

**Evaluation of  
Innovative Technology Experiences  
for Students and Teachers (ITEST)  
Year Three Grant Activities**

**For  
The Marine Advanced Technology  
Education (MATE) Center**

**September 2012**

Submitted by:

**SESRC**

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**Evaluation of Innovative Technology  
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(MATE) Center**

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# EXECUTIVE SUMMARY

## **Evaluation of Innovative Technology Experiences for Students and Teachers (ITEST) Grant Activities For the Marine Advanced Technology Education (MATE) Center**

BY: CANDIYA MANN & KYRA KESTER

SOCIAL & ECONOMIC SCIENCES RESEARCH CENTER, PUGET SOUND OFFICE

WASHINGTON STATE UNIVERSITY

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In September 2009, the National Science Foundation (NSF) funded the Marine Advanced Technology Education (MATE) Center's proposal for an Innovative Technology Experiences for Students and Teachers (ITEST) grant. Through this grant, the MATE Center planned to support middle school students and teachers by expanding the entry-level (SCOUT class) ROV competition, providing marine STEM career information targeted to this age range, and building ROVER, a cyber-learning center, to support them.

The evaluation is based on multiple data sources, primarily surveys and interviews, and reflects the input of a variety of stakeholders, including middle school students, teachers, parents, regional coordinators, community college students, and MATE management and staff. This report covers grant activities that took place between July 1<sup>st</sup>, 2011 and June 30<sup>th</sup>, 2012, the third year of the grant. The MATE Center has been granted a one-year, no-cost extension to their grant. Year-to-year comparisons of evaluation results will be included in next year's final, summative report. This report describes the project implementation as well as the preliminary findings for each of the research questions. The implementation is discussed by project objective, while the evaluation findings are reviewed by project strategy. This structure mirrors the evaluation design.

# Project Implementation

In the third year of the grant, the MATE Center made progress in implementing all four grant objectives.

## **Objective 1: Build the support infrastructure for an entry-level ROV competition class**

In the third year of the grant, the MATE Center completed its roll-out of targeted support for the entry-level (SCOUT) ROV competition class, from eight to twelve regions that cover the country from coast-to-coast: Monterey Bay, Pacific Northwest, New England, Southern California, Florida, Mid Atlantic, Oahu, the Great Lakes, the Big Island, Texas, Southeast, and Midwest.

Teacher and student workshops were offered in all regions. The MATE Center provided additional support for the teachers through its week-long beginner-level Summer Institute, held in Monterey, California, July 8 – 14, 2012.

An important component of the support for the SCOUT class was the middle school, ROV-focused STEM curriculum. In year three, the curriculum was distributed to teachers throughout the ROV competition network and reviewed by content experts.

## **Objective 2: Increase ocean STEM career awareness and present trajectories to those careers for middle and high school audiences**

The MATE Center researched and assessed existing career resources for middle and high school audiences. They beta tested the *Exploring Ocean Careers* course with high school students and also ran a pilot video program, where the students created their own technical, career or competition videos.

## **Objective 3: Build a cyberlearning center**

The ROVER website was launched in September 2010. It contains links to a growing selection of external career and instructional resources, acts as a gateway to the MATE Center's other social media efforts and hosts the competition registration system.

## **Objective 4: Evaluate and track project participants**

In the third year of the grant, interview and survey protocols were refined, including translating some into Spanish, and they were administered to a variety of project stakeholders. Analysis of the multiple data sources provided findings on the project's movement towards the expected outcomes. This report demonstrates the progress made towards Objective Four.

## Findings

The evaluation findings indicate that the MATE Center's ITEST project is achieving the expected outcomes. The project strategies that were implemented in the third year of the grant are reviewed below.

### Project Strategy 1: Provide Professional Development

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- **Increased Confidence Facilitating STEM Learning Experiences:** At the regional workshops, the percentage of teacher respondents who rated themselves as “very comfortable” facilitating STEM learning experiences for students rose from 39% in the pre-workshop surveys (N=82) to 60% in the post- surveys (N=83). After the training, 93% indicated that they felt less concerned about designing and building an ROV.
- **Strengthened Commitment to Participate in the Program:** As a result of the workshops, 83% of the teacher respondents (N=39) stated that they felt more committed to participating in the competition.
- **Increased Awareness/Understanding of Ocean STEM Careers:** In the follow-up survey conducted six months after the week-long Summer Institute, the majority of the respondents indicated that the Institute helped them understand the knowledge and skills needed for marine occupations (83%, N=12) and the current technologies used in the marine field (75%).

### Project Strategy 2: Support the Development of the SCOUT (Entry Level) ROV Class

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- **Increased Awareness of STEM Careers:** After building their ROV, 81% of the students surveyed (N=443) indicated that they knew more about careers in marine STEM.
- **Increased Interest in STEM Careers:** Over half of the students (56%, N=443) stated that their ROV project made them more interested in a marine career, and 79% of the teachers (N=90) observed an increase in their students' interest in pursuing a STEM career.
- **Increased Interest in STEM:** Three-quarters of the students (75%, N=443) indicated that their ROV project made them want to learn more about ocean STEM. Ninety-two percent (92%, N=90) of the teachers and 91% of the parents (N=220) observed greater interest among the students in learning STEM.
- **Increased STEM Knowledge & Skills:** The majority of the teachers (98%, N=90) observed improvements in their students' STEM knowledge and skills. Parents (N=220) reported that building an ROV contributed to improving their children's grades in engineering/robotics (59%), science (49%), math (36%) and computers (35%).

- **Increased 21<sup>st</sup> Century (SCANS) Skills:** Ninety-four percent (94%, N=90) of the teachers observed increases in their students' skills in team building, problem solving, and/or critical thinking. Sixty-eight percent (68%, N=220) of parents reported that their children were better able to work with others; 61% indicated that their child's self confidence improved; and 30% marked that their child was better organized.
- **Increased Parental Support of Their Children's Interest in STEM:** Eighty-one percent (81%, N=220) of the parents indicated that participation in the ROV program changed how they envisioned their child's future, making it easier to picture their child with a STEM career.
- **Overall Rating of MATE Center Support:** After the competition season, 51% of the teachers (N=90) rated the support provided by MATE as excellent, and 32% provided a rating of good, for an overall positive rating of 83%.
- **Overall Opinions of ROV Program:** The ROV program was rated positively (excellent or good) by 89% of the students (N=443), 100% of the teachers (N=90) and 99% of the parents (N=220).

### Project Strategy 3: Modify Career Guidance Resources to Better Suit Middle and High School Students

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Marine STEM career information was disseminated to students and teachers through workshops, the Summer Institute, presentations to schools, and the competition itself. After the competition, 81% of the students (N=443) reported that they knew more about marine STEM careers. After the Summer Institute, 83% of the teachers (N=12) indicated that the Institute helped them better understand the knowledge and skills needed for marine occupations.

### Project Strategy 4: Build ROVER, a Cyberlearning Center

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- **Increased Access to Career and Instructional Resources:** The website is populated with an extensive and growing selection of links to internal and external resources: 722 at last count.
- **Use of Website and Resources:** There are many indications that the website and resources were used in year three, including the website user registration survey (N=544), Twitter followers (264), Facebook "likes" (535), Flickr photos (3,223 photos), YouTube videos (226 videos) and ROV competition registrations (over 2,500).



## Broader Impacts

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The MATE Center’s ITEST activities have been leveraged in ways that were unanticipated during the writing of the proposal. These “broader impacts” fall into three main categories:

1. Leveraging ITEST activities/funding to raise additional funding by regional coordinators, teachers, schools, and student teams
2. Using ROVs and ROV-based activities outside of the competition by teachers and students
3. Involving college students to mentor middle school ROV teams in several competition regions

## Student Findings by Demographics

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According to the demographic data in the surveys (N=443), the students were about one-third female (35%), forty-three percent (43%) were of minority backgrounds, 41% came from high poverty areas, and 2% reported that they had disabilities requiring accommodations.

Overall, there were few statistically significant differences by gender, ethnicity, disability status or socioeconomic status, indicating that the ROV program was effective in producing positive results for under-represented students as well as the students who traditionally participate in STEM learning opportunities.

# INTRODUCTION

In September 2009, the National Science Foundation (NSF) funded the Marine Advanced Technology Education (MATE) Center's proposal for an Innovative Technology Experiences for Students and Teachers (ITEST) grant. The MATE Center's ITEST program, titled *MATE ROV Competitions: Providing Pathways to the Ocean STEM Workforce*, leveraged their extensive network of remotely operated vehicle (ROV) student competitions. In the past, the ROV competitions mainly focused on students at the high school, college, and university levels. This grant enabled the MATE Center to support middle school students and teachers by expanding the entry-level (SCOUT class) ROV competition, providing marine STEM career information targeted to this age range, and building ROVER, a cyber-learning center, to support them.

As stated in the proposal, the objectives are fourfold:

- Objective 1: Build the support infrastructure for an entry-level ROV competition class by
  - a) providing professional development and student support workshops in after-school and informal settings; and
  - b) developing, adapting, and enhancing ROV-focused STEM curriculum materials.
- Objective 2: Increase ocean STEM career awareness and present trajectories to those careers for middle and high school audiences.
- Objective 3: Build a cyberlearning center to
  - a) foster collaboration and increase communication among students, educators, parents, and working professionals; and
  - b) improve access to STEM instructional resources. (In this project, cyberlearning refers to the use of cyberspace or "cyberconnections" to advance learning.)
- Objective 4: Evaluate and track project participants to determine the impact on a) students' STEM knowledge, skill development, and inclination to pursue STEM education and careers; and b) teachers' confidence in facilitating STEM learning experiences and delivering career information.

This report covers grant activities that took place between July 1<sup>st</sup>, 2011 and June 30<sup>th</sup>, 2012, the third year of the grant. Year-to-year comparisons will be presented in next year's final, summative report. The results are presented below in two chapters. The first chapter, *Project Implementation*, describes how the ITEST grant has been implemented in the second year. The second chapter, *Findings*, discusses the results of the outcome evaluation. This chapter covers the evaluation questions listed in the methodology section below and includes analysis by demographics.

The MATE Center's ITEST grant evaluation was performed by the Puget Sound Division of the Social and Economic Sciences Research Center at Washington State University.

# METHODOLOGY

The evaluation connects each of the project strategies with research questions and expected outcomes of the project. These strategies and research questions are presented below. Please see the Appendix for the detailed evaluation plan, including the expected outcomes, data sources, and evaluation schedule.

**Table 1: Project Strategies and Research Questions**

Project Strategy	Research Questions
<p>1. Provide professional development: workshops and Summer Institutes</p>	<p>1.1. Did the teachers gain confidence facilitating STEM learning experiences through the workshops?</p> <p>1.2. What was the impact of the workshops on the teachers' decision to participate in the ROV competition?</p> <p>1.3. Did attendance at the Summer Institutes lead to greater awareness/understanding of ocean STEM careers?</p>
<p>2. Support the development of the SCOUT (Entry Level) ROV Class</p>	<p>2.1. To what extent did participating in the ROV program lead to an increase in the students' interest in STEM and STEM careers? Did educators and parents observe an increase in the students' interest in STEM and STEM careers as a result of the program? An increase in the students' STEM knowledge and skills and SCANS skills?</p> <p>2.2. Did participating in the workshops (or observing the competitions) lead to an increase in the parents' support of their children's interest in STEM careers?</p> <p>2.3. Were the curriculum materials and workshops at the appropriate level for a middle school audience?</p> <p>2.4. What was the impact of the workshops and other support on the teams' ability to build an ROV and participate in the regional competitions?</p>

3. Modify career guidance resources to better suit middle & high school students	<p>3.1. Has the <i>Exploring Ocean Careers</i> course and web site been modified so that the appeal, information and delivery are appropriate for the middle and high school audience?</p> <p>3.2. Did students, educators and parents use the career guidance tools? Did their awareness of ocean STEM careers increase as a result of these tools?</p>
4. Build ROVER, a cyberlearning center	<p>4.1. Has ROVER increased access to career and instructional resources? Increased use of the resources?</p> <p>4.2. To what extent were the website users satisfied with the ease-of-use of the website? With the materials available through the website?</p> <p>4.3. Has ROVER increased communication between students, educators, industry professionals, and parents?</p> <p>4.4. Did the availability of ROVER affect the teams' ability to build an ROV and participate in the regional competitions?</p>

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## DATA SOURCES

The evaluation relies upon multiple sources of data. The data collection includes input from a variety of stakeholders, including students, teachers, parents, judges/volunteers, regional coordinators, college students helping with grant implementation, and MATE staff. Below are descriptions of each of the data sources.<sup>1</sup> All of the surveys were developed in collaboration with MATE staff and regional coordinators.

### ROV Competitions

At the ROV competitions, input was solicited from as many stakeholders as possible, including students, teachers, parents, and judges/volunteers. In the second year of the grant, the competition survey method changed from a mix of online and paper with hand data entry to all paper surveys in a “scannable” format. Data entry was completed by scanning the surveys and entering the written comments by hand. Data analysis was performed with the Statistical Package for the Social Sciences (SPSS). This survey methodology continued in the third year. In year three, the student and parent surveys were translated into Spanish. Student, teacher, and parent surveys were administered at all regional events. Judge surveys were administered at all regional ITEST events except for Florida, New England, and Texas.

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<sup>1</sup> Please see Appendix for survey and interview protocols.

## STUDENTS

At the ITEST SCOUT class competitions, students were asked to complete surveys. The survey protocol was a modified version of the student survey that has been administered to more than 3,000 students over the past five years at regional and international ROV competitions. In year three, the student surveys were translated into Spanish. The survey covered the following topics: awareness and interest in ocean STEM careers, increased desire to take STEM courses due to involvement in the program, awards/honors received as a result of competition experience, and self-assessment of change in STEM knowledge.

