

Evaluation Report

What's the BIG Idea?[™]
Training-of-Trainers

Prepared for:
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Mother Goose Programs
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November 2009



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Executive Summary

In 2005, The Vermont Center for the Book (VCB) received funding from the National Science Foundation (NSF) to develop and implement a program called *What's the BIG Idea?*[™] to help librarians change their children's story hours to include more mathematics and science content and vocabulary. The project resulted in the creation of a professional development seminar; a manual with guidelines, activities, and other information for librarians; parent kits for families to take home and use to reinforce and extend learning in mathematics and science; and a Web site filled with ideas, bibliographies, and other information intended to support librarians and others as they implemented the program. Evaluations of the project showed that librarians changed their practices in statistically significant ways. The original cohort of librarians acquired specific knowledge and skills and confidence in their abilities to provide children with activities and vocabulary related to mathematics and science. They implemented the program with varying degrees of fidelity, and those with the strongest fidelity to the original program guide had the strongest impacts on children.

Because of the success, VCB sought additional funds from NSF to bring the project to scale. VCB recognized that its small staff could not possibly deliver the training to all of the librarians that requested it, so they developed a training-of-trainers approach wherein others could offer the training. This study was conducted to determine whether the training was as effective when staff other than VCB provided the training.

Methodology

The study designed called for random assignment of individuals to be in one of two cohorts: Level One trainers would be trained directly by VCB. Level Two trainers would be trained by Level One trainers. Differences in the quality and impact of training would be assessed. Then trainers from both levels would be asked to train at least five librarians each, and impact on those they trained would be compared.

Librarians from seven states comprised the sample. Thirteen librarians were randomly selected for Level One and fifteen for Level Two. The “cascade” of training was then implemented and evaluated.

Methods for evaluation included pre-/post- and follow-up surveys for all trainers and librarians who received the training; interviews with a randomly selected sample from each of the cohort groups, both trainers and librarians, receiving the training; and analysis of program reports. Data were triangulated and analyzed to determine quality and fidelity of training, immediate and longer-term impacts on participants, and perceived impacts on children. Differences between outcomes for cohort members were explored.

Results

- **Results clearly showed that the *What's the BIG Idea?*TM programming attained the same strong impacts no matter who provided the training.** There were significant impacts on all participants in both Level One and Level Two cohorts. Participants in these cohorts had nearly the same results as those librarians who participated in the original *What's the BIG Idea?*TM program.
- **Statistically significant impacts occurred in librarians' knowledge acquisition, confidence and comfort levels in training others, and in implementing mathematics and science activities.** The only area measured that did not show a significant positive change was in the area of designing programs for young children to learn literacy concepts, an area where most librarians already felt competent.
- **Trainers in both Level One and Level Two cohorts felt well prepared to deliver the training.** The only challenges that most trainers reported were in the areas of recruiting librarians to participate in the training and in organizing the training. Nearly all reported that the training was “easy” to provide.
- **There was some variation in the degree of fidelity of the training to the manual and the original training.** While trainers uniformly reported that they “stuck closely to the manual,” data showed that some condensed the information, added activities, or customized approaches to the audiences they had. Level Two trainers were more likely than Level One trainers to vary the training from the original.
- **Trainers found the support they received from VCB to be valuable.** Most strongly agreed that the follow up was responsive and had excellent content.
- **Librarians who received the training from Level One or Level Two trainers rated their experiences as “excellent” or “above average.”** They reported that the length of the training was appropriate, the pacing was “good,” and the utility of the information for their practice was “great.” There was some variation in ratings of the expertise of presenters, with a few trainers from Level Two receiving lower ratings.
- **Librarians had very few suggestions for improving the training, stating that they liked it as it is.** The few who made suggestions generally wanted additional ways to share ideas (mostly electronically), or desired more support especially with creating their own “lessons.” Several librarians who received Level Two training recommended that the purpose of the training should be clarified and more background information about the training should be given before the workshops.
- **Librarians who received the training also changed their resource acquisition practices.** After receiving the training, librarians were more likely to order nonfiction books and books related to mathematics and science for young children.

- **Impacts endured over time.** Follow-up surveys showed that the impacts on the librarians in terms of their implementation of mathematics and science activities endured and sometimes increased over time.
- **Certain activities were more likely to be implemented than others.** In general, librarians tended to implement activities related to graphing and charting, patterns, shapes, growth, building, and matching more than other activities. Patterns of implementation were somewhat different for those exposed to Level One versus Level Two trainers.
- **Fidelity of implementation was highest for those librarians trained by Level One trainers.** In their training, Level One trainers tended to have more fidelity to the manual. In their implementation, librarians who received training from the Level One cohort tended to have greater fidelity to the manual.
- **There was great variation in fidelity by state.** Several states showed stronger implementation fidelity than others, the fidelity also varied by cohort.
- **Specific skills addressed by librarians in their activities did not vary substantially by cohort.** Librarians in both cohorts tended to address numbers and operations, geometry and spatial sense, estimating and predicting, recognizing relationships, and sorting and classifying more often than other skills.
- **Librarians tended to pose “what,” “how many,” and “how” questions to children most often.** The manual suggests that there is a need to ask “why” questions more often.
- **Librarians noted that children responded very positively to the *What’s the BIG Idea?*TM programming.** Both immediate and longer term estimations of impacts on children revealed that librarians thought children were more likely to use mathematics and science vocabulary, became more interested in nonfiction books, more often checked out both the books read during story hours and the family kits, were more engaged in story hour than usual, interacted with other children more than usual, and engaged their parents in more activities than usual.
- **Librarians who implemented the *What’s the BIG Idea?*TM programming were likely to sustain implementation in the future.**
- **Additional unsolicited comments nearly uniformly showed that librarians and trainers both thought the programming was “wonderful,” useful, worthwhile, and added value to their libraries.**

*What's the BIG Idea?*TM was created by the VCB to enhance mathematics and science readiness of young children, aged 4 to 7. *What's the BIG Idea?*TM is predicated on a theory of change that hypothesizes that librarians who are exposed to high-quality professional development and are offered ongoing support will acquire the confidence and competence necessary to change their practices. The librarians will, in turn, offer more mathematics and science content during children's story hours, and will impact children's motivation to learn, knowledge and skills, and initial understandings of age-appropriate mathematics and science content standards.

Evaluation from the first 4 years of the *What's the BIG Idea?*TM initiative showed that:

- The professional development offered by the VCB is of very high quality;
- The support provided by the VCB is highly responsive, multifaceted, and targeted;
- Librarians have changed their practices to provide significantly more mathematics and science content to children; to stock and recommend significantly more nonfiction books to parents and children to take home; and to feel significantly greater confidence and competence in their ability to help motivate children to learn mathematics and science investigations, vocabulary, and content; and
- Parents and children respond very positively to the new initiatives, with many continuing at home to read books connected to mathematics and science and to check out and utilize the family kits with mathematics and science content.

The evaluation revealed that the greatest impact on librarian practices occurred during the first year of exposure to the BIG Idea program. Librarians demonstrated the strongest changes and had the greatest impacts when they implemented the programming with fidelity and understood the foundation on which the programming was built.

Given the knowledge about existing training and its results, VCB staff were interested in ways that the initiative could be brought to scale. Given the small number of staff at VCB, leadership was interested in testing whether the professional development associated with *What's the BIG Idea?*TM could be offered as a training-of-trainers model with a "cascade" whereby trainers other than the VCB staff would provide professional development without jeopardizing impact. VCB also wanted to know the levels of support they would need to offer to trainers in order for the trainers to be effective.

A report submitted previously on the professional development provided to the trainers by VCB documented the fact that the training quality was very high and that the participants acquired the necessary knowledge and skills to be successful. This report shows the ways in which the various cohorts in the cascade were affected by the training that was offered and the subsequent activities they implemented in their libraries. The report also answers the question of whether

the cascade of training has the same impacts as those that resulted from the original study with VCB trainers in terms of training delivery, quality, and impact.

The report is organized into several sections. This introduction is followed by an explanation of the methodology used for the study. Results are then presented, first for the trainers in both the Level One and Level Two cohorts, followed by an analysis of impact on the “end-user” librarians and the children they serve. The final section provides conclusions. All instruments are presented in the Appendix.

This section presents the methodology used for this study. The evaluation questions are presented first, followed by a discussion of the study design, descriptions of instruments for data collection, and participation rates for each method used.

Evaluation Questions

The study was guided by the following two evaluation questions:

1. Are there differences in acquisition of knowledge and skills and in confidence and competence levels of trainers depending upon the cascade level; that is, whether they receive training directly from VCB trainers (Level One Cohort) or training by those trained directly by VCB (Level Two Cohort)?
2. Are there differences in impact on end-users (librarians who participated in the training) depending upon whether they receive:
 - a. Direct training from the VCB (Initial Cohort);
 - b. Training from trainers directly trained by VCB (Level One); or
 - c. Training from trainers not directly trained by VCB (Level Two)?

Evaluation Design

To answer these questions, RMC Research employed a random assignment design. First, four team members were selected from each of the following seven states: Kentucky, Louisiana, New Jersey, Pennsylvania, South Dakota, Texas, and Washington, for a total of 28 team members. From these seven teams, RMC Research randomly selected half of the participants (2 team members from each state or 14 individuals) to attend the face-to-face training directly from VCB (Level One cohort). One person from New Jersey was unable to attend this training so she became part of the Level Two cohort, resulting in 15 individuals who received training from peers in their own state who attended the VCB training (Level Two cohort).

Level One cohort members attended multiday professional development sessions provided by the VCB in Denver, Colorado, in January 2009. The training generally followed the same format as that used in the original study of *What's the BIG Idea?*[™] except that the sequence followed the new manual. The training included Discovery Center approaches (a new innovation from the last year of the former study), and the training took a training-of-trainers approach, addressing the likely questions librarians would have and the lessons learned from the first 4 years of the project.

In the training, each Level One cohort member was told that they needed to train their two peers (Level Two). Both Level One and Level Two trainers were then to provide training to at least five librarians, for a minimum total of 140 “end-user” librarians.

In practice, 13 individuals became the Level One cohort. In each state, generally within a month or so of the original training, the two Level One trainers from each state provided the training to their two Level Two peers. Except in New Jersey, the Level Two trainers, in turn, paired up to train at least 10 librarians together. In New Jersey, single Level Two trainers provided training to approximately 5 librarians each.

All of the cohorts used the same materials and were asked to use the same approach to the training. All trainers and librarians who received the training were provided with kits of materials that enabled them to implement a portion of the activities in the program manual.

