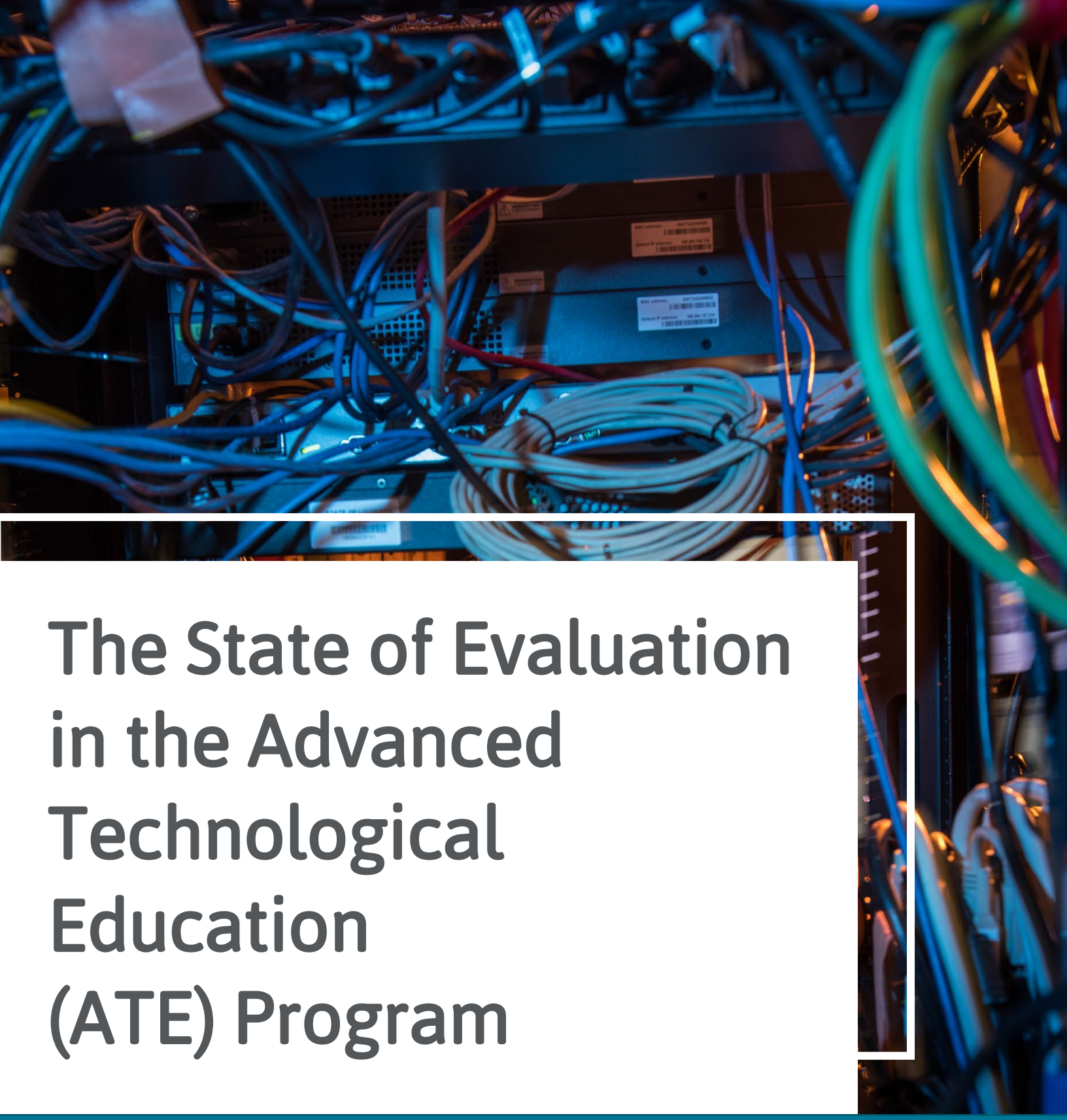

The State of Evaluation in the Advanced Technological Education (ATE) Program

EvaluATE
evalu-ate.org

2023

ACKNOWLEDGMENT

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INTRODUCTION

Purpose

The first report of its kind, *The State of Evaluation in the Advanced Technological Education (ATE) Program* provides a comprehensive overview of evaluation in ATE. In doing so, this report captures how evaluation is practiced and by whom, how ATE grantees procure evaluation services, and the challenges and opportunities for supporting and engaging in evaluation in ATE from the perspective of various stakeholders. The impact of COVID-19 on evaluation is also discussed. Our aim is to provide insight and about current evaluation practices that can be used to facilitate data-informed conversations about the role of evaluation in ATE, ideas for supporting and sustaining evaluation in ATE, and future directions for innovation in evaluation practices.

Audience

The audience for this report includes ATE evaluators, National Science Foundation (NSF) program officers, principal investigators and project staff, and others who are responsible for supporting, or are interested in, evaluation within the ATE community.

Data Sources

The findings presented in this report draw from data collected by EvaluATE, primarily from 2019 through 2022 to provide a current snapshot of activities and findings. Data from 2008, 2013, and 2018 are also integrated to provide historical context and benchmarks of 15 years, 10 years, and 5 years ago, respectively. Data collection mechanisms included: the ATE Survey of ATE Principal Investigators, EvaluATE's survey of ATE evaluators, and other surveys related to EvaluATE research efforts. Relevant EValuATE publications include the following:

- *Evaluator Procurement in the ATE Program* | bit.ly/evalprocurement
- *Defining and Measuring DEI in ATE Contexts* (2020) | bit.ly/2020DEI
- *Defining and Measuring DEI in ATE Contexts* (2019) | bit.ly/DEIreport2019
- *Student Participation and Completion of Marketable Credentials* | bit.ly/StudentPC
- ATE Survey reports | bit.ly/ate-survey-reports

KEY FINDINGS

ATE Evaluators

- Over time, ATE projects have consistently engaged evaluators. More than 80% of ATE projects reported having evaluators in 2008, 2013, 2018, 2020, 2021 and 2022 ATE Surveys.
- The majority of ATE evaluators are female and white, hold advanced degrees, and have participated in formal and/or informal educational opportunities about evaluation.

Evaluation Methods and Approaches

- ATE evaluations typically involved multiple data collection methods, with the most common being administering surveys, reviewing project records, and conducting interviews.
- Most ATE evaluations focused on generating descriptive information or exploring relationships (i.e., correlational questions). Fewer evaluations seek to answer causal questions.
- Ninety percent of ATE evaluators made recommendations to ATE projects, involved ATE project staff in the evaluation, and promoted the use of evaluation findings. Engaging in other evaluation activities, such as making explicit conclusions about project quality or involving project participants in the evaluation, were more variable.

Evaluation Reporting

- In 2020, 2021, and 2022 ATE Surveys approximately half of ATE projects reported receiving both written and oral reports from their evaluator.
- NSF program officers, faculty and staff at host institutions, and executive administrators at host institutions were the most common audiences for ATE evaluation reports.

Using Evaluation

- ATE PIs and project staff typically used evaluation results to inform their project's implementation, with over half of projects changing the timing of project activities.
- Compared to making changes to project implementation, changes to project goals or objectives were more variable over time, with percentages of ATE projects making changes to their goals ranging from 36% in the 2021 ATE Survey to 71% in the 2022 ATE Survey.

Diversity, Equity, and Inclusion in ATE Evaluation

- A top reason cited by ATE evaluators for *not* including diversity, equity, and inclusion (DEI) in an evaluation is that ATE personnel did not request this information.
- Out of all three DEI constructs, diversity is most often measured by ATE evaluators (52%), followed by equity (25%), and inclusion (24%).

