicators throughout this report show this to be the case.
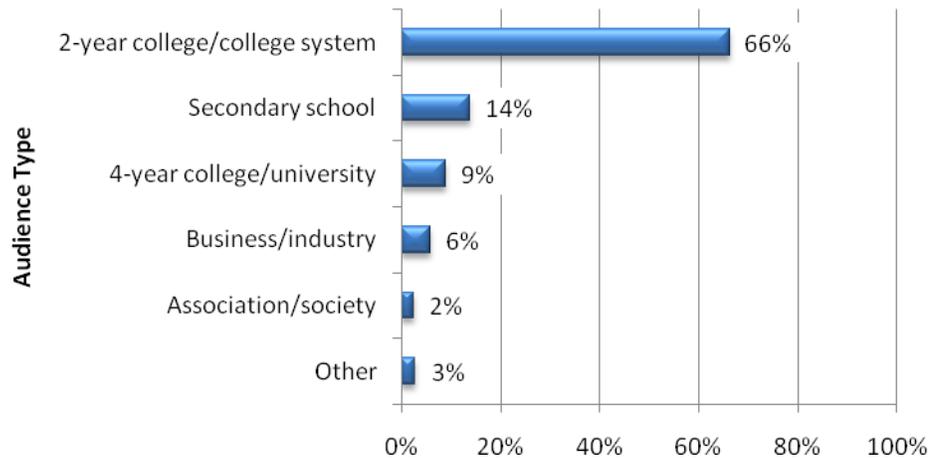
Figure 1. 2010 ATE Grant Recipient Institutions (N= 220)
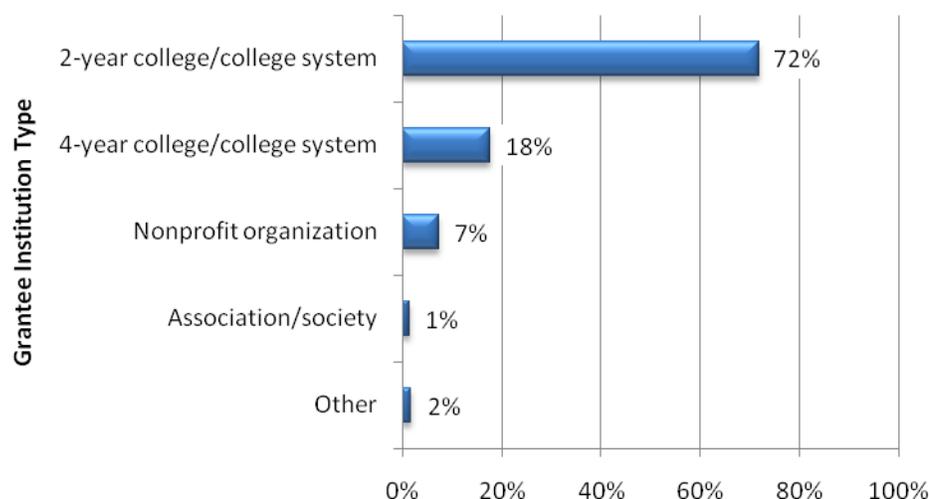
The **major emphases of projects and centers** reported by PIs (N=215) are diverse, with the largest category—information, geospatial, and security technologies—including only about 15 percent (n=33) of the respondents. Agricultural manufacturing technologies accounted for 11 percent (n=24), while advanced manufacturing technologies (n=18); learning, evaluation, and research (n=18); bio-technology and chemical processes (n=17); and engineering technologies (n=17) each accounted for about 8 percent of grants represented in the survey data. Other major content area emphases accounted for 5 percent or less of respondents. These included technology teacher preparation (n=11), micro and nanotechnologies (n=10), and recruitment (n=6). Additionally, a large number, about 26 percent (n=57), of respondents selected the "other" category. A number of these respondents provided brief descriptions of the major emphases of their project/centers, and generally these descriptions conveyed interdisciplinary or a multidisciplinary foci.

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[3] Public Law 102-476.

