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Corey Smith, Lori Wingate, & Arlen Gullickson

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Highlights

In 2012, National Science Foundation-funded Advanced Technological Education projects and centers

- educated approximately 96,460 students—52 percent of whom were at two-year colleges and 40 percent at secondary schools.¹
- offered programs at about 2,240 educational institutions across the country.
- developed 2,760 curriculum materials, 15 percent of which were full courses and 2 percent of which were published commercially.
- offered more than 3,240 professional development opportunities, which served more than 72,840 educators—roughly 44 percent of whom were two-year college faculty and 33 percent secondary school teachers.
- had approximately 1,570 articulation agreements in place, 25 percent of which were developed in 2012; these agreements helped about 1,460 students matriculate between high school and two-year institutions and 2,410 students between two-year and four-year institutions.
- served a student population that was 42 percent minority and 23 percent female.
- collaborated with more than 16,920 groups that provided more than \$16 million in monetary contributions and in-kind support valued at \$13 million.

This fact sheet summarizes data gathered in the 2013 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 fourteenth annual survey of ATE projects and centers. Included here are findings about the program's grantees and their activities, accomplishments, and impacts during the 2012 calendar year.

The 2013 survey was a census of active ATE principal investigators (PIs) (N=258). Survey responses were received from 247 grantees (96%), including 189 projects, 51 centers, and 7 targeted research projects. Most survey recipients completed the sections on Grantee Characteristics and Practices (96%) and Special Topics (91%). About half of the survey recipients completed the sections on Materials Development (50%), Professional Development (52%), and Program Improvement (51%). Whether grantees completed those sections depended on the nature of their grant work. Those who allocated at least \$100,000 or 30 percent of their budgets in 2012 to the activities in question were expected to complete the relevant sections. PIs that spent less had the option to complete each section.

¹ Reported numbers of participants, products, and activities 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.

Grantee Characteristics and Practices

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.”² 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.” Accordingly, two-year colleges figure prominently in the program, as both grantees and beneficiaries of grant-supported activities. Sixty-nine percent of ATE grant recipients are located at two-year colleges (Figure 1). Cumulatively, grantees reported spending 64 percent of program funds to serve students and faculty at two-year colleges (Figure 2).

Figure 1. ATE Grant Recipient Institutions (N=247)

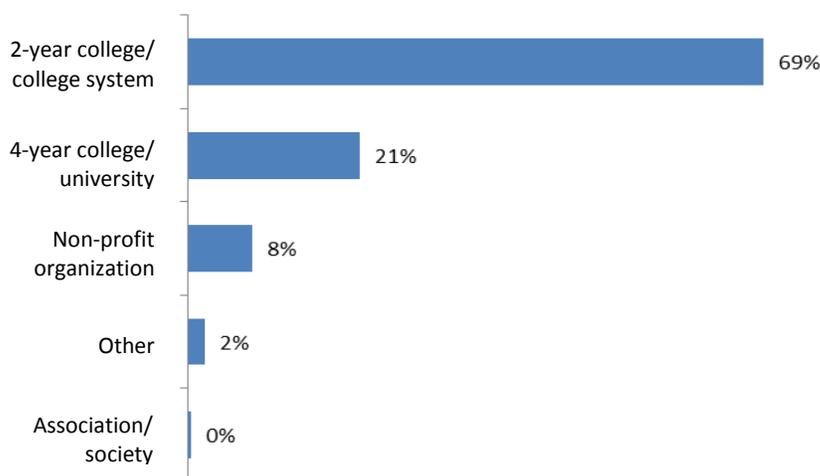
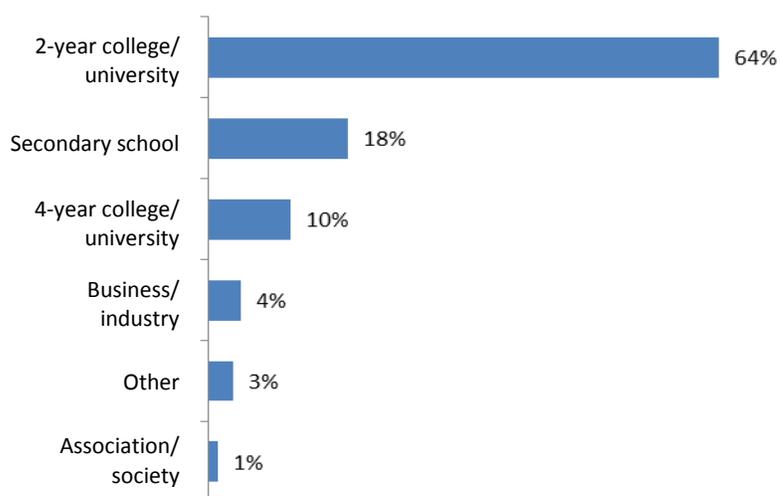


Figure 2. Grantee-Reported Budget Allocations to Serve Audience Types (N=224)



² Public Law 102-476.

