The Exploratorium's Explainer Program: The Long-Term Impacts on Teenagers of Teaching Science to the Public

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Over the past seventeen years, the Exploratorium in San Francisco has hired more than 900 teenagers to serve the museum in an unusual role. Chosen only for their enthusiasm and diversity, these students have been given the most difficult task in the museum: They serve as the primary staff available to the public on the floor of the museum. Their job is to explain exhibits on physics, perception, and biology, and to answer questions from half a million visitors a year.

The purpose of this study is to determine whether science museums, through such programs, can significantly affect students' social development, their attitudes toward science, and their interest in science, teaching, and museums. Our previous studies (Diamond, 1986) examined the impacts of science museums on family groups, who spend short periods of time in the museum (an average of 2 hours per visit). The present study examines the impact of the Exploratorium on a group of students who may spend as much time in the museum as in school.

The Explainer Program was initiated when the Exploratorium first opened its doors in 1969. From the beginning, the museum recognized a dual purpose in having high-school students work with the public. On the one hand, the students serve the museum by providing help for visitors and needed staff support in the areas of maintenance and security. On the other hand, the teenagers might benefit by working in a science museum. Since, in general, relatively few teenagers come to the museums, the program would attract not only explainers, but also their friends, to an institution

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that they might not otherwise visit. Long-term learning benefits might also result from asking teenagers serve as teachers, explaining phenomena that they had the opportunity to experience directly through their interactions with the exhibits.

If working as an explainer is typical of other student work experiences, however, such positive benefits are unlikely to result. A recent study of teenagers and work found that although over 80% of all adolescents in the United States are formally employed, there are generally few positive outcomes from the experience. In contrast to many assumptions, most teenagers' jobs did not build character, did not improve academic learning, and did not provide a basis for later careers. In addition, teenagers who work generally did not become more committed to the welfare of others or more tolerant of individual and cultural differences. In fact, as a result of their job experiences, many adolescents became more cynical about the intrinsic value of work and more accepting of unethical business practices (Greenberger & Steinberg, 1981; Steinberg, Greenberger, Garduque, Ruggiero, & Vaux 1982).

We have examined the Exploratorium's Explainer Program to understand the impact it has had on the teenagers who have participated in it. The primary focus of our study was not on what the program accomplishes for the museum, but rather on how this program, in the short and long run, has influenced teenagers' lives. We have focused our study on how present and former explainers viewed the explainer job and how, looking back on that time, they felt that the experience affected them.

Methods

We studied the impacts of working as an explainer using both qualitative and quantitative techniques. A total of 881 explainers were identified at the time the study began. We had information on 754 explainers from earlier interview records made at the time the students applied for the job. Information presented in the study on explainers' race, sex, and schools is based on the sample of 754 explainers. All other information presented in the study is based on 32 explainers given lengthy interviews and 116 explainers who were surveyed. We included at least one explainer from each year of the program from its beginning in 1969 through 1985 in the interview group. The larger sample of 754 was used to evaluate the interview and survey samples for bias. Both the interviewees and the survey respondents reflected the makeup of the larger explainer group.

The interview comments were used as a basis for the development of the survey questions. The survey was developed and revised through repeated trial testing with explainers currently working in the museum. It was then mailed to the 435 former explainers for whom we could find current addresses. The survey had three parts: The first section asked the respondents to record the events and impressions that they remembered most clearly

about the explainer experience. The second part of the survey asked them to rate, on a scale of 1 to 5, the impact of their experience as explainers on 14 different items. The third section consisted of 9 questions about the respondents' background, interests in high school, and current activities.

Statistical comparisons describing the impacts of the program are based on the 116 survey respondents. The 14 rated items were analyzed individually, using chi-squared tests, to determine the influence of sex, race, interest in science, year worked in program, maximum grade completed in school at the time of the survey, and major in college. The items were then factor analyzed (Principal Factor Method, with Varimax Rotation), and the score for each factor was obtained for all individuals in the sample. Analysis of variance examined the effects of sex, race, and prior interest in science.

Program Description

Students wishing to become explainers are generally referred to the Exploratorium by their high-school counselors or by friends already working as explainers. They are selected less for their science background than for their curiosity, friendliness, enthusiasm, and diversity.