## TEACHERS

Teachers also completed surveys at the ITEST SCOUT class competitions. The survey protocol was a modified version of the faculty/mentor survey that has been administered to more than 700 respondents over the past five years at ROV competitions. The survey addressed topics such as the value of the competition, incorporation of competition into course curriculum, interest in participating in future competitions, assessment of change in their students' STEM knowledge and skills, SCANS skills, and interest in STEM careers, and related topics.<sup>2</sup>

## PARENTS

In contrast to the student and teacher surveys, which have been conducted for years at MATE ROV competitions, year one of the grant was the first time parent input was solicited. Parents responded enthusiastically and seemed to appreciate the opportunity to provide input. The surveys were implemented again in the second year of the grant. In year three, the survey was translated into Spanish in order to promote even wider participation by family members in the evaluation, especially in regions with large Spanish-speaking populations, such as Florida and Southern California.

Parent surveys addressed the topics of parental support of their children's interest in STEM and STEM careers, the value of the competition, and changes they have observed in their children since they became involved in the program.

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<sup>2</sup> In the first year of the grant, a separate web survey was conducted in order to ask the teachers participating in the ITEST grant-funded activities some additional questions. (The post competition surveys are administered to all regional event participants, not only the ITEST program participants.) The web survey had a very low response rate so in the second year of the grant, the web survey was discontinued, and a few additional questions were added to the post-competition survey. The new questions asked the respondents to rate the ROV program and the support they received and to report on the obstacles they faced.

## JUDGES

In the second year of the grant, input was solicited for the first time from industry representatives serving as judges at the competitions. The survey was piloted at the international competition. In year three, the regional coordinators were invited to use this survey as well, on an optional basis. This survey collects information on the judges' experience at the competition, whether they feel it was a worthwhile use of their time, the skills of the students they observed, and their opinions on the usefulness of the competition in preparing future employees.

In the prior year of the evaluation, judge surveys were only administered at the international competition. In year three, these surveys were offered at all regional ITEST events, except for Florida, New England, and Texas.

### Regional Workshops

#### PRE AND POST TEACHER WORKSHOP SURVEYS

Pre and post paper surveys were administered to teacher workshop attendees in the Monterey, Florida, Midwest, Big Island, Southeast, and Pacific Northwest regions at the beginning of the workshop day and at the end of the training. The surveys addressed issues of teacher confidence facilitating STEM learning experiences, commitment to bringing a team to competition, concerns about mentoring students in designing and building an ROV, expectations of the workshops, and additional ways that the regional coordinators and the MATE Center could support the participants. Surveys were tallied in Microsoft Word and Excel.

### Summer Institute

#### IMMEDIATE FEEDBACK AND SIX-MONTH FOLLOW-UP SURVEYS

The evaluation of the Summer Institutes is a two-step process, collecting feedback from the participants immediately after the Institute (using the Institute feedback surveys) then again a few months later (using the Institute follow-up surveys). The follow-up surveys intend to measure the Institutes' longer-term impact and, in particular, to compare participants' actions once they returned to their classrooms with the intentions they had expressed at the close of the Institute. Because of the timing of the Summer Institute and the evaluation reporting, this evaluation covers the year two Institute. The feedback survey had a response rate of 80% (16 out of 20), and the follow-up survey had a response rate of 60% (12 out of 20).

## Curriculum

### TEACHER CURRICULUM FEEDBACK SURVEY

In year two, the draft curriculum was distributed to the teachers throughout the competition network, and their opinions about the curriculum were solicited through a feedback form. This survey asked them how they used the curriculum, their level of experience in leading science and technology activities, who they taught with the curriculum, and how they would rate the curriculum overall, the appropriateness of the content for the middle school audience, the guidelines and background materials for teaching the content, if the curriculum uses appropriate strategies to meet the needs of diverse audiences, and if the curriculum is free of bias. In year three, the project focused on updating the curriculum, and no additional evaluation of the curriculum was performed.

### Other Data Sources

Additional data sources informing the evaluation include the annual reports turned in by the regional coordinators to the ITEST grant PI, observations of the Pacific Northwest regional competition and the regional coordinators meeting, review of participation data, unsolicited letters sent to the regional coordinators and the MATE Center from students, parents and teachers, website review and document review, including supporting technical materials and the MATE Center's annual report.

### Challenges of the Evaluation and Lessons Learned

#### SURVEY METHODS

##### Year One

In the first year of the grant, the survey implementation was somewhat uneven, and the data did not cover all of the regions because some of the regional coordinators did not administer them. With the quick project ramp-up, regional coordinators were pulled in many different directions, and occasionally, survey implementation was forgotten.

##### Year Two

In the second year of the grant, several strategies combined to produce much better data. This effort began with the regional coordinators meeting in September of 2010. This meeting was the kick-off for the second year of the grant. The evaluator shared the results of the first year of evaluation and stressed the importance of the data collection activities. The regional coordinators received a complete set of data collection instruments, along with training on how and when to implement each.

In addition to improving the coordinators' awareness of the data collection expectations, the survey administration method was revised as well. To reduce the burden on the regional coordinators, the post-competition surveys were changed to a format suitable for scanning the resulting data. The surveys were printed at the MATE Center's head office at Monterey Peninsula College and mailed to the regional coordinators with a pre-filled UPS label and box to return the completed surveys to the evaluator for processing.

This method was very effective, and post-competition surveys were returned by all but one ITEST region.<sup>3</sup> This survey method also reduced the data entry burden on the MATE Center's administrative assistant, resulted in a quick turn-around for creating the dataset, and resulted in cleaner, more comprehensive data suitable for more sophisticated analysis.

The downside to this method was the increased costs in printing, shipping, and data entry. Some of the increased costs were one-time expenses, such as transforming the surveys into the format for scanning. Additionally, this method required a significant amount of the MATE Center's administrative assistant's time to coordinate the printing and mailing.

### Year Three

Grant year three again kicked off with a regional coordinators meeting, where the evaluation results from year two and the data collection plan for year three were presented. Regional coordinators were very interested in the results, and the presentation resulted in an engaging discussion.

In year three of the grant, survey administration was largely unchanged, with one exception. In order to lessen the administrative burden of coordinating the printing and mailing of the surveys, Kinko's did the printing. The method was as follows:

- In advance of the regional competitions, the regional coordinators identified a local Kinko's convenient to them.
- The MATE Center emailed the survey files and printing instructions to the Kinko's.
- The MATE Center mailed pre-printed FedEx labels to the regional coordinators.
- Kinko's printed the surveys and also provided an empty FedEx box.
- The regional coordinators picked up the surveys, administered them, and returned the completed surveys to WSU via FedEx.

This method worked relatively well, and surveys were again completed by all regions. Coordinating the printing with multiple Kinko's sites took more administrative time than expected, and in the case of the

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<sup>3</sup> This survey method was used for the entire MATE competition network. Over 1,800 student surveys and 400 teacher surveys were returned from the entire competition network in the 2012 season, far surpassing the completion numbers from prior implementation methods.



South Carolina region, the surveys were not printed on time, due to a miscommunication. In order to collect data from this region, the student and teacher surveys were programmed online, and the regional coordinator emailed the survey invitations.

The downsides to this approach were 1) cost and 2) administrative time. Next year, the surveys will be printed and mailed by WSU. This approach has the advantage of better quality control, lower cost, and coordination of printing with a single contact. A certain amount of administrative time is unavoidable: this includes tasks such as determining the dates of the regional events and the number of each type of survey in each language (English/Spanish) at each event.

## DEMOGRAPHIC DATA

### Year One

In year one, student demographic data was collected by asking the regional coordinators to request the data directly from the schools or clubs that sent ROV teams. This method proved to be very cumbersome, sparked privacy concerns among the participating organizations, and resulted in very uneven data of poor quality.

### Year Two

In the second year of the grant, the evaluation moved to an approach relying entirely on self-reported demographics using the post-competition surveys. This approach has the advantage of allowing the surveys to be anonymous while still providing the ability to analyze the results by the demographic factors. It has the disadvantage of only measuring the students who made it to the competition.

The first year of the evaluation only included demographic analysis by gender and ethnicity. In the second year, disability status and socio-economic status were added. In general, socio-economic status is a sensitive subject. Schools do not like to share information on students' eligibility for Free and Reduced Price Lunch (FRPL), and asking students how much money their family makes raise privacy issues (assuming the students even knew the answer to the question). In order to avoid triggering concerns from schools and parents, the evaluation used the students' home zip codes as a proxy for socioeconomic status. The zip codes were matched to US Census data on the percentage of families with children under 18 living in poverty. Students living in zip codes with greater than national average for families living in poverty were marked as living in high poverty areas. Unfortunately, the 2010 Census data on poverty was not released yet, thus the 2000 Census data was used for this year's analysis.

In addition, the teacher survey was revised to include more demographic data, and this information was also asked of judges. The goal of these questions is to show the percentage of under-represented role models that the students come into contact with through the program.

## Year Three

Year three of the grant continued the year two approach to demographic analysis. Unfortunately, the 2010 Census poverty data was not available at the Zip Code Tabulation Area (ZCTA) at the time of this report so the 2000 Census data was used again. The American Community Survey plans to release poverty data at the ZCTA level in late 2012. Next year's evaluation will rely on this updated data source.

### OTHER CHALLENGES

Within the ROV program, the regional coordinators have considerable latitude in how they implement the competition activities. While the variety of project implementation methods is a strength of the program, it introduces challenges to the evaluation design. The goal is to apply the same evaluation data collection methods to all regions. Some of the data collection plans in the proposal had to be changed because they would not be possible in all regions. For instance, the evaluation plan originally called for pre-surveys of students prior to attending an introductory workshop about the program. In practice, none of the regions offered an introductory workshop for students. Thus, the student pre-survey was removed from the evaluation.

Other basic challenges of the evaluation include the fact that the program does not have direct access to the students prior to the competition so true pre-post comparisons are not possible; the program takes place in multiple regions across the country, each which brings different strengths and weaknesses that can affect the results, and the grant activities involve a subset of participants in a larger program, which brings the challenge of identifying the ITEST participants.

# PROJECT IMPLEMENTATION

This chapter reviews the progress towards implementing each of the four grant objectives. Each of the objectives is discussed in turn, followed by a summary of additional grant activities that the MATE Center has performed in support of the overall grant.

## OBJECTIVE ONE

*Objective 1: Build the support infrastructure for an entry-level ROV competition class by a) providing professional development and student support workshops in after-school and informal settings; and b) developing, adapting, and enhancing ROV-focused STEM curriculum materials.*

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### SUPPORT FOR ENTRY-LEVEL ROV COMPETITION CLASS

In the third year of the grant, the MATE Center continued its roll-out of targeted support for the entry-level (SCOUT) ROV competition class. In the first year, four regions participated in the grant: Monterey Bay, Pacific Northwest, New England and Southern California. In the second year, these four regions continued their SCOUT support activities, and four more regions began their SCOUT support efforts: Florida, Mid Atlantic, Oahu and Great Lakes. In the third year, the eight prior regions continued, and four additional regions began their grant activities: Monterey Bay, Pacific Northwest, New England, Southern California, Florida, Mid Atlantic, Oahu, the Great Lakes, the Big Island, Texas, Southeast, and Midwest.

Through the 388 student workshops, classroom visits, and outreach activities, in year three, over 3,300 students were involved with the program. The support for the SCOUT class included 48 regional professional development workshops and one Summer Institute. Each of these will be described in turn below.

#### Regional Workshops for Teachers and/or Students

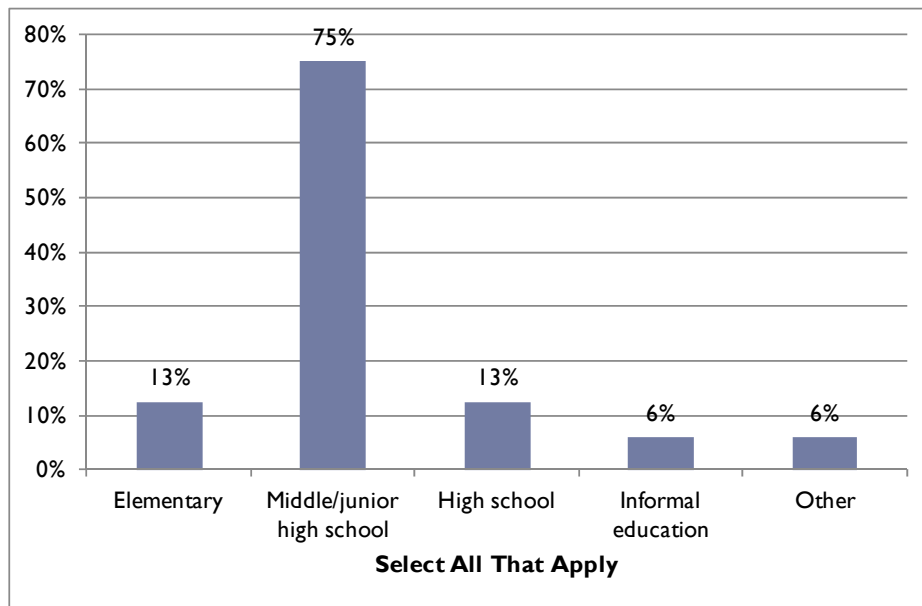
Regional coordinators have the flexibility to specialize the workshops in their region to the particular needs of their audience. That said, the workshops tend to cover a core, basic set of knowledge and skills. Generally, the competition season begins with a workshop for the new teachers only. This workshop allows the teachers to build their own ROV that they take with them to use as a teaching tool. They go back to their classes/clubs and assemble a team of students. Their students are welcome to come to the rest of the workshops. Indeed, some students come on their own, without their teacher/mentor. The follow-on workshops tend to cover subjects such as wiring and waterproofing. The regional coordinators also help to arrange for pool practice time. While these sessions are not “workshops” per se, they are valuable learning experiences and the coordinators are generally on-hand to offer one-on-one troubleshooting.