The content-area emphases of projects and centers reported by PIs (N=245) are diverse, with the largest category—agricultural and environmental technologies—including about 18 percent (n=44) of the respondents. This represents a shift from the past three years, when information, geospatial, and security technologies was the category that comprised the largest percentage of ATE respondents. Table 1 shows the various content-area emphases and the corresponding percent of grantees reporting in those categories. All percentages except for agricultural and environmental technologies are within 3 percent of the amounts reported on last year’s survey.³

Table 1. Reported Content-Area Emphases (N=245)

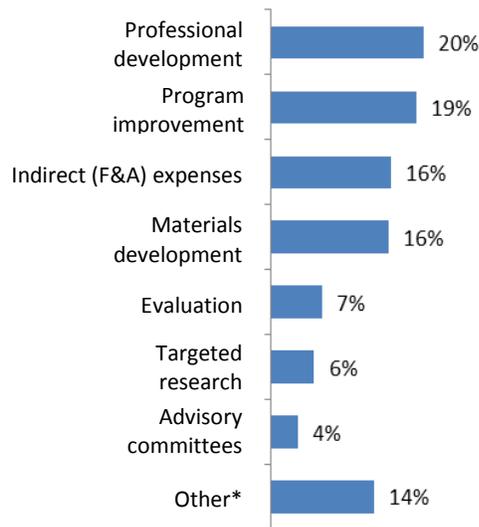
<i>Content area</i>	<i>Number of grantees</i>	<i>Percent of grantees</i>
Agricultural and environmental technologies	44	18%
Other*	40	16%
Information, geospatial, and security technologies	34	14%
Advanced manufacturing technologies	30	12%
Biotechnology and chemical processes	22	9%
Learning, evaluation, and research	19	8%
Engineering technologies	13	5%
Micro and nanotechnologies	13	5%
Recruitment	12	5%
Technology teacher preparation	11	4%
Core courses	7	3%

* Most respondents who selected “other” reported interdisciplinary or multidisciplinary foci.

For the ATE program as a whole, PIs reported that more than half of the grant funds were used to support efforts focused on professional development (20%), program development and improvement (19%), and materials development (16%). Six percent of grant funds was devoted to targeted research, 7 percent to evaluation, and 4 percent to advisory committees (Figure 3).

³ See the 2012 ATE Survey Fact Sheet at evalu-ate.org/annual_survey/reports.

Figure 3. Grantee-Reported Budget Allocations for Specific Activities/Costs (N=223)



**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 form.*

One-third of respondents reported spending grant funds on **targeted research**. Among those who spent money on research, the average budget allocation was 20 percent.⁴

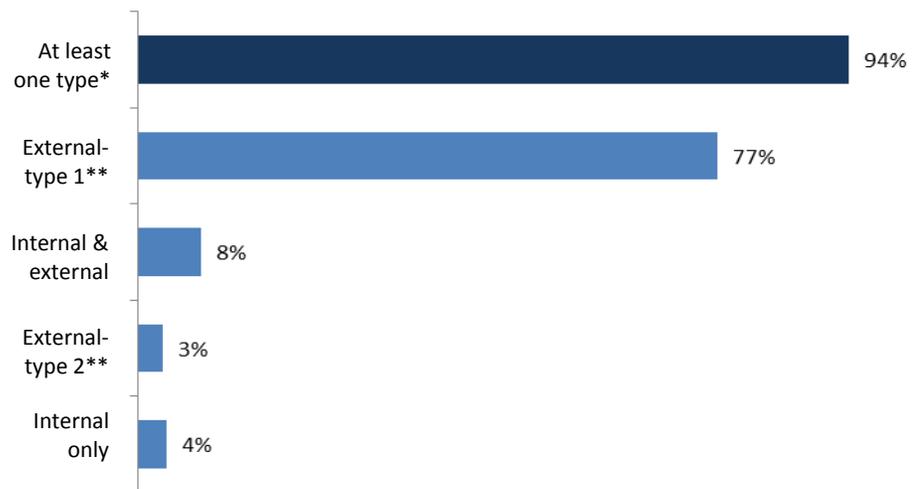
Most respondents (86%) reported some expenditure on **evaluation** in 2012.⁵ Among those that spent money on evaluation, the average budget allocation was 8 percent. Most projects and centers reported having an evaluator (94%). Figure 4 shows that most respondents reported using evaluators that were external to both the grant and the institution (77%); 12 percent of respondents indicated they had an internal evaluator (4 percent indicated an internal evaluator as their only evaluator). Some projects (10%) engaged more than one type of evaluator. This year's findings regarding types of evaluators and evaluation expenditures are very similar to those reported in 2012.⁶