Once they are accepted into the program, they attend training sessions for approximately 50 hours over three weekends. In the early years, the training program was quite informal, and the Exploratorium's founder, Frank Oppenheimer, played a major role. The most notable aspect of the original training program was that the explainers received so little instruction. The general expectation was that explainers were trained on the job, and the training sessions were merely a way to get a foothold in the museum. The program has evolved over the past five years so that it now includes more extensive and science-centered training, attempting to give the explainers a deeper conceptual background in physics and perception.

The present training program attempts to give the new recruits a general orientation to the museum, an introduction to several museum staff members, and competence at explaining at least a few exhibits. Throughout the training there is recognition that the explainers are not expected to know everything about the 600 exhibits in the museum, and that not every question a visitor might ask has an answer. Frank Oppenheimer used to say that he never expected the explainers to know all of the answers. It was more important for the public to see questions being asked, to think about how things might work, and to come up with ideas of their own, than it was to pretend that there are answers to everything.

Explainers are hired three times per year (spring, summer, and fall) for an average session of 4 months. The sessions are kept relatively short for two reasons: This enables more students to go through the program, and it minimizes feelings of burnout. There are an average of 18 explainers per session, and the vast majority of explainers (88%) work only for one session. Some of the group work only on weekends and holidays for a full day, while others work weekends and also half-days Wednesday through Friday.

On the floor the explainers, wearing orange jackets, rotate among various tasks. They may be assigned to do demonstrations (e.g. illustrate a laser, dissect a cow's eye) or to wander particular sections of the museum in search of visitors needing help. They are generally expected to report broken exhibits (and sometimes repair them), search for lost children, act as security guards, and help visitors find their way in the three-acre museum.

Who Are the Explainers?

The most obvious feature of the explainers is that they are highly diverse. They are racially diverse (46% of the explainers are Caucasian, 16% are Black, 10% are Hispanic, 15% are Asian, and 10% represent other groups). Explainers come from over 80 different schools in the San Francisco Bay Area, and they range in grade from high-school freshmen to an occasional college student. Eighty percent attend public schools in San Francisco, 15% attend private schools, and 4% attend public schools in other parts of the Bay Area. Only 1% are in college at the time of their employment. Over the history of the program, there have been relatively equal numbers of male (53%) and female (47%) explainers.

The explainers are not all science "whizzes." They are as diverse in their intellectual and social interests as they are in other respects. When asked to recall their interests in high school, they indicated interests in people (71%), reading and literature (68%), art and music (58%), science (54%), politics and social issues (46%), and sports (43%).

At the time of our study, we found that 85% of the explainers had graduated from high school. Of those who had been out of the program for over 4 years, 62% had graduated from college and 25% had attended graduate or technical school after college.

The Explainer Experience

What is it like to be an explainer? Explainers spoke to us candidly about their experiences with the museum, and how the social dynamics of the job affected them.

The explainers spend most of their time "out on the floor" with the museum exhibits. Survival on the floor involves developing strategies for approaching, attracting, and teaching people. These strategies are individually worked out by explainers, and no two explainers have the same approach. Some explainers perceive their jobs as entertainers:

> It is definitely a performance. It has to be appealing. (Phillip, explainer in 1983)

Others emphasize the need to read visitors' needs accurately:

> I had to feel people out. There were some people that didn't want someone to explain to them. They'd want to find out for themselves. (Marta, explainer in 1977)

The philosophy of the program – that explainers are not expected to know all of the answers – means that the explainers have to adjust to the fact that people will constantly be asking them questions that they do not have answers to. They, in turn, develop strategies for dealing with this:

> When I couldn't answer something, I would sometimes grab another explainer's arm and say, "Explain this for them, will ya? I know you have a better way of saying it." Sometimes I would tell the visitor, "Let's read this together." As we'd read the graphics it usually would register. (Joan, explainer in 1975).