KEY FINDINGS CONT.

Evaluator Selection and Pre-Award Collaboration

- A majority of ATE projects (66%) selected their evaluator because they had previously worked with them or because the evaluator was recommended by a colleague.
- ATE projects often collaborate with evaluators to complete the evaluation section of the ATE proposal, with 48% of projects reporting that their evaluator's input was extremely important to their proposal's success.

Evaluation Opportunities and Challenges

- Over 80% of ATE PIs report that they always use data for its intended use, while only 34% reported always using data on an ongoing basis.
- ATE evaluators reported that ATE PIs and project staff were key facilitators for evaluation while the capacity of ATE projects (e.g., time, resources) was a key barrier.
- To advance evaluation in ATE, ATE projects and ATE evaluators provided noted the important of clear communication, resource and information sharing (e.g., tools, plans, effective practices), and investment in evaluation.
- 82% of ATE evaluators said their work was impacted by the pandemic.

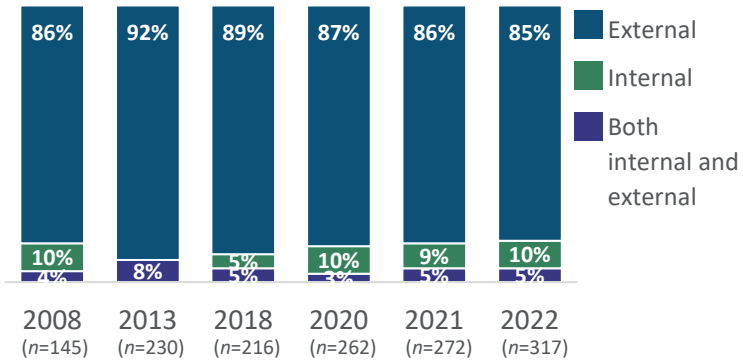
ATE EVALUATORS

This section provides a snapshot of ATE evaluator characteristics.

ATE projects consistently have an evaluator. In 2020—22 ATE Surveys, less than 10% of respondents reported not having an evaluator. This has historically been the case, with only 11% of projects not having an evaluator in 2018 and less than 10% not having an evaluator in 2013 and 2008.

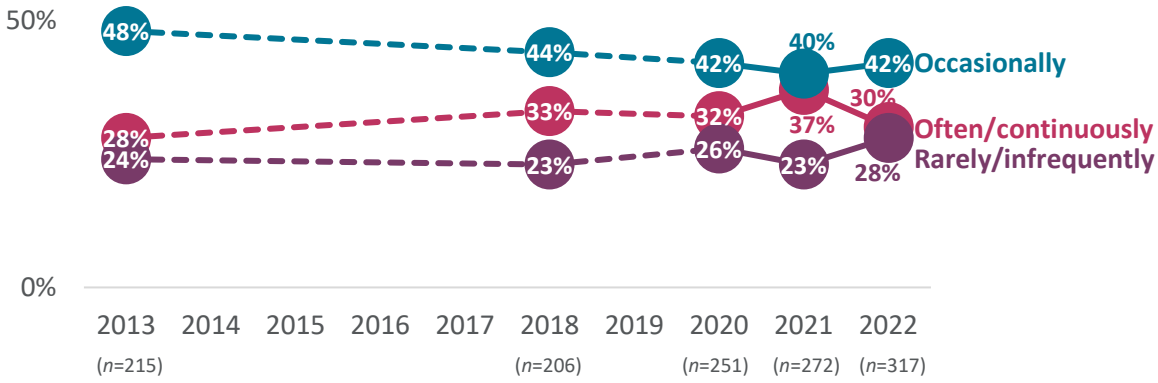
An external evaluator is the most common type of evaluator since 2008.

Given the NSF ATE solicitation requirement to include funds for an independent evaluator, this trend makes sense. Only a small percentage of ATE projects have an **internal evaluator only**.



Note: In 2013, the survey did not provide both internal and external evaluator as a response option.

ATE PIs are consistently in contact with their evaluator. Over half of ATE projects reported being occasionally or often/continuously in contact with their evaluator in 2013, 2018, and 2020—22 ATE Surveys.



Demographics of ATE evaluators in the 2019, 2020, and 2021 ATE Surveys included the following:

At least **84% were white**

At least **60%** identified as **female**

At least **46%** held a **doctoral degree**

75% or more participated in formal or informal **education on evaluation**

The median years of **evaluation experience were 12 years**

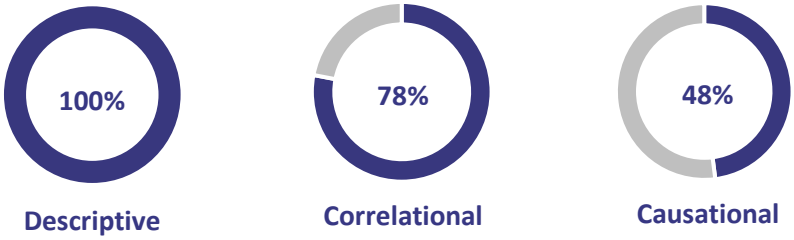
At least **43%** of evaluators were based at **independent consultancy firms**.

EVALUATION METHODS & APPROACHES

This section provides an overview of the approaches and tools ATE evaluators use in their work, including the type of evaluation reports provided.

Types of Evaluation Questions

In a 2021 survey, ATE evaluators were asked to identify all types of questions their evaluations sought to answer. All respondents (*n*=100) reported using descriptive questions, 78% used correlational questions, and 49% used causational questions.



Methods Used

Evaluators use a variety of data collection methods to answer these questions. Surveys, reviews of project records, and interviews were most commonly used with observations and focus groups used less by ATE evaluators.

In 2021, evaluators reported using multiple data collection methods in their ATE evaluations (*n*=100).

Evaluators were also asked to report how often they included site visits in their evaluation plans. Out of 99 responses, 67% of evaluators reported including site visits in their evaluation plans always or most of the time, 27% about half the time or sometimes, and 6% never included them.

More than half of evaluators reported always using logic models or theories of change (*n*=100).

EVALUATION METHODS & APPROACHES CONT.

Evaluators frequently harness existing data sources in their work and use multiple sources. In a 2021 survey, when asked about secondary data sources, 89% of ATE evaluators (*n*=100) reported using project records, 83% used institutional data on students, 54% used national or state databases, and 3% used other sources such as data from employers and website analytics.

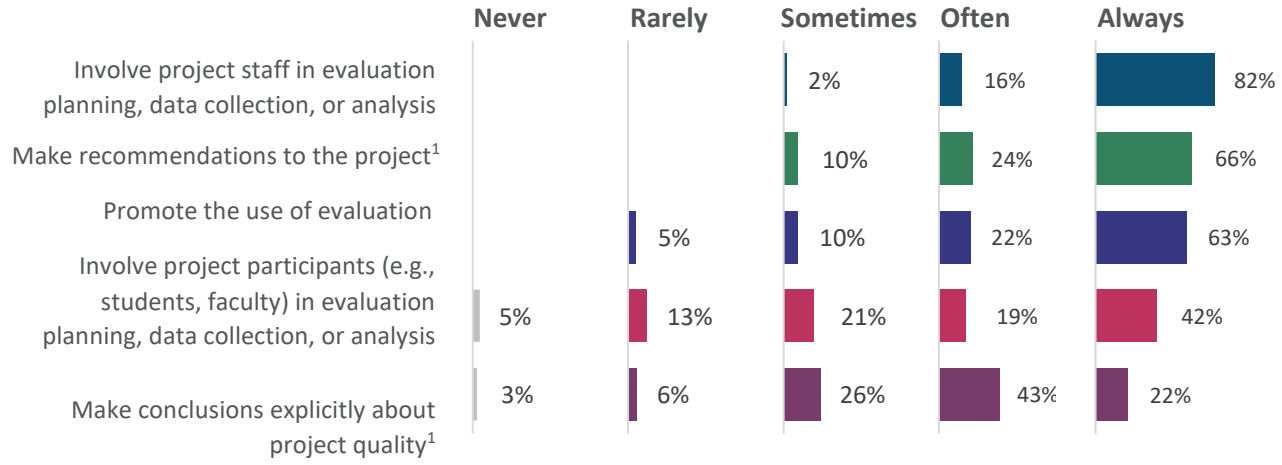
Validated instruments were less frequently used by evaluators, with 18% (n=18) reporting using them, which included the following:

- ✓ Undergraduate Research Student Self-Assessment (URSSA)
- ✓ Science Teachers' Pedagogical Discontentment Scale
- ✓ Developmental Assets Profile
- ✓ Critical Thinking Assessment Test (CAT)
- ✓ Classroom Undergraduate Research Experience (CURE) Survey
- ✓ Classroom Observation Protocol for Undergraduate STEM
- ✓ The Instructional Materials Motivational Survey (IMMS)
- ✓ New General Self-Efficacy Scale
- ✓ National Survey of Student Engagement
- ✓ The Survey of Undergraduate Research Experiences III

Evaluation Strategies

In a 2021 survey, ATE evaluators were asked how frequently they engaged in evaluation-specific practice, including engaging others throughout the evaluation, making recommendations, and promoting the use of evaluation.

Over 80% of ATE evaluators said they often or always make recommendations, involve ATE project staff in the evaluation, and promote the use of evaluation (*n*=100)**.** Evaluators' responses to how often they made conclusions explicitly about project quality and involved ATE project participants were more varied.



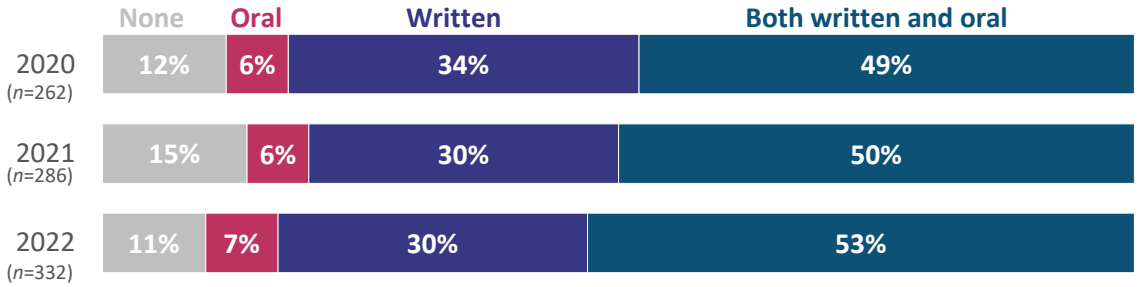
[1] Row percentages are out of 99 responses not 100, due to missing data.

EVALUATION REPORTING

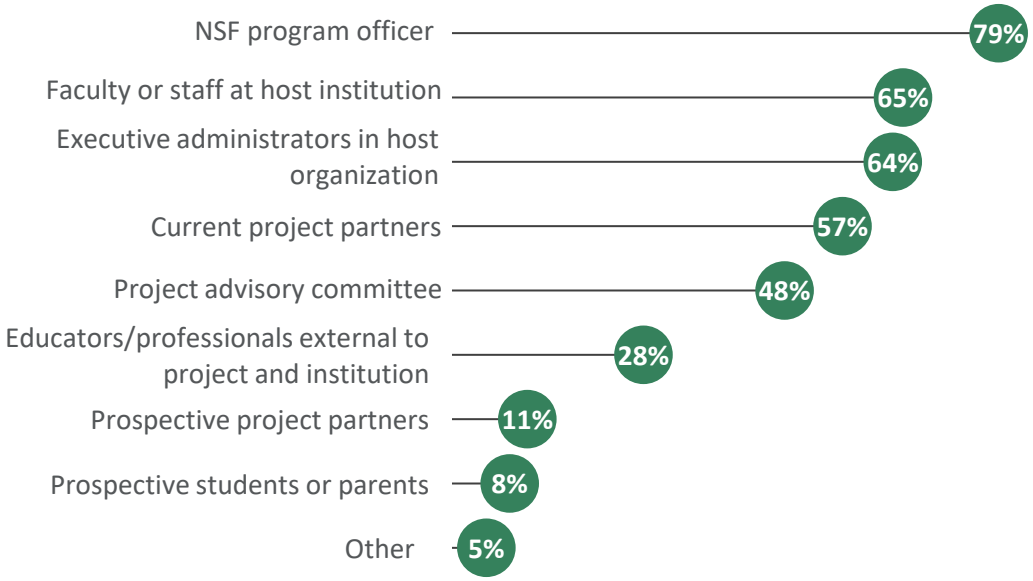
Using data from 2020-22 ATE Surveys, this section provides an overview of ATE evaluation reporting practices.

ATE evaluators consistently provide ATE projects with some form of an evaluation report. According to responses to the ATE Survey, less than 16% of ATE projects reported not receiving any type of evaluation report in 2020-2022. This is consistent with both ten-year (2013) and five-year (2018) benchmarks.

Approximately half of ATE projects received both a written and oral report in 2022, 2021, and 2020, followed by a written report.



In the 2022 ATE Survey, ATE projects were also asked with whom they shared their evaluation reports (*n*=332). **More than half of ATE projects reported sharing their evaluation results with their NSF program officer, faculty or staff at their host institution, and executive administrators in host organization.** The responses in 2021 and 2020 ATE Surveys were very similar.



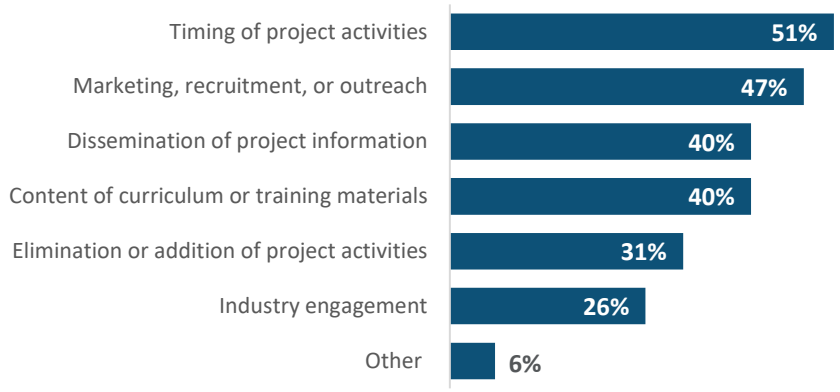
USING EVALUATION

Using data from 2020-22 ATE Surveys, this section provides an overview of ATE evaluation reporting practices.