Figure 2. Program-wide Budget Allocations to Serve Audience Types (N= 208)

Audience Type:
- 2-year college/college system — 66%
- Secondary school — 14%
- 4-year college/university — 9%
- Business/industry — 6%
- Association/society — 2%
- Other — 3%

(x-axis: 0% 20% 40% 60% 80% 100%)

Twenty-six percent of respondents reported spending grant funds on **targeted research.** Among those who spent money on research, the average was 12 percent of the grant budget. Thirty-four respondents provided brief descriptions of their research. Research topics included training/instruction or curriculum development to improve student outcomes (n=12); workforce analysis, best practices, and trends documentation (n=11); evaluation, assessment, and standard setting (n=3); developing or implementing new technologies (n=2); employment outcomes (n=1); or other/general research (n=5).

Articulation agreements are intended to enable students who complete a program or series of courses to matriculate to a higher level of education at specified institutions and most often are permanent. Twenty-eight percent of respondents indicated that developing articulation agreements was part of their project/center activities in 2010. These respondents reported 220 agreements were developed and 1,030 agreements were in place in 2010 (two-thirds were between high schools and two-year colleges), which involved 870 institutions and articulated 2,320 students (Table 1). Respondents who did not develop new agreements in 2010 were mistakenly directed to skip the remaining questions about articulation agreements, so it is possible grantees without new activity in this area did not report their preexisting agreements, which would result in an undercount of the articulation agreement metrics shown in Table 1.

Table 1. Articulation Agreements (N=62)

	Between high schools and 2-year colleges	Between 2-year and 4-year colleges	Total
Agreements developed in 2010	120	100	220
Agreements in place in 2010	700	330	1,030
Institutions involved in 2010	560	310	870
Students that matriculated in 2010	1,700	620	2,320

Looking at the program as a whole, more than half of the grant funds went toward program improvement (19%), materials development (17%), and professional development (22%) efforts combined. Four percent of grant funds was devoted to targeted research, 7 percent to evaluation, and 3 percent to advisory committees (Figure 3).

Figure 3. Program-wide Budget Allocations for Specific Activities/Costs (N= 212)
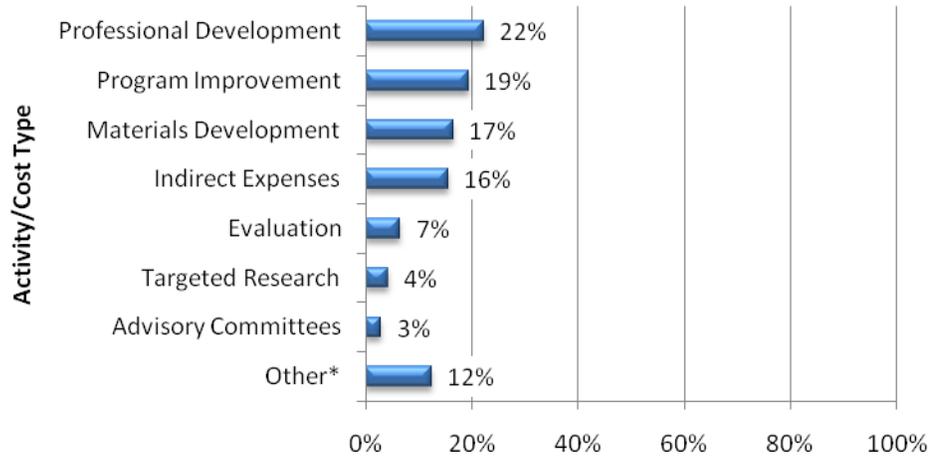
Note:"Other" costs reported by respondents included things like salaries, travel, equipment, outreach, dissemination, marketing, recruitment, administration, and student support. Many of these could/should have been included under the larger categories listed on the survey instrument.

ORGANIZATIONAL PRACTICES

The organizational practices survey section focused on activities intended to improve the knowledge base of project and center staff for conducting their grant work. These questions addressed use of workforce needs assessments, advisory committees, and grant-level evaluators, as well as providing support for the professional development of project/center staff.

Most projects and centers reported having an evaluator (95%). Most also reported using their ATE funds to support the professional development of their staff in 2010 (84%). Close to one-third (30%) conducted a workforce needs assessment in 2010.

Almost three-fourths (73%) of respondents indicated they used at least one type of **advisory group** in 2010, and nearly half (45%) engaged a locally-based committee (Figure 4). Note that a National Visiting Committee, used by 20 percent of grantees, is a special type of committee that guides the work of centers and reports to NSF. NVCs are required for all ATE-funded centers.