Evaluation Methodology

The evaluation included data collection using observation of the initial training, pre-/post-/follow-up surveys, interviews, and program report analysis.

Surveys

Surveys were administered to Level One cohort members, Level Two cohort members, and “end-users” or those librarians trained by the Level One and Level Two cohorts.

Level One Cohort Members

All Level One cohort members (those trained directly by VCB) completed a printed pre-and post-training survey that assessed:

- Their knowledge and skills related to mathematics and science vocabulary, content, and programming including each of the specific lesson areas; and
- Their feelings of confidence and competence in being able to provide training to others.

In addition, the pre-survey solicited information about their current job, training experience, experience in working with librarians, and experience in working with the *What’s the BIG Idea?*[™] approach. The post-survey also posed questions about the extent to which Level One cohort trainers maintained fidelity to the program guide and their own training.

All but one of the Level One cohort members also completed an online follow-up survey administered several months after the initial training and after they had both trained the Level Two cohort and had offered the training to the “end-users.” Follow-up surveys assessed:

- Confidence and competence in delivering the training;
- Reflections on what might be improved in the training and in the programming itself;

- Reflections on the type of support they received from VCB including its value, utility, and responsiveness to their needs; and
- Additional information they might provide that could illuminate any areas for improvement.

Level Two Cohort Members

Level Two cohort members also completed a pre- and a post-training survey. They had the choice of completing the survey online or in print format. Their pre-/post- and follow-up surveys measured the same background and outcome areas as the Level One cohort survey. All but one Level Two cohort member completed the pre-/post-survey. Two librarians who started as “end-users” and became Level Two trainers were also included in this pool.

“End-User” Librarians

“End-users” or those librarians trained either by Level One or Level Two cohort members also completed pre-/post-surveys. When Level One and Level Two cohort trainers combined to present a training session, their “end-users” were treated as a Level One cohort group.

End-user librarian pre-/post-surveys assessed:

- Their acquisition of knowledge and skills of mathematics and science vocabulary, content, and programming related to the training, including each of the specific lesson areas: their feelings of confidence and competence in being able to implement what they learned; and
- The fidelity of the training to the program guides.

Most of the end-user librarians completed either an online or print pre-survey before attending the training. In two states, Kentucky and South Dakota, trainers inadvertently administered the wrong pre-survey to participants (the trainer survey rather than the “end-user” survey) so those surveys were not included in the analysis. End-user librarians then completed a post-survey sometime after completion of their training. (This was to occur immediately, but some trainers did not request timely completion, so end-users were contacted by RMC Research and returns came in slowly).

Several months after the post-surveys were returned, follow-up surveys were administered to end-users who had completed both the pre- and post-surveys. As will be seen in the results section, response rates diminished significantly for the follow-up surveys even with repeated requests to complete the surveys. Follow-up surveys measured:

- Acquisition of knowledge and skills in mathematics and science programming;
- Confidence and competence in delivering *What’s the BIG Idea?*[™] programming;
- Actual implementation of the programming including an indication of which lessons or units and books were used;

- Any impacts they noticed for participating children; and
- Any differences in impacts they noted based on children or parent characteristics.

In Pennsylvania, end-user librarians did not complete pre- and post-surveys since participant lists were not submitted to RMC Research. Rather than exclude the state from the study, RMC Research asked end-users from those states to complete a retrospective pre- and post-survey several months after the training. In this survey, respondents estimated their knowledge, skills, and dispositions before and after the training occurred. Their responses were compared to the responses using the traditional pre-/post-measures and were found to be very similar. The results section provides both a combined and separate analysis section for this state.

Interviews

RMC Research randomly selected half of the members of the Level One and Level Two cohorts and half of the end-user population for indepth telephone interviews. Multiple attempts to reach each selected individual were attempted, and if no response was received after the third attempt, replacements were randomly selected. As will be seen in the results section, response rates for the cohorts and end-users varied.

During the interviews, Level One and Level Two trainers were asked to discuss:

- The content of the training they provided and any variations from the program manual, including reasons for the variations;
- Ease or difficulty of providing training;
- Challenges faced in providing training;
- The types and frequency of the support they received;
- The types of support they considered optimal;
- Their perceptions of impact on librarians they trained; and
- Any perceived reasons for differential impact among those whom they trained.

End-user librarians were asked:

- The extent to which the *What's the BIG Idea?*TM programming was implemented;
- Specific units or lessons chosen for implementation and why;
- Fidelity to the original program guide;
- The ease or difficulty of implementing various units/lessons; and
- Suggestions for improving the training, programming, or support.

Telephone interviews were conducted by RMC Research staff in September and October 2009 and generally lasted about 15 to 30 minutes.

Program Reports

All participants were asked to submit eight program reports to the VCB. These reports were provided to RMC Research for analysis. RMC Research coded each report to determine which

activities were being implemented, which skills were being addressed, what vocabulary was being used, which types of questions were being posed to the children, which books were being used, fidelity of implementation to the manual, and differences by cohort and state.

Data Analysis

Data collected using the various methods were analyzed and combined to determine answers to the two evaluation questions. The data analysis approach for each question is as follows:

- 1. Are there differences in acquisition of knowledge and skills and in confidence and competence levels of future trainers depending upon whether they receive training directly by VCB (Level One cohort) versus training by those trained by VCB (Level Two cohort)?**

Group differences between Level One and Level Two cohort members were analyzed using repeated measures analyses of variance¹ for all constructs on the surveys. Qualitative analyses from the interviews and open-ended questions on the surveys were used to complement and further explain the quantitative analysis.

- 2. Are there differences in impact for librarians depending upon whether they receive:**
 - a. Direct training from the VCB;**
 - b. Training from Level One cohort members; or**
 - c. Training from Level Two cohort members?**

Group differences between librarians who received training from Level One trainers and Level Two trainers were determined using repeated measures analyses of variance for all constructs on the survey. Results were compared with the results achieved by librarians who received direct training from VCB during the course of the original initiative. Qualitative analyses from the interviews, open-ended questions on the survey, and program reports were used to complement and further explain the quantitative analysis.

¹ Analysis of variance (ANOVA) is a statistical procedure that examines differences in outcomes for two or more groups.

This section discusses the background characteristics of the Level One and Level Two trainers. The impact of participation in the training is described, along with the subsequent ways in which the training was offered to other librarians. Trainers’ perceptions of the ease of training delivery, their fidelity to the original training and their assessments of the overall strengths and challenges in providing the training are presented. The follow-up support provided to the trainers and their perceptions of the types of follow up that would be optimal is discussed next. Finally, a comparison between the results of the current project and the original What’s the BIG Idea?™ project is provided.

Level One and Level Two Trainer Experience

Trainers for the *What’s the BIG Idea?™* program were randomly assigned into Level One and Level Two cohorts. To determine the extent to which the groups were alike, trainers responded to a number of questions about their backgrounds, expertise in mathematics and science, and experiences as librarians and trainers.

Trainers provided information about their experience with the trainer-of-trainer model and their years of experience in working with libraries. Exhibit 1 shows that about 50% of both Level One and Level Two trainers had no previous experience in implementing a trainer-of-trainer model. However, the Level One trainers tended to have more experience as librarians. As the Exhibit reveals, nearly all of the Level One trainers (92.3%) had over 5 years experience in working with libraries whereas only 58% of the Level Two trainers had more than 5 years experience.

Exhibit 1. Trainers’ Previous Training Experience by Cohort

	Percentage of Level One Trainers (N = 13)	Percentage of Level Two Trainers (N = 12)
Experience with trainer-of-trainer model		
Never	46.2	50.0
1-2 times	23.1	25.0
3-5 times	23.1	16.7
More than 5 times	7.7	8.3
Years experience in working with libraries		
Never	0.0	0.0
Less than 1 year	0.0	0.0
1-2 years	0.0	8.3
3-5 years	7.7	33.3
Over 5 years	92.3	58.3

Most of the trainer survey respondents (78%) had not participated in previous BIG Idea trainings. Of the six respondents who were participants, five of the six participated in only one *What’s the BIG Idea?™* training provided by VCB.

Impact of Participation in the Training-of-Trainers Model

Knowledge Acquisition

Comparisons of responses to pre- and post-surveys revealed significant increases in knowledge acquired by both Level One and Level Two trainers as a result of their participation in the *What's the BIG Idea?*[™] professional development. As shown in Exhibit 2, significant differences were found for all lesson areas. Data show that before receiving the training, both Level One and Level Two cohort participants were most knowledgeable in the areas of counting, using comparative words and in acting out stories and knew least about recognizing and presenting shapes from different perspectives.

Exhibit 2 also demonstrates that there were no statistically significant differences in the amount of knowledge gained by the cohorts before and after the training in any of the 24 mathematics and science lesson areas. The data suggests that trainers other than those from VCB were able to achieve the same level of impact as the trainers from VCB and that every trainer was able to make a significant impact.

Exhibit 2. Differences in the Knowledge of Trainers Before and After *What's the BIG Idea?*[™] Training (Level 1 N = 13, Level 2 N = 12)

Skill Area	Trainer Level	Before the Training		After the Training		Significant Increases Across Time	Significant Difference Between Trainer Levels
		Mean ²	SD ³	Mean	SD		
Matching, sorting, naming, and/or describing objects.	1	3.77	.83	4.38	.65	.00**	.36
	2	3.50	1.00	4.50	.67		
Talking about same and different.	1	3.69	.86	4.23	.73	.00**	.53
	2	3.75	.87	4.50	.67		
Naming and describing shapes found in everyday environments.	1	3.77	.73	4.46	.52	.00**	.43
	2	3.58	.90	4.58	.67		
Describing and combining shapes to make new shapes.	1	3.38	.87	4.38	.65	.00**	1.00
	2	3.17	.94	4.17	.94		
Making Prediction.	1	3.62	.87	4.38	.65	.00**	.86
	2	3.67	.99	4.50	.52		
Measuring and comparing sizes, shapes, and events.	1	3.62	.65	4.54	.52	.00**	.51
	2	3.25	1.14	4.42	.67		
Making graphs and charts.	1	3.46	.97	4.38	.77	.00**	.81
	2	3.17	.84	4.00	.74		
Designing and making things.	1	3.08	.77	4.23	.73	.00**	.57
	2	3.00	1.04	3.92	.79		
Talking about sequences and patterns.	1	3.38	.77	4.46	.52	.00**	.38
	2	3.50	.91	4.33	.99		

² The mean or average value is a measure of central tendency computed by adding a set of values and dividing the sum by the total number of values.