Changes to Project Implementation

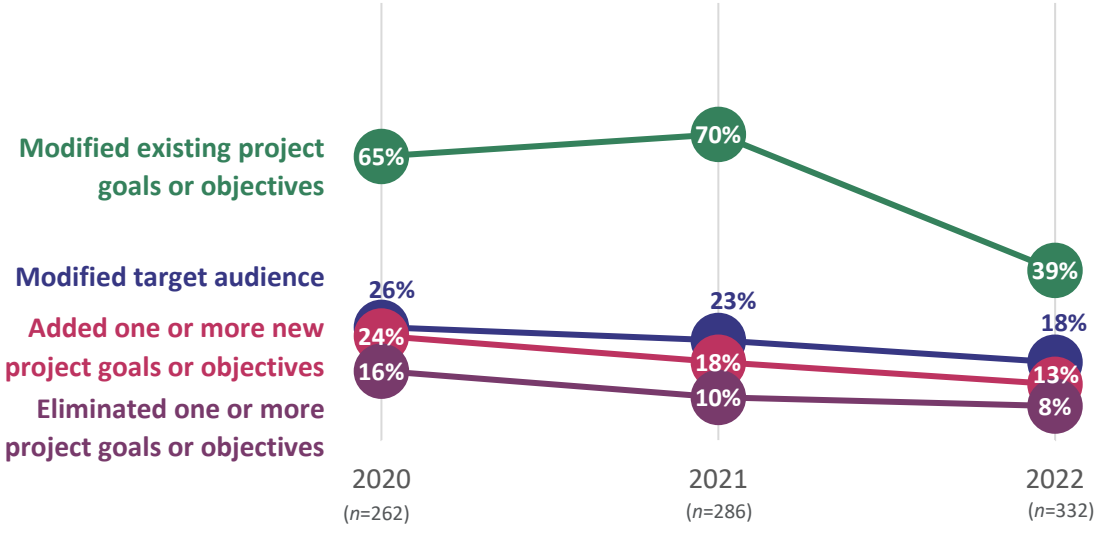
Using evaluation findings to make changes to project implementation is common. In the 2022 ATE Survey, 71% of ATE projects reported making at least one change to their project's implementation. This is consistent with what ATE projects reported in 2021 and 2020 ATE Surveys.

The most common implementation changes had to do with the timing of project activities, or to marketing, recruitment, or outreach strategies with about half of ATE projects reporting these types of changes (*n*=236). These trends are consistent with data from 2021 and 2020 ATE Surveys.



Changes to Project Goals

Evaluation findings are also used to inform ATE project goals. **Compared to making changes to project implementation, changes to project goals or objectives were more variable over time. The percentage of ATE projects that modified their goals or objectives ranged from 39% in the 2022 ATE Survey to 70% in the 2021 ATE Survey.** Other changes to goals included adjusting how goals are achieved and adjusting expectations.



DEI IN ATE EVALUATION

This section presents select findings from research on measuring diversity, equity, and inclusion (DEI) in ATE. Additional findings can be found at bit.ly/DEIreport2019 and bit.ly/2020DEI.

The National Academies of Sciences, Engineering, and Medicine (NAS) provide the following definitions for diversity, equity, and inclusion.

DIVERSITY

Differences among individuals, including demographic differences such as gender, race, ethnicity, and country of origin.

EQUITY

Fair distribution of opportunities to participate and succeed in education for all students.

INCLUSION

Processes through which all students/participants are made to feel welcome and are treated as motivated learners

Interviews in 2022 explored nine ATE evaluators' definitions of DEI and how they measured them.

Evaluators defined **diversity** as a representation across demographic categories such as race, gender, age, and geography, giving specific attention to program context, indicating general alignment with NAS indicators. Very few evaluators shared specifics about measuring and comparing diversity data, suggesting that data collection and analysis are not aligned with NAS indicators.

Evaluators defined **equity** as access and opportunity for students. Evaluators talked in generalities about the term "equity," often struggling to provide specific examples and evaluative strategies for evaluating equitable policies, practices, structures, and student persistence.

Evaluators defined **inclusion** in terms of broadening participation, removing barriers to increase enrollment for groups underrepresented in STEM, helping create a sense of belonging, and making students feel welcome, showing alignment with NAS indicators. In measuring inclusion, evaluations did not discuss faculty perceptions of inclusion, and their mentioning of specific evaluation practices related to cultural responsiveness was limited.

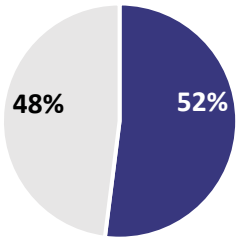
In addition to noting their own role in understanding student backgrounds and cultures to enhance their ability to help programs improve, the nine ATE evaluators described factors that impact collecting sound DEI data in ATE. Two major themes emerged in their answers:

The institutional context was an important factor in determining their ability to collect sound DEI data and in extending the scope and depth of their analyses. Buy-in from institutional leaders as well as building and maintaining relationships were cited as key aspects of the institutional context.

Evaluators commented on **the value of the data they collect on DEI**, suggesting that resource and time constraints often limit their analyses to second-hand data, surveys, and quantitative measures of diversity, equity, and inclusion.

DEI IN ATE EVALUATION CONT.

In a 2020 survey of ATE evaluators, 79 out of 91 evaluators (87%) reported evaluating DEI dimensions of ATE projects, primarily diversity.

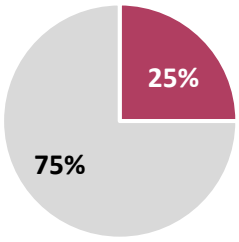


Diversity

Of those who measured diversity:

20% used surveys

19% used institutional data

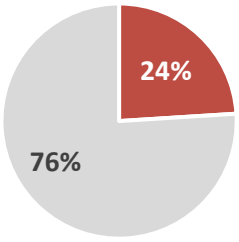


Equity

Of those who measured equity:

16% used surveys

15% used institutional data



Inclusion

Of those who measured inclusion:

21% used surveys

16% used interviews

Data collection and measurement of DEI did not guarantee that the information was utilized to its fullest potential. One ATE evaluator who reported collecting data on diversity explained, "We collect the data, but we really haven't done much else with it yet. This is an area of interest that will be explored during this grant."

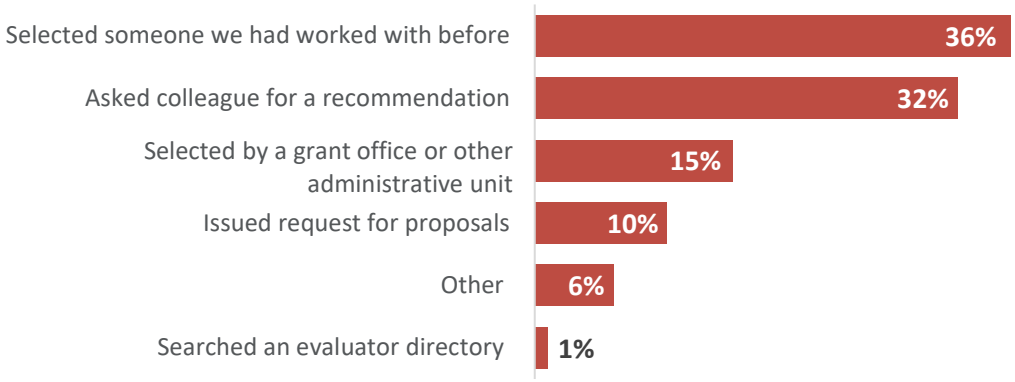
Twelve evaluators who reported not evaluating DEI in their projects were asked why they did not collect this information as part of their evaluation. The most frequently reported answers were that ATE project personnel did not request this type of information (8) and that DEI was not relevant to the project (7). Four evaluators reported difficulty in acquiring good data about DEI, and one evaluator cited an insufficient evaluation budget. Two evaluators reported other reasons, such as ATE projects focused on curriculum and faculty rather than students.

Results from the 2020 survey also revealed a potential conflation among the three different DEI concepts. For example, when asked to report the type of data used to measure each construct, four ATE evaluators answered the question with, "please see previous comment." This repetition suggests that evaluators may think that diversity, equity, and inclusion can be evaluated the same way or that they misunderstand about how these constructs are distinct, even when provided with the NAS definitions.

