School of Rock Five-Year Review
Preliminary Report
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Preliminary results from surveys conducted by Deep Earth Academy in 2011 show that the School of Rock (SOR) professional development program has been extremely successful in expanding participants' awareness of scientific ocean drilling and the important role it plays in science instruction. Data were obtained through two online surveys that were posted on Survey Gizmo (http://appv3.sgizmo.com/) in February and July of 2011 and completed by participants from each of the five SOR program cohorts.

Survey development

The aim of the surveys was to gather data for use in assessing the impact of the SOR experience on participants and their audiences. In particular, the surveys focused on questions that address the following objectives generated in 2005, at the inception of the SOR professional development program:

1. Increase teacher knowledge of IODP, ocean drilling, and marine geology.
2. Provide teachers with an opportunity to
    a. Participate in a seagoing experience on a scientific drilling vessel,
    b. Conduct a series of research activities similar to those that take place during scientific drilling expeditions, and
    c. Learn from scientists who focus their research on and actively participate in IODP expeditions.
3. Enlist teachers to translate scientific results into useful teaching resources, such as curriculum materials.
4. Engage teachers to disseminate IODP science education by
    a. Conducting at least two teacher workshops and
    b. Field testing curriculum in their classrooms.

Additionally, some of the survey questions were designed to inform Deep Earth Academy (DEA) about how to proceed with future SOR programming efforts and how DEA can best support SOR program participants (Rockers) in their efforts toward continued learning and engagement with IODP.

Preliminary Summary of Survey Findings

Of the 77 educators who participated in the five SOR cohorts, 51completed the first survey and 58 completed the second survey. All cohorts had a response rate between 71% and 93% for each survey, with the exception of 2005 and 2008 on the first survey, and 2008 on the second survey (Table 1).

Results from the two surveys indicate that the School of Rock professional development program is meeting all of the objectives set forth at the beginning of the program.

Table 1. Survey responders by cohort.

		February 2011 survey			July 2011 survey		
School of Rock cohort	Number of participants	Number of survey responders	% of participants who responded	% of total survey responders from cohort	Number of survey responders	% of participants who responded	% of total survey responders from cohort
2005	13	5	38 %	10%	10	77%	17%
2007	17	12	71 %	24%	13	76%	22%
2008	15	6	40 %	12%	8	53%	14%
2009	15	14	93 %	28%	14	93%	24%
2010	17	13	76 %	26%	13	76%	22%
Total	**77**	**50**	**65%**	**100%**	**58**	**75%**	**100%**

Objective 1: Teachers learning about IODP, ocean drilling, and marine geology

Prior to their SOR experience, more than half of the participants had either no knowledge of scientific ocean drilling, the *Glomar Challenger*, and/or the *JOIDES Resolution* or had only heard of the ships and their work (Table 2). Fewer than 9% of the participants taught about these topics, despite the high percentage who teach content directly resulting from such research (Table 3). As a result of their participation in the SOR program, more than 96% of the July 2011 survey responders now incorporate SOR science content into their teaching (or programming), 72% incorporate scientific process skills, and more than 60% incorporate instructional strategies (Figure 1).

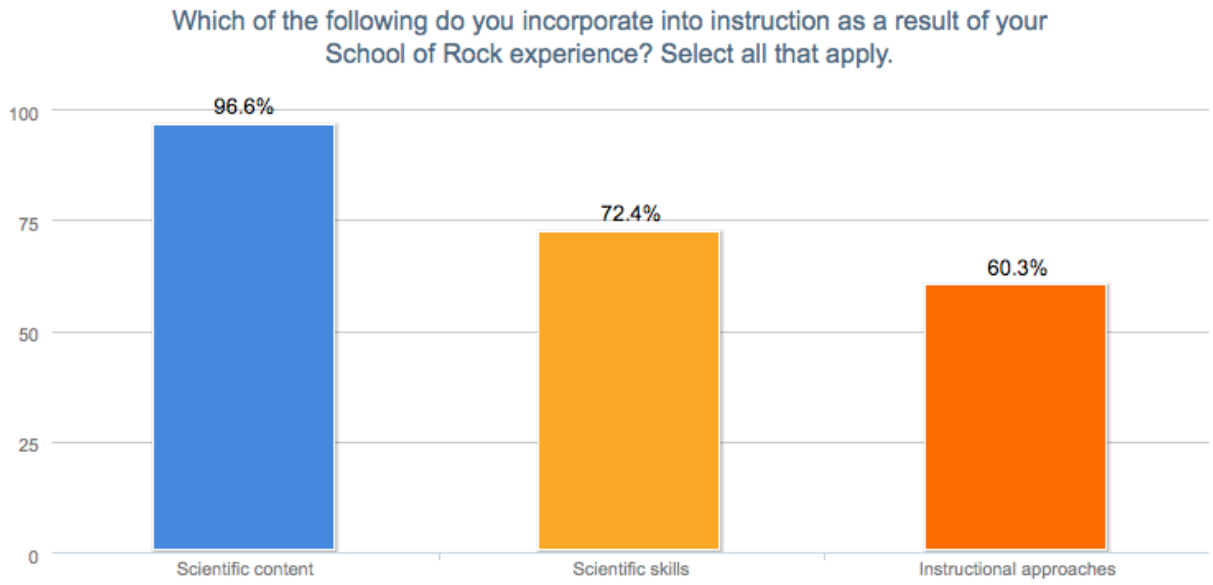
Table 2. Participants' pre–School of Rock knowledge of IODP.