Figure 4. ATE Grantees' Use of Advisory Groups (N= 220)
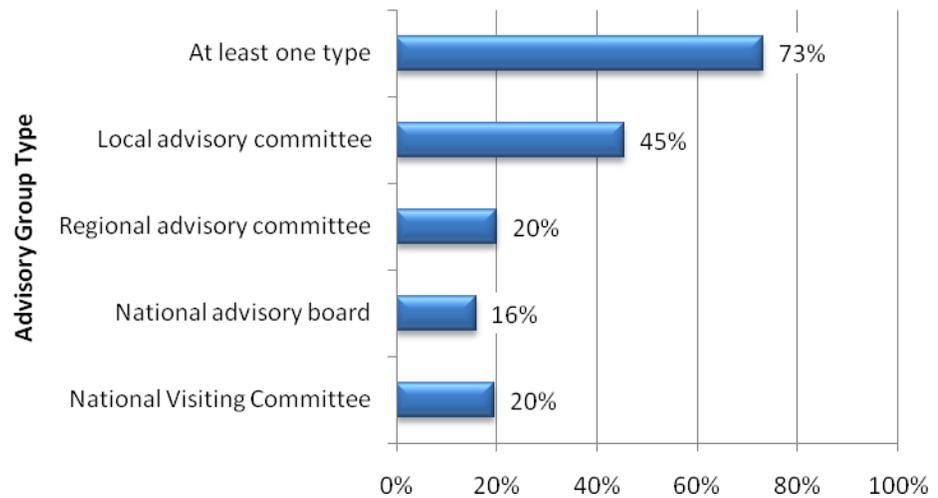
Most respondents reported using evaluators that were external to both the grant and the institution (84%); 15 percent of respondents indicated they had an internal evaluator (Figure 5) (5 percent indicated an internal evaluator as their only evaluator). Some projects engaged more than one type of evaluator. A majority of respondents (83%) reported some expenditure on **evaluation** in 2010. Among those that spent money on evaluation, the average allocation was 8 percent. Not all grantees that reported having an evaluator also reported expenditure on evaluation in 2010. Aside from missing data, the causes for this discrepancy may be that some new grants have an evaluator selected, but have not paid for services yet and/or that the compensation for internal evaluators was not have been reported under Evaluation on the question about budget allocations.

## Figure 5. ATE Grantees' Use of Evaluators (N= 219)
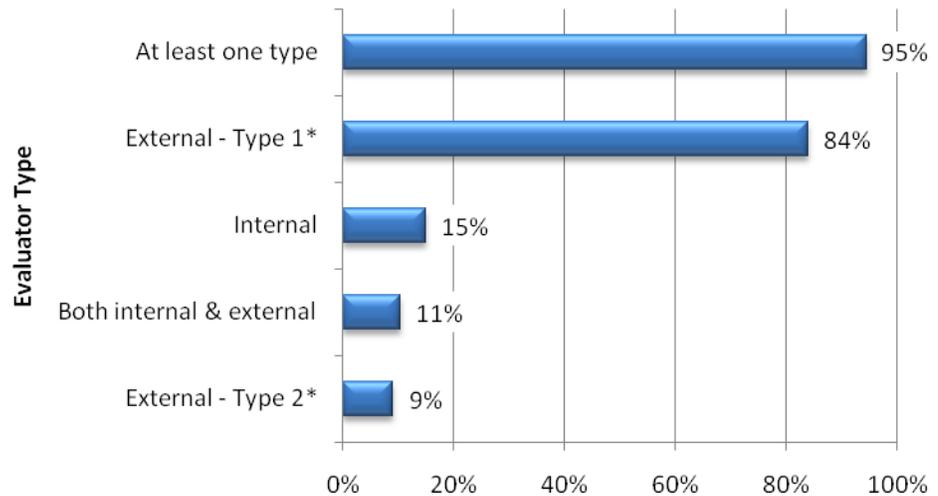
Note: Type 1 external evaluator = external to both institution and grant; Type 2 external evaluator = external to grant, but internal to institution.