⁴ In 2010, we asked survey respondents to describe the focus of their research activities. At that time, research topics included instruction or curriculum development to improve student outcomes; workforce analysis, best practices, and trends documentation; evaluation, assessment, and standard setting; developing or implementing new technology; employment outcomes; and other issues. For more information, see the brief on ATE targeted research at evalu-ate.org/annual_survey/reports.

⁵ Not all grantees that reported having an evaluator also reported expenditure on evaluation in 2012. Aside from missing data, the causes for this discrepancy may be that some new grants had not yet paid for any evaluation services and/or that the compensation for internal evaluators was not reported under Evaluation on the question about budget allocations.

⁶ See the 2012 ATE Survey Fact Sheet at evalu-ate.org/annual_survey/reports.

Figure 4. 2012 ATE Grantees' Use of Evaluators (N=240)



* Note: This bar is not a complete sum of the four bars below it. This is because some grantees reported having an evaluator, but did not indicate what type of evaluator they had.

**Note: Type 1 external evaluator = external to both institution and grant; Type 2 external evaluator = external to grant, but internal to institution.

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. Thirty-nine percent of respondents indicated that developing articulation agreements was part of their project/center activities; 34 percent provided additional information on these agreements. The program totals for 2012 are shown in Table 2. Two-thirds of these agreements were between high schools and two-year colleges.

Table 2. Articulation Agreements in 2012 (N=85)

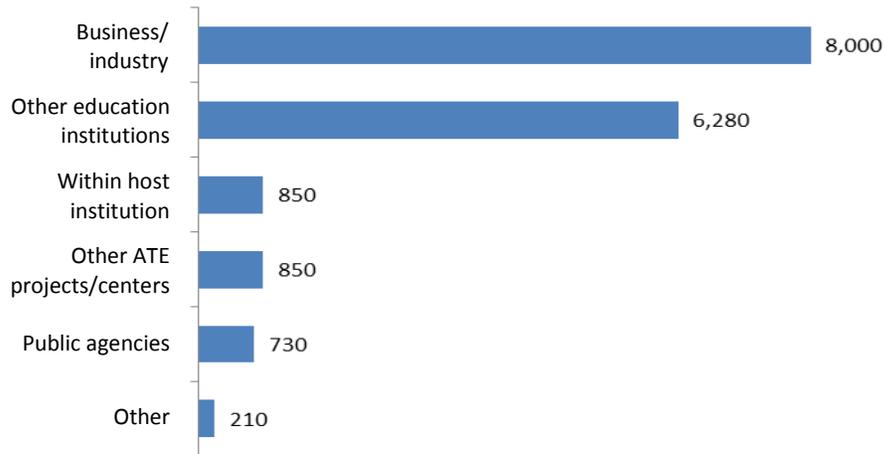
	<i>Between high schools and 2-year colleges</i>	<i>Between 2-year and 4-year colleges</i>	<i>Total</i>
Agreements developed	290	110	400
Agreements in place	940	620	1,560
Institutions involved	740	520	1,260
Students that matriculated	1,460	2,410	3,870

The survey's questions about **collaboration** were accompanied by a definition of this term, describing it as "a project/center's relationship with another institution, business, or group that provides money or other support to your project or center. Collaborators are not funded by the grant." Respondents reported 16,920 collaborating organizations, which collectively added \$29 million to the ATE program—\$16 million in monetary support and \$13 million in-kind. The median number of collaborations reported was 19. The median amount of monetary support reported by grantees was \$30,000.

