



# ADVANCED TECHNOLOGICAL EDUCATION PROGRAM 2008 SURVEY FACT SHEET

Arlen R. Gullickson & Lori A. Wingate

The Evaluation Center, Western Michigan University, 1903 W. Michigan Ave., Kalamazoo, MI 49008-5237

Telephone: 269-387-5895; E-mail: arlen.gullickson@wmich.edu

This fact sheet summarizes data gathered in the 2008 survey of National Science Foundation (NSF) Advanced Technological Education (ATE) grant recipients. Conducted by The Evaluation Center at Western Michigan University, this was the ninth annual survey of ATE projects and centers. Included here are statistics about the program’s grantees and their activities, accomplishments, and impacts.

All respondents were asked to complete the first three sections—Grantee Characteristics, Organizational Practices, and Collaboration. They were asked to complete one or more of the remaining three sections—Materials Development, Professional Development, Program Improvement—if they allocated at least \$100,000 or 30 percent of their budgets in 2007 toward the activity in question. *Because grantees who did not meet these criteria did not report their activities related to materials development, professional development, and program improvement, our findings concerning these topics should be regarded as underestimates of the impacts of the overall ATE program.*

The survey population included the principal investigators (PIs) for all ATE projects and centers that had been active for at least one year as of January 1, 2008, or were continuation grants, having received a precursor ATE award (N=164). Nearly all of the PIs completed the sections on grantee characteristics (99%), organizational practices (98%), and collaboration (96%). Table 1 provides a comparison of the survey population sizes and response rates since 2006.

**Table 1. Population Size and Survey Response Rates 2006-08**

	2006	2007	2008
Population size	178	171	164
Respondents			
Centers	35	32	32
Projects	128	130	130
Total	163 (92%)	162 (95%)	162 (99%)

At least one-third of the PIs who received the survey this year completed the Materials Development (35%), Professional Development (41%), and Program Improvement (33%) sections.

## GRANTEE CHARACTERISTICS

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 2-year associate-degree-granting colleges . . . .”<sup>1</sup> Given the Congressional mandate to engage 2-year colleges, one would expect them to figure prominently as both grantees and beneficiaries of ATE project and center activities. Indeed, the survey findings show this to be the case.

Seventy-five percent of grants were awarded to 2-year colleges or 2-year college systems, 15 percent were awarded to 4-year colleges/universities, and 4 percent were awarded to nonprofit organizations.<sup>2</sup>

Respondents also reported that the largest proportions of their budgets were targeted to serve 2-year college audiences. Table 2 indicates (i) the number of respondents who reported allocating *some portion* of their budgets to serve the listed audience type and (ii) the *average percentage* of budgets devoted to these groups.

**Table 2. PIs’ Estimates of Allocations of Funds for Audience Types (N=162)**

Audience	Respondents reporting any expenditure on audience type		Mean percentage of budget to audience
	n	%	
2-year college	147	91%	61%
Secondary school	105	65%	21%
4-year college/university	75	46%	11%
Business/industry	49	30%	4%
Association/professional society	16	10%	1%
Other	15	9%	2%

As shown in Table 2, nearly all projects and centers (91%) reported allocating at least some portion of their budgets (61% on average) to 2-year colleges. Two-thirds

<sup>1</sup> Public Law 102-476.

<sup>2</sup> The remaining 5 percent included association/societies (1%), K-12 school districts (1%), and other (3%) (percentages add up to 99 percent due to rounding).

of respondents (65%) spent at least some of their budgets (21% on average) on secondary school audiences.

Professional development, materials development, and program improvement are the major tracks within the ATE program. Table 3 provides PIs’ estimates of their allocations of ATE funding toward these and other activities/cost categories. These estimates provide a rough indicator of the relative emphases placed on these areas by ATE grantees. Close to three-quarters or more of respondents reported allocating some of their budgets to materials development, professional development, or program improvement—and these activities also command the largest proportion of budgets (averaging 18% to 23% each).