COLLABORATION

The survey questions about collaboration are accompanied by a definition of this term as "a project/center relationship with another institution, business, or group that involved the collaborator's contribution of money or in-kind support to an ATE grant." Respondents reported 9,800 collaborating organizations, which collectively added $16 million to the ATE program—$7 million in monetary support and $9 million in-kind. Business/industry and educational institutions were the most common types of collaborator, comprising more than three-quarters of all collaborating organizations (Figure 6).

Figure 6. Number of ATE Collaborating Organizations (N= 213)
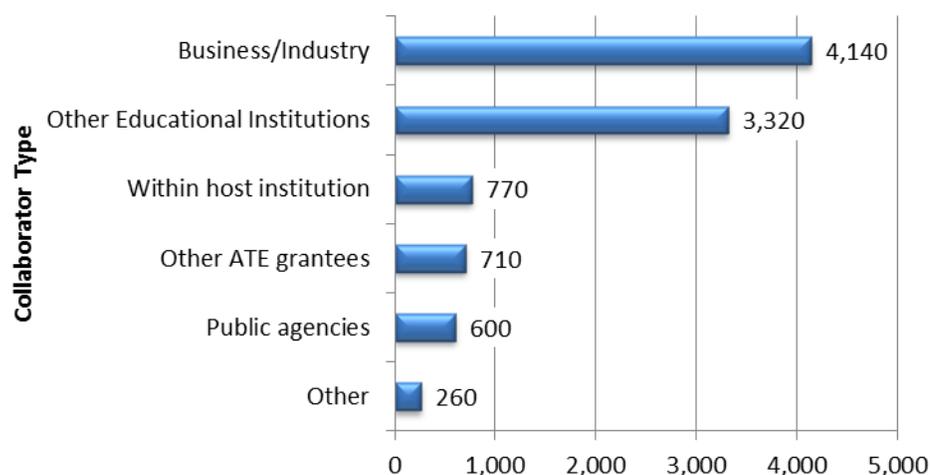
MATERIALS DEVELOPMENT

By completing this section of the survey, 94 PIs (40% of the survey recipients) indicated that they were significantly involved in developing curriculum and educational materials for national dissemination. Of this group, 48 reported that they allocated at least 30 percent of their direct costs or at least $100,000 to materials development in 2010; the remainder indicated that they did not meet this threshold but wanted to report on their work in this area anyway.

In total, 2,310 materials were reported, of which 1,220 materials were drafted and/or field tested in 2010, and 1,080 were completed. Of the materials completed, 31 percent were reported to be in use outside of the home and partner institutions. One-quarter were published commercially in 2010.

Materials addressed here are various media (textbooks, laboratory experiments and manuals, software, CD-ROMs, videos, or other courseware) used to convey the content and instruction of courses, modules, and activities. These were defined as follows:

Course: A stand-alone collection of instructional content and activities to achieve some desired educational outcomes. Courses usually last a semester or a year.

Module: A self-contained collection of content and activities designed to achieve a set of specific objectives. Modules are generally shorter than courses and focus on fewer outcomes.

Activity: An instructional exercise, such as a laboratory experiment or test, designed to achieve a discrete learning outcome.

PIs were asked to indicate which education levels their materials were developed to serve. Their responses indicate that a large proportion of materials were intended to serve multiple levels (evidenced by the fact that the sum of the materials reported by education level exceeds the total number of materials developed in 2010). Figure 7—which indicates the number of developed courses, modules, and activities that serve the different education levels—reflects a strong focus on the two-year college level.

**Figure 7. Education Level Served by Materials Developed (N= 93)**
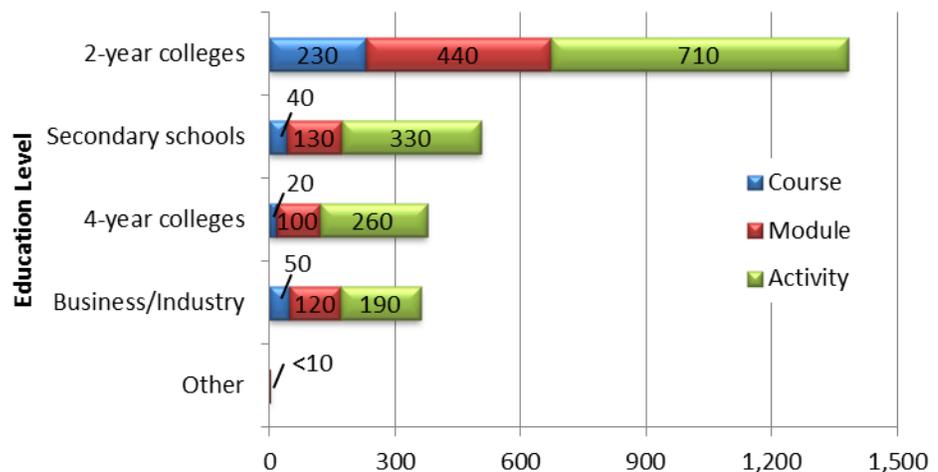
PROFESSIONAL DEVELOPMENT