## Summer Institute

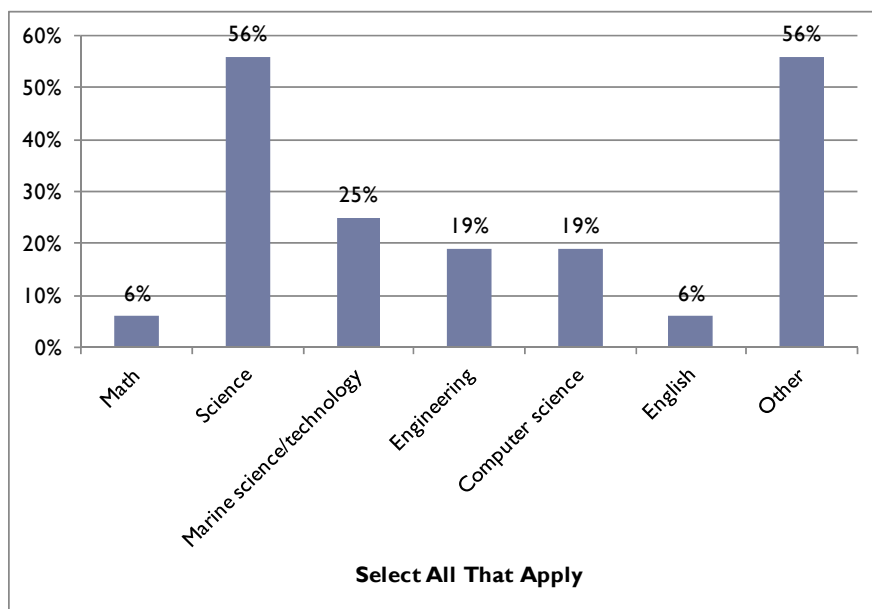
Since the Summer Institute takes place shortly after the evaluation reporting period closes, each evaluation report covers the institute from the prior grant year. The year two ITEST Summer Institute took place July 8– 14, 2012. The goal of the Institute is to provide the participants with the knowledge to become resources for the ROV programs in their regions. This includes not only technical skills but also information about marine STEM careers. Please see the MATE Center annual report and addenda for detailed information about the Institute.

Three-quarters (75%) of Institute participants taught in middle schools or junior high schools, and most of them taught science (56%), in addition to another subject (56%). The other subjects included robotics, underwater archeology, maritime history, literature of the sea, and science enrichment activities for the entire school. Participants came with a wide range of teaching experience, from one year to 28 years. The participants report that they teach an unduplicated count of just over 1,500 students per year.

**Figure 1: Grades/Levels Taught by Institute Participants**



**Figure 2: Subjects Taught by Institute Participants**



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## ROVER MIDDLE SCHOOL CURRICULUM

In the first two years of the grant, the Shedd Aquarium collaborated with the MATE Center to draft the ROVER middle school STEM curriculum. This ROV-focused curriculum is a collection of chapters that can be implemented as stand-alone activities/modules or as a full course. An in-depth review of the curriculum was conducted by an elementary/middle school science program coordinator and a retired middle school science teacher. After their feedback was incorporated into the curriculum, a beta version was distributed by the regional coordinators to the teachers attending workshops throughout the ROV competition network.

In year three, the Center continued to work with the (now former) Shedd Aquarium education specialist to refine the draft middle school ROV curriculum. This curriculum was disseminated to the year one and two ITEST teachers. It has also been reviewed by content experts, including the Director of Programs of Immersion Presents (see [www.immersionlearning.org](http://www.immersionlearning.org)). Immersion Presents also contributed content and images. The Center also received permission from the Mechanical Engineering Department at Villanova University to use lessons from their underwater robotics curriculum (see [www72.homepage.villanova.edu/aaron.wemhoff/URC/Underwater%20Robotics%20Curriculum.pdf](http://www72.homepage.villanova.edu/aaron.wemhoff/URC/Underwater%20Robotics%20Curriculum.pdf)). This information, along with photos and illustrations from MATE's underwater robotics textbook, are currently being incorporated. The goal is to finalize the curriculum and disseminate it to ITEST teachers, project partners, and via the ROVER web site during the one-year, no-cost extension of the grant.

## OBJECTIVE TWO

*Objective 2: Increase ocean STEM career awareness and present trajectories to those careers for middle and high school audiences.*

Originally, the MATE Center planned to achieve Project Strategy Three, modifying career guidance resources to better suit middle and high school students, through updating the *Exploring Ocean Careers* course and website. As the preparatory research for this update was completed, it became clear that a different approach would be more effective to providing career guidance resources for these two audiences, as discussed below.

**High School Students:** The *Exploring Ocean Careers* course is set up so that all students complete the first few chapters, which help them assess their skills and which careers might be the best for them. Next, they read (or listen to) only the chapters that apply to their target careers. The MATE Center has begun beta testing this course with high school students, to very positive reviews.

It appears that for the high school audience, modification of the online course is not necessary; however, the MATE Center would like to increase access to the course. Thus, in the fall of 2012, the course will be migrated from Moodle, which limits access to users with this particular software, to the MATE website. The entire course will be open to the public, with the exception of the quiz banks, which will be shared with teachers who deliver the course for academic credit.

**Middle School Students:** When considering how best to modify the *Exploring Ocean Careers* course, the MATE Center began by interviewing middle school teachers. The teachers posited that career videos would be the most effective way to reach this audience, since videos require a shorter attention span and provide action and excitement.

The MATE Center researched existing marine career videos and rated them. Overall, they found that a wide variety of high quality videos were already available from sources such as ATE TV and ABC TV. However, they also discovered that these resources were not widely known among middle and high school teachers. To facilitate access to these videos, they plan to link them to the revised MATE Center website.

**Pilot Video Program:** In grant year three, the MATE Center piloted a program that encouraged ROV competition student participants to create their own videos. Six teams in the southern California region were selected to participate in the pilot: three Ranger teams and three Scout teams. In January 2012, the teams participated in a workshop with a professional videographer. A total of eight mentors and 23 students attended. Each team was provided with a waterproof video camera to use for the duration of the project. They received training in the use of the camera, as well as storyboarding, filming, editing with iMovie, and distribution. They were encouraged to create videos of no more than two minutes that focused on an experience participating in the competition, a technical lesson, or a marine STEM career.

They could use a reality show approach, a news report approach with interviews, or they could make tutorials, music videos, stop motion animation, or follow their own inspiration.

After the workshop, the teams were supported through the videographer calling and emailing the team mentors. She checked on their progress and offered technical support. She offered underwater shipwreck (the theme of the 2012 competition) footage to be incorporated into the students' videos. She also set up a Wikispace where the workshop videos and information were posted. Additionally, pages were set up for team communication and sharing information.

By the international ROV competition in June 2012, two of the six teams posted videos. Several valuable lessons were learned as a result of the pilot project:

- There was no deadline so several of the teams are still working on their videos. Next year, the Center will consider setting a deadline.
- The main challenge for the teams was finding the time to do the editing, with the many competing academic and extracurricular demands. Next year, the Center will consider creating a contest (possibly combined with the ROV competition) and offering a prize.
- The Wikispace was not used by the teams. In fact, most teams did not register for access. Next year, the Center will try to hold the kick-off workshop at a site with internet access so the teams can register during the event. Alternately, other communication methods/venues will be explored.

## OBJECTIVE THREE

*Objective 3: Build a cyberlearning center to a) foster collaboration and increase communication among students, educators, parents, and working professionals; and b) improve access to STEM instructional resources.*

The ROVER (ROV Education and Resources) website was launched in September 2010. It contains links to a growing selection of external career and instructional resources, acts as a gateway to the MATE Center's other social media efforts and hosts the competition registration system. In year three, ROVER continued to serve as a portal for information, resources, communication forums, links to outside sources, social media outlets, and more. It served as the one-stop shop for competition information, communication, and participant support again this year. From mid-June 2011 until present, the site has received 43,242 unique visitors. The majority of visitors (69% of those completing a first-time user survey) were students. The main resource visitors were seeking was ROV competition information (93%), followed by technical resources for building ROVs (36%).

## OBJECTIVE FOUR

*Objective 4: Evaluate and track project participants to determine the impact on a) students' STEM knowledge, skill development, and inclination to pursue STEM education and careers; and b) teachers' confidence in facilitating STEM learning experiences and delivering career information.*

In the third year of the grant, interview and survey methods from the second year were refined, and survey protocols were translated into Spanish. Records review and observations of meetings and competitions also informed the evaluation. Analysis of the multiple data sources provided findings on the project's movement towards the expected outcomes. This report demonstrates the progress made towards Objective Four.

## ADDITIONAL GRANT ACTIVITIES

In addition to the grant implementation activities that fit within each objective, the MATE Center also performed several other implementation tasks in support of the project as a whole. These included a Regional Coordinators Meeting held in Monterey on November 10-11, 2011. This meeting allowed the regional coordinators who participated in the first two years of the grant implementation to share their experiences and lessons learned.

The project also conducted a variety of outreach activities, including workshops and presentations to students, teachers, and industry professionals. Please see the Annual Report for a complete list.



# FINDINGS

This chapter reviews the project strategies and associated research questions. Evaluation results from all applicable data sources are summarized under each research question. A discussion of results by gender, ethnicity, socioeconomic status and disability status is included at the end of the chapter.

## Project Strategy 1: Provide Professional Development, including Workshops and Summer Institutes

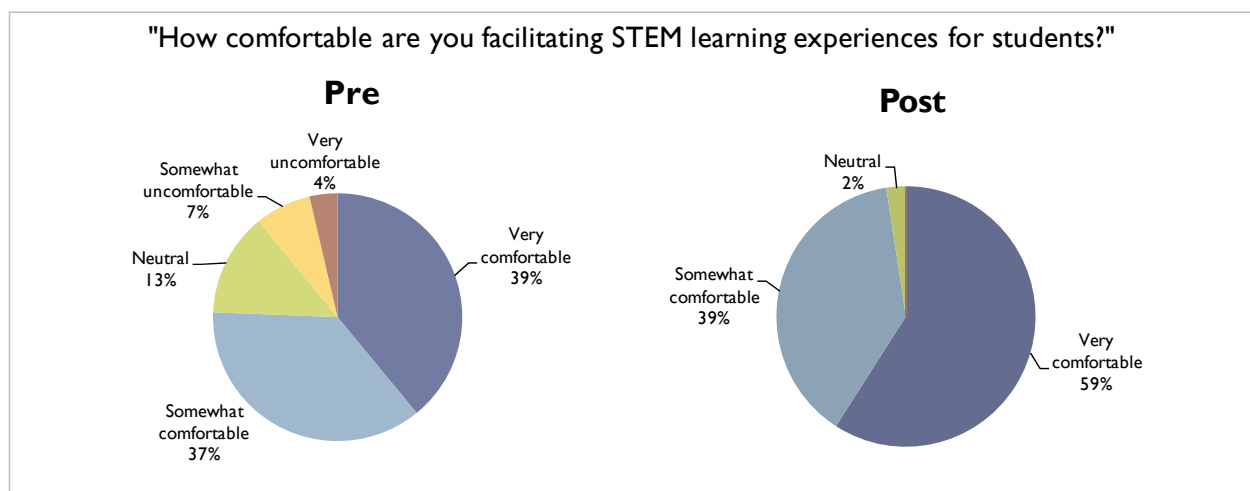
### Research Question 1.1. Did the teachers gain confidence facilitating STEM learning experiences through the workshops?

Pre and post workshop surveys, post competition surveys, and Summer Institute feedback surveys demonstrate that the participants gained confidence facilitating STEM learning experiences through the training and support provided by MATE.

The pre-workshop surveys show that there is a need for the workshops. Before the training, well over one-third of the respondents (42%, N=82) stated that they had concerns about mentoring students in designing and building an ROV. Over half of the teachers (55%) indicated that they were concerned that they might not have the necessary technical skills and expertise.

The percentage of respondents who rated themselves as “very comfortable” facilitating STEM learning experiences for students rose from 39% in the pre-workshop surveys to 60% (N=83) in the post-workshop surveys.

**Figure 3: Level of Teacher Confidence Facilitating STEM Learning Experiences: Pre and Post Workshops**



When asked if the training addressed their concerns about designing and building an ROV, 93% indicated that they felt less concerned. Overall, 88% of the respondents rated the usefulness of the training as “excellent”, and 11% gave it a rating of “good”. One individual rated the training as “fair”. Open-ended comments included the following:

*This training really helped alleviate many of my concerns about so many things. It was good to talk to you guys (the experts) and other teachers ranging from experience to multi-year veterans.*

After the competition season, teachers rated the support provided by MATE. Half of the teachers (50%, N=89) gave a rating of excellent, and 32% rated it as good. Fifteen percent (15%) indicated that the support was fair, and 3% marked that the support was poor. No respondents indicated that it was very poor.

### **Research Question 1.2. What was the impact of the workshops on the teachers’ decision to participate in the ROV competition?**

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Post workshop surveys indicate that the workshops helped affirm the teachers’ decision to participate in the program. After the training, 88% of the respondents marked that they intended to mentor a team. (The other 12% marked “maybe”). The majority of the respondents (83%) indicated that as a result of the training, they felt more committed to participating in the competition.