³ The standard deviation (SD) is a measure of how spread out a set of values is. Higher standard deviations indicate greater variability in data across respondents.

Skill Area	Trainer Level	Before the Training		After the Training		Significant Increases Across Time	Significant Difference Between Trainer Levels
		Mean ²	SD ³	Mean	SD		
Using words that describe where objects are located.	1	3.62	.65	4.46	.66	.00**	.97
	2	3.58	.90	4.42	.90		
Counting.	1	4.23	.83	4.77	.44	.00**	.90
	2	4.33	.78	4.83	.39		
Using comparative words.	1	3.69	.86	4.54	.66	.00**	.35
	2	4.00	.85	4.50	.91		
Describing how things grow and change over time.	1	3.38	.87	4.46	.66	.00**	.67
	2	3.50	.91	4.42	.52		
Reading science books and doing science activities.	1	3.38	.87	4.15	.69	.00**	.87
	2	3.33	1.07	4.17	.84		
Reading mathematics books and doing mathematics activities.	1	3.23	1.01	4.00	.82	.00**	.19
	2	2.92	.90	4.17	.84		
Describing the attributes and parts of shapes.	1	2.92	.86	4.23	.73	.00**	.95
	2	2.92	1.31	4.25	.97		
Forming mental images of geometric shapes.	1	2.77	.83	3.92	.76	.00**	.62
	2	2.92	1.24	4.25	.87		
Recognizing and presenting shapes from different perspectives.	1	2.77	.83	4.00	.82	.00**	.95
	2	2.83	1.19	4.08	1.17		
Acting out a story.	1	3.92	.86	4.62	.51	.00**	.54
	2	4.00	1.04	4.50	.91		
Specifying locations and describing relationships.	1	3.23	.93	4.46	.52	.00**	.34
	2	3.42	1.00	4.25	1.14		
Describing direction and distance of objects and places.	1	3.23	.60	4.00	.91	.00**	.53
	2	3.17	1.27	4.17	.94		
Using drawings to communicate information.	1	2.77	.83	4.23	.93	.00**	.24
	2	3.33	.99	4.33	.99		
Navigating an obstacle course.	1	2.85	.69	3.85	.99	.00**	.37
	2	3.09	1.04	4.45	.69		
Communicating directions for getting from one place to another.	1	3.23	.83	4.08	.95	.00**	.65
	2	3.83	.94	4.50	.67		

Note. Responses were rated on a 5-point scale where 1 = Not Knowledgeable, 2 = A little Knowledgeable, 3 = Fairly Knowledgeable, 4 = Very Knowledgeable, and 5 = Extremely Knowledgeable. ** $p \leq .01$, two-tailed test.⁴

Confidence Levels

Findings from the survey data analyses, shown in Exhibit 3, revealed that there were no statistically significant differences in the confidence levels gained over time between the two levels of trainers in any of the 24 mathematics and science lesson areas. For each area measured, significant increases were found for both cohorts. These findings again suggest that VCB and

⁴ The p -value is an indicator that represents the likelihood that observed results occurred by chance. In education research, values of $p < .05$ (i.e., values indicating that observed results had a less than 5% chance of occurring by chance) are typically used to identify results that are statistically significant. Lower p -values indicate a smaller likelihood that observed results occurred by chance and are therefore associated with statistically significant findings. Two-tailed test is a statistical test of whether a value of the statistic is either sufficiently small or sufficiently large enough to lead to rejection of the hypothesis tested.

other trainers make an equally large impact on participants, implying that it is the materials and approach, rather than the trainer, responsible for the gains.

Exhibit 3. Differences in Confidence Levels in Training Others in Lesson Areas Before and After the *What's the BIG Idea?*™ Training (Level 1 N = 13, Level 2 N = 12)

Skills Area	Trainer Level	Before the Training		After the Training		Significant Increase Across Time	Significant Difference Between Trainer Levels
		Mean	SD	Mean	SD		
Matching, sorting, naming, and/or describing objects.	1	3.23	.83	4.46	.66	.00**	.56
	2	3.58	1.04	4.58	.67		
Talking about same and different	1	3.23	.83	4.46	.66	.00**	.42
	2	3.67	1.07	4.58	.67		
Naming and describing shapes found in everyday environments	1	3.54	.66	4.46	.66	.00**	.82
	2	3.67	1.07	4.50	.67		
Describing and combining shapes to make new shapes.	1	3.08	.86	4.31	.75	.00**	.73
	2	3.08	1.24	4.17	.84		
Making prediction	1	3.31	.75	4.08	.76	.00**	.55
	2	3.42	1.00	4.42	.67		
Measuring and comparing sizes, shapes, and events.	1	3.15	.56	4.46	.78	.00**	.30
	2	3.42	1.00	4.33	.78		
Making graphs and charts.	1	2.85	.90	4.15	.80	.00**	.53
	2	3.25	1.14	4.33	.65		
Designing and making things.	1	2.69	.75	4.15	.80	.00**	.23
	2	3.33	1.16	4.25	.75		
Talking about sequences and patterns.	1	3.00	.71	4.38	.77	.00**	.47
	2	3.50	1.24	4.58	.67		
Using words that describe where objects are located.	1	3.38	.51	4.31	.75	.00**	.57
	2	3.67	1.16	4.42	.67		
Counting.	1	4.00	.82	4.69	.63	.00**	.95
	2	4.08	1.00	4.75	.45		
Using comparative words.	1	3.75	.87	4.58	.67	.00**	1.00
	2	3.75	1.14	4.58	.52		
Describing how things grow and change over time.	1	3.23	.83	4.38	.77	.00**	.47
	2	3.58	1.08	4.42	.67		
Reading science books and doing science activities.	1	3.23	.83	4.38	.65	.00**	.86
	2	3.25	1.06	4.33	.65		
Reading mathematics books and doing mathematics activities.	1	3.15	.80	4.23	.73	.00**	.68
	2	3.08	1.17	4.33	.65		
Describing the attributes and parts of shapes.	1	3.00	1.00	4.38	.87	.00**	.77
	2	3.25	1.06	4.50	.67		
Forming mental images of geometric shapes.	1	2.69	.95	3.85	.99	.00**	.87
	2	3.27	1.10	4.36	.67		
Recognizing and presenting shapes from different perspectives.	1	2.77	.93	4.08	1.04	.00**	.59
	2	3.00	1.28	4.08	1.00		
Acting out a story.	1	3.77	1.01	4.46	.66	.00**	.59
	2	4.00	1.13	4.50	.67		

Skills Area	Trainer Level	Before the Training		After the Training		Significant Increase Across Time	Significant Difference Between Trainer Levels
		Mean	SD	Mean	SD		
Specifying locations and describing relationships.	1	3.00	.91	3.85	.90	.00**	.70
	2	3.42	1.31	4.42	.90		
Describing direction and distance of objects and places. (difference in level when combining time)	1	2.62	.77	3.92	1.19	.00**	.90
	2	3.33	1.23	4.58	.52		
Using drawings to communicate information.	1	2.77	.73	4.08	.95	.00**	.87
	2	3.33	1.07	4.58	.52		
Navigating an obstacle course.	1	2.92	.86	4.00	1.08	.00**	.84
	2	3.50	1.17	4.67	.49		
Communicating directions for getting from one place to another.	1	3.15	.90	4.00	1.16	.00**	.85
	2	3.75	.97	4.67	.49		

Note. Responses were rated on a 5-point scale where 1 = Not Confident, 2 = A little Confident, 3 = Fairly Confident, 4 = Very Confident, and 5 = Extremely Confident. ** $p \leq .01$, two-tailed test.

Comfort Levels

Trainers were also asked to indicate their comfort level in teaching, designing, and using mathematics and science programs and for young children on the pre- and post-surveys. Analyses suggested that there were no statistically significant changes over time in comfort ratings between the two levels of trainers as seen in Exhibit 4. There were significant increases in comfort level in teaching young children across all trainers in six of the seven areas assessed, including teaching and using mathematics skills and science skills and designing mathematics and science programs. There were no significant increases in designing literacy programs across the trainers.

Exhibit 4. Differences in Comfort Level of Trainers in Teaching, Using, and Designing Mathematics and Science Programs for Young Children (Level 1 N = 12, Level 2 N = 14)

Area	Trainer Level	Before the Training		After the Training		Significant Increase Across Time	Significant Difference Between Trainer Levels
		Mean	SD	Mean	SD		
Teaching mathematics skills to young children.	1	2.75	.87	3.58	.52	.00**	.73
	2	3.14	.77	3.86	.36		
Teaching science skills to young children.	1	3.00	.74	3.58	.52	.00**	.38
	2	3.07	.83	3.93	.27		
Using scientific investigations with young children.	1	2.75	.62	3.67	.49	.00**	.40
	2	3.14	.86	3.79	.43		
Using prediction activities with young children.	1	2.75	.75	3.58	.52	.00**	.18
	2	3.43	.85	3.86	.36		
Designing programs for young children to learn literacy concepts.	1	3.33	.65	3.50	.91	.12	.48
	2	3.50	.86	3.93	.27		

Area	Trainer Level	Before the Training		After the Training		Significant Increase Across Time	Significant Difference Between Trainer Levels
		Mean	SD	Mean	SD		
Designing programs for young children to learn mathematics concepts.	1	2.46	.78	3.46	.58	.00**	.61
	2	3.00	.78	3.79	.58		
Designing programs for young children to learn science concepts.	1	2.69	.75	3.54	.88	.00**	.98
	2	2.93	1.00	3.79	.58		

Note. Responses were rated on a 4-point scale where 1 = Not Very Comfortable, 2 = A Little Comfortable, 3 = Somewhat Comfortable, and 4 = Very Comfortable. ** $p \leq .01$, two-tailed test.

Preparation to Deliver Training to Others

In the follow-up survey, trainers were asked a series of questions about how well they were prepared to deliver workshops to others. Exhibit 5 reveals that overall, trainers agreed that they were prepared to deliver workshops. The data showed no significant differences between Level One and Level Two trainers in the way that they responded to the survey items. Trainers agreed most strongly that they were well prepared to deliver training, the training they received was adequate, and that they found it easy to train others. Trainers felt least strongly about others implementing what they taught them.