**Table 3. PIs’ Estimates of Allocations of Funds for Specific Activities (N=162)**

Activity	Respondents reporting any expenditure on activity		Mean percentage of budget allocated to activity
	n	%	
Program improvement	121	75%	23%
Professional development	143	88%	19%
Materials development	118	73%	18%
Institutional indirect costs	140	86%	14%
Evaluation	142	88%	6%
Targeted research	38	23%	3%
Advisory committees	83	51%	2%
Other <sup>a</sup>	77	48%	15%

<sup>a</sup> Respondents identified “other” expenses for administration, articulation agreements, curriculum development, dissemination, equipment, participant support, personnel/salaries, and travel. However, most of these probably should have been included in the predefined categories (e.g., materials development, program improvement).

Table 3 also provides a first glimpse of the extent to which projects and centers sought evaluative and advisory input. Most PIs (88%) reported expenditures on evaluation, with an average budget allocation of 6 percent. Fewer (51%) reported expenditures on advisory committees, with an average allocation of 2 percent. However, it is probable that expenditure on advisory committees is not a good indicator of grantees’ use of advisory committees, since 87 percent of respondents said they had advisory committees (see Table 5). In many cases, participation on advisory committees may be an in-kind contribution to ATE projects and centers.

Forty-nine percent of the respondents indicated that developing articulation agreements is part of their project/center activities. These 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. On average, (a) there is slightly more than one agreement per institution and (b) five students are engaged per agreement.

**Table 4. Articulation Agreement Facts**

	Between high schools and 2-year colleges	Between 2-year and 4-year colleges	Total
Number of agreements (n=63,66) <sup>a</sup>	944	555	1,499
Number of institutions involved (n=58,47)	979	445	1,424
Number of students (n=66,61)	4,370	3,176	7,546
Number of agreements providing for concurrent matriculation (n=56,50)	406	116	522

<sup>a</sup> Reported n’s in the first column indicate the numbers respectively reporting that information for each type of articulation agreement.

Almost twice as many articulation agreements were formed between high schools and 2-year colleges than between 2- and 4-year colleges (944 vs. 555). Correspondingly, more institutions and students also are engaged in the articulation agreements between high school and 2-year colleges (see Table 4).

Slightly more than one-third (35%) of these agreements provide opportunities for concurrent matriculation (i.e., courses count for credit in both institutions). As Table 4 also shows, opportunities for concurrent matriculation are much more likely to occur as a result of agreements between high schools and 2-year colleges than between 2- and 4-year colleges (406 vs. 116).

**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, grant-level evaluators, and professional development for project/center staff.

As shown in Table 5, in 2007 more than 80 percent of projects and centers (a) supported professional development for their staff (82%), (b) engaged an advisory committee (87%), and (c) employed an evaluator (86%). Half (51%) conducted a workforce needs assessment.

**Table 5. Organizational Practices (N=160)**

Type of organizational practice in which the center/project engages	n	%
<b>Professional development opportunities for project/center staff/faculty</b>		
ATE grant funds provided support for professional development by project/center staff/faculty	131	82%
<b>Advisory committees</b>		
National advisory committee	60	38%
Regional advisory committee	42	26%
Local advisory committee	91	57%
At least one type of advisory committee	139	87%
<b>Evaluation</b>		
External evaluator only (external to the project/center and institution)	127	79%
External evaluator only (external to the project/center but internal to the institution)	4	3%
Internal evaluator only (a project/center staff member)	6	4%
At least one type of evaluator	137	86%
Both internal and external evaluators	15	9%
<b>Workforce needs assessment</b>		
Workforce needs assessment data gathered in 2007	82	51%

**COLLABORATION**

Collaboration was defined in the survey 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 project or center. Table 6 shows that of the more than 4,500 reported collaborator groups, most were from business/industry (42%) or other education institutions (31%). In 2007, these collaborations added about \$16.5 million to the ATE program—\$7 million in monetary support and \$9.5 million in in-kind support.

**Table 6. Number of Groups and Organizations Collaborating with Projects and Centers (N=154)**

Type of collaborator	Number of collaborators	Percentage of total number of collaborators
Business/industry (n=122)	1,892	42%
Within host institution (n=120)	516	11%
Other education institutions (n=126)	1,411	31%
Public agencies (n=87)	373	8%
Other ATE awards (n=70)	244	5%
Other types (n=21)	93	2%
Total	4,529	99%

**MATERIALS DEVELOPMENT**

This section of the survey focused on materials developed for *national dissemination* to serve instructional purposes. 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.