Results from the Summer Institute follow-up surveys indicate that the Institute was also effective at motivating teachers to participate in the competition. In the six-month follow-up surveys, participants indicated described the support provided by MATE in the following words:

*I never would have considered a ranger team without the support at the workshop*

*It has helped me take the lead on ROV related education for my institution.*

*I have tried to get some of the other small schools in Cochise Co. involved and to have our own competition. So far I have three schools that are interested in a competition this spring.*

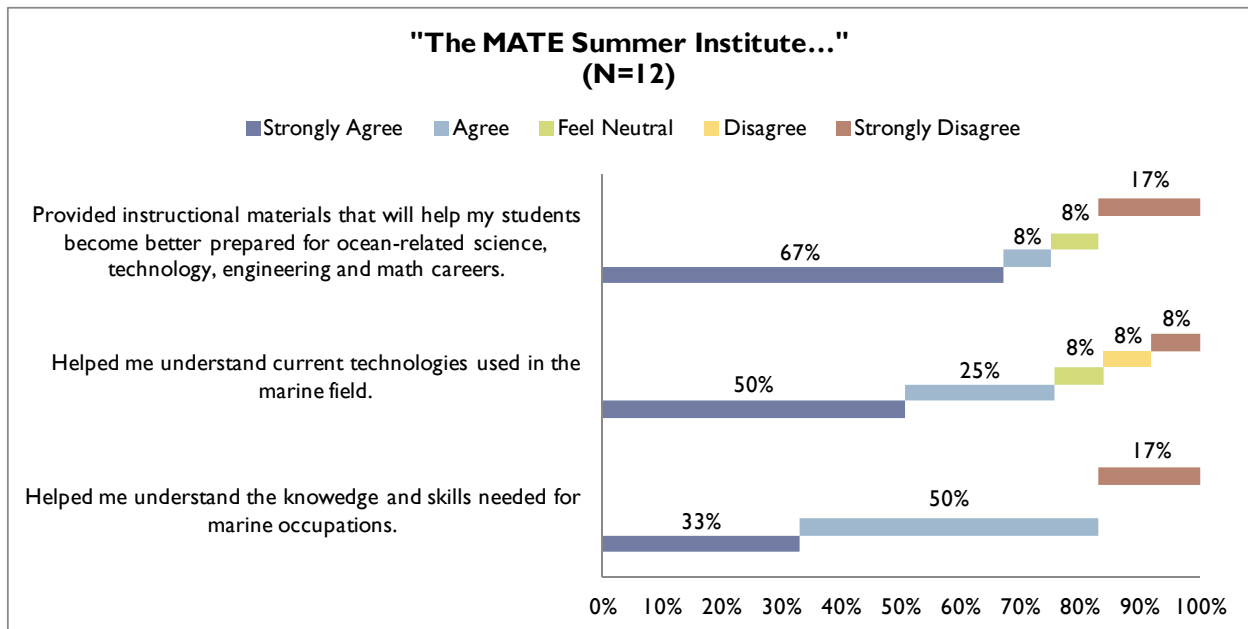
**Research Question 1.3. Did attendance at the Summer Institutes lead to greater awareness/understanding of ocean STEM careers?**

In the follow-up survey conducted six months after the Summer Institute, the majority of respondents (83%, N=12) indicated that the Institute helped them understand the knowledge and skills needed for marine occupations and the current technologies used in the marine field (75%). Three-quarters (75%) of the respondents agreed that the Institute provided instructional materials that will help their students become better prepared for ocean-related science, technology, engineering and math careers. Open-ended comments from the Institute participants include the following:

*Yes, it has given me the opportunity to show my students that there are other fields of employment that can be fun, interesting and can be very challenging.*

*It [having attended the Summer Institute] has doubled my after school science club. More interest in science in general and new occupations.*

**Figure 4: 2011 Summer Institute: Affect on Ocean STEM Career Awareness, Percentage of Respondents Agreeing or Disagreeing with Statements**



Survey results demonstrate that in the months following the Institute, most of the respondents (92%) implemented what they learned by modifying their courses and teaching strategies (100%). The information gained at the Institute was disseminated by the participants sharing what they learned with their students (100%) and other instructors (100%).

Overall, the Institute received very positive marks, with all of the respondents rating the usefulness of the Institute positively: excellent (83%) or good (17%). Participant comments include the following:

*The workshop was phenomenal. I look forward to going back for the next level of instruction. The information provided in the workshop helps me to enhance my students learning experiences.*

*I really felt the MATE summer institute was one of the best professional development opportunities I've experienced.*

*Great workshop which I highly recommend to other instructors.*

## Project Strategy 2: Support the Development of the SCOUT (Entry Level) ROV Class<sup>4</sup>

**Research Question(s) 2.1. To what extent did participating in the ROV program lead to an increase in the students' interest in STEM and STEM careers? Did educators and parents observe an increase in the students' interest in STEM and STEM careers as a result of the program? An increase in the students' STEM knowledge and skills and SCANS skills?**

**Increased Awareness of and Interest in STEM Careers:** After building their ROV, 81% of the students (N=443) indicated that they knew more about careers in marine science, technology, and engineering. Indeed, almost one-quarter (24%) marked that they knew “a lot more”. Over half (56%) stated that their ROV project made them more interested in a marine career. Overall, 43% of the students were interested in having a career in marine science, technology, or engineering; 46% were not sure, and 11% were not interested in a career in this field. Students mentioned wanting careers such as marine scientist, computer programmer, electrical engineer, and mechanical engineer. Students noted that their experience in the ROV program sparked their interest in having a STEM career, with comments such as the following:

*I am so thankful for the MATE ROV contest. I would have never thought of engineering for a pathway in the future.*

*Before this program I didn't know what to do with my life, but now I do.*

*I thought this was a very fun activity and it taught me a lot about what some people do in life. It also made me consider having a career on robotics.*

Among the teachers/mentors who completed post-competition surveys (N=90), over three-quarters of the respondents (79%) indicated that they had observed that their students were more interested in pursuing a STEM career. Ninety-four percent (94%) agreed that the ROV program provided a valuable venue to help prepare their students for a career in marine science and technology.

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<sup>4</sup> In the proposal, this project strategy was stated as “Provide student workshops and ROV STEM curriculum”. After the first year of implementing the grant, it became clear that the wording of this strategy and the associated research questions needed to be broadened to “Support the development of the SCOUT (Entry Level) ROV Class.”

Parents also noted an increased interest in STEM careers, in comments such as the following:

*Interest change from medicine to medical robotics - serious, active interest.*

*Career development and interests ID'ed.*

*Interested in career in science.*

*More interested in school and how it relates to the future.*

**Increased Interest in STEM:** Three-quarters of the students (75%) stated that their ROV project made them want to learn more about ocean science, technology, and engineering. Students indicated that their ROV projects increased their desire to take courses in engineering (60%), science (52%), computer science (42%), math (35%), and other hands-on classes or club activities like robotics, electronics and shop courses (62%). Additionally, 53% of the students wanted to learn more about WWII shipwrecks, including how ROV's can be used to assess them. As one student explained his experience, "From doing ROV I've been really interested in other forms of robotics and engineering." Another stated that the competition affected his academic interests as follows:

*I never participated in these sorts of activities before. Now I have more knowledge, and I am more interested in how marine technology works and, of course, science.*

In the post-competition survey, 92% of the teachers/mentors (N=90) indicated that their students were more interested in learning about science, technology, engineering and math. This follows patterns of prior surveys of teachers/mentors.

# ROV Program Testimonials

## Students

*Don't stop this program EVER! I cannot put into words how much I love this competition. For the two years I have participated, I have learned more about constructing circuits and building than I have through any class or extracurricular.*

*This was one of the best learning experiences I've had. Not only did I learn how to manage an ROV, I became more aware of fields opening in science and engineering.*

*I have learned so much about robotics and the value of teamwork and friendship. It is in unforgettable experience that I will treasure always.*

*I'm looking forward to doing this again. It's fun, exciting, and educational.*

## Parents

*It was like a booster shot of wanting to learn. Best learning experience we've ever encountered.*

*My daughter had no interest in robotics, but now she loves it! I am so happy with what she has learned, can't wait for her to do this again.*

*Massive increase in a hunger for knowledge, looking up and researching information.*

## Faculty/Mentors

*This has definitely been an enriching educational experience for my students. They are excited and looking forward to ROV competition next year and are already discussing designs.*

Parents concurred with the other sources reporting increased student interest in STEM. Ninety-one percent (91%) of the parents surveyed (N=220) stated that building an ROV has made their child more interested in science, technology, engineering or math. Parents wrote comments such as the following:

*I have seen just his excitement in all parts of engineering just soar, plus his creativity and understanding of how engineering affects our lives.*

*Developing a strong interest in electrical components*

*Greater interest in (Applied) Science*

**Increased STEM Knowledge and Skills:** Most students entered with no knowledge about ROV's. Over half of the students (54%) did not know what an ROV was before entering this program, and for three-quarters of the students (75%), this was their first time building an ROV. One indication of increased STEM knowledge is that before beginning their research for the competition, only 12% of the students indicated that they knew "a lot" about WWII shipwrecks. After completing their research, 37% marked that they knew "a lot". Students also gained research skills as part of the competition. Over half (57%) used the Internet to conduct research, including websites for organizations including UNESCO, NOAA, and National Geographic. Additionally, 57% interviewed teachers or parents, and 19% used print resources, such as journals and newspapers. Twelve percent (12%) interviewed working professionals. In the responses to open-ended survey questions, students drew the connection between their ROV experiences and their STEM classes, such as the following:

*Middle School ROV has opened doors to learning more about marine science. During my science class I used my knowledge from ROV to answer my teacher's questions.*

Among the teachers/mentors who completed post-competition surveys (N=90), 98% of the respondents reported that they observed improvements in their students' STEM knowledge and skills. Parents reported that building an ROV contributed to improving their child's grades in engineering/robotics (59%), science (49%), math (36%) and computers (35%).<sup>5</sup>

**Increased 21<sup>st</sup> Century (SCANS) Skills:** In the post-competition surveys, 94% of the teachers/mentors mentioned that they observed increases in their students' skills in team building, problem solving, and/or critical thinking. Teachers/mentors saw skill development in many areas, as evidenced by their written comments:

*We really enjoyed our experience. Through this program, my students have developed great problem-solving skills and a zeal for STEM competitions.*

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<sup>5</sup> Percentages are calculated among students studying each topic.

When parents were asked what changes they have seen in their child as a result of their involvement in the ROV project, 68% reported that their children were better able to work with others; 61% indicated that their child's self confidence had improved, and 30% marked that their child was better organized. In the open-ended comments, parents noted other changes that they observed in their children:

*Better communication skills; better advocacy skills; takes more initiative; very excited about science.*

*Better able to deal with frustrations*

*Better problem solving skills*

*Commitment and follow through on projects*

*Improved self confidence in area of STEM.*

*More creative in problem solving*

*Overcoming obstacles / perseverance*

*Recognized the need for time management!*

*Responsibility and communication skills improved.*

*He is learning to be resourceful and creative. He also has learned the importance of teamwork and how the ability to work with others is an essential part of a business' success.*

*His biggest challenge is teamwork and following directions, and this project has been really helpful in these areas.*

*Besides the technical aspects of constructing and operating the ROV, they learned about teamwork and the completion of a major project.*

*It has taught him to be a team player, work well with others and be responsible as he feels he needs to contribute and do his best for the group.*

In responses to open-ended survey questions, students also described gaining 21<sup>st</sup> Century skills through their experiences building an ROV, such as the following: "Great experience to learn about engineering, trial and error, speaking, group work, community outreach."



### Overall Opinions of ROV Program:

Overall, parents rated their children's experience building and competing with an ROV extremely positively. Eighty percent (80%) rated it as excellent, 19% gave a rating of good, and 1% marked fair. When asked how valuable the competition has been for the educational development of their child, over two-thirds indicated that it was extremely valuable (71%), one-quarter stated that it was quite valuable (26%), and 3% rated it as somewhat valuable. No respondents marked that it was not at all valuable.

*Thank you for having this competition. My daughter has learned that Math and Science are very cool. This is something very good for girls her age to learn!*

*I'm excited about the science, technology, and math skills that have been acquired. Equally important, skills have been developed in working with others to accomplish tasks.*

*My daughter is very excited about this competition and super proud of her team's ROV. She is very shy, but her confidence has really been boosted by this process. It was also a great group/teamwork experience for her. ABSOLUTELY GREAT EXPERIENCE for her in so many ways!*

Teachers/mentors gave uniformly positive ratings of the usefulness of the competition, with 80% stating that it was excellent and 20% indicating that it was good. Teachers/mentors also rated the support provided by the MATE program highly (51% excellent, 32% good, 15% fair, and 3% poor). As one teacher stated, "My students and myself loved the program, particularly the integration of STEM, the environmental theme and history (Diving into History)."

Students also rated their experiences building and competing with their ROV very positively, with close to half rating their experience as excellent (47%), and 42% providing a rating of good. Ten percent (10%) thought their experience was fair, and less than 1% gave the experience a poor rating. In the post-competition surveys, students wrote comments such as the following:

*ROV is one of the best things I have ever done. It has helped me in so many different ways. I also learned a lot of new things. I have made so many new friends who are like family to me now as well. ROV has helped me in school too. I now know things that I didn't know before so I know I can put that information into my school work. Even though I am a while away from deciding what I want to be when I grow up, ROV has changed what I wanted to do at first completely. It has made me so much happier and smarter. I also get to help out the environment. I am just so thankful that I had the opportunity to do something as wonderful as ROV.*

## 2.2. Did participating in the workshops (or observing the competitions) lead to an increase in the parents' support of their children's interest in STEM careers?

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Eighty-one percent (81%) of the parents surveyed indicated that participation in the ROV program changed how they envisioned their child's future, making it easier to picture their child with a STEM career. Seven percent (7%) marked that the program participation did not affect how they picture their child's future, and 11% were not sure. Eighty-six percent (86%) of the parents stated that they feel they have at least some influence on their child's career choice.

## 2.3. Were the curriculum materials and workshops at the appropriate level for a middle school audience?

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**Curriculum materials:** Overall, feedback about the curriculum has been extremely positive, with reviewers indicating that the curriculum materials are at the appropriate level for a middle school audience.

**Workshops:** Anecdotal reports from regional coordinators, faculty, and parents indicate that the workshops targeting a broad audience (students, teachers/mentors, and parents) were at the appropriate level for the middle school audience, and that the participants were very engaged. In the post-competition surveys, half of the teachers (49%, N=90) indicated that having the technical skills and expertise was an obstacle for them. This was especially true of the female instructors, who were over twice as likely to mark this as an obstacle (female: 67%, male: 28%), a statistically significant difference.

The regional coordinators responded to this challenge with different approaches: most offered multiple workshops throughout the program duration. Another professional development opportunity for these teachers is the MATE Center's week-long Summer Institute. One Institute participant noted below that the materials provided at the Institute helped inspire a successful middle school outreach effort:

*I am using experiments and techniques provided by MATE that I learned about at the Institute. The Institute also inspired me to come up with an event-based ROV-in-a-Bag program this fall at my site that was extremely successful for reaching a middle school population of students and teachers in my community.*

## 2.4. What was the impact of the workshops and other support on the teams' ability to build an ROV and participate in the regional competitions?