July 2011 survey		
Question: How much did you know about scientific ocean drilling, the *Glomar Challenger,* and/or the *JOIDES Resolution* before your School of Rock experience?		
Level of knowledge	**Count**	**Percent**
Nothing at all	12	21.1%
Heard of it	22	38.6%
Had a basic understanding	17	29.8%
Was part of my academic training	3	5.3%
Taught about it	5	8.8%

Table 3. Subjects/topics addressed in participants' teaching/programming.

July 2011 survey		
Question: Which of the following subjects or topics do you address in your teaching or programming? Mark all that apply.		
Subject/Topic	**Count**	**Percent**
Plate tectonics	44	77.2%
Climate change	47	82.5%
Evolution	28	49.1%
Rock cycle	35	61.4%
Hydrogeology	22	38.6%
The sedimentary record	37	64.9%
Microfossils	33	57.9%
Geologic time and dating methods	37	64.9%
Deep biosphere	12	21.1%
Process and nature of science	43	75.4%
Science technology	41	71.9%
Careers in science	43	75.4%
Current Earth science research topics	33	57.9%
All	14	24.6%

Figure 1. Incorporation of IODP-related content, science process skills, and instructional methods.



Further demonstrating the effectiveness of the program, 100% of the surveyed Rockers are sharing what they have gained from the SOR experience in terms of science, technology, engineering, and mathematics (STEM), most of them doing so “during a specific time of year” and/or “as often as possible.” None of the participants marked that they “never” or “rarely” use what they have learned (Figures 2 and 3).

Figure 2. Incorporation of IODP-related STEM content.