By completing this section of the survey, 57 PIs (35%) indicated that they were significantly involved in materials development. As Table 7 shows, three-fourths (74%) of the materials they reported developing were either completed or field-tested in 2007.

**Table 7. Number of Materials Under Development or Completed (N=57)**

	Number of materials	Percentage of all materials developed
Draft stage	700	27%
Field-tested	730	28%
Complete	1,202	46%
Total	2,632	101%

These PIs reported that 2-year colleges were the primary target audience for course and module materials, and secondary schools were the primary audience for activities (see Table 8). Together, materials developed for secondary school and 2-year college audiences account for almost three-quarters (74%) of all the materials. Overall, activity materials constituted more than half (58%) of the materials developed in 2007.

**Table 8. Materials Developed for Specified Targeted Audiences**

Target audience	Type of Material			Total	%
	Course	Module	Activity		
Secondary	26	142	687	855	38%
2-year college	131	325	355	811	36%
4-year college	30	126	170	326	14%
Business/industry	62	91	86	239	11%
Other	6	8	21	35	2%
Total	255	692	1,319	2,266 <sup>a</sup>	101% <sup>b</sup>

<sup>a</sup> The total number of materials in this table does not match the total in Table 7 because of missing data.

<sup>b</sup> Total percentage exceeds 100 percent due to rounding.

Of the completed materials, almost half were reported to be in use locally (49%); the rest were reported to be in use elsewhere (24%) or published (26%). Moreover, PIs collectively reported that more than 1,600 institutions other than their own were using at least one of the materials developed with ATE funds.

**PROFESSIONAL DEVELOPMENT**

The 68 PIs (41%) who completed this section of the survey reported that they provided more than 2,500 professional development activities in 2007. As Table 9 shows, the majority of professional development participants are nearly evenly distributed among the three major audiences—36 percent from 2-year colleges, 31 percent from secondary schools, and 25 percent from business/industry.

**Table 9. Professional Development Participation by Primary Target Audience**

Primary target audience	Number of participants <sup>a</sup>	Percentage of all participants
2-year college	17,500	36%
Secondary	15,200	31%
Business/industry	12,500	25%
4-year college	3,900	8%
Total	49,100	100%

<sup>a</sup> Figures are rounded to the nearest hundred.

Table 10 shows the number of participants in professional development activities hosted by projects and centers, broken out by length of activity. About three-fourths of all participants engaged in brief programs lasting less than a day. Fewer than 5 percent engaged in activities that lasted more than a week.

**Table 10. Professional Development Participation by Length of Activity**

Length of activity	Number of participants <sup>a</sup>			Percentage of all participants
	Total	Center-hosted	Project-hosted	
Short/awareness	26,600	14,300	12,300	54%
Less than 1 day	11,800	7,200	4,600	24%
1 day to 1 week	8,400	4,800	3,600	17%
1 to several weeks	1,700	1,000	700	4%
Long-term/periodic	600	400	200	1%
Total	49,100	27,700	21,400	100%

<sup>a</sup> Figures are rounded to the nearest hundred.

**PROGRAM IMPROVEMENT**

One-third of PIs (n=53) reported that they were significantly engaged in improving their education programs, where “programs” are defined as a sequence

of courses, laboratories, and/or work-based experiences that lead students to a degree, certification, or occupational competency point.

Tables 11 and 12 present respondents’ estimates regarding the number of (a) programs and (b) courses improved with ATE support, (c) locations where these programs and courses were offered, and (d) enrolled students. Table 11 presents these numbers in terms of the overall ATE program, and Table 12 provides per-grant averages. Both tables break out the numbers by education level (2-year college, 4-year college, secondary school, and on-the-job). As is typical of data presented in most other tables, productivity is highest at the 2-year college level. That education level accounts for more than half of the totals for each category (programs, locations, courses, and students).

**Table 11. Program Improvement Characteristics: Numbers of Programs, Locations, Courses, and Students Involved**

	Programs	Locations	Courses	Students <sup>a</sup>
Secondary	73	222	136	11,000
2-year college	287	485	789	48,300
4-year college	22	38	87	23,200
On-the-job	39	237	7	900
Total	421	982	1,019	83,400

<sup>a</sup> Figures are rounded to the nearest hundred.