Exhibit 5. Preparation to Deliver *What's the BIG Idea?*™ Workshops to Others (Level 1 N = 12 Level 2 N = 10)

	Trainer Level	Percentage				Mean	SD	Significance
		Strongly Disagree	Disagree	Agree	Strongly Agree			
I felt well-prepared to deliver BIG Idea workshops.	1	0.0	0.0	16.7	83.3	3.50	.97	
	2	10.0	0.0	20.0	70.0			
I could answer all of the questions librarians asked in the BIG Idea workshops.	1	0.0	0.0	41.7	58.3	3.58	.52	.58
	2	10.0	0.0	30.0	60.0			
The training I received to deliver the BIG Idea workshops was adequate for my needs as a trainer.	1	0.0	0.0	16.7	83.3	3.83	.39	.29
	2	10.0	10.0	10.0	70.0			
It was easy to provide BIG Idea training to others.	1	0.0	0.0	25.0	75.0	3.75	.45	.44
	2	10.0	0.0	20.0	70.0			
Librarians who attended my workshops appeared to understand the BIG Idea programs I presented.	1	0.0	0.0	66.7	33.3	3.33	.49	.84
	2	10.0	0.0	30.0	60.0			
The librarians in my workshops implemented what I taught them.	1	0.0	0.0	72.7	27.3	3.27	.47	.64
	2	0.0	14.3	57.1	28.6			

Note. Responses were rated on a 4-point scale where 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree.

Provision of Training to Others

Level One and Level Two trainers provided professional development primarily to public library personnel. There were also a few school librarians and other children's programming staff in the Level Two trainings.

All of the trainers reported that they followed the basic sequence and approach of the training initially provided by the VCB, providing an introduction, giving participants time to experience the hands-on activities from the Discovery Centers, then reviewing the manual and concepts. Several trainers from Level One and Level Two provided time at the end of the workshop for librarians to create a session, and several asked the librarians to discuss the ways in which they planned to implement the program in their libraries.

In their introductions, trainers reported emphasizing the standards and terminology, asking open-ended questions, and conveying that the approach was not "rocket science." Several also said that they provided hands-on activities when reviewing the concepts. The majority of both Level One and Level Two trainers stated that they relied heavily on the manual during their trainings. Representative reflections include:

The manual is absolutely fabulous. It's a great source to jump off with. – Level One trainer

We talked about how this is a process, not just a product. It's not just a picture of a bee with glitter, it's how we get there and have kids take something more away from it. – Level Two trainer

We showed them how they can work with what they already have in existence and how [this programming is] an asset to the current programming. – Level Two trainer

We found that playing with the Discovery Centers and the manipulatives with the concepts were the pieces that helped it click for us. – Level Two trainer

Fidelity to the Manual and the Training They Received

On a post-survey, trainers were asked to indicate the extent to which they maintained fidelity to the program manual during the training. Of the 22 trainers who responded to this question, 95% reported that the trainer used the manual during the professional development sessions, referred often to the page numbers or the location of the section being addressed in the guide, or sequenced their training to mirror the layout of the manual. Nearly 55% of the respondents stated that they used the hands-on activities from the training and discussed and demonstrated the Discovery Centers. They provided opportunities for participants to ask questions and share ideas, and shared their personal experiences in implementing the activities. The following quotes were illustrative of their approaches.

Every activity was followed by where it was in the manual. I left with great confidence in the materials we will be using.

The purpose of the program was explained and we explored the various discovery stations and used the manual to understand the process. Many ideas were presented that allowed us to think of ideas and usage. Frankly, I wish this was available when I was young [sic]. I'm sure that my academic experience would have been more enjoyable.

We worked through ideas presented in the program guide and discussed the ideas as pertains to young children. The program is fantastic! I can't wait to start exploring mathematics and science with preschoolers.

Interviews revealed a similar response to the question of fidelity. When asked about varying their training from the material in the manual, the majority of trainers stated that they did not stray from the manual at all. Others stated that they varied the training to a small extent. When asked what changes they made, Level One trainers reported that they had participants follow the manual at the Discovery Centers, condensed the information into a one-day session, added activities to use, and/or customized their approaches to audience needs. Level Two trainers varied their training by adding ideas for program implementation, using different books that were applicable to the concept, creating a PowerPoint to present the concepts, and distributing additional information from the *Mother Goose* Web site. There were no reports of significant modifications to the concepts from the manual. As reported succinctly by one trainer:

We just followed the manual. We stayed with what we know works. – Level Two trainer

Ease of Training Delivery

When asked on the surveys to indicate which parts of the training were easiest to convey to others, 83% of the 24 trainers who responded reported that it was having the participants experience the Discovery Centers and manipulatives. About two thirds (63%) noted that the program builds upon what they already know and what they are already doing, and that it is not additional work, but simply a fun and easy alternative. Other librarians said that the manual and materials were easy to use and that the training encouraged discussion among the participating librarians about how *What's the BIG Idea?*TM would be used. The following quotes represent the sentiments expressed by the librarians.

Use of the manipulatives was really the easiest way to convey the concepts being presented. The participants really developed ideas on how to incorporate the concepts into their own programming via use of the manipulatives.

Much of this validates and gives vocabulary to those things we already do. Singing "Five Green and Speckled Frogs" becomes mathematics when you think in terms of one-to-one correspondence. I love things that build on what I already know and do.

[It was easy to convey] the benefits of using the manipulatives and to focus on process rather than product. The 'learning by doing' model is more beneficial to the child and parent than simply taking home a precut craft. Mathematics and

science can be fun and can re-energize librarians and programming that can become routine.

Indepth interviews with a random selection of trainers validated these responses. All trainers reported that it was easy to deliver the training. They credited the manual and materials and the stated premises of the program as being the reasons for the ease of training.

The manual is so well done; you can just walk through it and do training with just the manual on your own if necessary. – Level Two trainer

You don't have to have an early childhood education background or mathematics or science background to get it. – Level Two trainer

However, although the trainers felt it was easy to provide the training, they all reported difficulty with finding people to attend and scheduling the training.

Perception of the Training They Received Several Months After Provision of Training

In the follow-up survey administered several months after trainers had provided the *What's the BIG Idea?*[™] professional development to librarians, trainers were asked to reflect on the greatest strengths of the training that they received. Of the 24 trainers who responded to this question, 96% stated that the greatest strength was the manual and materials. They felt the manual was excellent and easy to use. The hands-on activities, discussions, and information from the Web site also were well regarded, with 50% of trainers reporting these components as strengths. About 29% thought that the standards and mathematics and science ideas were a great strength. Others mentioned the support from the VCB, the quality of the training they received, and the supplies. Representative quotes are as follows:

The manual was invaluable because everything in it was directly applicable to what librarians do every day. The Web site is informative and easy to use. The support staff at the VCB was excellent. The quality of the training in Denver was simply the best. It was wonderful to meet and work with librarians from all across the country.

The training manual was by far the greatest strength of the program. It's an incredible resource accessible to anyone interested in understanding the information and providing the programming. I've also heard some good feedback from libraries on the What's the BIG Idea?[™] Web site.

That the supplies that were provided were very helpful, even though some of them were very elementary at times. Every library could or would already have them for little or no money.

When asked about any weaknesses in the training approach, 26% of the 23 respondents stated “none.” About 70% reported that there was not enough time to recruit and train librarians, that

the learning curves of various participants were different and thus challenging, that the purpose of the program was not covered in the training, or that there needed to be more organization. Nearly 13% stated that there was a lack of communication regarding the requirements of the grant and a lack of follow up. A few (9%) reported that there were not enough materials for each person or that the activities only focused on preschool-aged children. The following quotes illustrate some of the concerns that were expressed.

In training others, we did not cover why books are so necessary to introduce mathematics and science content; that is, why use librarians? In retrospect, I can see why, but this did not come up until after we'd finished our training of others.

It took a little while to adjust to some of the terminology variation . . . education terms versus library terms. It was a little confusing at first to understand that some of the activities were meant to be used in the Discovery Center while some were for programming and still others for librarian and caregiver interactions.

Interview data confirmed that organizational challenges were perceived as the most daunting. At both of the cohort levels, trainers had difficulty finding time to plan before the training. They also mentioned challenges around having people drop out before the training, scheduling the trainings, and having supplies sent.

Support Received by Trainers

Toward the end of the project, trainers were asked to complete survey items that addressed the support that they received for providing training to librarians. Overall, trainers were very positive about the support. As seen in Exhibit 6, trainers found the support to be valuable, responsive, and to have excellent content. Also seen in Exhibit 6, there were no significant differences in the way Level One trainers and Level Two trainers answered the survey items.

Exhibit 6. Support Received for Providing *What's the BIG Idea?*TM Training to Others (Level 1 N = 13, Level 2 N = 12)

	Trainer Level	Percentage			Mean	SD	Significance	
		Strongly Disagree	Disagree	Agree				Strongly Agree
The support I received for providing training and follow-up support to librarians was valuable.	1	0.0	0.0	45.5	54.5	3.30	.68	
	2	0.0	10.0	50.0	40.0			
The support I received for providing training and follow-up support to librarians was responsive to my needs.	1	0.0	0.0	45.5	54.5	3.55	.52	.19
	2	0.0	10.0	60.0	30.0	3.20		
The support I received for providing training and follow-up support to librarians had excellent content.	1	0.0	0.0	50.0	50.0	3.50	.52	.24
	2	0.0	10.0	60.0	30.0	3.20		

Note. Responses were rated on a 4-point scale where 1 =Strongly Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree.