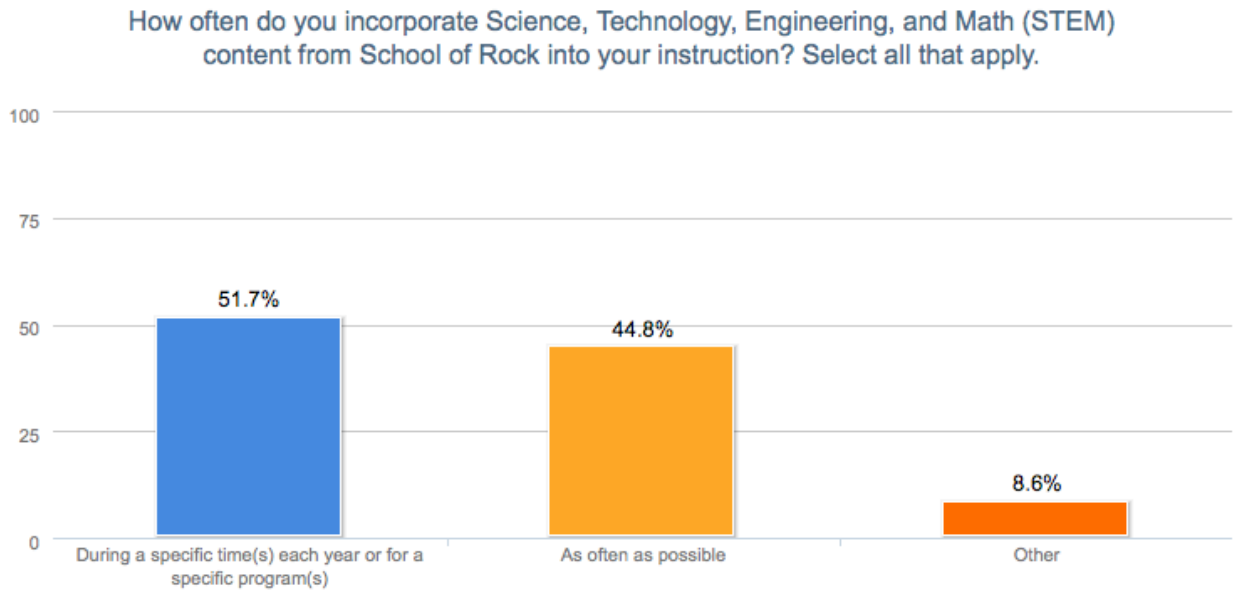
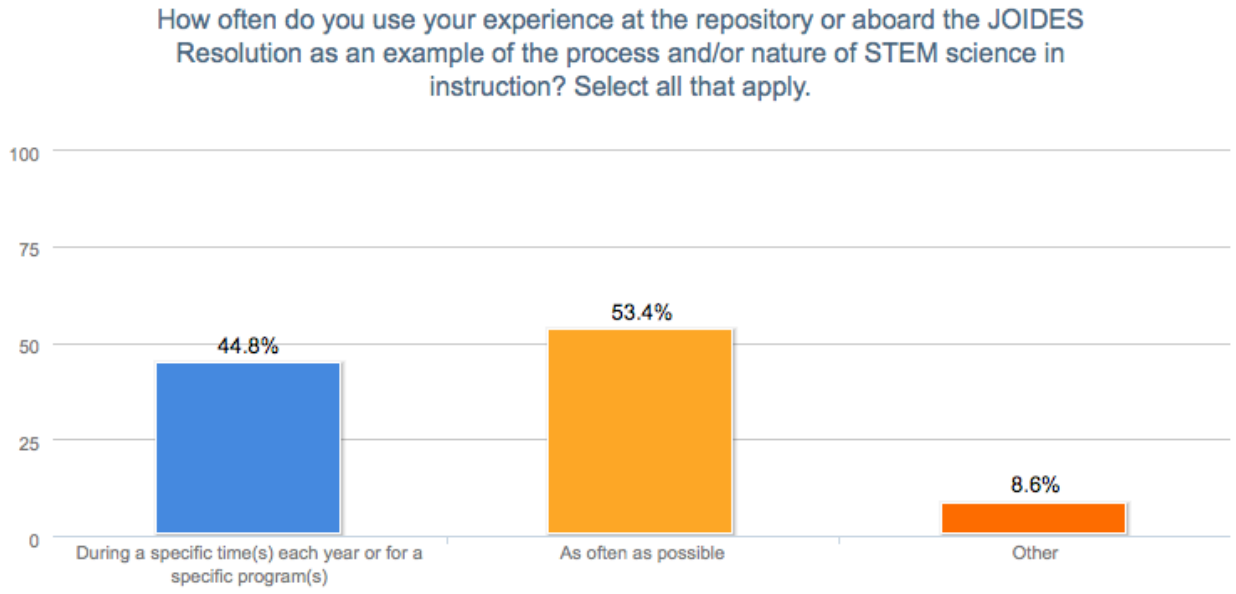


Figure 3. Incorporation of SOR-related experience to illustrate the process and/or nature of STEM science.



Objective 2: Educators participating in ocean drilling expeditions and related research

Additional evidence that the SOR program has successfully met Objectives 1 and 2 comes from open-ended responses about content or experiences that participants found most important and/or valuable to share with others (Table 4). After participant responses were grouped into categories and tallied, we found that doing and experiencing the science was the most valuable experience for the largest number of participants, followed by learning new content and learning about the ship and/or how the drilling program operates. The pattern remains when responses are categorized by cohort, with the exception of the 2007 group, whose responses indicate that doing and experiencing science was most the most valuable experience for that group, followed by interacting with scientists. Interestingly, only ship-board participants indicated the importance of the nature of science and interactions with participants (with the exception of 2005). Other responses point to the importance of technology, the immersive environment, take-home materials, online materials, field trips, and societal relevance (Table 4).

Table 4. Most valuable SOR content or experiences.

February 2011 survey						
During your School of Rock, what content did you learn and/or experiences did you have that you found most important/valuable to share with others (students, colleagues, friends)?						
Content/experiences	**2005**	**2007**	**2008**	**2009**	**2010**	**Total**
Doing science/experiencing science in action	2	7	3	6	6	24
Learning science content	2	2	4	6	7	21
Ship/Program operations	3		1	5	5	14
Interact w/ scientists		5		1	1	7
Nature of science	1			2	2	5
Interact w/ participants				2	3	5
Technology	1	1			2	4
Developing activities	1			2		3
Careers				3		3
Immersive environment				1	2	3
Take-home materials		2				2
Online materials		1				1
Field trips		1				1
Societal relevance					1	1