Table 12 shows that projects and centers involved in 2-year college program improvement engaged an average of 1,100 students per grant; grantees involved in 4-year college program improvement engaged an average of almost 2,000 students per grant.

**Table 12. Program Improvement Characteristics: Per-Grant Average Numbers of Programs, Program Locations, Courses, and Students Involved**

	Programs	Locations	Courses	Students <sup>a</sup>
Secondary	5	20	8	500
2-year college	7	14	20	1,100
4-year college	2	4	8	1,900
On-the-job	7	40 <sup>b</sup>	4	200

<sup>a</sup> Figures are rounded to the nearest hundred.

<sup>b</sup> This average is high due to one center (Cyber Security Education Consortium) reporting on-the-job programs at 221 locations (see [www.cseconline.org](http://www.cseconline.org))

*Note.* Reported averages in individual cells reflect responses from only those who reported conducting a specified activity (e.g., 16 respondents reported 73 programs at the secondary level, which yielded a mean of 5).

Table 13 presents PIs’ estimates of the demographic make-up of their student participants—persons who had taken at least one ATE course in 2007. According to the

numbers reported, about one-third of students are female (37%), and nearly half are nonwhite (45%).

**Table 13. Demographic Characteristics of ATE Students**

<i>Demographic Characteristic</i>	<i>Number<sup>a</sup></i>	<i>Percentage of category</i>
<b>Gender</b>		
Male	29,600	63%
Female	17,300	37%
<b>Race/ethnicity</b>		
Hispanic/Latino	4,900	16%
American Indian/Alaska Native	100	0%
Asian	2,300	8%
Black/African American	4,500	15%
Native Hawaiian/Pacific Islander	300	1%
Multiracial	1,700	6%
White	16,700	55%
Students requesting accommodation under the Americans with Disabilities Act	300	-
Incumbent workers (i.e., students who are employed as technicians while enrolled)	3,900	-

<sup>a</sup> Figures are rounded to the nearest hundred.

**TRENDS: 2007-08**

Funding allocations for various audience types changed very little from last year. The average percentage of budgets allocated to 2-year colleges decreased by about 5 percent, while allocations to 4-year colleges and secondary schools increased by 2 percent. Allocations changed by 2 percent or less for materials development, professional development, and program improvement.

Articulation agreements are expanding in number and student participation. Compared with last year, 19 more agreements are in place, involving an additional 80 institutions and serving about 1,800 more students. On average, one additional student is engaged per agreement, compared with last year.

Two organizational practices show notable improvements. Grantees are now in nearly full compliance with stated program evaluation expectations—94 percent reported use of an evaluator (up from 80 percent last year). Likewise, more grantees conducted workforce needs assessments—51 percent this year, compared with 43 percent last year.

Key indicators for materials development, professional development, and program improvement all showed substantial increases. The number of materials that respondents reported in this year’s survey (2,632) is two-

and-half times the number reported last year (1,035). Course development increased by 72 percent, module development declined by 65 percent, and activity development increased by 427 percent. Moreover, while the rate of materials distribution beyond the local college changed little, the percentage reporting publication increased more than eightfold from 3 to 26 percent.

The number of professional development participants increased by more than 70 percent (49,100 vs. 28,400). But the distribution of professional development participants across target audiences and length of activity changed little.

This year’s program improvement findings show that more programs (421 vs. 380) but fewer courses (1,019 vs. 1,319) were the focus of program improvement efforts. The greatest changes in program improvement findings are in the number of locations and students involved across all categories (secondary, 2- and 4-year colleges, and on-the-job training). Overall, the number of locations increased more than threefold (982 vs. 282) and student participation nearly doubled. Most notably, student participation in 4-year colleges increased by more than 20,000 students.

Student demographic data reported by respondents indicate increases in the proportion of women (37 percent this year, compared with 31 percent last year) and nonwhite students (45 percent this year, compared with 36 percent last year) in ATE programs. Both changes are consistent with NSF’s interest in “broadening opportunities and enabling the participation of all citizens.”<sup>3</sup>

*Additional ATE fact sheets and reports for years 2000 to 2008 are available at [www.wmich.edu/evalctr/ate/publications](http://www.wmich.edu/evalctr/ate/publications).*

<sup>3</sup> National Science Foundation. (2005). *ATE program solicitation* (NSF 05-530). Washington, DC: Author. (p.15)