On open-ended questions on the surveys, nearly all of the trainers reported that they did not need follow-up support from those who conducted their training. They appreciated the additional ideas about sessions and implementation for the summer programs they received from VCB. A few stated that they needed support regarding the materials and where to send them or how to receive them. All of the Level One trainers and the majority of the Level Two trainers asserted that the support they received was helpful, and that they liked the e-mails that were sent about additional program ideas. As one trainer noted:

They were there whenever I needed something. – Level One trainer

However, when trainers were asked during interviews to identify the types of support that they thought would be optimal, the most frequent response from both groups of trainers was getting together again, or having some forum to share program ideas and discuss what worked with different groups in different settings. There were also several trainers who thought that it would be beneficial to have someone available if they did need support. A few suggested providing feedback on program reports to ensure that they were applying the program properly. Several liked the idea of electronic gatherings, as illustrated by the following quotes:

A wiki, blog, or some sort of online community to share ideas and keep in touch with it. I think when it is always there it keeps it fresh, and with new ideas you can only keep expanding on it. – Level One trainer

Encouraging people to get together and trading ideas, have discussions on programs. There are so many other interesting ways of incorporating the concepts, and the concepts intermingle. – Level Two trainer

I wish there was a central place to go, like a blog or something that you go and say ‘this is what I did and this is how it worked.’ Everyone will use this in a slightly different way and I would like to hear that, it’s inspiring. – Level Two trainer

Additional Comments

When asked during interviews if there was anything else they would like to add to their reflections, trainers commented that the program was wonderful and that they would like to have a way to share ideas and discuss the different ways to implement the program. They recommended that the program should be presented to other audiences, such as individuals working with children in schools, day care centers, and other early childhood settings. Level Two trainers also noted that both children and their families had very positive responses to the programming and were actually asking that the programs be offered. Additional comments included:

I just think it’s a wonderful program and I am happy we were a part of it and our state is benefitting from it. I think mathematics and science is going to become standard practice in libraries. – Level One trainer

The VCB has done a fabulous job in their approach and materials—the manual and manipulatives are just great. – Level One trainer

I have librarians from all over the state contacting me because the word is trickling out. The librarians that I trained have gone to other trainings or conferences and talked about the program. – Level One trainer

The training was one of the best I have gone to. – Level One trainer

The kids are asking about it and the parents are asking how to get this for the home. I referred them to the Web site and the parent kits. – Level Two trainer

Our children love and enjoy it so much. You don't have to spend a lot of money, it's bringing kids into the library, it's building relationships between adult and child, and you're teaching them something. – Level Two trainer

The program has really fostered and increased an excitement of science and mathematics in the parents of the young children. It's been inspiring. – Level Two trainer

Comparison of BIG Idea Librarians Trained through the Training-of-Trainers Program and Librarians Trained by VCB

Shown in Exhibit 7 are the changes in use of skill areas from pre-survey to post-survey data for both librarians trained by VCB in 2005 and the librarians trained by Level One and Level Two trainers. In all cases but one (*designing and making things*), there were statistically significant increases over time in all skill areas⁵ measured for librarians trained by VCB and those trained by Level One and Level Two trainers. Librarians trained in 2005 did not show a significant increase in the one identified skill area over time.

These results once again demonstrate that the *What's the BIG Idea?*TM training is likely to have an impact whether the training is presented by VCB or by others who have participated in the trainers-of-trainers approach

⁵ Only 15 skill areas were part of the BIG Idea training provided in 2005.

Exhibit 7. Changes Over Time in Use of Mathematics and Science Activities by Librarians Trained by VCB and Those Trained by Level 1 and 2 Trainers

Skill Areas	Librarians Trained by VCB (N = 13)			Librarians Trained by Level 1 and 2 Trainers (N = 155)		
	Fall 2005 Mean	Spring 2006 Mean	Significance	Pre- Survey Mean	Post- Survey Mean	Significance
Matching, sorting, naming, and/or describing objects.	3.08	4.00	.00**	3.41	3.85	.00**
Talking about same and different.	2.75	3.83	.00**	2.99	3.56	.00**
Naming and describing shapes found in everyday environments.	2.75	3.67	.00**	2.84	3.49	.00**
Describing and combining shapes to make new shapes.	1.92	3.38	.00**	2.17	2.73	.00**
Making predictions	3.17	3.75	.00**	3.09	3.65	.00**
Measuring and comparing sizes, shapes, and events.	2.45	3.55	.00**	2.43	3.21	.00**
Making graphs and charts.	1.25	2.17	.00**	1.55	2.12	.00**
Designing and making things.	3.55	3.91	.10	3.39	3.72	.00**
Talking about sequences and patterns.	2.58	3.58	.00**	2.53	3.24	.00**
Using words that describe where objects are located.	3.23	3.85	.02*	3.30	3.69	.00**
Counting.	4.17	4.50	.01**	3.99	4.31	.00**
Using comparative words.	3.42	4.33	.00**	3.34	3.75	.00**
Describing how things grow and change over time.	2.69	3.15	.01**	2.61	3.08	.00**
Reading science books and doing science activities.	2.00	3.31	.00**	2.01	2.70	.00**
Reading mathematics books and doing mathematics activities.	1.54	3.46	.00**	1.80	2.62	.00**

Note. Responses were rated on a 5-point scale where 1 = Never, 2 = Several Times a Year, 3 = Once Every Month or Two, 4 = Several Times a Month, and 5 = Once a Week or More. * $p < .05$, ** $p \leq .01$, two-tailed test.

This section provides information on the impacts of participating in the What’s the BIG Idea?™ on the librarians who received training from either Level One or Level Two trainers. Data on changes in their knowledge, skills, and practices immediately and over time are presented, along with their perceptions of impacts on children who attended the BIG Idea story hours. Finally, data on librarians’ use of other VCB materials, likelihood of sustaining the program, and additional comments are provided.

Librarian Characteristics

Librarians received training from either Level One or Level Two trainers. The Level One and Level Two cohorts were compared on a number of characteristics measured by surveys to determine their similarities and differences. Exhibit 8 shows that while most librarians in Level One were relatively new to their profession, librarians in Level Two were more likely to have over 10 years of experience. The groups were roughly equivalent in terms of teaching background and highest degrees attained. The majority of those from both cohorts who hold a Masters obtained that degree in Library Science.

Training typically occurred in a full day for both Level One and Level Two librarians, though a few Level Two librarians participated for several days. Most librarians traveled a few hours to participate in the workshops. Those who reported significant travel time also mentioned that a training session was offered closer to them, but they were unable to attend.

Exhibit 8. Librarian Background Characteristics and Training Participation

	Cohort	
	Level One	Level Two
Years as a Librarian		
0-5	13	3
6-10	7	5
11-19	0	9
20+	5	2
Background		
Teaching (includes substitute, assistant, teacher with or without a certificate)	11	9
Working at the library (includes experience and professional development)	9	3
Bachelors degree	6	7
Masters degree or higher	5	4
Other	3	4

	Cohort	
	Level One	Level Two
Number of Training Sessions		
Half day	1	0
Full day	24	15
Two full days	0	2
Four half days	0	2
Distance of Training Session		
Local	11	8
30 minutes of travel time	5	3
One hour of travel time	2	2
Two hours of travel time	6	3
Three hours of travel time	1	1
Four or more hours of travel time	0	2

Quality of the Professional Development

During indepth interviews with a random sample of study participants, librarians trained by Level One and by Level Two trainers were asked to rate the quality of the training in terms of content, length, pacing, expertise of the presenters, and utility for their work. The majority of librarians trained by both cohorts reported that the content was above average or better, very informative and they liked the manual and materials.

When asked about the length of the training, most of the librarians from both levels stated that it was good. There were a few participants from both cohorts who would have liked the training to be shorter, since they felt they were quickly able to grasp the program and its concepts. There were a few others who would have liked the training to be longer, primarily so they could network and share additional ideas on how to present the concepts.

The pacing of the training sessions was reported as “good” by nearly all of the librarians from both cohorts. The majority of librarians from both levels also liked the Discovery Centers and the hands-on nature of the training.

There were variations in responses to the question about the expertise of the presenters. While the majority of librarians in both cohorts reported that the trainers were really good, informative, and knowledgeable, there were a few from Level Two who felt the trainers were not well prepared and did not convey the information and concepts to them proficiently.

Librarians rated the quality of their training in terms of the utility for their work. Most respondents said that the quality was “great” and aligned well with their current programming. As one respondent reported:

Very good and beneficial. It didn't just focus on books. It was nice to have a different approach to incorporate other subject areas into story time. – Level One cohort librarian

Follow-Up Support

In interviews, when trainers were asked what types of follow-up support they provided, the most frequent response was that they answered questions about the program reports. The trainers said that participants were not clear on how to access the program reports and what their requirements were. The majority of Level Two trainers also mentioned that they checked in with their participants to see if they needed anything or had any questions. When trainers were asked if participants contacted them about questions or concerns about concepts or implementation, all Level One trainers and the majority of Level Two trainers reported “no.”

Suggestions for Improving the Training

When participants were asked what suggestions they had for improving the training, programming, and support they received, respondents from both cohorts had many of the same recommendations. They would retain the current training, manual, and activities. In addition, as shown in Exhibit 9, they would change the emphasis of the program to include other target populations, provide more means for participants to share ideas, provide more support, and help participants to learn how to create their own lesson plans. The following quotes are representative of their recommendations:

The hands on is a must. It really helps you visualize it. – Level One cohort librarian

The manual is the selling point. It is so comprehensive, they did an amazing job.
– Level One cohort librarian

I would love a wiki or something to interact with other librarians here and in other states, to give and get ideas, tips on the program and activities, but also marketing, and other things. – Level One cohort librarian

Exhibit 9. Participants’ Recommendations for Improvement

Suggestion for Improvement	Level One	Level Two
Include other groups—schools, day care, older children, special needs children.	X	X
Have another session, wiki, listserv, blog, or some other forum to share and discuss ideas.	X	X
Follow up with participants.	X	X
Be available if/when needed.	X	X
Give clear background information about the program before the training.		X
Create a lesson plan in the training to take.	X	
Update bibliography.	X	X

Impact of Participation in the *What's the BIG Idea?*TM Training on Librarians

Librarians who received the *What's the BIG Idea?*TM training were asked to complete a pre-/post- and follow-up survey about their current practices, comfort levels, and confidence in providing information to children related to mathematics and science. Results were examined by content and by cohort level, that is, whether they were trained by Level One or Level Two trainers. Immediate changes are defined as those that occurred between the pre- and post-survey, which typically spanned a several week period of time. Longer term changes are those that occurred between the post-survey and the follow-up survey, which spanned several months of time.

Immediate Change in Librarian Story Hour Practices

As shown in Exhibit 10, librarians reported a significant change in their current story hour practices as an immediate result of their participation in the *What's the BIG Idea?*TM training. Librarians were significantly more likely to offer mathematics and science content from the time period before they attended the training to after they attended the training. There were significant changes in practice for librarians in all 24 skill areas that were measured.