> I learned to tolerate a lot of my own mistakes. On the floor you fall on your face a lot in front of those who know better. You learn to appreciate that you can learn from those that know better. Once at an eye dissection, I got into a conversation with an ophthalmology student. I'd be explaining things but all of a sudden I was learning new stuff by talking to this guy. (Gabe, explainer in 1981)

To many explainers, the social dynamics of the explainer group are the most significant part of the job. The explainers are put into close contact with high-school students different from themselves, and they are asked to form a cohesive group:

> When you go to different high schools, you look at other students from different schools as foes. Once you are here on neutral ground you can do a lot of sharing and learning together. (Joan, explainer in 1975)

> Other explainers had such different life styles. I remember going over to the house of an explainer friend and realizing that he lived in a halfway house because he'd been a runaway and a male prostitute. It came home to me that we each had such a different way of being. (Dan, explainer in 1974)

We looked for evidence of division within the group and asked specifically about racial differences, cliques, and feelings of being left out. There was remarkably little divisiveness within any explainer group. Explainers remember the job as very interracial. For some explainers, working closely with students from other races was a significant learning experience:

> I grew. I grew up here. I had a lot of prejudiced views. I was raised in a traditional Chinese family that has a prejudice against blacks. There was one person here I was particularly attached to. She broke down a lot of deep barriers. She taught me everyone has a veneer, and to break through that veneer, is to take each person as a soul. (Wilson, explainer in 1979).

The Exploratorium gave the explainers their own space to meet in the center of the museum office area. It was intended that the explainers should be included as an integral part of the museum staff, and that they should be allowed to have their own culture flourish. Thus, many explainers described the museum as their home away from home and it represented a combination of freedom and challenge:

> For me, the Exploratorium was my home. It allowed you to be yourself, to explore yourself. There's no restraint. There is an atmosphere of play with no

> restrictions. You're free to discover yourself and to discover how to learn. People are very important to me. Dealing with strangers was the most challenging part of being here. (Kristen, explainer in 1983)

At the end of each four-month session, a few students are invited to be rehired, and these students provide a source of continuity between sessions. Although it is generally looked on as desirable to be asked to stay more than one semester, there are reasons why it is not altogether successful. Burnout is a realistic concern:

> After the end of the second semester, I was glad to be finished. I was kinda burnt out. I ended up being a door person and that's what did it; it became really monotonous. There wasn't the interaction with the public. That interaction is what made it interesting. (Luanda, explainer in 1978)

The program's full-time director is a former explainer who has run the program for over 10 years. The explainers see her as tough, supportive, and deeply committed to the program. Both the explainers and the Exploratorium staff view the success of the program as being highly dependent on her ability to work effectively with teenagers. She also serves as a strong role model for them:

> Darlene was the best. Her warmth was so strong and she wanted to get to know each one of us. Everyone started becoming more like Darlene. Darlene's a big part of my learning here. (Marta, explainer in 1977)

Impacts

Our interviews with former explainers suggest that the program affected them very deeply: They considered it a challenging job and a fascinating social experience. We felt it was important to know, however, whether any parts of that experience carried over into other aspects of their lives. For example, we wanted to know whether working as an explainer influenced their later educational decisions. Did it influence their choice of career? Did it give them specific skills that were transferable to other situations?

On the basis of the factor analysis, the impacts of the program were grouped into two broad categories: "Science and Learning" and "Communication and Self-esteem." Together, these two factors accounted for 97% of the variance in the analysis. The dominant items on each factor are shown in Tables 1 and 2.

Science and Learning

Explainers indicated that there were strong and persistent impacts from working in the science museum. Working as explainers had a major influence on the development of their curiosity, interest, and confidence in learning science. As shown in Table 1, 80% felt that the program strongly enhanced

TABLE 1

Measures of Program Impact on Science and Learning

The items in this table all displayed factor loadings of 0.3 or better on Factor #1. Percent high impact indicates the percent of the subjects who rated a particular item 4 or 5. Rated impact indicates the arithmetic mean of all ratings of the item.

	Percent High Impact (N=116)	Rated Impact Mean and S.D.
Your curiosity about how things work.	80	4.2 (0.9)
Your interest in science.	67	3.8 (1.2)
Your confidence that you could understand science.	66	3.8 (1.2)
The amount you watch science programs on TV or listen to them on the radio.	35	2.8 (1.4)
The amount you read about science or scientists.	32	3.0 (1.2)
The number of science courses you took or plan to take in school or college.	32	2.9 (1.4)*

*Ratings of students indicating a high interest in science in high school were significantly higher ($p < 0.001$) than other students.

TABLE 2

Measures of Program Impact on Communication and Self-Esteem

The items in this table all displayed factor loadings of 0.3 or better on Factor #2*. Percent high impact indicates the percent of the subjects who rated a particular item 4 or 5. Rated impact indicates the arithmetic mean of all ratings of the item.