Objective 3: Educators translating scientific results into useful teaching resources

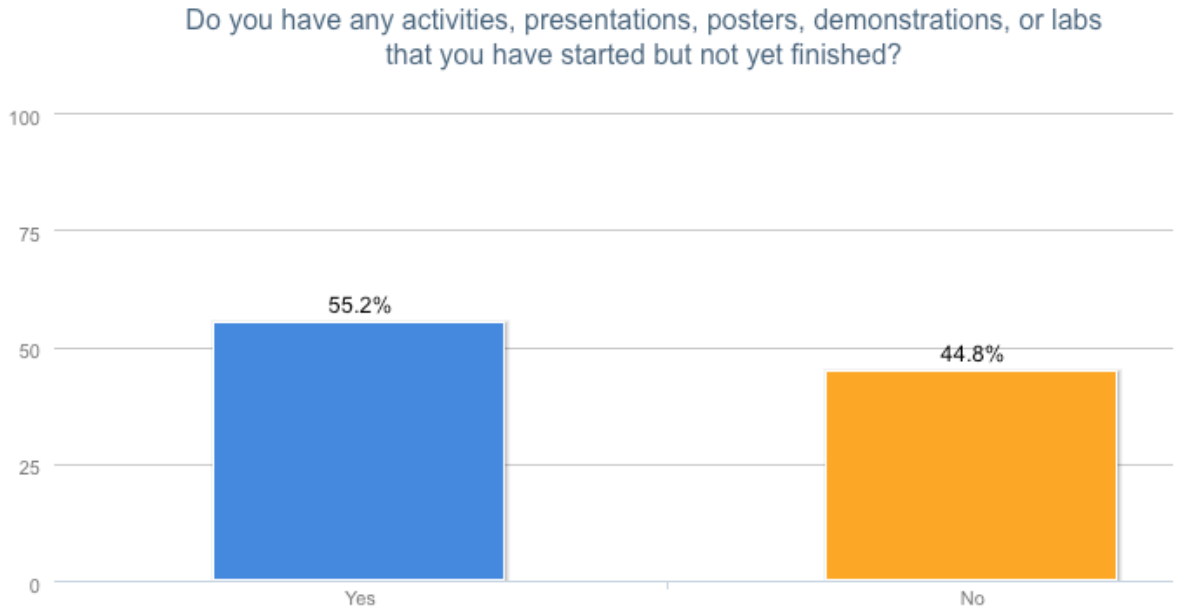
The SOR program is also meeting Objective 3, as demonstrated by the large number of curricular materials that Rockers have developed and continue to develop. Many of these activities are published on the Deep Earth Academy website. In total, survey responders reported post-SOR completion of 106 activities, 113 PowerPoint or other presentations, 21 posters, 59 demonstrations, and 73 laboratory investigations, with an average of 6.4 products

per individual. Even the 13 members of the 2010 cohort, who completed their SOR experience less than a year before taking the survey, produced an average of more than four products each (Table 5). All but two Rockers from the 2007 cohort have developed at least one product. Of the two Rockers who have not, one acknowledged that they created products as a team, and the other incorporates already existing materials. More than half of the Rockers indicated that they are still working on products (Figure 4) and 60% have designed a new activity or new material in the last year (Table 8). Examples of products that are currently under production include a board game that incorporates a typical work day during a drilling expedition, an ocean crust heat flow activity, a children's book, virtual core activities, and videos.

Table 5. Products developed as a result of School of Rock experience.

July 2011 survey						
How many products did you develop as a result of your School of Rock experience?						
Products	**2005**	**2007**	**2008**	**2009**	**2010**	**Total**
Activities	23+	24	16+	27+	16	**106+**
Powerpoint, other presentations	24+	26+	15	25	23	**113+**
Posters	8+	5	5	3	0	**21+**
Demonstrations	12+	17	8	9	13+	**59**
Labs *	13+	14	13+	24+	9	**73**
TOTAL	80+	86+	57	88+	61+	**372+**
# survey responders	10	13	8	14	13	**58**
Avg # products produced	8	6.6	7.1	6.3	4.7	**6.4**
* with smear slides, core models + indicate responses that exceed 5						

Figure 4. SOR-related projects under development.



In addition to developing new material, Rockers are using a wide range of existing hands-on resources provided through Deep Earth Academy, as well as IODP data that is available online. More than half of the surveyed Rockers have used core models, smear slides, and/or sediment samples in their instructions; almost 89% have used core photos (Table 6); and 69% have accessed IODP data through the web, with retrieval of core images being the most common pursuit, followed by accessing expedition reports and results and information about cores (Table 7).