Librarians who were trained by Level Two trainers reported the greatest changes in their practices, specifically in the areas of *making predictions*, *talking about sequences and patterns*, and *recognizing and presenting shapes from different perspectives*. There were statistically significant differences in practices between the librarians who were trained by Level One trainers and those trained by Level Two trainers in those three areas.⁶

Exhibit 10. Changes in Librarian Story Hour Content Before and Immediately After the *What's the BIG Idea?* Training by Cohort

Skills Area	Trainer Level	Number of Librarians	Before the Training		After the Training		Significant Increases Across Time	Significant Differences Between Trainer Levels
			Mean	SD	Mean	SD		
Matching, sorting, naming, and/or describing objects.	1	102	3.49	1.41	3.81	1.20	.00**	.11
	2	51	3.24	1.49	3.92	1.13		
Talking about same and different.	1	103	3.15	1.30	3.60	1.09	.00**	.14
	2	54	2.70	1.21	3.48	1.01		
Naming and describing shapes found in everyday environments.	1	101	2.95	1.35	3.50	1.17	.00**	.14
	2	52	2.62	1.24	3.46	1.09		
Describing and combining shapes to make new shapes.	1	99	2.27	1.35	2.76	1.25	.00**	.35
	2	50	1.98	1.17	2.68	1.25		
Making predictions.	1	103	3.26	1.41	3.65	1.27	.00**	.02*
	2	53	2.75	1.51	3.66	1.11		
Measuring and comparing sizes, shapes, and events.	1	101	2.57	1.37	3.28	1.20	.00**	.32
	2	51	2.14	1.08	3.08	1.18		

⁶ These significant differences should be examined with caution due to the number of statistical analyses conducted in this group of items. The chances of finding a statistical significant difference increases with the number of analyses conducted.

Skills Area	Trainer Level	Number of Librarians	Before the Training		After the Training		Significant Increases Across Time	Significant Differences Between Trainer Levels
			Mean	SD	Mean	SD		
Making graphs and charts.	1	94	1.57	1.09	2.19	1.22	.00**	.52
	2	45	1.49	.82	1.98	1.03		
Designing and making things.	1	101	3.50	1.40	3.74	1.23	.00**	.29
	2	54	3.20	1.25	3.69	1.10		
Talking about sequences and patterns.	1	101	2.74	1.41	3.21	1.25	.00**	.00**
	2	51	2.10	1.08	3.31	1.14		
Using words that describe where objects are located.	1	104	3.28	1.42	3.68	1.25	.00**	.90
	2	50	3.34	1.33	3.72	1.14		
Counting	1	103	4.05	1.11	4.36	.90	.00**	.83
	2	55	3.87	1.25	4.22	.96		
Using comparative words.	1	102	3.32	1.32	3.71	1.20	.00**	.61
	2	52	3.37	1.33	3.85	1.14		
Describing how things grow and change over time.	1	105	2.71	1.24	3.08	1.16	.00**	.07
	2	52	2.40	1.18	3.10	.98		
Reading science books and doing science activities.	1	102	2.02	1.16	2.73	1.24	.00**	.85
	2	51	1.98	1.05	2.65	1.11		
Reading mathematics books and doing mathematics activities.	1	102	1.82	1.10	2.59	1.24	.00**	.46
	2	51	1.76	1.12	2.69	1.14		
Describing the attributes and parts of shapes.	1	101	2.01	1.14	2.85	1.24	.00**	.70
	2	51	1.98	1.07	2.90	1.25		
Forming mental images of geometric shapes.	1	98	1.80	1.10	2.40	1.24	.00**	.40
	2	46	1.63	.97	2.41	1.33		
Recognizing and presenting shapes from different perspectives.	1	100	2.06	1.28	2.53	1.26	.00**	.01**
	2	48	1.58	.87	2.63	1.25		
Acting out a story.	1	103	3.12	1.29	3.48	1.13	.00**	.97
	2	52	3.04	1.24	3.40	1.14		
Specifying locations and describing relationships.	1	99	2.57	1.33	3.23	1.22	.00**	.70
	2	52	2.48	1.29	3.23	1.31		
Describing direction and distance of objects and places.	1	103	2.15	1.29	2.97	1.30	.00**	.67
	2	51	2.24	1.35	2.96	1.33		
Using drawings to communicate information.	1	103	2.77	1.42	3.34	1.26	.00**	.77
	2	53	2.77	1.35	3.42	1.27		
Navigating an obstacle course.	1	100	1.63	1.07	2.19	1.32	.00**	.53
	2	49	1.43	.79	1.88	.95		
Communicating directions for getting from one place to another.	1	98	2.60	1.42	3.00	1.41	.00**	.89
	2	52	2.50	1.53	2.87	1.33		

Note. Responses were rated on a 5-point scale where 1 = Never/Almost Never, 2 = Several Times a Year, 3 = Once Every Month or Two, 4 = Several Times a Month, and 5 = Once a Week or More Frequently. * $p \leq .05$, ** $p \leq .01$, two-tailed test.

Immediate Changes in Librarians' Comfort Levels in Addressing Mathematics and Science Content

Pre- and post-surveys showed that librarians significantly increased their comfort levels in teaching, using, and designing programs for young children immediately after attending the *What's the BIG Idea?*TM training, as demonstrated in Exhibit 11. The greatest increases in

comfort levels were reported by librarians trained by Level Two trainers in teaching mathematics skills and in using scientific investigations with young children.

There were significant differences in increases in comfort level between librarians trained by Level One and Level Two trainers in teaching mathematics, using scientific investigations, and using prediction activities with young children, favoring those trained by Level Two trainers.

Exhibit 11. Librarians’ Comfort Levels in Teaching, Using, and Designing Mathematics and Science Programs Before and Immediately After the *What’s the BIG Idea?*™ Training

Area	Trainer Level	Number of Librarians	Before the Training		After the Training		Significant Increases Across Time	Significant Differences Between Trainer Levels
			Mean	SD	Mean	SD		
Teaching mathematics skills to young children.	1	114	2.75	1.04	3.16	.88	.00**	.00**
	2	56	2.55	1.14	3.45	.63		
Teaching science skills to young children.	1	114	2.67	1.02	3.25	.82	.00**	.11
	2	55	2.56	1.09	3.38	.76		
Using scientific investigations with young children.	1	115	2.57	1.01	3.05	.90	.00**	.00**
	2	54	2.39	1.12	3.37	.71		
Using prediction activities with young children.	1	113	2.85	1.05	3.32	.89	.00**	.04*
	2	55	2.84	1.09	3.62	.71		
Designing programs for young children to learn literacy concepts.	1	114	3.23	1.04	3.54	.77	.00**	.21
	2	54	3.26	1.01	3.76	.61		
Designing programs for young children to learn mathematics concepts.	1	112	2.64	1.07	3.14	.88	.00**	.17
	2	55	2.80	1.10	3.53	.69		
Designing programs for young children to learn science concepts.	1	111	2.68	1.08	3.14	.86	.00**	.12
	2	53	2.74	1.02	3.45	.77		

Note. Responses were rated on a 4-point scale where 1 = Not Very Comfortable, 2 = A Little Comfortable, 3 = Somewhat Comfortable, and 4 = Very Comfortable. * $p \leq .05$, ** $p \leq .01$, two-tailed test.

Open-ended survey responses confirmed these findings. When asked what they learned as a result of their participation, the majority of librarians from both Level One and Level Two reported that they learned how to integrate the *What’s the BIG Idea?*™ program into children’s story time and how to present more mathematics and science concepts to children. Librarians from both cohorts also frequently reported that they learned how to use specific materials and ideas to address mathematics and science concepts.

Several librarians noted that what they learned reinforced what they were already doing, but they gained more ability and confidence to present the concepts. Another frequent response was that they learned “all sorts of things.” Representative quotes include the following:

It allows us to take what we are doing and make it more purposeful to our story time. – Level One cohort librarian

I've found that we don't have to do a craft after story time, we can do more.
– Level One cohort librarian

I was impressed with how practical the ideas are. I learned ideas on how to incorporate mathematics and science into my story time. – Level One cohort librarian

A new way (of using) manipulatives. Ways to use the manipulatives with the concepts. I never thought of graphing with a toddler. – Level One cohort librarian

(The training) reiterated how important mathematics and science is, how I can teach this to young children, and that they need this sooner than later. – Level One cohort librarian

The manual is fantastic, and I love how it's tied to NSF and standards. The key concepts are great and lay the foundation. – Level Two cohort librarian

It's the best thing I've ever been to. I hadn't heard about it before. If I was asked to teach mathematics and science concepts to kids, I would have said no way, but after the training, I learned we are already doing some of this and this training got us doing more. I went home and started using it. – Level Two cohort librarian

I knew a lot of what was offered, but I never thought of using it at the preschool age library program. – Level Two cohort librarian

Availability of Library Resources in Mathematics and Science

Analyses also revealed a significant increase in availability of library resources after librarians attended *What's the BIG Idea?*TM training, as shown in Exhibit 12. The greatest increases were in the acquisition of resources for teaching mathematics and science to young children. There was a statistically significant difference in responses to resources available to teach science to young children between librarians trained by different cohort members, with those librarians trained by Level Two trainers acquiring more resources than those trained by Level One trainers.

Exhibit 12. Availability of Library Resources Before and Immediately After the *What's the BIG Idea?*™ Training

Area	Trainer Level	Number of Librarians	Before the Training		After the Training		Significant Increases Across Time	Significant Differences Between Trainer Levels
			Mean	SD	Mean	SD		
Resources for teaching mathematics to young children.	1	101	2.89	.81	3.36	.61	.00**	.44
	2	54	2.83	.84	3.43	.63		
Resources for teaching science to young children.	1	101	3.13	.81	3.42	.59	.00**	.04*
	2	54	2.89	.74	3.48	.57		
Resources to help parents teach mathematics to young children.	1	100	2.76	.78	3.16	.71	.00**	.88
	2	54	2.63	.85	3.06	.88		
Resources to help parents teach science to young children.	1	101	2.88	.84	3.21	.71	.00**	.57
	2	54	2.65	.81	3.07	.84		
Professional development activities for librarians.	1	100	2.87	.86	3.21	.64	.00**	.26
	2	53	2.94	.93	3.09	.82		

Note. Responses were rated on a 4-point scale where 1 = Not at All, 2 = A Little, 3 = Some, and 4 = A Lot. * $p < .05$, ** $p \leq .01$, two-tailed test.