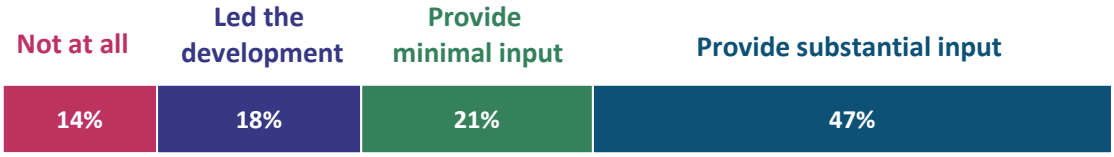
EVALUATOR SELECTION & PRE-AWARD COLLABORATION

This section provides an overview of the evaluator procurement process. Additional findings can be found at bit.ly/evalprocurement.

In the 2019 ATE Survey, out of 238 ATE PIs, approximately two-thirds reported selecting an evaluator they had already worked with, or an evaluator recommended by a colleague. Write-in responses included asking fellow ATE grantees for help finding evaluators (e.g., via Mentor Connect) and meeting evaluators at conferences.



Approximately half of ATE projects reported that their evaluator provided substantial input into the evaluation section of their ATE proposal, only 14% noted their evaluator had no input (*n*=238).



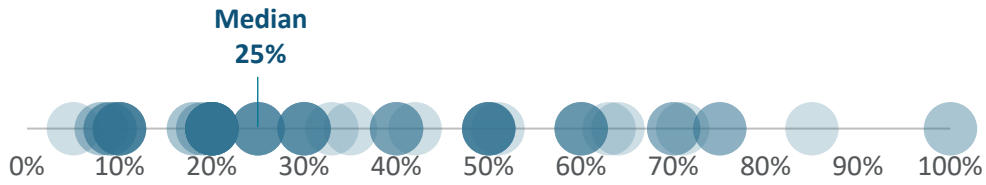
Many ATE projects also reported that an evaluator's input was important to their ATE grant proposal's success (*n*=203). Almost half of ATE projects said evaluator input was extremely important, and only 2% reported that it was not at all important.

EVALUATION OPPORTUNITIES & CHALLENGES

This section provides an overview of evaluation opportunities and challenges in three sections: (1) potential factors that may influence evaluation, (2) barriers to and facilitators of evaluation, and (3) suggestions for advancing evaluation in ATE.

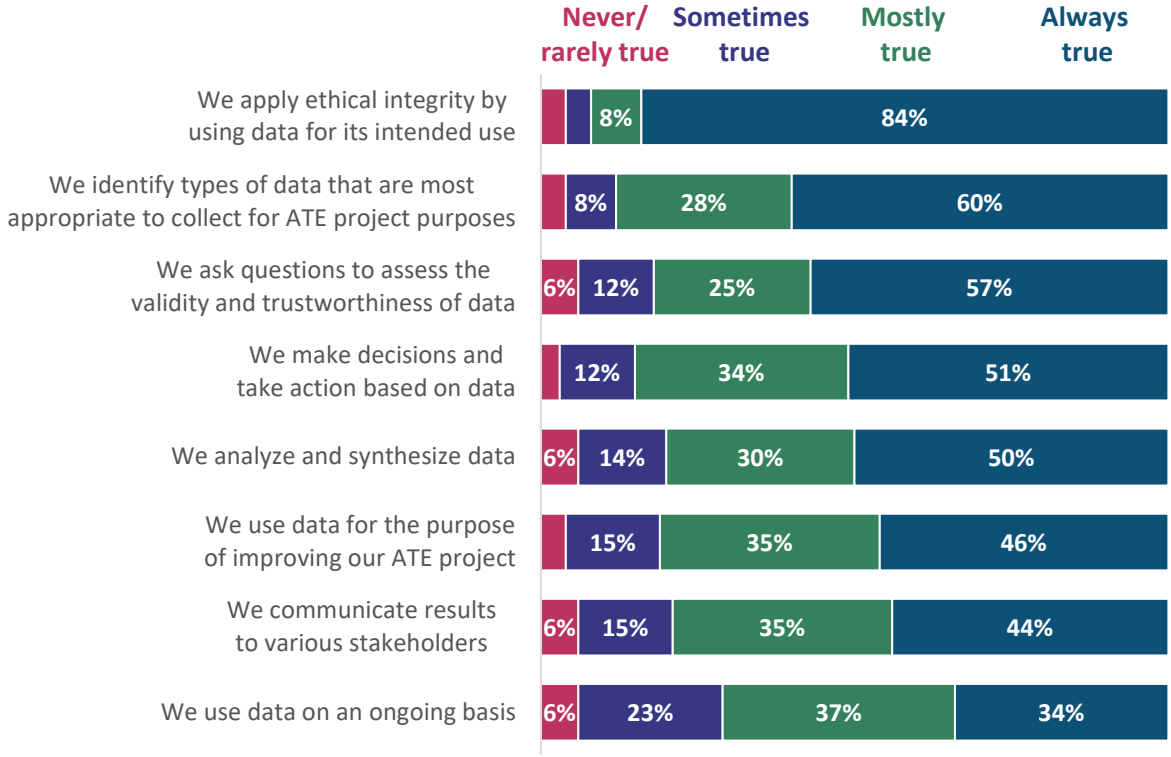
Potential Factors Influencing Evaluation in ATE

In a 2020 survey, ATE evaluators were asked, "Imagine that NSF no longer required ATE projects to be evaluated. What percentage of ATE grantees do you think would still have their projects evaluated?" Eighty-three evaluators responded to this question, and **their estimates ranged from few as 5% to as many as 100% of ATE projects, with a median of 25%.** The range of responses is presented below.



In the 2022 ATE Survey, ATE projects were asked to report how they collect, manage, evaluate, and apply data in a critical manner. The survey defined "data" as either qualitative or quantitative data obtained from an external evaluator, institution, public dataset, or other source relevant to the project.

At least 60% of ATE projects reported that each statement was mostly true or always true (*n*=348).



Percentages below 5% are not labeled.

EVALUATION OPPORTUNITIES & CHALLENGES CONT.

In 2021, EvaluATE examined the current systems for and barriers to counting students served by ATE projects. The resulting report, *Student Participation and Completion of Marketable Credentials*, can be found online at bit.ly/StudentPC. Acquiring students' demographic information, program participation and completion data, and unique student counts has long been a challenge for many ATE projects. This leads to missing or duplicated data being reported on the ATE Survey and limits the ability to identify who is being served through ATE projects. Interviews with nine ATE projects to understand these challenges identified the following barriers to collecting student participation and completion data:

Lack of time and help.
Several PIs expressed willingness to document participation and credential completions more thoroughly but felt they did not have enough time and help from others.

"I am only one person. I need help so badly. I can't work any more than all the time."

Financial constraints at the institutional level.
For some PIs, lack of time was exacerbated by frustrations over lack of institutional support resulting from budget constraints. Financial instability at an institutional level reduces the available resources and personnel.

"Data is not going to be a priority when you are in survival mode."

Lack of a consistent approach or system.
PIs noted a lack of a standard system for tracking students who move to other institutions. Persistence rates are often lower at community colleges because students transfer to other institutions. Data sharing is therefore essential for tracking the progress of students.

"Everyone tracks [students] differently and does it their own way."

NSF guidance perceived as unclear.
PIs who struggled with documenting student participation and credentials expressed willingness to gather more complete data, but said they needed more explicit guidance about what was required.

"I love NSF, and I'm willing to collect anything. I only need to know what…to collect."