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As stated above, 84% of the teachers at the workshops indicated that as a result of the workshops, they felt more committed to participating in the competition. The biggest indicator that the regions successfully supported the teams was the increase in the number of SCOUT class teams participating in the program.

It appears that the workshops were an important component in supporting the teachers. In the post-competition surveys, teachers who attended workshops were significantly more likely to rate the overall support provided by the ROV program as excellent or good (90%), compared to those who did not attend a workshop (70%).

*This is a high quality program with a great deal of support. My students learned a tremendous amount and were always enthusiastic and excited about all aspects of the program.*

## Project Strategy 3: Modify Career Guidance Resources to Better Suit Middle & High School Students

### 3.1. Has the *Exploring Ocean Careers* course and website been modified so that the appeal, information and delivery are appropriate for the middle and high school audience?

As noted above in the implementation section, the MATE Center has decided to take a different approach to enhancing the career information available to middle school and high school students. They have assessed and rated the available career videos and ran a pilot project for students to create their own videos. Next year, they will link the existing career videos to the ROVER website, transition the *Exploring Ocean Careers* course to the ROVER website to be publicly available, and expand the student video project.

### 3.2. Did students, educators and parents use the career guidance tools? Did their awareness of ocean STEM careers increase as a result of these tools?

As noted above and in the implementation section, the MATE Center's approach to increasing ocean STEM career awareness changed from the initial focus on creating "career guidance tools". Instead, career information was disseminated through the Summer Institute, presentations conducted within schools and regional workshops, and the competition itself, as the students conducted research on the competition theme. See research question 1.3 above for the teachers' increased awareness of ocean STEM careers and section 2.1 for the students' increased awareness.

## Project Strategy 4: Build ROVER, a Cyberlearning Center

### 4.1. Has ROVER increased access to career and instructional resources? Increased use of the resources?

#### Increased Access to Career and Instructional Resources

One of the goals of the ROVER website is to be a portal for existing career and instructional resources in this field. Towards this end, the website has been populated with the following links. Many of these links lead to collections of resources, so the actual numbers of resources that can be accessed through the links is much greater than the number of links.

Links to MATE Resources:

- 5 ROV Competition FAQs
- 3 Help Videos

### Links to External Resources

- 434 ROV Videos
- 10 ROV Images
- 9 ROV News Sources
- 31 ROV How-to Books, Information and Articles
- 6 ROV Blogs
- 4 ROV Online Communities
- 59 ROV Building Supplies/Suppliers
- 16 Archived ROV Competition Information Links
- 9 ROV Internships, Scholarships, & Opportunities
- 40 ROV General Links
- 22 ROV Competition Press Coverage Links
- 11 ROV Team/School Links
- 63 Glossary Entries

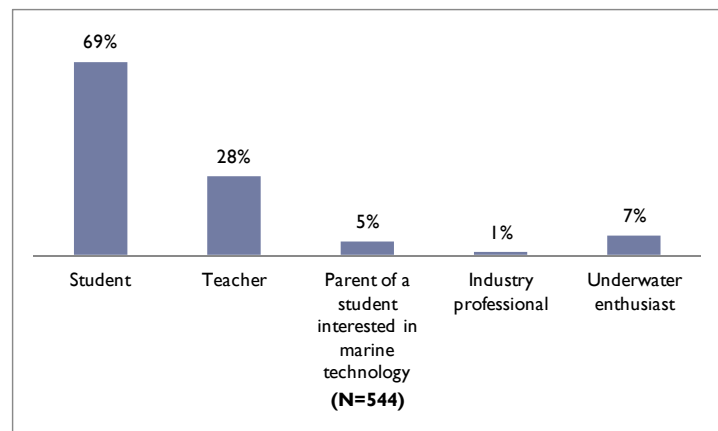
### Increased Use of Website and Resources

Unfortunately, the Google Analytics system that should have been monitoring the website usage was not working, and this failure was not discovered until the end of the international competition in June of 2011. Since that time, the site has received 43,242 unduplicated visitors.

Additional sources of data that indicate usage of the website and other MATE online resources include the following: website user registration survey, Twitter followers, Facebook “likes”, Flickr photo views, and YouTube videos. Additionally, the ROV competition registration was handled entirely through the ROVER website, which was an effective way to drive traffic to the site.

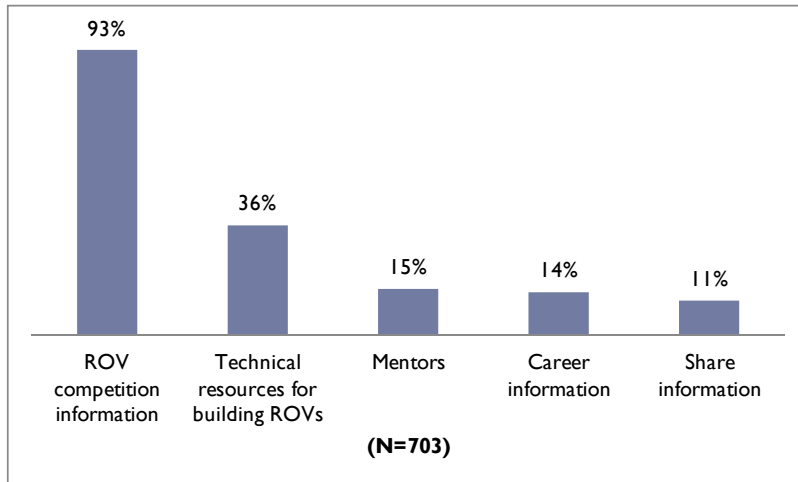
When visitors viewed the website for the first time, they were invited to complete a short registration survey that asked about what type of stakeholder they were (student, parent, teacher, industry professional or underwater enthusiast), how they’ve been involved with the MATE Center, and their reason for registering with the site. The survey was completed by 544 users between July 1, 2011, and August 27, 2012.

**Figure 5: ROVER Website Users, July 1, 2011 – August 27, 2012**



By far, the main resource that website users were seeking when they first visited the site was ROV competition information (93%), followed by technical resources for building ROVs.

**Figure 6: ROVER Website, Reasons for Registering, July 1, 2011 – August 27, 2012**



Beyond the website registration survey, other sources of usage data include the following:

- Twitter: 264 followers, up from 101 last year (<http://twitter.com/#!/matecenter>)
- Facebook: 535 “likes”, up from 134 last year (<http://www.facebook.com/pages/MATE-Center/226625134802>)
- Flickr: 3,223 pictures of ROVs and participants, up from 1,850 last year (<http://www.flickr.com/photos/matecenter>)
- Youtube channel: 226 videos, compared to 123 last year (<http://www.youtube.com/MATECenter>)
  - Total upload views (since May 2007): 41,556
  - Subscribers: 98, up from 54 last year
- 2012 ROV Competition Registration: more than 2,500 student, teacher and judge registrants
- 2012 International ROV Competition Live Feed: During the international competition, a live video feed was streamed on the website. According to Google Analytics, there were nearly 10,000 visits during the event dates.

Plans for the upcoming year include migrating ROVER to the new MATE website platform. Clear Science, Inc., MATE’s web developer for the past 14 years and the company that developed and maintained ROVER, moved on from the web development business last fall. After contacting several web development companies, the Center found Byte Technologies, which is in the process of redesigning, restructuring, and populating the [www.marinetech.org](http://www.marinetech.org) site. ROVER will migrate next, completing the transition in time for the November release of the 2013 competition information.

Following the transition, ROVER will continue to add content and features. The proposed “Mentor Hotline,” a geo-referenced directory of working professionals and the “services” (design reviews, tours of facilities) that they offer, will morph into several different ROVER features. The first will link to the “experts’ directory” of the Marine Technology Society, where students can search and directly contact industry professionals with the expertise they are seeking. The second will highlight the student-produced videos described in Objective 2 above, while the third will point students to the Ocean Careers web site and its career profiles. In addition, the Center will create a new “SHARE” area, where students, teachers, mentors, parents, and industry professionals can share their stories, videos, best practices, techniques, curriculum materials, etc. with the larger ROV STEM community.

#### **4.2. To what extent were the website users satisfied with the ease-of-use of the website? With the materials available through the website?**

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MATE staff report that the website rollout went smoothly and only a few user issues were reported. Some school computer networks had firewall issues with the site, and some bugs were reported early on within the registration process. These issues were quickly corrected. In the next grant year, user satisfaction will be assessed through adding website usability questions to the post-competition surveys.

#### **4.3. Has ROVER increased communication between students, educators, industry professionals, and parents?**

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The website has several different components that are intended to increase communication between students, educators, industry professionals and parents, including several discussion boards. In addition, there are several other methods for these stakeholders to communicate, such as posting photos to the MATE Flickr stream, videos to the YouTube channel or comments on the Facebook page.

The most well-used discussion board on the ROVER website is the ROV competition FAQ page. In the 2012 competition season, there were 450 posts on 150 different topics, a marked increase from the 191 posts in the prior year. PIs attribute much of the increase to their increased attention to “seeding” the discussions. The rule of thumb for discussion board usage is that there are 10 “lurkers” (users reading the posts) for every one user who posts a question or comment.<sup>6</sup>

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<sup>6</sup> See “Participation Inequality: Encouraging More Users to Contribute” at [http://www.useit.com/alertbox/participation\\_inequality.html](http://www.useit.com/alertbox/participation_inequality.html)

#### 4.4. Did the availability of ROVER affect the teams' ability to build an ROV and participate in the regional competitions?

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The ROVER website supported teams' ability to build an ROV and participate in the competitions through the online registration system, FAQ discussion board, and links to instructional materials (see above "Increased Access to Career and Instructional Resources").

### Broader Impacts

The MATE Center's ITEST activities have been leveraged by regional coordinators and participants in ways that were unanticipated during the writing of the proposal. Thus, they don't fit under any particular evaluation question. Since the evaluation was not set up to monitor these activities, the findings presented here should be considered preliminary. Next year, the evaluation tools will be modified to capture more of this data.

These "broader impacts" fall into three main categories:

1. Leveraging ITEST activities/funding to raise additional funding by regional coordinators, teachers, schools, and student teams
2. Using ROVs and ROV-based activities outside of the competition by teachers and students
3. Involving college students to mentor middle school ROV teams in several competition regions

#### Leveraging ITEST Activities/Funding

Faculty who led ROV teams and/or attended the Summer Institute reported that they have applied for and won funding from grants and school boards and have received equipment donations from local industry. Examples include the following:

*Yes, I just was awarded a \$1000 grant from PSEF (Peninsula Schools Education Foundation). I also get funds from our ASB to support the club and pay for pool rental and/or transportation +/- \$500 to 750. I am hoping to have additional sponsors as well.*

*Just received a grant with Carol Rivera, of a \$1000 to support our building of Ranger teams at each of our schools and to try in increase the number of girls in our ROV programs.*

*Great Lakes Stewardship Initiative (GLSI) grant 1500, Friends of Thunder Bay National Marine Sanctuary grant – 1500*

*Our School's Foundation provides me with an annual \$1,500.00 grant.*

Additionally, ROV competition regions outside of the United States have leveraged news of the ITEST grant raise additional funds.



## Using ROVs outside the Competition

Many faculty have reported using ROVs or ROV-based activities outside of the competition, incorporating these tools and topics into their classes or clubs in order to bring science to life. Examples from year 2 of the grant include the following:

*The ITEST funded project helped us leverage this film project with the Great Lakes Stewardship Initiative. In the end, the students talk about both preparing for the MATE competition and using ROVs to study zebra mussels/shipwrecks.*

<http://vimeo.com/25825942>, password: syrup

*My marine science class built ROV's and have acquired an underwater video camera which we have attached to a ROV to monitor marine life in our area.*

*My kids had a blast! They are planning on building an ROV this summer to take down the river with them!*

*I am using my ROV group to promote this new science area for our local 4-H program. We are planning demonstrations at 4 different events in the spring and summer.*

*I am once a week exploring a field of marine science with the students and companies and government agencies that rely on this skill and education.*

*It [the Summer Institute] opened my experiences I could share with my students - we followed SCINI when it went to the Arctic and even took data from the Arctic to graph in the classroom. Having the students view my pictures from MBARI and seeing their teacher there and then SCINI on the news - brought home the relevance.*

## College Students as Middle School ROV Team Mentors

In several regions, the regional coordinator matched up college students – in many cases, former ROV competitors themselves – with middle school ROV teams to work with them throughout the competition season. College students also acted as helpers at the workshops. In some cases, the college students received a small stipend (though they stated that they would have done the work without it), and in other cases, they received service learning credit, Presidential Volunteer Service Awards, or simply volunteered their time with no recompense. This arrangement worked well for the regional coordinators, college students and middle school students and teachers.

Involving college students as mentors helped the regional coordinator ensure that the middle school teams had the one-on-one support that many of them needed. Since over half of the teachers at the workshops (56%) were concerned about having the technical skills and expertise, the additional technical support was a boon for many of them.

Anecdotal reports suggest that the involvement of college students as mentors can lead to profound experiences for both the college and middle school students. Many sources reported that the middle school students found the college students to be approachable representatives of science. These young adults modeled the paths that the middle school students could take to a STEM career. One service learning college student in grant year three described his conversations with his team as follows:

*I had a wonderful experience and it's something I will not forget! I can tell that this program makes a difference with the students because they are actually excited to be applying what they are learning in the classrooms.*

The college students indicated that acting as a mentor was a valuable experience for them because it helped improve their science communication, deepened their own knowledge, and acted as a valuable resume builder. Their descriptions of their experiences were filled with adjectives like “exciting”, “ecstatic”, “amazed”.