Trainers' Perceptions of the Impact of the Training on Participating Librarians

Trainers were asked what they thought the impact of their training was on the participants. Nearly all responded that the training showed the librarians how to add mathematics and science concepts to their story hours in a way that was an extension of what they were currently providing. They reported that the participating librarians left the training understanding how to incorporate the new ideas into their current practices. The majority of trainers also noted that the librarians were excited about the program and that it was well received. Several noted that the participants valued the materials and the manual. Representative quotes are as follows:

Our librarians tend to want to do easy craft projects, but with this program they realized that they can do something 'easy' that has more meaning behind it, with more of an educational impact, and it is still just as fun. – Level One trainer

The realization of some of the things that they could do, and they were empowered to use mathematics and science concepts in a way they hadn't before. They saw how they are doing it some, just not like this. – Level One trainer

For those that said they didn't like mathematics or science, it eased their fear factor of working it into the program. It showed them that mathematics and science can be fun and we can do it at libraries, not just in school. – Level One trainer

Everyone could see how they could use it in their library, whether rural, urban, or suburban. – Level One trainer

They are coming at it from a different perspective now. It's not just books and finger puppets, it has a deeper purpose. – Level One trainer

They loved it and couldn't wait to share with other employees and the children. They were talking about how they were going to set it up. – Level One trainer

A light came on for them. It fits with programs and what we are doing and gives us a way to validate the education that a library can provide. The library does have a place in the education of kids. – Level Two trainer

We gave them new tools to use and raised the question of why are we not using mathematics and science. There is a correlation between reading and mathematics, and this brings that holistic approach to programming. It made everybody feel like they can do this. – Level Two trainer

Several trainers mentioned that they emphasized adaptations and reviewed ways to incorporate the program based on library size, group size, and varying age groups of children who participate in the story hours. Trainers did not notice any differences in impact by any particular librarian characteristics.

Program Impact on Librarians Over Time

To determine the extent to which participation in the *What's the BIG Idea?*TM programming helped librarians change the content of their story hours to include mathematics and science concepts, increase their comfort levels in providing content related to mathematics and science, and increase the availability of resources to teach mathematics and science over a longer period of time, analyses were conducted on data using post-survey data and follow-up survey data.

Change in Practices Over Time

Exhibit 13 shows the changes in librarians' practices in using mathematics and science skill areas over the time from soon after attending the *What's the BIG Idea?*TM training until late October/early November 2009. Findings indicate statistically significant increases in practices in 63% of the skill areas or 15 out of 24. The data suggest significant differences for acting out a story between librarians who were trained by Level One and Level Two trainers. There were greater increases in practices for librarians who were trained by Level Two trainers.⁷

⁷ This finding should again be examined with caution since multiple analyses were conducted on this set of items increasing the likelihood that the finding occurred just by chance.

Exhibit 13. Changes Over Time in Librarian Use of Mathematics and Science Activities

Skills Area	Trainer Level	Number of Librarians	Post-Survey		Follow-up Survey		Significant Increases Across Time	Significant Differences Between Trainer Levels
			Mean	SD	Mean	SD		
Matching, sorting, naming, and/or describing objects.	1	80	3.81	1.26	4.01	1.05	.52	.17
	2	42	3.98	1.20	3.90	.93		
Talking about same and different.	1	80	3.59	1.14	3.60	.94	.07	.09
	2	43	3.47	1.05	3.81	.82		
Naming and describing shapes found in everyday environments.	1	81	3.46	1.21	3.65	1.05	.09	.79
	2	42	3.45	1.17	3.60	1.06		
Describing and combining shapes to make new shapes.	1	79	2.76	1.31	3.10	1.24	.00**	.24
	2	43	2.51	1.24	3.14	1.15		
Making predictions.	1	79	3.71	1.32	3.89	1.22	.19	.68
	2	43	3.60	1.26	3.70	1.12		
Measuring and comparing sizes, shapes, and events.	1	81	3.25	1.29	3.43	1.14	.05*	.62
	2	42	2.90	1.27	3.21	1.07		
Making graphs and charts.	1	80	2.09	1.19	2.69	1.06	.00**	.51
	2	41	1.85	.99	2.29	1.06		
Designing and making things.	1	78	3.71	1.32	3.80	1.19	.03*	.15
	2	43	3.67	1.19	4.09	.92		
Talking about sequences and patterns.	1	80	3.21	1.26	3.58	1.09	.00**	.93
	2	42	3.14	1.22	3.52	.94		
Using words that describe where objects are located.	1	81	3.78	1.21	3.85	1.10	.02*	.09
	2	41	3.80	1.21	4.27	.84		
Counting	1	79	4.38	.90	4.43	.93	.11	.33
	2	43	4.35	1.00	4.56	.67		
Using comparative words.	1	80	3.79	1.24	3.94	1.04	.02*	.39
	2	42	3.83	1.21	4.17	.94		
Describing how things grow and change over time.	1	81	3.02	1.24	3.19	1.00	.22	.77
	2	41	3.05	.89	3.15	.88		
Reading science books and doing science activities.	1	80	2.63	1.25	2.98	.99	.00**	.94
	2	42	2.57	1.06	2.90	1.10		
Reading mathematics books and doing mathematics activities.	1	79	2.54	1.25	2.94	1.14	.00**	.92
	2	43	2.56	1.12	2.93	.99		
Describing the attributes and parts of shapes.	1	80	2.89	1.35	3.19	1.05	.02*	.69
	2	42	2.83	1.19	3.05	.96		
Forming mental images of geometric shapes.	1	78	2.32	1.30	2.65	1.17	.00**	.53
	2	43	2.30	1.30	2.79	1.13		
Recognizing and presenting shapes from different perspectives.	1	81	2.49	1.25	2.89	1.15	.00**	.80
	2	42	2.57	1.23	2.90	1.03		
Acting out a story.	1	80	3.53	1.14	3.64	1.18	.00**	.02*
	2	43	3.33	1.23	3.91	1.13		
Specifying locations and describing relationships.	1	78	3.21	1.17	3.45	1.15	.01*	.44
	2	42	3.21	1.34	3.64	.85		

Skills Area	Trainer Level	Number of Librarians	Post-Survey		Follow-up Survey		Significant Increases Across Time	Significant Differences Between Trainer Levels
			Mean	SD	Mean	SD		
Describing direction and distance of objects and places.	1	81	2.91	1.35	3.15	1.11	.06	.99
	2	42	2.98	1.30	3.21	.90		
Using drawings to communicate information.	1	79	3.38	1.26	3.37	1.21	.29	.25
	2	42	3.38	1.27	3.67	1.07		
Navigating an obstacle course.	1	81	2.09	1.27	2.33	1.05	.01**	.96
	2	42	1.71	.92	1.95	.85		
Communicating directions for getting from one place to another.	1	81	2.94	1.35	3.02	1.17	.24	.66
	2	42	2.88	1.35	3.07	1.26		

Note. Responses were rated on a 5-point scale where 1 = Never/Almost Never, 2 = Several Times a Year, 3 = Once Every Month or Two, 4 = Several Times a Month, and 5 = Once a Week or More Frequently. * $p \leq .05$, ** $p \leq .01$, two-tailed test.

Changes in Comfort Level over Time

Exhibit 14 shows that there were no statistically significant changes over time from the post-survey administration to the follow-up survey administration in librarians' comfort levels in using, designing, and teaching mathematics and science skills. One statistically significant difference between librarians was found for those who were trained by Level One and Level Two trainers. Librarians who were trained by Level One trainers increased in their comfort level over time in designing mathematics programs for young children while those trained by Level Two trainers decreased in their comfort levels.

Exhibit 14. Changes Over Time in Librarians' Comfort Levels in Providing Children's Mathematics and Science Programming

Area	Trainer Level	Number of Librarians	Post-Survey		Follow-up Survey		Significant Increases Across Time	Significant Differences between Trainer Levels
			Mean	SD	Mean	SD		
Teaching mathematics skills to young children.	1	81	3.15	.90	3.21	.79	.40	.07
	2	42	3.43	.67	3.26	.89		
Teaching science skills to young children.	1	81	3.23	.80	3.31	.77	.86	.16
	2	42	3.36	.79	3.26	.93		
Using scientific investigations with young children.	1	81	3.06	.89	3.22	.88	.41	.13
	2	42	3.43	.70	3.38	.80		
Using prediction activities with young children.	1	80	3.35	.84	3.46	.83	.26	.65
	2	42	3.55	.77	3.60	.70		
Designing programs for young children to learn literacy concepts.	1	80	3.60	.65	3.59	.72	.93	.93
	2	41	3.76	.62	3.76	.49		
Designing programs for young children to learn mathematics concepts.	1	80	3.14	.84	3.16	.80	.31	.17
	2	41	3.61	.63	3.44	.71		
Designing programs for young children to learn science concepts.	1	80	3.13	.82	3.30	.83	.84	.03*
	2	41	3.56	.67	3.41	.74		

Note. Responses were rated on a 4-point scale where 1 = Not Very Comfortable, 2 = A Little Comfortable, 3 = Somewhat Comfortable, and 4 = Very Comfortable. * $p \leq .05$, two-tailed test.

What's the BIG Idea?™ Activities That Were Implemented

Two sources of evidence were used to determine which of the *What's the BIG Idea?™* activities were most likely to be implemented: interviews with a random selection of participants and program reports.

Indepth interviews conducted in the fall after the follow-up surveys were administered revealed that librarians from the Level One cohort were most likely to implement patterns, shapes, and graphs/charting while those in Level Two were most likely to implement building, graphs/charts, and sink or float, according to their self-reports. Results are shown in Exhibit 15.

Exhibit 15. What's the BIG Idea?™ Activities Implemented By Cohorts As Reported in Interviews

	Cohort	
	Level One	Level Two
Graphs and Charting	10	7
Patterns	14	5
Sink or Float	8	7
Shapes	11	5
Growth/Change Over Time	8	5
Discovery centers	7	4
Tangrams	5	3
Sorting	5	5

	Cohort	
	Level One	Level Two
Counting	7	5
Building	7	9
Matching	3	0
Prediction	3	2
Maps	6	1
Weather	3	1
Measuring	3	2

Several librarians from both cohorts also reported an increased level of parent involvement during story time. Librarians noted that parents were inquiring about the program and how to continue the activities at home. Some librarians purchased additional parent kits or referred parents to the *Mother Goose* Web site.

When asked why they chose these specific activities to implement, the majority of librarians from both cohorts said they chose the activities because of the importance of the concepts being addressed. Several participants from both cohorts also reported that the activities were simple and easy to assemble and that the activities aligned well with the current programs or themes that they were implementing. Many respondents replied that the activities were fun to do, while a few mentioned that they chose activities that parents could reinforce with their child at home. As reported by one librarian:

I've made them part of my story time. I make parents aware of what concepts we will be learning and how they can go over this in everyday things, like ask the questions and point things out. – Level One cohort librarian

Almost all of the librarians from both cohorts reported that they followed the *What's the BIG Idea?*TM librarian manual relatively closely, with a few stating they followed it exactly. The changes librarians from both cohorts made were altering the activities and adapting them to fit younger or older children, bigger or smaller group sizes, and/or using different books that addressed the same concepts. Level One librarians were more likely to say that they altered the program to fit into pre-established story time themes. The following quotes are representative of the answers provided:

I may have changed the activity a little, but the ideas are solid and good.
–Level One cohort librarian

I took the concepts and book recommendation and ran with an activity myself. You go from the book to the manipulatives, which helps reinforce the concepts.
– Level Two cohort librarian

The materials are of such a high quality. I'm very discriminate with program and materials, there is just too many of them [sic]. This is a great program that thinks about the kids-learning the information but doing it in a meaningful way. – Level Two cohort librarian

When asked how hard or easy it was to implement the lessons, almost all of the librarians from both cohorts stated that it was easy. A few reported that some activities were easier to implement than others. According to the librarians, the reason it was so easy to implement the activities was because of the manual. Several librarians also reported that the activities were easy to implement because they were simply a continuation of what they were already doing, and they just needed to ask the right questions and incorporate the correct terminology.