Table 6. IODP materials used in instruction.

July 2011 survey		
Which of the following have you used in your instruction? Select all that apply.		
IODP material	**Count**	**Percent %**
Smear slides	29	50.0%
Sediment samples	30	51.7%
Core photos	52	89.7%
Core models	30	51.7%

Table 7. IODP materials accessed: how and why.

February 2011 survey	
Do you access IODP data - if so, how?	
Answer	**Number**
Yes	35
No	10
Tried unsuccessfully	2
Have not figured out how to use yet	1
Was unaware of the site	1
Forgot how to use it	1
Reasons for using the IODP site	
Answer	**Number**
Access core Images	13
Get information about cores	8
Find images	7
Use with others educators	5
Get site info	3
Find staff e-mail	1
Map	1
Use with parents	1
Find expedition reports/results	9
Use it with students	7
Get data sets	5
Find technology-related images	3
Need a refresher	2
Use core ref	1
Personal only	1
Get news releases	1

Objective 4: Educators disseminating IODP science education

Survey results strongly support the conclusion that SOR is also meeting Objective 4, as indicated by the wide range of audiences that Rockers are reaching and the continued frequency of their presentations. Within the last year alone, at least 70% of the Rockers have used SOR lessons with students and presented content to students, colleagues, and/or other educators; 86% have shared their experience informally with others; and 38% have presented to the public (Table 8). Rockers indicate that they have made more than 132 presentations that have reached more than 21,600 people (Table 9). On average, each survey responder has given two presentations, and many have given more.

Table 8. Use of materials during the past year.

February 2011 survey		
How have you used Deep Earth Academy materials and/or scientific ocean drilling research information during the past year? Check all that apply.		
Use of materials	**Count**	**Percent of responders**
Used lessons with students	35	70%
Presented content to students	35	70%
Presented to colleagues and/or other educators	39	78%
Presented to the public	19	38%
Designed a new activity/material	30	60%
Shared informally with others	43	86%

Table 9. Workshops conducted after School of Rock participation.

July 2011 survey		
How many Rocker workshops did you conduct between your School of Rock participation and July 2011?		
Year of SOR participation	**Total # of workshops given**	**Estimate of total # of people reached**
2005	28	2,775
2007	33	11,627
2008	19	4,558
2009	34	2,040
2010	18	670
Total	**132**	**21,670**

Future programming efforts and support for SOR

When asked how Deep Earth Academy can support Rocker's ongoing science education efforts, 31 responders provided 49 comments that referenced what DEA does well or should continue to do, compared to 19 responders who provided recommendations for improvements (Table 10). Rockers expressed that DEA should continue providing resources such as content and materials (18 responses).

One Rocker wrote, "I think the staff is doing a wonderful job of continually adding new content and ideas. I like the variety of depth—some fun and simple ideas, while others are more in

depth and could be used as longer projects. I am very satisfied with everything that has been provided so far." Other SOR strengths that were highlighted include the general support and responses to Rocker questions by DEA staff, communication through e-mail and newsletters, and opportunities to collaborate, network, and participate in other educator experiences.

There were 12 recommendations related to DEA resources, such as "have the materials/background information easily accessible along with the lessons that are age/grade specific." Other recommendations pertained to communications, improving the website, and providing support for outreach events. There was a single response on collaboration: "I appreciate the opportunities to create synergies between our projects and hope we can find ways to work together in the future."

Table 10. Continued support for science education efforts.

February 2011 survey		
How can Deep Earth Academy staff best help you in your science education efforts?		
Nature of comment provided	**Total number of responders**	**Total number of comments**
Satisfied/continue providing	31	49
Recommendations	19	28
Comment not provided	6	0
Comment can't be categorized	3	0
Total	**59**	**77**
Categories of individual responses	**Satisfied/ continue providing**	**Recommendations to improve**
General support/answers questions	9	0
Resources (activities, materials and/or content)	18	12
Communication (e-mail, newsletter)	7	6
Educator experiences/ opportunities	5	0
Collaboration/networking opportunities	6	1
Website	4	4
Conference/workshop, outreach support	0	3
Resource development support	0	2
Total	**49**	**28**

Survey responses also revealed that the certificate issued to participants upon completion of the School of Rock program was useful as professional development credit at the institutions of 53% of the responders, and that 55% of survey responders receive our monthly newsletter. Additional data from the surveys will be analyzed, combined with the findings included in this preliminary report, and submitted for publication.

Deep Earth Academy will use data from these surveys in combination with data collected from the School of Rock 2011 Review Summit conducted in Curaçao in July 2011 to guide the development and expansion of future School of Rock programming efforts.