By completing this section of the survey, 97 PIs (41% of the survey recipients) indicated that they were significantly involved in providing professional development in 2010. Of this group, 48 reported that they allocated at least 30 percent of their direct costs or at least $100,000 to materials development in 2010; the rest indicated that although they did not meet this threshold, they still wanted to report on their professional development.

These respondents said they provided 2,780 professional development activities in 2010. These activities ranged in length from short presentations, intended primarily to raise awareness, up to long-term periodic instructional activities, including internships or peer coaching. Almost half of these activities were short presentations to raise awareness. Figure 8 shows the number of **activities** of each length that were offered in 2010.

Figure 8. Number of ATE Professional Development Activities by Length (N= 95)
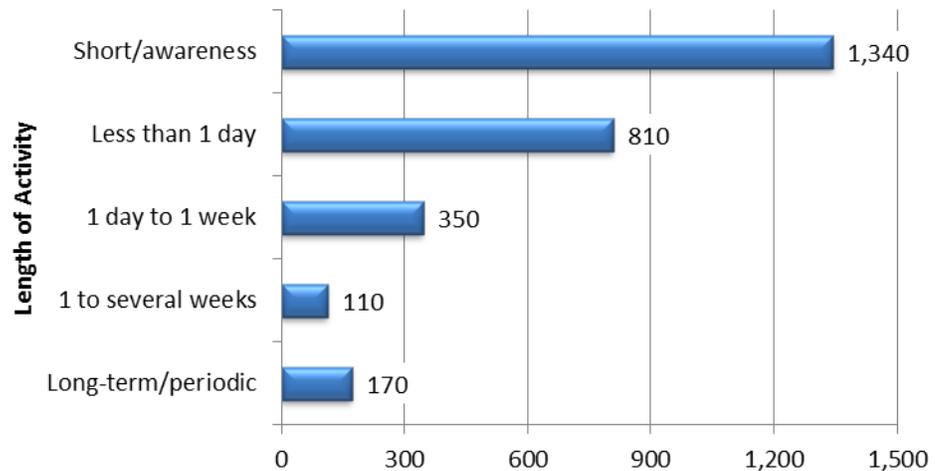

Almost two-thirds (61%) of the 58,260 participants in ATE professional development activities were involved in short presentations to raise awareness. Fourteen percent of all participants were engaged in activities lasting at a day or more. Figure 9 shows the number of **participants** in each type of activity in 2010.

Figure 9. Number of ATE Professional Development Participants Across Activities of Different Lengths (N= 95)
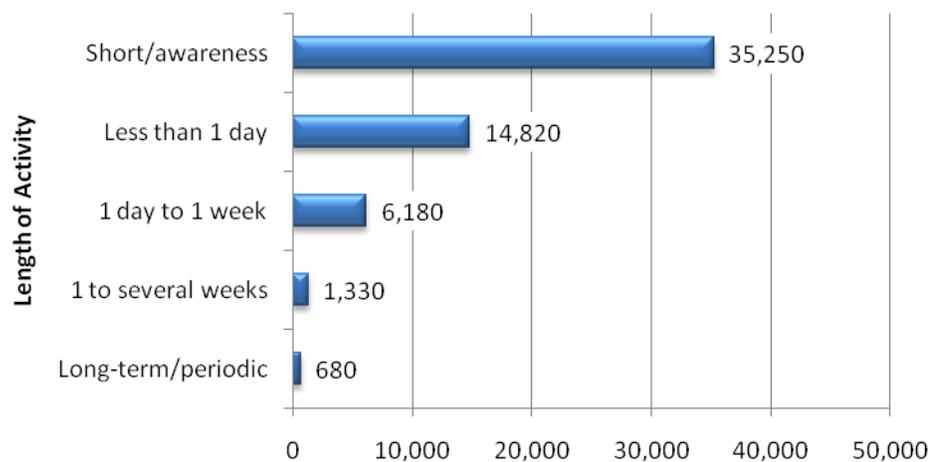
Forty-two percent of professional development participants were from two-year colleges, and 35 percent were from secondary schools. Figure 10 shows what percentage of the 46,490 participants was reported for each **education level**. Missing data is the reason for the discrepancy in participant counts between Figures 9 and 10 (questions about the total number of participants and the breakdown by education level were asked in separate items on the survey form).