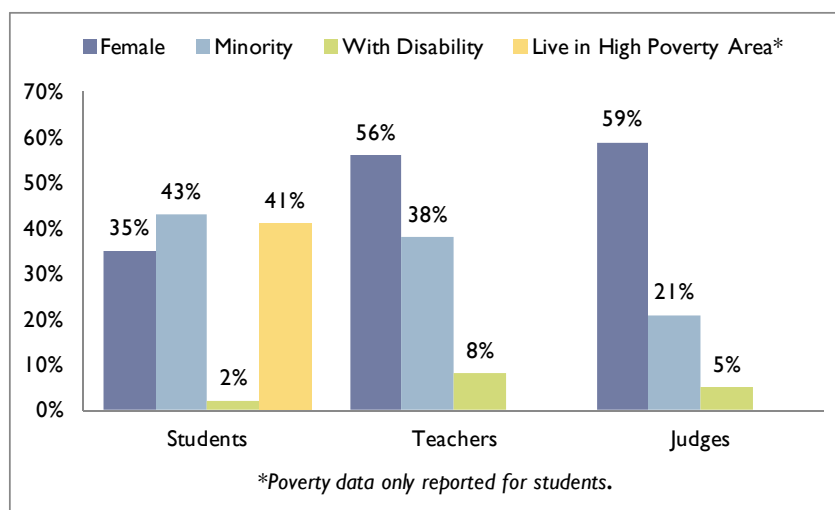
## Breakdowns by Demographics

### Background: Demographics of Students, Teachers and Industry Representatives

According to the demographic data in the year three surveys (N=443), the students were about one-third female (35%), forty-three percent (43%) were of minority backgrounds<sup>7</sup>, 41% came from high poverty areas<sup>8</sup>, and 2% reported that they had disabilities requiring accommodations.

The project has made efforts to include the participation of

**Figure 7: Student, Teacher and Judge Demographics**



<sup>7</sup> The sample size of participant surveys from each ethnicity was not large enough to do analysis by individual ethnicity. Instead, all non-white respondents were coded as “minority”, and results were analyzed by this “minority status” variable.

<sup>8</sup> High poverty areas were defined as zip codes where the percentage of families with children under age 18 in poverty was higher than the nationwide average of 13.6%. This calculation is based on data from 1999 reported in 2000, the most recent data available at the Zip Code Tabulation Area (ZCTA) level. The American Community Survey plans to release ZCTA level estimates in late 2012, based on the 2007-2011 5-year estimates.

teachers, college students, staff, and competition judges (industry professionals) of diverse backgrounds who can serve as role models for the middle school students. Over half (56%) of the teachers working with ITEST teams were female, 38% were of minority backgrounds, and 8% indicated that they had a disability.<sup>9</sup>

Among the judges completing surveys (N=96), 59% were female, 21% were of minority ethnic backgrounds, and 5% marked that they had a disability.<sup>10</sup>

### **Analysis of Student Demographics**

In the grant year one report, preliminary results presented the trends by gender and ethnicity only. In grant year two, the analysis took a different approach. Rather than simply look at trends, the changes in survey administration methods helped us produce a dataset more suitable for more sophisticated analysis. Thus, we looked for statistically significant differences between the under-represented students and the students who more typically participate in these types of STEM events.

This new analysis begged the question: how should success be defined? In consultation with project managers, the evaluators decided that the measure of successfully engaging under-representative students would be that their results were not statistically different from the other students' results. In other words, the under-represented students made the same gains as the other students.

### **Findings by Student Demographics**

Overall, there were few statistically significant differences by gender, ethnicity, disability or socioeconomic status, indicating that the ROV program is effective in producing positive results for under-represented students as well as the students who traditionally participate in STEM learning opportunities.

The analysis focuses on whether there were statistically significant differences between the groups in the following topics:

- Awareness of STEM careers
- Interest in STEM careers
- Interest in STEM topics
- STEM knowledge

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<sup>9</sup> The teacher survey did not ask about socioeconomic status.

<sup>10</sup> The judges' survey did not ask about socioeconomic status.

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## Awareness of STEM Careers

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Students were asked to rate their level of awareness of marine science, technology, engineering and math (STEM) careers before building their ROV. They were then asked if they knew more about STEM careers after building their ROV, and if so, how much more. There were no statistically significant differences between the responses of the under-represented students, when compared to the other students. Both groups reported increased STEM career awareness.

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## Interest in STEM Careers

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The survey asked students if their ROV project made them more interested in a marine career, less interested, or didn't affect their level of interest. Across the board, students indicated that their ROV project had made them more interested in a marine career. There were no significant differences by gender, ethnicity, socio-economic status, or disability status.

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## Interest in STEM Topics

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The survey explored interest in STEM topics in two different ways. First, the survey asked if the students' ROV project made them want to learn more about marine science, technology and engineering. There were no differences by ethnicity, socioeconomic status or disability. However, while gains were high across both genders, males were more likely to state that their ROV experience made them want to learn more about marine science, technology and engineering (male: 76%, female: 67%).

Next, the students were asked if their ROV project increased their desire to take any of a list of courses. Students could mark as many courses as they wished out of a list including math, computer science, engineering, science, and hands-on classes or club activities. There were statistically significant differences in the courses that the students marked:

- **Gender:** There were no significant differences between the genders in their increased desire to take math, science, computer science, or hands-on classes or clubs. However, male students were more likely than females to state that the project increased their desire to study engineering (male: 67%, female: 45%).
- **Ethnicity:** Students with minority backgrounds were significantly more likely to state that their ROV project increased their desire to take math courses (minority: 45%, white: 27%). There were no significant differences by ethnicity in the increased desire to take science, computer science, engineering or hands-on classes.
- **Socioeconomic status:** There were no significant differences between the responses of the students living in high and low poverty areas.
- **Disability status:** There were no significant differences between the responses of the students with and without disabilities.

## STEM Knowledge

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There were no statistically significant differences in the gains in knowledge about WWII shipwrecks between the under-represented students and the other students. Similarly, there were no significant differences in the percentage of students who knew what an ROV was before they built one, indicating a similar level of exposure to the topic before joining the program.

## CONCLUSIONS

Overall, the MATE Center successfully implemented the third year of ITEST grant activities, expanding the SCOUT class ROV competition from eight to twelve regions across the country. Activities supporting the entry-level ROV competition included conducting hundreds of student and teacher workshops, as well as the week-long Summer Institute, that engaged over 3,300 middle school students and over 240 teachers.

Evaluation results continue to show strong positive outcomes for both teachers and students. For the third year, the professional development activities were effective in increasing teachers' understanding of ocean STEM careers, strengthening their commitment to lead middle school teams in the ROV competition, and improving their confidence in facilitating STEM learning experiences.

Input from students, teachers and parents all pointed to the strong gains made by students. Involvement in the ROV competition generated greater awareness and interest in pursuing STEM careers, increased interest in studying STEM topics, improved STEM knowledge and skills, and increased teamwork, critical thinking and problem solving skills.

Parents were passionate supporters of their children's involvement in the program, with comments such as "It was like a booster shot of wanting to learn. Best learning experience we've ever encountered." Educational research has stressed the importance of family support in a students' choice to follow a STEM career path. Evaluation results show that the ROV program impacted the participants' parents as well, making it easier for them to picture their child in a STEM career.

This is the second year that the evaluation was able to dig deeper into the effectiveness of the competition for under-represented students: females, minority ethnicities, students living in high poverty areas and students with disabilities. Overall, the evaluation continued to find that the program was effective in producing positive results for under-represented students as well as the students who traditionally participate in STEM learning opportunities.

After the final, no-cost extension year of the grant, the final evaluation report will be produced. This report will be summative, tracing the trends and impacts of the program across the four years of the grant and its plans for sustainability in future years.

# APPENDIX: DETAILED EVALUATION PLAN AND PROTOCOLS

The appendix includes the following items:

- Detailed evaluation plan
- Competition
  - Student post-competition survey protocol (English & Spanish)
  - Faculty/mentor post-competition survey protocol (English)
  - Parent/guardian post-competition survey protocol (English & Spanish)
  - Judge/volunteer post-competition survey protocol (English)
- Workshops
  - Faculty/mentor pre-post workshop survey protocol
- Summer Institute
  - Summer Institute feedback and six-month follow-up survey protocols



**MATE**  
MARINE  
ADVANCED  
TECHNOLOGY  
EDUCATION  
CENTER



Dear Student:

This survey is being circulated by the Marine Advanced Technology Education (MATE) Center, headquartered at Monterey Peninsula College in Monterey, California. The MATE Center is a national program funded by the National Science Foundation to help prepare students for careers as marine professionals. *The information that you provide on this survey is important to us!* When you complete the survey, return it to your instructor, who will return it to the MATE Center. You can also return it directly to a MATE Center representative.

Thank you!

**Please use a #2 pencil to answer the questions**

**Q1. How would you rate your experience building and competing with your ROV?**

- Excellent
- Good
- Fair
- Poor
- Very poor

**Q2. Was this your first time building an ROV?**

- Yes
- No

**Q3. Did you know what an ROV was before you built one?**

- Yes
- No

**Q4. Before building your ROV, how much did you know about careers in marine science, technology, and engineering?**

- A lot
- Some
- A little
- Nothing

**Q5. After building your ROV, do you know more about marine careers?**

- Yes
- No -- Skip to Q7

**Q6. How much more do you know about marine careers now?**

- A lot more
- Some more
- A little more
- No more

**Q7. Are you interested in having a career in marine science, technology, or engineering?**

- Yes
- No
- Not sure

**MARKING INSTRUCTIONS**

- Use a No. 2 pencil only
- Do not use ink, ballpoint, or felt tip pens.
- Make solid marks that fill the response completely.
- Erase cleanly any marks you wish to change.
- Make no stray marks on this form.

**CORRECT:**  **INCORRECT:** 

Regional event code:



Q8. Has your ROV project made you more interested in a marine career? Less interested? No difference?

- More interested
- Less interested
- No difference

Q9. What career would you like to have when you finish school? *(Please print.)*

Q10. Has your ROV project made you want to learn more about science, technology, and engineering?

- Yes
- No
- Not sure

Q11. Has your ROV project increased your desire to take any of these courses? *(Mark ALL that apply.)*

- |  |  |
|--|--|
| <input type="radio"/> Math             | <input type="radio"/> Science (i.e., physics, chemistry, biology, earth science, etc.)             |
| <input type="radio"/> Computer science | <input type="radio"/> Hands-on classes or club activities like robotics, electronics, shop courses |
| <input type="radio"/> Engineering      | <input type="radio"/> None   |

Q12. Have you or your school received an award or honor as a result of your ROV project?

- Yes -- Please describe:
- No

Q13. Has your ROV project opened up other education or career opportunities for you (e.g., strengthened college application, scholarship, internship, job offer)?

- Yes -- Please describe:
- No

This year's competition theme highlighted the role that ROVs play in assessing WWII shipwrecks that may contain hazardous materials.

Q14. Before you began your research for this competition, how much did you know about WWII shipwrecks?

- A lot
- Some
- A little
- Nothing

Q15. After completing your research for this competition, how much do you know now about WWII shipwrecks?

- A lot
- Some
- A little
- Nothing

Q16. Do you want to learn *more* about WWII shipwrecks, including how ROVs can be used to assess them?

- Yes
- No
- Not sure

Q17. What resources did you use in your research? (Mark ALL that apply.)

- Websites (Which ones):
- Journals, newsletters, and other print publications
- Interviews with working professionals or employers
- Teachers or parents
- Other (Please describe):

Some questions about you:

Q18. What is your grade level? (If you are completing this during the summer, please mark the grade you attended in the school year that just finished.)

**Elementary, Middle School, and Junior High**

- Kindergarten
- 1st grade
- 2nd grade
- 3rd grade
- 4th grade
- 5th grade
- 6th grade
- 7th grade
- 8th grade

**High School**

- Freshman
- Sophomore
- Junior
- Senior

**Community or Technical College**

- Year 1
- Year 2

**Four-Year College or University**

- Freshman
- Sophomore
- Junior
- Senior

**Other -- (Please describe)**

Q19. What competition class did you participate in?

- EXPLORER
- RANGER
- SCOUT

Regional event code:

Q20. What is your home zip code?

zip code

Q21. What is your team name? *(Please print.)*

Q22. What is your gender?

- Male
- Female

Q23. What would you say best describes your ethnicity? *(You can check more than one.)*

- White
- African American/Black
- Hispanic/Latino/a
- Asian
- Filipino/a
- Pacific Islander
- American Indian or Alaska Native
- Multiple Ethnicities
- Other -- Please describe

Q24. Do you have any disabilities that require accommodations?

- Yes
- No
- Prefer not to respond

Q25. Do you have any comments that you would like to share about your experience in the program? If so, please write them in the box below.

One easy way for you to keep in touch with the MATE Center – and for MATE to keep in touch with you – is through MATE’s alumni web site, “AlumniWeb”, at [www.marinetech.org/alumni](http://www.marinetech.org/alumni). We thank you for registering and would appreciate hearing from you over the years as you progress in your education and career!

THANK YOU!

Please return your completed evaluation to your teacher or a MATE Center representative



**MATE**  
MARINE  
ADVANCED  
TECHNOLOGY  
EDUCATION  
CENTER



Estimable Alumno:

Esta encuesta está siendo circulada por el Centro (MATE) Educación de Tecnología Avanzada Marítima, con sede en Monterey Peninsula College en Monterey, California. El Centro MATE es un programa nacional financiado por la Fundación Nacional de Ciencia para ayudar a preparar a los alumnos para carreras como marinos profesionales. ¡La información que usted provea en esta encuesta es importante para nosotros! Cuando complete la encuesta, regrésela a su instructor quien a su vez lo regresará al Centro MATE. Usted también puede regresárselo directamente a su representante del Centro MATE.

¡Muchas gracias!

**Use lápiz #2 para responder las preguntas**

**Q1. ¿Cómo calificarías la experiencia de construir y competir con el ROV?**

- Excelente
- Buena
- Más o Menos
- Mal
- Muy mal

**Q2. ¿Fue esta la primera vez que construyes un ROV?**

- Sí
- No

**Q3. ¿Sabías lo que era un ROV antes de construir uno?**

- Sí
- No

**Q4. Antes de construir tu ROV, ¿qué tanto sabías de carreras en la ciencia marítima, tecnología, e ingeniería?**

- Mucho
- Algo
- Un poco
- Nada

**Q5. Después de construir tu ROV, ¿sabes mas acerca de carreras marítimas?**

- Sí
- No >>> Brincar a la Pregunta 7

**Q6. ¿Qué tanto sabes ahora de las carreras marítimas?**

- Mucho más
- Algo más
- Un poco más
- No más

**Q7. ¿Estas interesado en tener una carrera en ciencia marítima, tecnología o ingeniería?**

- Sí
- No
- No estoy seguro/a

**INSTRUCCIONES DE MARCAR**

- Usar Únicamente lápiz # 2.
- No usar tinta, bolígrafo, o rotuladores.
- Marquen sólido y llenen la respuesta completamente.
- Borrar claramente cualquier marca que desea cambiar.
- No hacer marcas de ninguna clase en el formulario.