The totals for both the number of collaborations and the amount of monetary support were greatly impacted by just a few grants. Two grants accounted for

more than 25 percent of the total number of reported collaborations.⁷ One grant accounted for 25 percent of the total monetary support reported by grantees. Business/industry and educational institutions were the most common types of collaborators, comprising more than three-quarters of all collaborating organizations (Figure 5).

Figure 5. Number of ATE Collaborating Organizations (N=228)



Materials Development

By completing this section of the survey, 122 PIs (47% of all survey recipients) indicated that they were significantly involved in developing curriculum and educational materials for national dissemination. Of those who responded to this section, 48 percent reported that they allocated at least 30 percent of their direct costs or \$100,000 to materials development in 2012; the remainder indicated that they did not meet this threshold but chose to report on their work in this area because they viewed their materials development efforts as significant.

Materials addressed included various media (textbooks, laboratory experiments and manuals, software, videos, or other courseware) used to convey the content and instruction of courses, modules, and activities, 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.

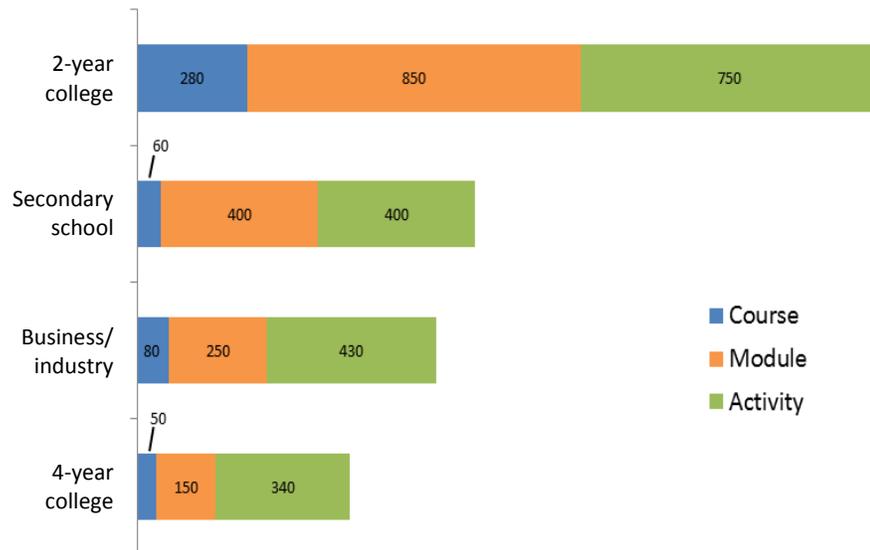
⁷ We followed up with these two respondents to better understand their responses. Their outlying numbers are accounted for by mostly large donations such as robotic equipment, manufacturing materials, and volunteer time from their industry partners.

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

In total, 2,760 materials were reported, of which 1,350 were in draft and/or field test stage in 2012 and 1,360 completed. Of the materials completed, 29 percent were reported to be in use outside of the home and partner institutions (up from 22 percent in 2011). Two percent (50) were published commercially in 2012, a drop from nearly 25 percent in 2010 and a 10 percent drop from last year.⁸

Figure 6, which indicates the number of developed courses, modules, and activities for different education levels, depicts a strong focus on the two-year college level. In addition to the materials included in Figure 6, 42 materials were reported for the “other” education level category, including 18 modules and 21 activities. The sum of the materials reported by education level (4,040) exceeds the total number of materials developed in 2012 by 46 percent, suggesting that a large proportion of materials were intended to serve multiple levels.

Figure 6. Education Levels Served by Materials Developed (N=116)



Professional Development

By completing this section of the survey, 127 PIs (49% of survey recipients) indicated that they were significantly involved in providing professional development in 2012. Of this group, 41 percent reported that they allocated at least 30 percent of their direct costs or at least \$100,000 to professional development in 2012; the rest indicated they did not meet either threshold, but reported on their professional development because of its significance to their project or center.

⁸ Because the materials reported in this section include those developed or completed in 2012 only, we are not capturing publication of materials developed in prior years.

These PIs reported providing 3,240 professional development activities in 2012, ranging from short presentations intended primarily to raise awareness to long-term periodic instructional activities (e.g., internships or peer coaching). A total of 72,840 individuals participated in these ATE-supported professional development activities. As the length of the professional development activity increased, the numbers of activities conducted and participants engaged in those activities dropped off substantially.