	Percent High Impact (N=116)	Rated Impact Mean and S.D.
Your ability to teach people.	80	4.2 (0.9)
Your desire to work with people.	73	4.0 (1.0)
Your desire to learn on your own.	63	3.7 (1.1)
Your understanding of your capabilities.	62	3.7 (0.9)
Your self-confidence.	60	3.9 (0.9)
Your effectiveness in other jobs.	50	3.7 (1.1)

*Ratings of female explainers on factor 2 were significantly higher ($p < 0.03$) than the ratings of male explainers on this factor.

their curiosity about how things work, 67% said they were strongly influenced by the program to become interested in science, and 66% gained confidence that they could understand science. Approximately one-third of the respondents indicated that the program influenced the amount that they sought out scientific topics in books, in the media, or in classes.

The comments of explainers indicate that the extensive time they spent at the exhibits played an important role in stimulating these effects:

> There is an exhibit here about the expansion of metal as it heats up. You can actually feel a metal rod growing as it heats up. I mean that is exciting. Even though everyone knows that it expands, they were never able to observe it. I think the fact of observing it makes it a lot more interesting. (David, explainer in 1980)

The ability to touch, manipulate, and visualize phenomena in the exhibits was seen as very distinct from the way they had learned in school settings:

> There would be times when something didn't catch my interest in class, but it did when I learned it here. It was hands-on. There was actual proof. It wasn't something read from a textbook (Marta, explainer in 1977)

> It's not like in school where you solve a math problem or a physics problem where the instructor might help you with a step you were stuck on. No, this was a much more interactive kind of thing and you find a lot of times you could answer your own questions just by experimenting with the exhibits. (Phillip, explainer in 1983)

The exhibits gave some explainers a physical understanding of phenomena that could later be used as a tool in problem solving. By remembering the images, principles, and concepts of the exhibits they were often able to make sense of other things that were previously unclear to them:

> A friend of mine went to a space movie – you know, one of those movies where they are fighting in space and there are loud explosions and stuff. I said to my friend, "In real life you wouldn't be able to hear all that. Sound can't travel through empty space." He said I couldn't know that because when you hit two objects together, they make noise. I told him that there was an exhibit here that proved you wouldn't hear it in space. He came here to see it because he didn't believe me and I proved it to him. (Marcella, explainer in 1981)

> It was easier in class becasue of the Exploratorium. Sometimes the teachers would say something and I really understood. I'd think, oh yeah, that's like an exhibit or something we'd talked about in the Exploratorium. (Marta, explainer in 1977)

Other explainers found themselves able to "make connections" because they learned to see the same principle in many different exhibits, and they could then generalize that principle to still other things:

> Learning is a practical experience. It's seeing it happen in the exhibit and then being able to look at the graphics for it. And there you just get a real nutshell idea of what's going on. When you have that little nutshell idea and then go to the next exhibit, that nutshell description makes it sink in all the more. You

> realize that there is a fundamental idea – such as resonance and you can apply that idea to a lot of different things – from electrons in an atom to the way a bridge will fall apart. (Steve, explainer in 1983)

The explainers described various ways that the program helped them when they went on to college-level science courses. The generalized learning and thinking skills that the explainers acquired made it easier for many of them to learn in college:

> I took biology and it was easy. I was more tuned in with what was going on, and I could see things a little bit better. I think that was because of my experience here. Learning at the Exploratorium is more direct than in college. In college, there is no room to ask why and how this goes on. (Angela, explainer in 1977)

> Experience as an explainer helped me immensely. The quantum physics was pretty tough coursework. I didn't have to memorize as much. You just knew what was high frequency, what waves can do, how light can be altered. It had another side benefit. It made me not afraid to ask questions. In Berkeley, it's very easy to feel intimidated to ask questions when there are a thousand students in the audience. (Terry, explainer in 1971)

Some explainers, however, were discouraged by the fact that the gains they achieved from the program were not recognized in college:

> I used the experience I had here to get bored to tears in a conceptual physics class at State College. I got a "C" and it was only because I came to class. I could have taught that class better than the instructor. (Greg, explainer in 1972)

We asked explainers whether their experience with the job had influenced their decision to go to college or other school after high school. For some explainers, the contact with the scientists and other staff in the Exploratorium played an important role in influencing their decision to go to college:

> I'd rather learn things on my own. But I'm going to go to college. I think I was influenced to go on to college by observing people at the Exploratorium who've been to college. There are a lot of professors that teach here. They're real people. When you watch TV, professors they seem like robots. After working here you can talk to professors. (Cindy, explainer in 1985)

Twenty-four percent of the explainers indicated that they had been strongly influenced by the program to continue with school after high school. This figure seems particularly significant in light of the brief (4-month) duration of the program.