Counts perceived as not fully representing a project's impact.
Some PIs felt that the ATE program should more strongly emphasize measures of success beyond counts. There are other ways projects define success.

"Not…everything that can be counted is important. If you are dealing with small programs like [ours], then counts don't make a lot of sense."

Lack of awareness of existing databases.
PIs seemed unaware of existing databases, such as the National Student Clearinghouse, that may be able to provide them with some information related to student credentials.

EVALUATION OPPORTUNITIES & CHALLENGES CONT.

To address barriers to collecting student participation and completion data, study participants suggested the following:

1. NSF should be more explicit about the metrics ATE projects are expected to track, how indicators are defined/operationalized, and how they should be reported. Standardizing this process will provide a clear process and expectation to projects.
2. ATE projects should engage evaluators during the project planning phase to ensure student tracking is built into project operations. Evaluators will likely already be collecting participation records through surveys and other means for the various ATE activities. PIs and evaluators should discuss additional ideas for tracking credential data.
3. NSF should invest in initiatives that will support project-level data collection and reporting.
4. ATE projects should keep detailed digital records.
5. NSF should collaborate with other initiatives that are working to identify alternative success measures, or fund initiatives to increase discussion in the ATE community about how student success is defined and measured.
6. ATE projects should seek out technical support to help meet data collection and evaluation expectations.

Facilitators of and Barriers to Evaluation

In a 2021 survey, ATE evaluators were asked to report perceived barriers to and facilitators of evaluation in ATE. Seventy-eight out of 100 evaluators who completed the survey listed at least one facilitator, and some evaluators identified as many as five facilitators. A total of 124 facilitators were identified.

The most frequently reported facilitator of evaluation in ATE was engagement and support from ATE PIs and project staff (29).

Engagement or support from **ATE PIs or project staff** (29)

Assistance from **EvaluATE** (12)

Support from **institutional staff or program staff** (11)

Working with **other ATE grantees** (11)

EVALUATION OPPORTUNITIES & CHALLENGES CONT.

Five types of facilitators emerged from qualitative analysis of the 124 facilitators provided in ATE evaluators' open-ended responses. They are listed below with illustrative quotes. See Appendix A for a complete list of codes that summarize and describe each type of facilitator.

The most common types of facilitators of evaluation were project-specific, evaluation-specific, and related to NSF ATE.

Facilitator Theme	Illustrative Quote
Good relationship with project staff (*n*=49)	*"Having a strong relationship with the PI or designated leader."*
Awareness of evaluation from project staff and participants (*n*=24)	*"[Working with] project teams that really get evaluation."* *"Common understanding of the value of evaluation."* *"When the students know about us, a much greater percentage of them respond to our requests for feedback."*
Support from other ATE grants (*n*=23)	*"The ATE Program values evaluation."* *"Webinars, ATE Office Hours with ATE Central, EvaluATE and ATE Central newsletters, The Rucks Group Coffee Break webinars, etc. resources that build my knowledge of the ATE program."*
Institutional policies or processes (*n*=18)	*"Unrelenting support at the institutional level e.g., from Deans and Departmental Chairs. "* *"Establishing a working relationship with the institutional research group."*
Strong project management (*n*=3)	*"Having a PI who can manage the project."*

Sixty-eight evaluators identified between one and four barriers to evaluation in ATE. A total of 97 barriers were identified. **The most common barrier reported was insufficient ATE project capacity; the next most commonly reported barriers were COVID-19 and accessing institutional data.**

ATE projects **lack capacity** (e.g., time, money) (19)

Accessing institutional data (9)

COVID-19 (13)

EVALUATION OPPORTUNITIES & CHALLENGES CONT

Twenty-one codes were used to summarize the 97 barriers identified by evaluators and were used create the six categories below. See Appendix B for a complete list of codes that summarize and describe each type of barrier.

The most common type of barrier was project-specific followed by barriers related to the evaluation and data and measurement.

Barrier Theme	Illustrative Quote
Lack of resources (*n*=19)	*"Budgets are often too small to do all that we want to do."* *"ATE evaluation budgets are usually very small."* *"A lack of understanding by the funding agency and/or some Program Officers about the "business" of evaluation. There are business-related costs that must be covered, in addition to the evaluator's time that are hard to incorporate unless contractive via subaward."*
Lack of awareness of or buy-in to evaluation (*n*=18)	*"I encountered barriers with administration and the faculty PIs re-collecting data on-site. They would acknowledge it needed to be done, review and critique my suggestions, agree on my suggestions, and then just not do it. "* *"Lack of understanding or potential of evaluation to support sustainability."*
Barriers to data collection (*n*=17)	*"Access to student data."* *"Timeliness on getting institutional data for analysis and reporting."*
COVID-19 related (*n*=13)	*"COVID-19 restrictions."* *"The project staff has changed and replacing them was challenging. It became even more difficult with Covid-19."*
Changes to project staff or activities (*n*=9)	*"The project staff has changed and replacing them was challenging. It became even more difficult with Covid-19. Current staff are over-tasked."* *"Project-level turnover and/or a change in administrative leadership, both of which can impact the continuity of evaluation activities and the acknowledgement of evaluation findings/recommendations."*
Institutional policies or processes (*n*=3)	*"Unreliable or unavailable institutional data due to personnel turnover, changes in data systems at colleges, or non-responsive institutional research departments/people."*

EVALUATION OPPORTUNITIES & CHALLENGES CONT

Advancing Evaluation in ATE

In a 2020 survey, ATE evaluators and PIs were asked, "If you could convey one message to NSF, ATE PIs and project staff, and ATE evaluators, what would it be?" Comments were collected from 378 PIs and 106 evaluators and qualitatively analyzed. Three themes emerged from their collective responses:

The need for clear communication among ATE project staff, evaluators, and NSF program officers. ATE evaluators and PIs had a slightly different focus on the context and the degree of addressing the importance of communication. Some examples include, NSF providing clarity about their expectations and guidance for evaluation in ATE. Other examples focused on ATE projects and evaluators working closely and having regular meetings together.

The important of resource and information sharing. Sharing of tools, instruments, effective practices, plans, ideas, approaches, results was encouraged. The ultimate purpose of sharing and collaboration seem to be directed to working more effectively and building a community of practice.

Investing in evaluation. Programs could benefit more from robust evaluation, and the level and the depth of data collection and data analysis depend on the resources available for evaluation.

ATE evaluators' and PIs' top three messages for advancing evaluation in ATE are listed below by group. See Appendix C for a summary of findings and key messages to each group.

To NSF program officers	To ATE PIs and project staff	To ATE evaluators
Enhance communication about evaluation with PIs and evaluators (33)	Work closely and communicate frequently with evaluators to share experiences, ideas and resources (17)	Build a community of practice: share best practices, instruments, evaluation plans, approaches, results, and relevant resources to benefit other evaluators (21)
Continue to require evaluation for ATE projects and keep external evaluators engaged in ATE evaluation (14)	Integrate evaluators and evaluation into project planning and implementation (12)	Ensure you are providing competent and high-quality service that brings value (11)
Promote formative evaluation and focus on quality and process of evaluation (14)	Collect and use data purposefully and integrate data strategically for project/program improvements (7)	Work closely with PIs and project staff by interacting frequently and building relationships throughout the project period (9)

EFFECT OF COVID-19

This section reviews findings from surveys of ATE evaluators and PIs about the impact of the COVID-19 pandemic on ATE activities and evaluation. Relevant findings from interviews with ATE evaluators are also integrated.

In a 2021 survey, ATE evaluators were asked to report the impact of COVID-19 on their work. Out of the 90 evaluators who provided responses to these questions, 82% (74) said their work was impacted by the pandemic.