**CORRECT:** ● **INCORRECT:** ●

Regional event code:

Q8. ¿El proyecto ROV aumentó tu interés en Carrera marítima? ¿Menos interesado? ¿No hay diferencia?

- Más interesado
- Menos interesado
- No hay diferencia

Q9. ¿Qué carrera te gustaría tener cuando termines tu preparatoria? (Favor de imprimir.)

Q10. ¿Tu proyecto ROV te ha hecho querer aprender más respecto a ciencia, tecnología, e ingeniería?

- Sí
- No
- No estoy seguro/a

Q11. ¿Tú proyecto ROV aumentó tu deseo de tomar estos cursos? (Marcar todo lo que se aplica.)

- |  |  |
|--|--|
| <input type="radio"/> Matemáticas            | <input type="radio"/> Ciencia (i.e., física, química, biología, ciencia de la tierra, etc.)                |
| <input type="radio"/> Ciencia en Computación | <input type="radio"/> Clases a la mano o actividades de club como robóticos, electrónica, cursos de taller |
| <input type="radio"/> Ingeniería             | <input type="radio"/> Ninguna  |

Q12. ¿Ha recibido tu escuela un premio de honor como resultado de tu proyecto ROV?

- Sí >> Favor de describir:
- No

Q13. ¿Tu proyecto ROV abrió otras oportunidades de educación o carreras para ti (ejemplo., reforzó la solicitud de ingreso al colegio, becas, internado, oferta de empleo)?

- Sí >> Favor de describir:
- No

El tema de la competición de este año señaló el papel que ROV tiene en asesorar los naufragios de WWII que pueden contener materiales peligrosos.

Q14. Antes de comenzar tu investigación de esta competencia, ¿Qué tanto sabes de los naufragios de WWII?

- Mucho
- Algo
- Un poco
- Nada

Q15. Al completar tu investigación para esta competencia, ¿Qué tanto sabes de los naufragios de WWII?

- Mucho
- Algo
- Un poco
- Nada

Q16. ¿Quieres saber mas respecto a los naufragios de WWII, incluyendo cómo se puede usar ROV para asesorarlos?

- Sí
- No
- No estoy seguro/a

Q17. ¿Qué recursos usaste en tu investigación? (Marca TODO lo que se aplica.)

- Sitios web (¿cuales?):
- Libros, noticieros, y otros documentos imprimidos
- con profesionales del empleo, o los empleadores
- Maestros o padres
- Otros (favor de describir):

Algunas preguntas sobre ti:

Q18. ¿Cuál es tu nivel de grado? (Si lo estás completando durante el verano, favor de marcar el grado que asististe en el año escolar que acaba de terminar.)

**Escuela primaria, intermedia y Secundaria**

- Kinder
- Primer grado
- 2nd grado
- 3er grado
- 4to grado
- 5to grado
- 6to grado
- 7 Septimo grado
- 8to grado

**Escuela Secundaria**

- Primer año
- Segundo año
- Tercer año
- último año

**Colegio Técnico o de la Comunidad**

- Año 1
- Año 2

**Universidad o Colegio de Cuatro-Años**

- Primer año
- Segundo año
- Tercer año
- último año

**Otros >>** (Favor de describir)

Q19. ¿En qué clase de competición participaste?

- EXPLORADOR/A
- GUARDA BOSQUES
- SCOUT

Regional event code:





**MATE**  
MARINE  
ADVANCED  
TECHNOLOGY  
EDUCATION  
CENTER



# MATE ROV Competition -- Instructor/Mentor Survey

Dear Instructor/Mentor:

This survey is being circulated by the Marine Advanced Technology Education (MATE) Center to help us improve the quality of the program and future events. *The information that you provide on this survey is confidential and important to us!* Only summary results will be reported. Return your completed survey to a MATE Center representative.

Thank you!

Please use a #2 pencil to answer the questions

**Q1. Overall, how would you rate the usefulness of the ROV program?**

- Excellent
- Good
- Fair
- Poor
- Very poor

**Q2. How would you rate the support provided by the ROV program?**

- Excellent
- Good
- Fair
- Poor
- Very poor

**Q3. What obstacles did you face in the ROV program this year? (Mark ALL that apply.)**

- Recruiting students
- Having the technical skills and expertise
- The time commitment
- Integrating this activity into existing curriculum
- Not enough support from MATE
- Not enough resources
- None

**Q4. We are interested in hearing about changes you may have observed in your students since they began designing and building their ROV. Please indicate how much you agree or disagree with each of the following statements.**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
A. <i>My students are more interested in learning about science, technology, engineering, and math (STEM).....</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. <i>My students are more interested in pursuing a STEM career. ....</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C. <i>My students have increased their STEM knowledge and skills. ....</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D. <i>My students have increased their skills in team building, problem solving, and/or critical thinking. ....</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**MARKING INSTRUCTIONS**

- Use a No. 2 pencil only
- Do not use ink, ballpoint, or felt tip pens.
- Make solid marks that fill the response completely.
- Erase cleanly any marks you wish to change.
- Make no stray marks on this form.

**CORRECT:** **INCORRECT:**

Regional event code:



**Q5. We are interested in hearing your opinions about the usefulness of the program and how you incorporated the program materials into your course or club. Please indicate the degree to which you agree or disagree with each of the following statements.**

Strongly Disagree    Disagree    Neutral    Agree    Strongly Agree

- A. *The ROV program provided a valuable venue to help prepare my students for careers in marine science & technology. ....*
- B. *I modified my course/club curriculum based on MATE information and training so that my students could participate in the ROV program. ...*
- C. *I used MATE materials/resources to incorporate the ROV building project into my course or club. ....*
- D. *I intend to use what I learned through the project to work with future students. ....*

**Q6. Has the ROV program opened up other education or career opportunities for you? (E.g., professional development opportunities, partnerships with other schools/industry, job offers, etc.)**

- Yes -- Please describe:
- No

**Q7. Has the ROV program opened up other education or career opportunities for your students? (E.g., scholarships, internships, job offers, etc.)**

- Yes -- Please describe:
- No

**Some questions about your team**

**Q8. This year, did your team receive support from the MATE Center's ITEST grant?**

- Yes
- No
- Not sure

**Q9. How many students worked on this project?**

# of students

**Q10. Overall, how much elapsed time did the students spend on the ROV project?**

months

**Q11. Over the period that you and your students worked on the ROV project, approximately how many times did you meet per month?**

meetings per month

Q12. What competition class did your team participate in?

- EXPLORER
- RANGER
- SCOUT

Some questions about you

Q13. Are you a...? (Mark ALL that apply.)

- Teacher/faculty member
- Working professional (outside of the school system)
- After-school program or club coordinator
- Parent of an ROV team member
- Other

Q14. What audience do you teach and/or mentor? (Mark ALL that apply.)

- Elementary
- Middle/junior high school
- High school
- 2-year college or technical institution
- 4-year college or university
- Other (Please describe):

Q15. How many years have you worked with an ROV team from the school or club that you are representing today?

- 1 year
- 2 years
- 3 - 5 years
- 6 or more years

Q16. This year, did you attend any workshops related to the ROV program?

- Yes
- No
- Not sure

Regional event code:





**MATE**  
MARINE  
ADVANCED  
TECHNOLOGY  
EDUCATION  
CENTER



# Competencia MATE ROV -- Encuesta para Padres

Estimables Padres: Esta encuesta está siendo distribuida por el Centro de Educación Avanzada de Tecnología Marina (MATE), con sede en Monterey Peninsula College en Monterey, California. El Centro MATE es un programa nacional fundado por la Fundación de Ciencia Nacional para ayudar a preparar a los alumnos para carreras como profesionales marítimos.

*La información que usted proporcione nos ayudará a continuar mejorando nuestro programa! Todas sus respuestas se mantendrán anónimas. Al completar la encuesta, regrese esta al instructor de su hijo o a un representante del Centro MATE.*

Muchísimas gracias

Use lápiz #2 para responder las preguntas

**Q1. ¿Cómo calificarías la experiencia de su hijo de construir y competir con un ROV (robot sumergido en el agua)?**

- Excelente
- Buena
- Más o Menos
- Mal
- Muy mal
- No estoy seguro/a

**Q2. El construir un ROV hizo a su hijo/a más interesado/a en ciencia, matemáticas, tecnología, o ingeniería? ¿Menos interesado? ¿No hay diferencia?**

- Más Interesado
- Menos Interesado
- No hay Diferencia
- No estoy seguro/a

**Q3. ¿Qué tan valiosa calificas esta competencia para el desarrollo educacional de su hijo/hija?**

- Extremamente valiosa
- Muy valiosa
- Algo de valiosa
- Levemente valiosa
- No tan valiosa

**Q4. ¿El construir un ROV afectó las calificaciones de su hijo/a en cualquiera de las materias anotadas abajo?**

Calificaciones Mejoraron    No hubo Diferencia    Calificaciones Declinaron    No estudia esa materia

Ciencia .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Matemáticas .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Computadoras .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ingeniería/Roboticas .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Otros (especifique):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q5. ¿Qué cambios ha visto en su hijo/a como resultado de su involucramiento en el proyecto ROV? (Marcar todo lo que aplica.)**

- Mas organizado
- Puede trabajar mejor con otros
- Mejoró su confianza en sí mismo
- Otros cambios (Favor de describir):

**INSTRUCCIONES DE MARCAR**

- Usar Únicamente lápiz # 2.
- No usar tinta, bolígrafo, o rotuladores.
- Marquen sólido y llenen la respuesta completamente.
- Borrarr claramente cualquier marca que desea cambiar.
- No hacer marcas de ninguna clase en el formulario.

**CORRECT:** ●    **INCORRECT:** ●



**Q6. ¿La participación en el programa ROV ha cambiado sobre cómo imaginar el futuro de su hijo/a? Es más fácil visualizar a su hijo con una carrera en ciencia, tecnología, ingeniería, o matemáticas?**

- Si
- No
- No estoy seguro/a

**Q7. Como padre, ¿Qué tanta influencia tiene en la selección de carreras de su hijo/a?**

- Mucho
- Algo
- Ninguna
- No estoy seguro/a

**Q8. ¿Su hijo/a asiste a una escuela...**

- Elemental?
- Intermediaria/Pre-Secundaria?
- Secundaria?
- Colegio/Universidad?
- Otro (Favor de describir):

**Q9. ¿En qué competición participa su hijo en clase?**

- EXPLORADOR/A
- GUARDA BOSQUES
- SCOUT
- No estoy seguro/a

**Q10. Estamos interesados en aprender acerca de las familias que tienen varios niños que participan en la competición. ¿Cuántos de sus hijos han participado alguna vez?**

# de niños

**Q11. ¿Tiene algún otro comentario que compartir acerca de la experiencia de su hijo en el programa de ROV? Si es así, por favor escriba en el siguiente cuadro.**

**¡MUCHISIMAS GRACIAS!**

**Por favor devuelva su evaluación realizada al instructor de su hijo/a o a un representante**

Regional event code:





**MATE**  
MARINE  
ADVANCED  
TECHNOLOGY  
EDUCATION  
CENTER



# Competencia MATE ROV -- Encuesta para Padres

Estimables Padres: Esta encuesta está siendo distribuida por el Centro de Educación Avanzada de Tecnología Marina (MATE), con sede en Monterey Peninsula College en Monterey, California. El Centro MATE es un programa nacional fundado por la Fundación de Ciencia Nacional para ayudar a preparar a los alumnos para carreras como profesionales marítimos.

*La información que usted proporcione nos ayudará a continuar mejorando nuestro programa! Todas sus respuestas se mantendrán anónimas. Al completar la encuesta, regrese esta al instructor de su hijo o a un representante del Centro MATE.*

Muchísimas gracias

Use lápiz #2 para responder las preguntas

**Q1. ¿Cómo calificarías la experiencia de su hijo de construir y competir con un ROV (robot sumergido en el agua)?**

- Excelente
- Buena
- Más o Menos
- Mal
- Muy mal
- No estoy seguro/a

**Q2. El construir un ROV hizo a su hijo/a más interesado/a en ciencia, matemáticas, tecnología, o ingeniería? ¿Menos interesado? ¿No hay diferencia?**

- Más Interesado
- Menos Interesado
- No hay Diferencia
- No estoy seguro/a

**Q3. ¿Qué tan valiosa calificas esta competencia para el desarrollo educacional de su hijo/hija?**

- Extremamente valiosa
- Muy valiosa
- Algo de valiosa
- Levemente valiosa
- No tan valiosa

**Q4. ¿El construir un ROV afectó las calificaciones de su hijo/a en cualquiera de las materias anotadas abajo?**

Calificaciones Mejoraron    No hubo Diferencia    Calificaciones Declinaron    No estudia esa materia

Ciencia .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Matemáticas .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Computadoras .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ingeniería/Roboticas .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Otros (especifique): <input style="width: 300px; height: 20px;" type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q5. ¿Qué cambios ha visto en su hijo/a como resultado de su involucramiento en el proyecto ROV? (Marcar todo lo que aplica.)**

- Mas organizado
- Puede trabajar mejor con otros
- Mejoró su confianza en sí mismo
- Otros cambios (Favor de describir):

**INSTRUCCIONES DE MARCAR**

- Usar Únicamente lápiz # 2.
- No usar tinta, bolígrafo, o rotuladores.
- Marquen sólido y llenen la respuesta completamente.
- Borrarr claramente cualquier marca que desea cambiar.
- No hacer marcas de ninguna clase en el formulario.