Almost half (49%) of the professional development activities were short presentations to raise awareness and engaged a majority (68%) of the participants. Twenty-nine percent of the professional development activities lasted a day or more; these activities engaged 14 percent of all participants.

We found two additional aspects of professional development responses noteworthy. For activities lasting less than a day, one grant accounted for more than one-third of the participants reported. Also, two-hundred eighty long-term activities were reported for 2012, down from 330 reported in 2011.

Figure 7 shows the number of **activities** of each length that were offered in 2012.⁹ Figure 8 shows the number of **participants** in each type of activity in 2012.

⁹ See the 2011 ATE Survey Fact Sheet at evalu-ate.org/annual_survey/reports.

Figure 7. Number of ATE Professional Development Activities by Length (N=120)

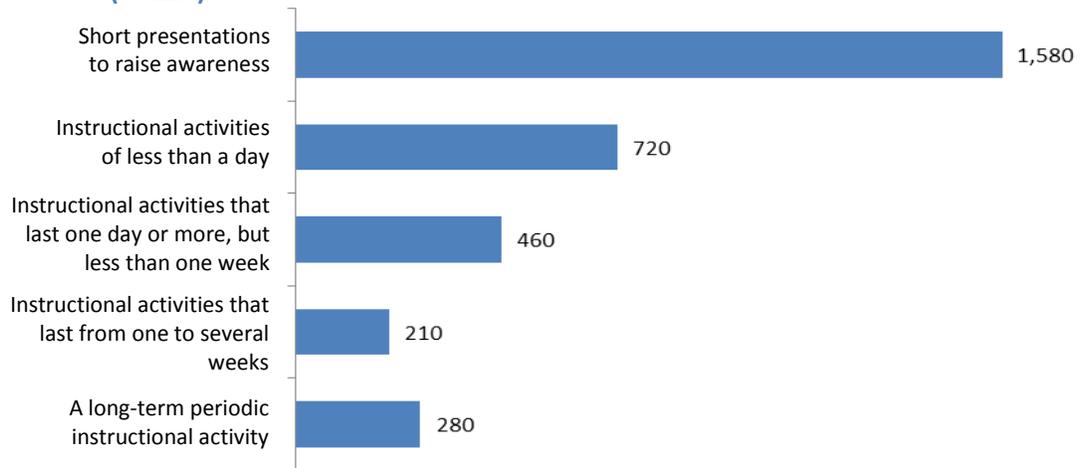
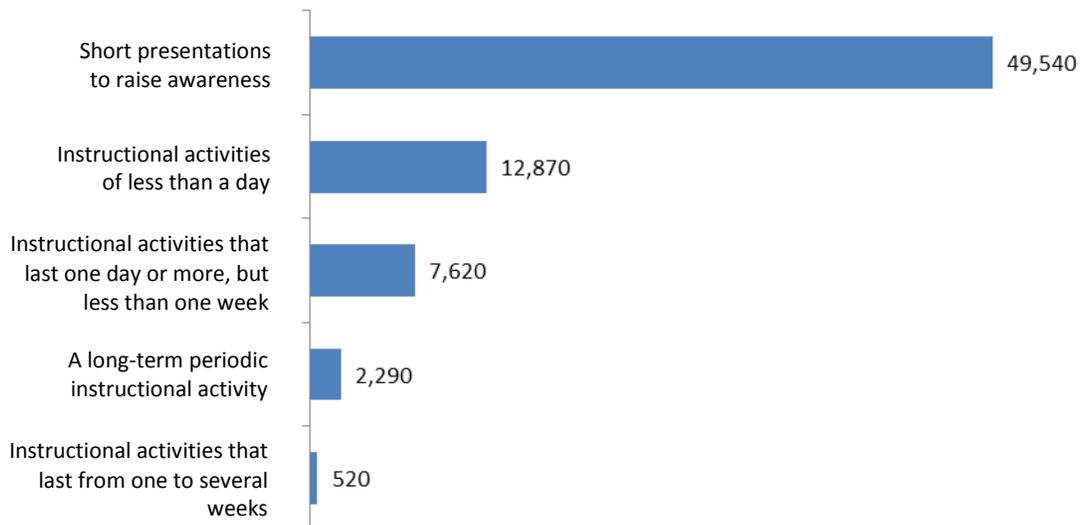
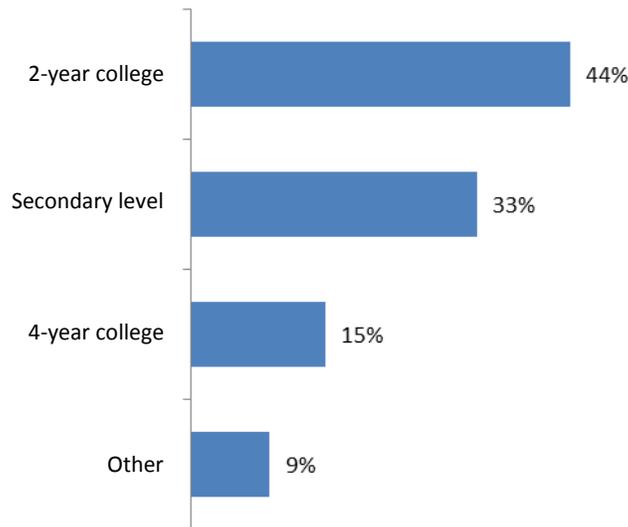