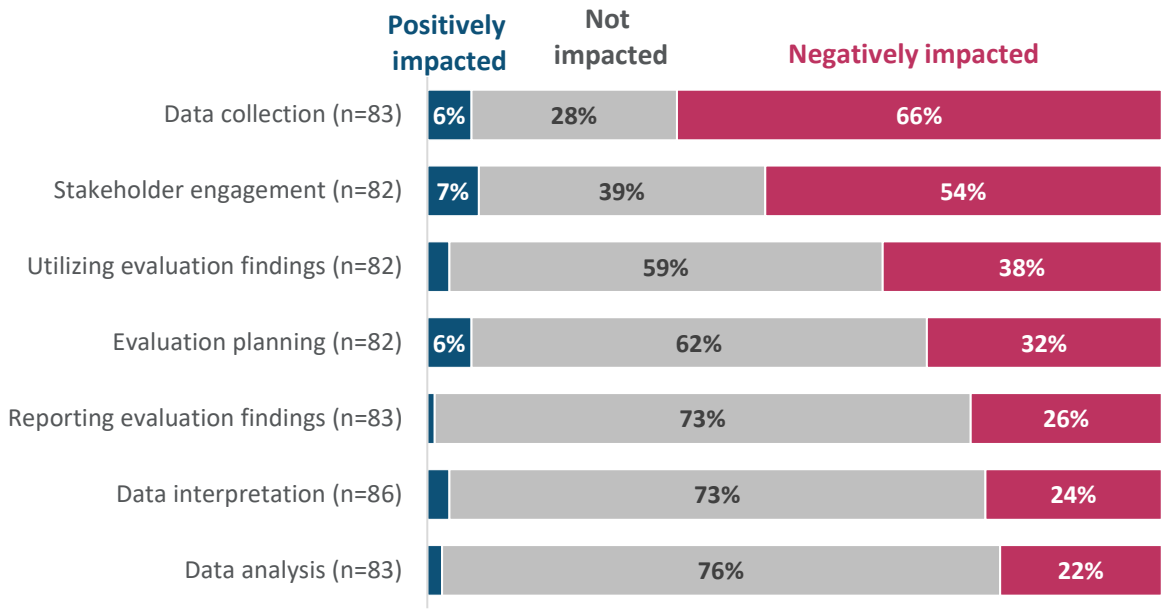
A majority of the 90 ATE evaluators reported making changes to their evaluation plans in response to COVID-19.

88% reported changing their evaluation plans

10% reported making no changes

2% reported being unsure

ATE evaluators reported that many evaluation activities were negatively impacted by COVID-19.



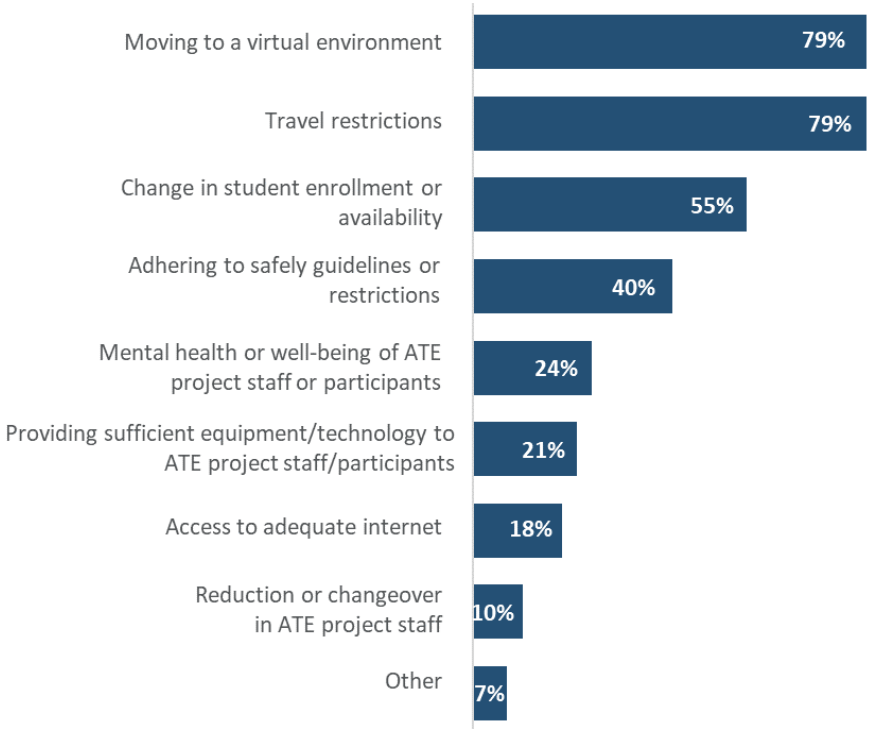
In interviews with nine ATE evaluators in 2022, they were asked to report what impacts COVID-19 and the current racial climate, given recent national protests, had on DEI work in the ATE context. Two major themes were found in their responses.

1. Regarding the pandemic's impact on ATE projects, evaluators said they noticed a reduction in student persistence and retention rates, decreased student engagement, and a lack of equitable access to resources for students.

COVID-19 CONT.

2. Some interviewees noted that the racial climate heightened evaluators' responsibility to facilitate communication about the topic. Evaluators emphasized giving voice to those intended to be served by ATE projects, assuming moral responsibility, and being more courageous in discussing and thinking critically about these topics.

In the 2021 ATE Survey, ATE PIs were asked to identify what COVID-19-related challenges they had experienced the prior year (2020). The most common challenges were moving to a virtual environment (79%) and travel restrictions (79%).



As shown in the graph above, 55% of ATE projects reported a change in student enrollment as a COVID-related barrier. All 2021 ATE Survey respondents located at institutions of higher education were asked to report how student enrollment had changed. Out of the 270 respondents who provided an answer, more than two-thirds (68%) reported a decrease in student enrollment, while only 13% reported that enrollment stayed the same.

More than two-thirds of ATE projects reported student enrollment decreased due to COVID-19 (*n*=270).

APPENDIX A

Coding and Counts of Facilitators to Evaluation in ATE

Code	Count	Type of facilitator
Support and engagement from ATE PI and/or ATE project staff	29	Good relationship with project staff
EvaluATE	12	Support from other ATE grants
Other NSF-funded grants (e.g., ATE Central)	11	Support from other ATE grants
Support of college/institution/program faculty	11	Institutional policies/processes
Having previous evaluation experience/expertise	8	Project and participant awareness of evaluation
Regular meetings with ATE project team	7	Good relationship with project staff
Understanding value and/or benefits of evaluation	7	Project and participant awareness of evaluation
Good relationship with PI	6	Good relationship with project staff
Ability to work/collaborate with experienced evaluators	6	Project and participant awareness of evaluation
Working with evaluators pre-award	6	Institutional policies/processes
Participants are aware of the importance of data collection and/or willing to participate in data collection	3	Project and participant awareness of evaluation
Ability to meet/conduct virtually	2	Good relationship with project staff
PI who can manage the project	2	Strong project management
Ability to meet in person with ATE project staff/PI	2	Good relationship with project staff
Clarifying evaluator's role and expectations	2	Miscellaneous
Recommendations from others or professional reputation	2	Miscellaneous
Participatory evaluation process	2	Good relationship with project staff
Funding	1	Miscellaneous
Embedding evaluation activities into program delivery	1	Miscellaneous
Project management skills	1	Strong project management
Developing trust	1	Good relationship with project staff
Familiarity with the ATE program	1	NSF ATE grant related
Institutional/program awareness about evaluation activities	1	Institutional policies/processes