Figure 10. Percentage of ATE Professional Development Participants by Education Level (N= 93)
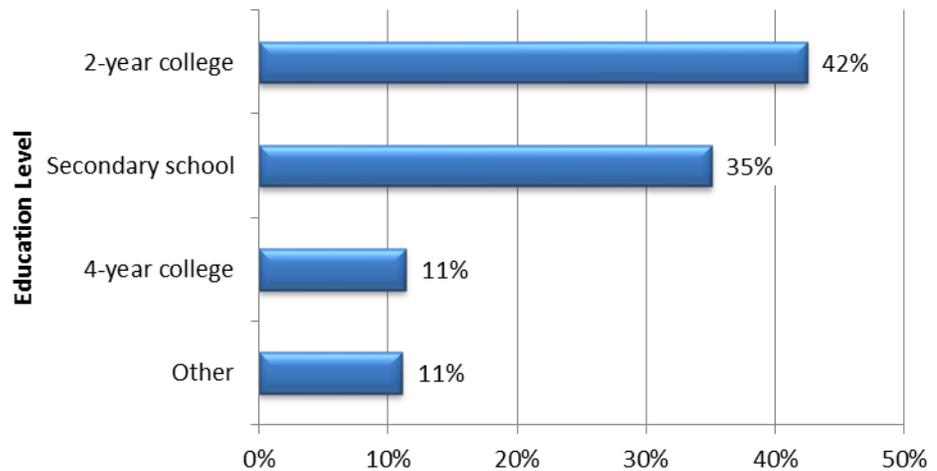

ATE-Supported Instruction and Program Development/Improvement

Survey questions about program development and improvement were preceded by a definition of a program as a sequence of courses, laboratories, and/or work-based experiences that lead students to a degree, certification, or occupational competency point.

Beginning in 2010, the survey's organization changed such that Section 1 now includes a subsection where all grantees are invited to report on instruction of students. Slightly more than half (54%) of all ATE respondents (n=119) completed these questions on student enrollments (107 of these indicated elsewhere that program improvement was a significant focus of their work). Findings from those responses are provided here first, followed by findings from responses to Section 6, where respondents significantly engaged in program improvement and development provided additional details about their work in this area and its evaluation.

PIs were asked to report the total number of individual students who took at least one course in one of their ATE-supported programs in 2010. Responding PIs reported that their ATE funds supported the instruction of 70,750 students. Sixty percent of the students were enrolled at two-year colleges, 33 percent at secondary schools (Figure 11). Given that 147 grantees indicated they spent some portion of their ATE budgets on program improvement, it is likely that the number of students reported is an underestimate, the extent of which is unknown.