Figure 8. Number of ATE Professional Development Participants across Activities of Different Lengths (N=122)



The number of professional development participants reported by education level increased from 52,370 participants in 2011 to 60,300 participants in 2012. Forty-four percent of these professional development participants were from two-year colleges, and 33 percent were from secondary schools. Fifteen percent of professional development participants in 2012 were from four-year colleges, up from 10 percent in 2011. This shift coincides with a decrease in the percentage of participants from the secondary level. The actual number of secondary-level participants changed very little despite a decrease of four percent overall. Figure 9 shows what percentage of the 60,300 participants was reported for each **education level**. The discrepancy in total participant counts between Figures 8 and 9 is a result of missing data (questions about the total number of participants and the breakdown by education level were asked in separate items on the survey form). Fewer respondents reported participant data by education level than total participant counts.

Figure 9. Percentage of ATE Professional Development Participants by Education Level (N=105)



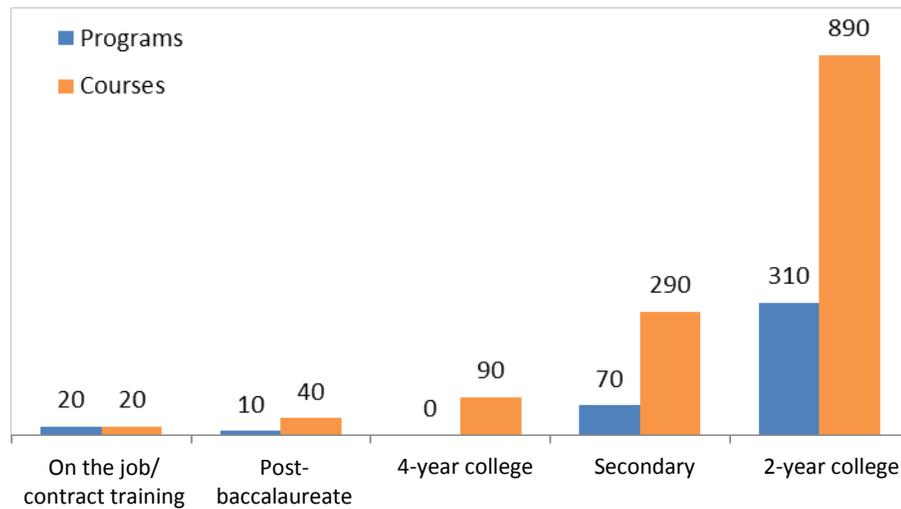
Program Development/Improvement

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.” Here we report findings about ATE-supported **programs** and **courses**, as well as the **students** enrolled in them.

Almost fifty percent of survey recipients (n=125) completed the Program Improvement section, which includes questions about courses and programs developed or modified with grant funds. Of this group, 68 (54%) reported that they allocated at least 30 percent of their direct costs or at least \$100,000 to program improvement in 2012; the remainder indicated that they did not meet this threshold but viewed their program development efforts as substantial and chose to report on their work in this area. Respondents to this section include 109 of the 139 PIs (78%) that stipulated that their project or center provided ATE-supported instruction.

Collectively, the respondents in this section reported that they offered 410 programs and 1,330 courses with ATE support in 2012. A majority of the programs (76%) and courses (67%) were developed for the two-year college level (Figure 10). Because more grantees indicated that they provided ATE-supported instruction than completed the program improvement section the course and program totals likely underestimate the total numbers supported by ATE.