APPENDIX B

Coding and Counts of Barriers to Evaluation in ATE

Code	Count	Type of barrier
ATE project lacks capacity (time, staff, money, other resources)	19	Resources
COVID-19	13	COVID-related
Accessing institutional data	9	Barriers to data collection
Lack of awareness in the institution, program, teachers about the evaluation underway and having issues with recruitment for data collection or support for ATE project grant activities	8	Lack of awareness of or buy-in for evaluation
Change in ATE project staff or institutional staff	7	Changes to project staff or activities
Communication with ATE PI and staff	7	Communication with project staff
Lack of willingness and/or buy-in for evaluation	7	Lack of awareness of or buy-in for evaluation
Inconsistent or incomplete data collection, or unwillingness to engage in data collection	6	Barriers to data collection
Lack of student enrollment	4	Lack of student enrollment
Not being involved in project planning	3	Not being involved in planning
Lack of consistent requirements from NSF	2	Lack of NSF requirements
Getting institutional IRB approval and/or working with IRB	2	Institutional policies/processes
Misunderstanding / lack of clarity around evaluator's role and purpose of evaluation	2	Lack of awareness of or buy-in for evaluation
Constantly evolving project goals	1	Changes to project staff or activities
Delays in ATE project planning or implementation	1	Changes to project staff or activities
New potential grantees unaware of what it takes to write a good proposal	1	Lack of awareness of or buy-in for evaluation
Insufficient time, support, and space for evaluation in ATE grant application	1	Miscellaneous
Understanding ATE as a program	1	Miscellaneous
Institutional policies that don't guarantee evaluator who wrote evaluation plan will be selected	1	Institutional policies/processes
Getting data from partnering institutions	1	Barriers to data collection
Measuring outcomes	1	Barriers to data collection

APPENDIX C

Advancing Evaluation in ATE

The following analysis and write-up were compiled by Takara Tsuzaki.

EvaluATE asked ATE principal investigators (PIs) and ATE evaluators a question: "If you could convey one message to each of the following groups about how to advance evaluation in the ATE program, what would it be? (1) NSF program officers, (2) ATE project PIs and staff, and (3) ATE evaluators."

Comments were collected from 378 ATE PIs and 106 evaluators. All comments were coded and analyzed using MAXQDA. Key themes were identified through inductive and deductive coding. The following is the summary of the findings and key messages to each group.

To National Science Foundation Program Officers

1. Enhance communication about evaluation with PIs and evaluators (33).
   Comments related to communication included several sub-themes, such as the need to clarify expectations for evaluation (15), read evaluation reports and provide PIs and evaluators with feedback on them (6), provide clear guidance on evaluation requirements (5), and enhance communication through e-mail, documents, and direct communication (7).
2. Continue to require evaluation for ATE projects and keep external evaluators engaged in ATE evaluation (14).
   - Continue to require evaluation as a value-added resource for PIs.
   - Requiring external evaluation is key to ensuring that program leaders gather and utilize information on their programs' activities and outcomes, and to assisting them in doing this. It establishes a community expectation and norm of doing so, which is critical for public services.
3. Promote formative evaluation and focus on quality and process of evaluation (14).
   - Place more focus on formative evaluation (and formative assessment data) for student outcomes than just high-stakes testing
   - Formative evaluation is crucial. Efforts need to focus more on student impacts that contribute to recruitment, retention, graduation, and launch of career.
   - Quality evaluation improves project design and project outcomes as a result of the reflective and iterative evaluation process.
4. Invest in evaluation by allocating sufficient funds and resources to improve the project's processes and to achieve the project's long-term goals (12).
   - Provide guidance on the proportion of budget appropriate for evaluation activities.
   - Consider updating the guidance about the expected cost of evaluation if NSF places more emphasis on formative evaluation and encourages more comprehensive evaluations.
5. Continue providing support and resources on evaluation that help the PIs to engage in meaningful ways (11).

- Support the idea that evaluation is a critical component to help project teams to achieve project goals.
- PIs and evaluators appreciate the resources available to them through websites and trainings (referring to EvaluATE).
- Provide resources and trainings for PIs on external evaluation (how to work with an evaluator effectively, expectations for evaluation, nature of evaluations, logic models etc.).

To ATE Principal Investigators and Project Staff

1. Work closely and communicate frequently with evaluators to share experiences, ideas, and resources (17).
   - Include evaluation in regular project meetings and planning throughout the project period. Do not wait until the annual report is due.
   - Involve evaluators. Evaluators can support project staff by summarizing data and information, helping with decision-making, and highlighting project success.
   - Share evaluation results with others on campus to help them understand your work, as this might bring further opportunities for the institution that extends beyond the project.
2. Integrate evaluators and evaluation into project planning and implementation (12).
   - Evaluation is important for assessing outcomes and providing a value-added resource for the NSF projects.
   - Working with program evaluators helps determine if the project is "shooting for the moon" or being realistic with what it wants to accomplish, given budget and timelines.
3. Collect and use the data purposefully and integrate them strategically for project/program improvements (7).
   - Discuss data collection methodology and how to use the data to ensure program improvements.
   - The partnership between the PIs and evaluators to collect and analyze data can be exciting and real place for learning.
4. Allocate sufficient funds to evaluation efforts (6).
   - Consider and discuss with evaluators what a reasonable budget is for the services, based on the nature of the project. Make sure evaluation is appropriately budgeted to better serve the target audience (students).
   - Budget for professional development opportunities (workshops and trainings) and networking opportunities (conferences relating to evaluation and promoting equity, diversity and inclusion).

To ATE Evaluators

1. Build a community of practice: share best practices, instruments, evaluation plans, approaches, results, and relevant resources that will benefit other evaluators (21).

- Keep supporting the network efforts of EvaluATE. For example, create a forum for sharing the tools created with NSF funds that have been successfully used to conduct ATE evaluations.
- Many of the EvaluATE evaluators probably have tools that are specific to student assessment and other instruments that are unique to the context, and they may serve our purposes to conduct good evaluation.
- Interact more with other evaluators to find commonalities in instruments and other data sources so that future metaevaluations of the entire ATE portfolio can be achieved.
- Peer-to-peer mentoring, sharing research among ATE evaluators, and learning more about creativity and diversity in evaluation practice (i.e. autism spectrum disorder, ADHD, giftedness, etc.) will help the community of practice grow.

2. Ensure you are providing competent and high-quality service that brings value (11).
   - Remember that evaluation is a profession and an important component of program development. We need to be viewed as evaluators and do a top-quality job.
   - Evaluation is more than just statistics and number crunchers.
   - Being an ATE evaluator is a leadership role.
3. Work closely with PIs and project staff by interacting frequently and building relationships throughout the project period (9).
   - Try to be involved with an ATE project from the outset of the proposal, before it is funded.
   - Interact more frequently with project staff, ask evaluative questions, and work closely with PIs.
   - Working as a team with the project leadership staff is essential throughout the evaluation process.
4. Support PIs and project staff to meet their goals when assisting with data collection and analysis (7).
   - Listen to the project goals and provide data collection and analysis tips to improve the project.
   - Assist in the data collection requirements for the ATE Survey.
5. Understand and adapt to the project's contexts, such as institution- and discipline-specific needs and sociocultural issues (4).
   - Pay close attention to local diversity, equity, and inclusion concerns as exhibited in practice and in discussion with the PIs.
   - Understanding the community college culture and students is important in an ATE evaluation. Community colleges are not universities.
6. Advocate for sufficient funding for evaluation in project budgets (4).
   - Keep advocating for larger budgets so evaluation can better serve and inform projects.