Figure 11. Number of Students in ATE-Supported Courses by Education Level (N= 114)
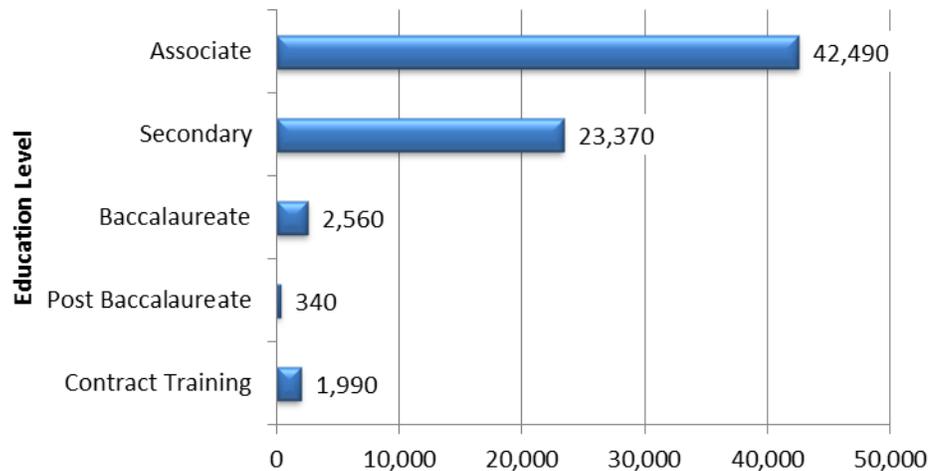
Of the 1,250 **locations** where ATE-supported programs were offered, most were at two-year colleges (50%) and secondary schools (40%) (Figure 12).

Figure 12. Percentage of ATE-Supported Program Locations by Education Level (N= 119)
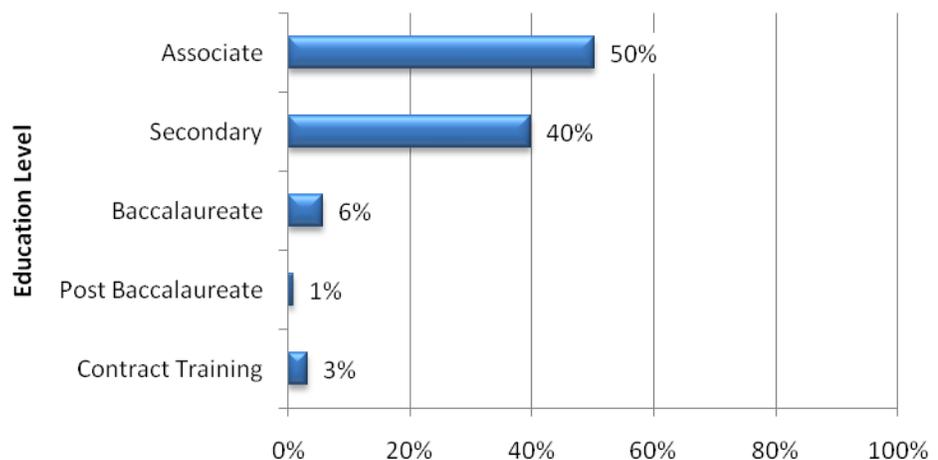

Table 2 presents PIs' reports of the demographic makeup of their student participants—persons who had taken at least one course in one ATE-supported program in 2010. According to the numbers reported, almost half of the students (45%) were nonwhite; a little less than one-fourth (23%) were female. Inconsistency between the total number of students reported and the sums of subgroups can be attributed to some PIs not reporting demographic data (student demographic s data were gathered via a separate question from total enrollments).

Table 2. Demographic Characteristics of ATE Students

Demographic Characteristic	Number	Percentage of category
Gender (N=111)		
Male	49,420	77%
Female	15,100	23%
Race/ethnicity (N=103)		
Hispanic/Latino	10,370	18%
American Indian/Alaska Native	320	1%
Asian	3,500	6%
Black/African American	8,980	16%
Native Hawaiian/Pacific Islander	640	1%
Multiracial	2,070	4%
White	31,670	55%
Students requesting accommodation under the Americans with Disabilities Act (N=32)	420	-

Forty-six percent of survey recipients (N=107) completed the program improvement section. Of this group, 80 reported that they allocated at least 30 percent of their direct costs or at least $100,000 to program improvement in 2010; the remainder indicated that they did not meet this threshold but wanted to report on their work in this area anyway. The respondents in this section reported that they offered 940 programs and 2,070 courses with ATE support in 2010. A majority of the programs (74%) and courses (91%) were provided at the two-year college level. Because 119 grantees indicated in Section 1 that they provided ATE-supported instruction, but only 98 and 91 respondents reported data on programs and courses, respectively, these numbers underestimate the total number of programs and courses supported by ATE.

OTHER ATE SURVEY REPORTS

Additional reports based on annual ATE survey data, dating back to 2000, are available at www.evalu-ate.org. Recent reports include data snapshots focused on particular topics and trend analyses.