**CORRECT:** ●    **INCORRECT:** ●



**Q6. ¿La participación en el programa ROV ha cambiado sobre cómo imaginar el futuro de su hijo/a? Es más fácil visualizar a su hijo con una carrera en ciencia, tecnología, ingeniería, o matemáticas?**

- Si
- No
- No estoy seguro/a

**Q7. Como padre, ¿Qué tanta influencia tiene en la selección de carreras de su hijo/a?**

- Mucho
- Algo
- Ninguna
- No estoy seguro/a

**Q8. ¿Su hijo/a asiste a una escuela...**

- Elemental?
- Intermediaria/Pre-Secundaria?
- Secundaria?
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- Otro (Favor de describir):

**Q9. ¿En qué competición participa su hijo en clase?**

- EXPLORADOR/A
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- No estoy seguro/a

**Q10. Estamos interesados en aprender acerca de las familias que tienen varios niños que participan en la competición. ¿Cuántos de sus hijos han participado alguna vez?**

# de niños

**Q11. ¿Tiene algún otro comentario que compartir acerca de la experiencia de su hijo en el programa de ROV? Si es así, por favor escriba en el siguiente cuadro.**

**¡MUCHISIMAS GRACIAS!**

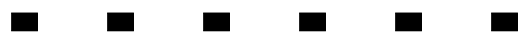
**Por favor devuelva su evaluación realizada al instructor de su hijo/a o a un representante**

Regional event code:









**Q06. Thinking about the majority of the students at the competition, please rate their skills in the following areas:**

EXCELLENT    GOOD    FAIR    POOR    VERY POOR    DON'T KNOW

Content knowledge in science, technology, and/or engineering .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critical thinking .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teamwork .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professionalism .....	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q07. Do you currently work in a technology related field?**

- Yes
- No -- Skip to Q10

<p><b>Q08. If an entry-level job or internship were available at your organization, would you consider the students at the competition to be strong candidates?</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> Yes, definitely      <input type="radio"/> No, definitely not</li> <li><input type="radio"/> Yes, probably        <input type="radio"/> Don't know</li> <li><input type="radio"/> No, probably not</li> </ul>	<p><b>Q09. Has your organization hired any students who participated in the MATE ROV program?</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> Yes -- How many? _____</li> <li><input type="radio"/> No</li> <li><input type="radio"/> Don't know</li> </ul>
--	--

**Q10. How many years have you volunteered with the MATE ROV program?**

\_\_\_\_\_ years

**Q11. Have you ever competed in a MATE ROV competition? (Mark all that apply.)**

- Yes, as a student
- Yes, as a mentor
- No

**Q12. What is your gender?**

- Male
- Female

**Q13. What would you say best describes your ethnicity? (Mark all that apply.)**

<input type="radio"/> White	<input type="radio"/> Asian	<input type="radio"/> Pacific Islander
<input type="radio"/> African American/Black	<input type="radio"/> Filipino/a	<input type="radio"/> Multiple ethnicities
<input type="radio"/> Hispanic/Latino/a	<input type="radio"/> American Indian or Alaskan Native	<input type="radio"/> Other, please describe:

**Q14. Do you have any disabilities?**

- Yes
- No
- Prefer not to respond

**Q15. Do you have any comments you would like to share about your experiences as a volunteer? Write them in the space below.**





# MATE ROVER\* Teacher Workshop

\*ROV Education and Resources



Saturday, February 4, 2012

Monterey Peninsula College

## *Using Underwater Robots to Teach Technical & Teamwork Skills*

Before the workshop starts, please take a few moments to complete this short survey. There will be another short survey at the end of the training to find out how useful it was for you.

1. How comfortable are you facilitating STEM (science, technology, engineering and math) learning experiences for students?
  - Very comfortable
  - Somewhat comfortable
  - Neutral
  - Somewhat uncomfortable
  - Very uncomfortable
  - Don't know
  
2. Do you have any concerns about mentoring students in designing and building an ROV?
  - Yes
  - No
  - Don't know
  
3. If so, what are your concerns? (Please check all that apply.)
  - Recruiting students
  - Having the technical skills and expertise
  - The time commitment
  - Integrating this activity into existing curriculum
  - Other: Please explain: \_\_\_\_\_
  - NA – I don't have any concerns.
  
4. What would you like out of today's workshop?

Thank you!!





# MATE ROVER\* Teacher Workshop

\*ROV Education and Resources



Saturday, January 22, 2011

Monterey Peninsula College

## *Using Underwater Robots to Teach Technical & Teamwork Skills*

Please take a few moments to share your opinions about the training. Your feedback will help us improve the training and support that we provide for you.

1. How would you rate the usefulness of this training?
  - Excellent
  - Good
  - Fair
  - Poor
  
2. After this training, how comfortable are you facilitating STEM (science, technology, engineering and math) learning experiences for students?
  - Very comfortable
  - Somewhat comfortable
  - Neutral
  - Somewhat uncomfortable
  - Very uncomfortable
  - Don't know
  
3. Has this training addressed your concerns about mentoring students in designing and building an ROV? Do you feel...
  - Less concerned
  - Unchanged
  - More concerned
  - NA – I didn't have any concerns
  
4. After this training, do you intend to mentor a student team in designing and building an ROV?
  - Yes
  - Maybe
  - No

more →

5. As a result of this training, how committed do you feel about participating in the ROV competition?
- More committed
  - Unchanged
  - Less committed
6. How could we help ensure that the ROV competition process (designing, building, and competing) is a good experience for you?
7. What area would you like to see addressed in a focused workshop?

Thank you!!



# 1. Summer Institute (ITEST Session) Feedback Form 2011

Your feedback to MATE about the Summer Institute will help us to improve the quality of similar institutes in the future. Please use this form to provide us with your comments. If there is not enough room on this form for all your comments in response to a particular question, please feel free to send an additional email and note the number of the question you are responding to. Thank you!

Please note:

\*\* The MATE independent evaluator will send all institute participants a brief follow-up survey this fall. The survey will aim to assess the longer-term impact of the institute. We would very much appreciate your prompt response to that survey when it arrives. Thank you! \*\*

## 1. What grade/level do you teach? Check All that Apply.

- Elementary
- Middle/ Junior High School
- High School
- 2-yr College or technical institution
- 4-yr College or university
- Other (Please describe)

## 2. What subject(s) do you teach? Check all that Apply.

- Math
- Science (biology, physics, chemistry, etc.)
- Marine Science and/or Technology
- Engineering
- Computer Science
- English
- Other (Please describe)

## 3. How many years have you been teaching?

## 4. Approximately how many students do you teach in one year? (Please don't double count students who are in more than one of your classes.)

**5. Did the Institute clearly address the topic(s) you came to learn about?**

- Yes, right on
- Pretty much
- Somewhat, but not entirely
- Just marginal
- No, not at all
- Other (please specify)

**6. Overall, were the sessions well-led and well-organized, with ample opportunity for participant interaction?**

- Yes, first-rate
- Yes, pretty much
- Not bad
- Only fair
- No, they were pretty ragged
- Other

Comments

**7. How useful were the MATE Institute workshops and presentations?**

	Not Useful at All	Not Very Useful	Somewhat Useful	Pretty Useful	Very Useful
Guest speaker- Farley Shane, MBARI	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guest speaker- Annemarie Sullivan, middle school teacher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guest speaker - DJ Osborne, MBARI Vessels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ROV in a Bag exercise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lessons on soldering	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lessons on frame building and design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lessons on electricity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Building the ROV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MBARI & Vessel Tour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ROV competition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ITEST Grant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ocean Careers -Deidre Sullivan, MATE Center	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**8. Do you plan to use the information from this Institute in order to participate in the MATE/MTS ROV Committee ROV competition?**

- Yes
- Possibly
- No
- Don't know

**9. Please indicate the degree to which you agree with each of the following statements by placing an check mark in the appropriate box.**

	Not at All	A Little	A Fair Amount	A Great Deal
a. I intend to modify my curriculum based on the MATE information and training I received.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. I intend to modify my teaching strategies based on the MATE information and training I received.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. I intend to share the information offered in the MATE Institute with other instructors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**10. Please indicate the degree to which you agree with each of the following statements by placing a check mark in the appropriate box.**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. The MATE Institute provided valuable ideas that I can use in my courses.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. The MATE Institute helped me understand industry guidelines for marine technicians (including SCANS).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. The MATE Institute helped me identify course assessment strategies that are aligned with course objectives and industry guidelines.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. The MATE Institute provided me with instructional materials that will improve student preparedness for ocean-related occupations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. The MATE Institute helped me understand current technologies used in the marine field.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Using what I learned at the MATE Institute, I am planning to develop action plans for inserting instructional materials into existing curriculum.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. The MATE institute and literature helped me understand marine workforce/ROV information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**11. What improvements or additions to the MATE Center's educational products and services do you think would be most valuable? Please check all that apply and add any comments you might have.**

- materials that fit directly into traditional science courses
- materials that fit directly into traditional math courses
- materials that fit directly into traditional vocational courses
- curricula that I can implement as a new submersible technology course
- detailed, how-to manuals for construction of ROV components and other undersea instruments
- materials linked to national educational standards
- materials linked to occupational standards
- materials in hard copy formats
- CDs, web sites, videos, and other electronic materials
- Other

Comments:

**12. What improved and additional opportunities for students do you think would be most valuable? Please check all that apply and add any comments you might have.**

- internship programs
- summer institutes
- programs to match students with marine science and/or technology mentors
- career counseling
- other

Comments:

**13. What improved and additional professional development activities for educators and mentors do you think would be most valuable? Please check all that apply and add any comments you might have.**

- weekend workshops
- programs to match faculty and mentors with marine science and/or technology professionals
- discuss-and-share web sites for faculty and mentors
- internship and summer employment programs in marine science and technology
- training and support for educators to run workshops in their local area
- assistance with developing and writing curricula
- other

Comments:

**14. Overall, how would you rate the usefulness of the Institute?**

- Excellent
- Good
- Fair
- Poor

**15. Were the overall logistics and transportation for the Institute well organized and satisfactory?**

- Yes, first-rate
- Yes, pretty much
- Not bad
- Only fair
- No, they were inadequate
- Other

Comments:

**16. Were you satisfied with the food that was provided during the Institute?**

- Yes, first-rate
- Yes, pretty much
- Not bad
- Only fair
- No, it was inadequate
- Other

Comments:

**17. Were you pleased with your hotel accommodations during the Institute?**

- Yes, first-rate
- Yes, pretty much
- Not bad
- Only fair
- No, they were inadequate
- Other

Comments:

**18. Overall Comments:**

## 1. Default Section

Your response to this survey will provide MATE and NSF with essential information about the impact of the 2011 MATE Summer Institute. We have analyzed the feedback form you completed at the end of the Institute; this survey is designed to gather information about the longer-term impacts. Thank you for taking a few moments to share your opinions!

### 1. In retrospect, how would you rate the usefulness of the MATE Summer Institute?

- Poor
- Fair
- Good
- Excellent

### 2. Please review the statements below and mark the box that best reflects your opinions about the Institute. "The MATE Summer Institute..."

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
Provided valuable ideas that I am using in my courses or programs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Helped me understand the knowledge and skills needed for marine occupations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Helped me understand current technologies used in the marine field.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provided instructional materials that will help my students become better prepared for ocean-related science, technology, engineering and math careers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### 3. To what extent have you implemented or shared the information from the MATE Summer Institute?

	Not at All	A Little	A Fair Amount	A Great Deal
I have modified the content of my course or program.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have modified my teaching strategies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have shared the information offered at the Institute with other instructors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have shared the information offered at the institute with students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**4. Since the MATE Summer Institute, how useful have each of the workshops and presentations been for you?**

	Not Useful at All	Not Very Useful	Somewhat Useful	Pretty Useful	Very Useful
Guest speaker- Farley Shane, MBARI	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guest speaker- Annemarie Sullivan, middle school teacher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guest speaker - DJ Osborne, MBARI Vessels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ROV in a Bag exercise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lessons on soldering	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lessons on frame building and design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lessons on electricity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Building the ROV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MBARI & Vessel Tour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ROV competition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ITEST Grant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ocean Careers -Deidre Sullivan, MATE Center	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**5. Reflecting on what you learned in the institute, please rate your knowledge and skills.**

- 1. I have no knowledge or skills in this area.**
- 2. I am familiar with this technology but have limited hands-on experience.**
- 3. I can use this technology with some help.**
- 4. I can use this technology on my own without any help.**
- 5. I could teach another person how to use this technology.**

	1	2	3	4	5
Understanding of electronics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understanding of electricity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to solder	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use a multimeter to measure current, voltage, and resistance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understanding of sensors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**6. Do you have any other feedback about the usefulness of the workshops and presentations?**

**7. Since attending the Institute, have you received any funding or support for your work with ROVs? If so, what type of funding or support? How much?**

**8. If you are not participating in the MATE ROV competition, are you doing anything else with ROV's? If so, please explain.**

**9. Have you come across any obstacles or barriers to implementing what you learned at the Summer Institute? If so, could you tell us about them?**

**10. Has your participation in the MATE Summer Institute opened new opportunities for you? If so, please explain.**

**11. How could MATE make the Summer Institutes more useful?**

**12. Please provide any additional comments you may have on the Summer Institute, including its impact on your instruction, courses, students, or institution.**

**13. Are you a classroom teacher?**

- Yes
- No

Please specify your role/position

**14. What audience do you teach? Check all that apply.**

- Elementary
- Middle/ Junior High School
- High School
- 2-yr College or technical institution
- 4-yr College or university
- Other (Please describe)

**15. What subject(s) do you teach? Check all that apply.**

- Math
- Science (biology, physics, chemistry, etc.)
- Marine Science and/or Technology
- Engineering
- Computer Science
- English
- Other (Please describe)

**16. How many years have you been teaching?**

**17. Approximately how many students do you teach in one year? (Please don't double count students who are in more than one of your classes.)**

**18. What is your gender?**

- Male
- Female

**19. What would you say best describes your ethnicity? (You can check more than one.)**

- White
- African American/Black
- Hispanic/Latino/a
- Asian
- Filipino/a
- Pacific Islander
- American Indian or Alaska Native
- Multiple Ethnicities

Other (please specify)