Interest in Science

We had found from our previous work with staff from other museums (Diamond & Duensing, 1985) that many believe that a strong science background is necessary for teenagers to be effective in their work in science

museums. A science background was not a requirement for the explainer job, and only 54% of the explainers surveyed indicated that they had some interest in science in high school. This compares with 71% and 68% who indicated interests in people or literature, respectively.

We examined how the "science" and "nonscience" students compared in the types of impact the program had on them. In fact, the students interested in science were significantly different statistically from other students in at least one respect. They were more likely to be influenced by their experience with the program to take more science courses later in school (see Table 1).

One explainer described how working at the Exploratorium helped him decide to pursue his interests in science:

> It got rid of a stigma for me and let me go and pursue science, which is really what I wanted to do in the first place. I found out that, yeah, you can enjoy science and you're not weird if you do, so why not? Before, I would just keep it to myself. I never told anybody that I read science books before I came here. (Steve, explainer in 1983)

The Explainer Program was not necessarily easier for the science students, and other explainers recognized that science buffs were sometimes at a disadvantage on the floor:

> Some of the explainers knew that those with the most science weren't as good with the visitors. They'd get into so much detail and the visitors didn't want so much (Christina, explainer in 1982)

Communication and Self-Esteem

The Explainer Program had other kinds of impact on the teenagers that were distinct from their experiences with science and learning. These impacts are included in the category, "Communication and Self-esteem" (see Factor 2 shown on Table 2). From 50 to 80% of the explainers mentioned that the program had a major impact on them with respect to the following six items:

"Your ability to teach people"
"Your desire to work with people"
"Your desire to work on your own"
"Your understanding of your capabilities"
"Your self-confidence"
"Your effectiveness in other jobs"

Also, interestingly, female explainers were significantly more likely than males to indicate that the program had impact on them with respect to this factor (see Table 2).

The explainers described how the job helped them work with other people:

> You can't go into a group like that and not be changed in some way. Some who weren't as outgoing became more outgoing. Others who were hard to get along

> with became more tolerable. Still others, like myself, who were conceited, became more humble. The Explainer Program helps us all learn to work with people a little better. (Gabe, explainer in 1981)

A central aspect of learning to work with people involved learning to teach. This had many different aspects: it involved learning to speak to different audiences and becoming aware of nuances important in effective communication:

> I think it improved our ability to communicate. We really worked on our communication skills. It definitely helped us later on. You learned to deal with different people, those from different countries, how to tolerate people with accents, how to talk with your hands to people with language barriers. That is a carry-over to what I do now because I still have to deal with the public. (Kim, explainer in 1976)

> For my life, that was one of the key things to come out of the Exploratorium experience: becoming a people-oriented person. When you explain something and you see the spark in people's eyes, you are enriching them. You are giving them something, and in return you're getting the feeling that you are enriching their lives. You are teaching them something. (Terry, explainer in 1971)

Teaching played a strong role in improving the explainers' self-esteem. They felt important because they knew something that other, particularly older, people would listen to:

> Part of the reason I liked it a lot was that it gave me the feeling that I was teaching for the first time. I was showing people things instead of always having them shown to me. (David, explainer in 1980)

> It felt great. There were millions of people and they didn't understand what was going on but I did. I was only 16 years old and I could explain things. It was a good feeling to know that we were just kids and we knew things. I think the public liked that too. (Angela, explainer in 1977)

The teaching skills that the explainers acquired at the Exploratorium proved useful in other jobs:

> Working here was not only a learning experience, it was a rewarding experience. Every job I've had since has been working with the public and in some ways, explaining. I've been teaching: I taught travel courses and now I teach computer systems where I work. I've always been in some teaching capacity. (Kim, explainer in 1974)

> It helped me be a teacher. It let me experience very early on in my life how it is to teach people things. A big part of my present job as a manager is teaching; the ability to understand when people are understanding you and when they are not. (Terry, explainer in 1971)

Working as an explainer helped the students clarify their notions about what they wanted in a job and career:

> I have a different job now. If I had had this job first, I would have a totally different outlook on the world. I think I would look at the world as a rat race. But here, people in the shop didn't rush. They went along at their own pace doing the things they wanted to do. They were really relaxed and they liked what they were doing. You can't do it just because of the money. You've got to like it. I found that out. I still don't know what I want. I think working here helped me a lot in knowing what I don't want. (Cindy, explainer in 1983)

> Working in animal behavior was challenging. It was the first time I came to the conclusion that I had to do something with my life, that there was work involved, and that if I wanted to accomplish something, I'd better figure out what it was and do it. (Dan, explainer in 1974)

We searched for differences in the types of impacts of the program based either on year of participation, race, amount of schooling, interests, major in college, or subsequent work experience at the Exploratorium. We found no statistically significant differences among these variables.

The Visitors' Perceptions of Explainers

While our study focused largely on the explainers themselves, we wondered how much the visitors noticed the orange-jacketed explainers, how they interacted with them, and what they thought of them. To this end, we questioned 75 museum visitors as they left the museum about their impressions and observations of the explainers.

Eighty percent of the visitors did, in fact, notice the explainers and 44% of the visitors understood their role in the museum as active agents who give demonstrations and approach visitors to offer assistance. Thirty-nine percent of the visitors perceived explainers as essentially passive agents who gave information if asked and who looked after the exhibits. Another 17% of the visitors had only a vague notion of the explainers' role as having something to do with being a volunteer or working on maintenance.

Over one-third of the visitors were approached by explainers during the course of their visit. Of these, 97% remembered and could name, at the end of their visit, the particular exhibits where they had interacted with explainers. Sixty-one percent indicated that they felt their needs were met by the explainers and they required no further assistance whereas 39% indicated that they would have liked even more help. All of the visitors had generally positive comments about their interaction with the explainers.

Conclusions

The results of our study suggest that the brief experience of working as an explainer can substantially affect the teenagers' later lives. We found that the Explainer Program had influenced teenagers' interest in learning, in general,

and the learning of science, in particular. The students acquired increased self-confidence from the job, and they developed skills in learning how to get along with people, particularly those from different racial and socio-economic backgrounds. The job was a major influence in stimulating some explainers to go to college, and it served as a career start for others. The experience of teaching provided many of the students with critical communication skills that proved to be useful in their subsequent work and school.

These results contrast strongly with the findings of Greenberger and Steinberg (1981) and Steinberg et al. (1982) on the impacts of most teenagers' work experiences. There are several reasons why this might be so. Greenberger and Steinberg suggest that most youth jobs provide adolescents with little opportunity to cooperate with others on joint tasks. They tend to feel that the work they perform does not contribute importantly to the overall functioning of their organization. Furthermore, the authors suggest that young workers perform tasks that make only minimal demands on cognitive skills acquired through school, and they perform tasks that do not require substantial new learning. Most adolescents interact primarily with other young workers and have little contact with adults who might serve as effective mentors or role models.

At the Exploratorium, the explainers are asked to perform a job that is very difficult, but in which failure is not an issue. Oppenheimer (1975) pointed out that "no one flunks a museum," and this applies as much to the explainers as to the general public.

On one hand, the explainers are asked to teach visitors about over 600 exhibits on subjects for which they may have had little or no formal preparation in school. The training is relatively minimal and there is little indication that the explainers learn much science content in the training.

On the other hand, the explainers are given a great deal of time to explore for themselves how the exhibits work. They develop experience with the physical and biological phenomena portrayed in the exhibits. They learn to play with sound, light, and their own physiology. They make up games with the exhibits, and they attempt to make the exhibits do new and unexpected things. Over time, this intensive exposure with the exhibits enables some explainers to develop an intuition about how some phenomena work, and they utilize this to understand physical and biological processes that occur outside the museum.

The social milieu is as important to the success of the program as are the exhibits. The explainers depend very strongly on each other's help, and this fosters feelings of interdependency and cooperation among students with quite differing backgrounds. Furthermore, the explainers are encouraged to rely on the museum's permanent staff for assistance, and mentor relationships between staff and explainers readily form.

In many regards, the Exploratorium's Explainer Program serves as a useful model for how early job experiences can result in significant learning experiences. These results suggest that science museums may be able, through relatively short-term programs, to play a profound role in stimulating teenagers' social development, communication abilities and interest in science.

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