Figure 10. Number of ATE-Supported Programs and Courses by Education Level (N=109)



Respondents were asked to report the number of **locations** by education level where ATE-supported programs were offered. The number of reported locations increased from 1,720 in 2011 to 2,240 in 2012. Of these 2,240 locations, most were at secondary schools (56%) and two-year colleges (34%). These data indicate the continuation of a trend where more programs are being offered at secondary school locations, whereas prior to 2011, more programs were being offered at two-year college locations.

The increase in the proportion of programs offered at secondary schools is largely due to two grants. Those two grants are responsible for 70 percent of the reported secondary-level locations. The actual number of projects engaged in offering programs strongly favors community colleges, outnumbering the offering secondary programming by more than two to one. Forty-seven respondents reported providing programs at secondary schools compared with 123 respondents who reported programs at two-year colleges.

Table 3 presents **student demographic** findings. It also shows what percent of the United States population is made up of the various demographic groups as a point of comparison. Almost half of the students (42%) were from racial/ethnic minorities, and a little less than one-fourth (23%) were female. These numbers are nearly identical to the demographics reported in last year's survey. Participation by women continues to be well below their representation in the U.S. population.

Inconsistency between the total number of students reported (in Figure 11 and related discussion) and the sums of subgroups (Table 3) can be attributed to some PIs not reporting demographic data (student demographics data were gathered via a separate question from total enrollments).

Table 3. Demographic Characteristics of ATE Students

<i>Demographic Characteristic</i>	<i>Number</i>	<i>Percentage of category</i>	<i>Percent of U.S. population</i>
Gender (N=123)			
Male	65,910	77%	49%
Female	19,150	23%	51%
Race/ethnicity (N=116)*			
Hispanic/Latino	12,900	17%	17%
American Indian/Alaska Native	630	1%	1%
Asian	4,110	5%	5%
Black/African American	11,870	16%	13%
Native Hawaiian/Pacific Islander	450	1%	0.2%
Multiracial	2,260	3%	2%
White	43,750	58%	63%
Students requesting accommodation under the Americans with Disabilities Act (N=29)	1,050	-	-

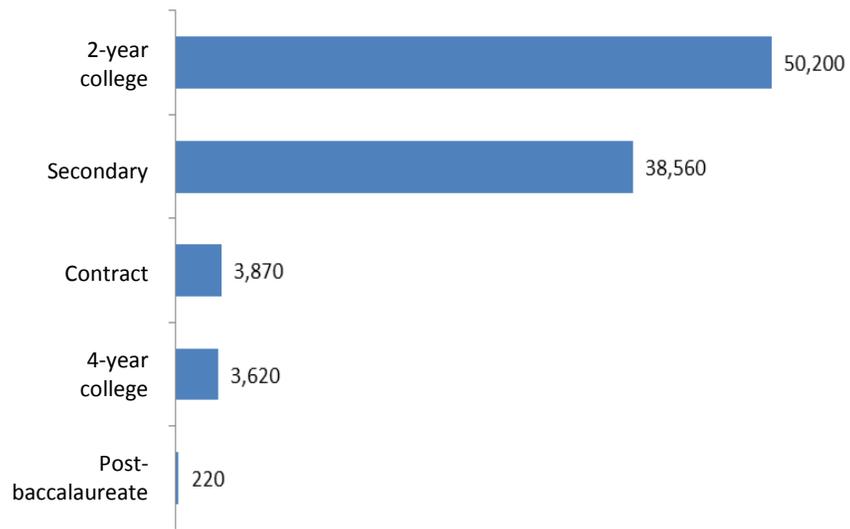
† Source: <http://quickfacts.census.gov/qfd/states/00000.html>

*Hispanic origin is not a race, and persons of Hispanic origin may be of any race.

All 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 2012. Slightly more than half (52%) of all ATE respondents (N=128) completed these questions on student enrollments. Given that 186 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 of the ATE program's reach.

Responding PIs reported that their ATE funds supported the instruction of 96,460 students, with 52 percent enrolled at two-year colleges and 40 percent at secondary schools (Figure 11).

Figure 11. Number of Students in ATE-Supported Courses by Education Level (N=120)



Other ATE Survey Reports

Additional reports based on annual ATE survey data, dating back to 2000, are available at evalu-ate.org/annual_survey/reports.

Custom reports may be developed upon request. For more information, contact corey.d.smith@wmich.edu.