Easy. The book is outlined, gives you the books to use and supplies. It's just all spelled out, and the boxes from librarians is very helpful [sic]. – Level One cohort librarian

It's just a natural extension of what we are already doing with this age group. It has an added value and the activity helps drive home the point, it's not just getting it from a book. – Level One cohort librarian

Activities Implemented According to Program Reports

Program reports were also examined to determine which of the activities in the *What's the BIG Idea?*[™] approach were being implemented. Exhibit 16 shows implementation by concepts, programs, and cohort. The Exhibit shows that the activities that were the most popular were *Recognizing Relationships*, *Exploring More Than Counting*, and *Exploring Shapes*. This evidence was not completely aligned with the evidence presented in interviews.

Program reports also revealed cohort differences. Only the librarians that received training from Level One trainers implemented the Data Collection and Graphic Representation activities. Level Two cohort members were more likely to implement the *Counting, Patterns, and Relationships* and *Recognizing Relationship* activities.

The *Change Over Time* units were almost equally implemented by the cohorts. Librarians who received training from Level Two trainers were far more likely to implement the *Exploring Shapes, Spaces, and Places* and *Building and Construction* activities.

Exhibit 16. Types of What's the BIG Idea?™ Concepts and Program Activities Implemented by Librarians in Level One and Level Two Cohorts

Concept Area	Name of Program	Level One Cohort	Level Two Cohort
Data Collection and Graphic Representation		7	0
Exploring More Than Counting	<i>More Than Counting: A Typical Program</i>	1	2
	<i>Assessing Number Knowledge: Counting Fingers</i>	1	8
	<i>Make a Count to Five Book</i>	1	0
	<i>How Many in My Chain?</i>	0	1
	<i>Fix My Mistake!</i>	0	0
	<i>Dogs or Cats?</i>	2	2
	<i>Count and Match Numerals</i>	0	0
	<i>What's Missing?</i>	0	0
	<i>Count and Match Sets</i>	0	0
	<i>Part-Part-Whole: Making Sets of 5</i>	0	1
	<i>Part-Part-Whole: Making Sets of 7</i>	0	0
	<i>Part-Part-Whole: Adding Feet</i>	0	0
	<i>Measuring With the Librarian's Foot</i>	1	4
	<i>Fun With Estimation</i>	3	1
	<i>Measure Me!</i>	0	3
	<i>Count and Compare Cargo</i>	1	0
	Total	10	22
Patterns and Relationships	<i>Patterns: A Typical Program</i>	1	1
	<i>Beginning With Patterns</i>	4	2
	<i>Making Pattern Strips</i>	0	2
	<i>What's My Pattern?</i>	0	0
	<i>Patterns With Linking Cubes</i>	0	3
	<i>Patterns in Nature</i>	1	1
	<i>Pattern Walk</i>	0	0
	<i>Clapping Patterns</i>	1	1
	<i>Movement Patterns</i>	2	3
	Total	9	13
Recognizing Relationships	<i>Sorting: A Typical Program</i>	3	2
	<i>Same and Different</i>	1	9
	<i>Sorting Animals</i>	3	9
	<i>Sorting Animals Collage</i>	0	0
	<i>Sorting Tools</i>	0	1
	<i>Sorting a Button Collection</i>	0	3
	<i>Sorting Rocks</i>	3	3
	<i>What's My Attribute?</i>	2	2
	<i>Sink or Float?</i>	8	7
	<i>Time for Bed</i>	1	1
	<i>Paper Gliders</i>	0	1
	<i>Changing Shadows Over Time</i>	0	0
<i>Growth: A Typical Program</i>	2	0	
	Total	23	38

Concept Area	Name of Program	Level One Cohort	Level Two Cohort
Change Over Time: Growth	<i>As We Grow</i>	1	0
	<i>How Does Your Garden Grow?</i>	0	3
	<i>What's Inside</i>	1	0
	<i>Germinating Seeds</i>	0	0
	<i>An Experiment</i>	0	0
	<i>Watch it Grow! In the Library</i>	2	3
	<i>Watch it Grow! At Home</i>	2	0
	<i>Decomposition: Indoors</i>	0	0
	<i>Decomposition: Outdoors</i>	0	0
	<i>Be Friends With a Tree</i>	0	0
	<i>Weather</i>	3	5
	Total		9
Change Over Time: Weather	<i>Making a Weather Chart</i>	1	2
	<i>Cloud Exploration</i>	0	1
	Total	1	3
Exploring Shapes	<i>Shapes: A Typical Program</i>	5	2
	<i>Shapes All Around</i>	6	6
	<i>Combining Shapes</i>	0	0
	<i>Sorting and Matching Shapes</i>	1	3
	<i>Shape Pictures and Designs</i>	1	7
	<i>String Shapes</i>	0	0
	<i>Shape Collage</i>	0	2
	<i>Just One Shape/All the Shapes</i>	1	0
	<i>My Shape Book</i>	0	0
	<i>Exploring Tangrams</i>	0	3
	<i>Copying Tangram Pictures</i>	2	2
	Total	16	25
	Spaces and Places	<i>Spaces and Places: A Typical Program</i>	0
<i>Act Out a Story</i>		1	3
<i>Tell Me How to Find It</i>		0	3
<i>Obstacle Course</i>		1	0
<i>Tell Me How to Find It: Follow the Map</i>		0	2
<i>This Room: Making a Map with Blocks</i>		0	0
<i>Taking a Walk: Where Did We Go?</i>		0	0
<i>How Did We Travel Today?</i>		1	0
<i>Maps and More Maps</i>		1	0
<i>Exploring Blocks</i>		1	0
Total		5	8
Building and Construction	<i>Building With Blocks</i>	1	6
	<i>Copy My Design</i>	0	1
	<i>Building Towers</i>	0	2
	<i>Building Bridges</i>	1	0
	<i>Building Enclosed Structures</i>	0	0
	<i>Building With Recycled Materials</i>	1	5
	<i>Straw Structures</i>	1	7
	Total	4	21

Implementation of Activities Not Covered in the Training Session

The librarian kits that participants were given did not contain the materials needed to implement all of the activities within the manual. However, there were some participants who, on their own accord, presented these programs. These activities and the participants from the different cohorts that conducted them are listed in Exhibit 17.

The Exhibit shows that librarians in Level Two were far more likely than others to implement activities from areas that were not covered in the professional development sessions and for which materials were not automatically provided. In particular, program reports revealed that librarians were most likely to conduct the *Sound Patterns* activities.

Exhibit 17. Activities Not Introduced in the Training That Were Implemented by Librarians by Cohort

Concept Area	Name of Program	Level One Cohort	Level Two Cohort
Exploring More Than Counting	<i>Counting and Sorting With Dominoes</i>	0	2
	<i>Heavy or Light?</i>	1	1
Patterns and Relationships	<i>Sound Patterns</i>	2	6
Recognizing Relationships	<i>Outdoor and Indoor Shadows</i>	0	0
Change Over Time: Growth	<i>Live Displays in the Library</i>	0	1
Exploring Shapes	<i>Nine-Patch Patterns</i>	1	0
	<i>Triangle Block Puzzles</i>	1	0
	<i>Triangle Block Patterns</i>	0	1
Spaces and Places	<i>Where Am I? Looking at Maps</i>	0	0
Total		5	11

Fidelity of Implementation

Descriptions of activities in program reports were analyzed and compared to descriptions of activities in the *What's the BIG Idea?*TM manual to determine a rating of fidelity. Exhibit 18 shows fidelity ratings for each cohort using a high, moderate, or low fidelity scale. Trainers who received training from the VCB most closely followed the manual.

Exhibit 18. Fidelity of Implementation by Trainer Cohort

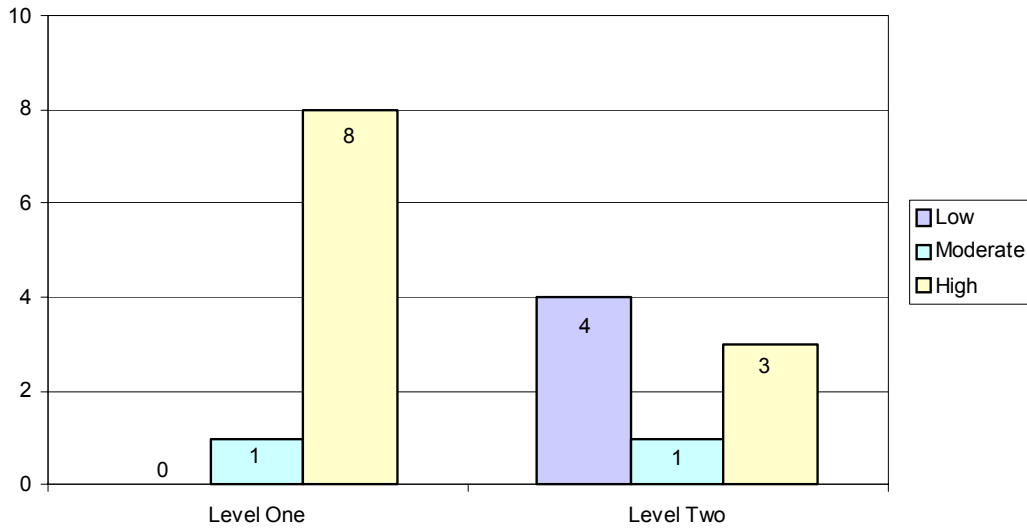


Exhibit 19 shows differences by state for the Level One cohort. Librarians from Louisiana had the greatest fidelity and those from Washington have the least fidelity. Overall, the Exhibit shows great variation in the way that activities are implemented. The Level Two cohort had a different pattern with librarians from New Jersey having the greatest fidelity and those in Texas and Washington having the least fidelity.

Exhibit 19. Fidelity of Implementation for the Level One Cohort Librarians

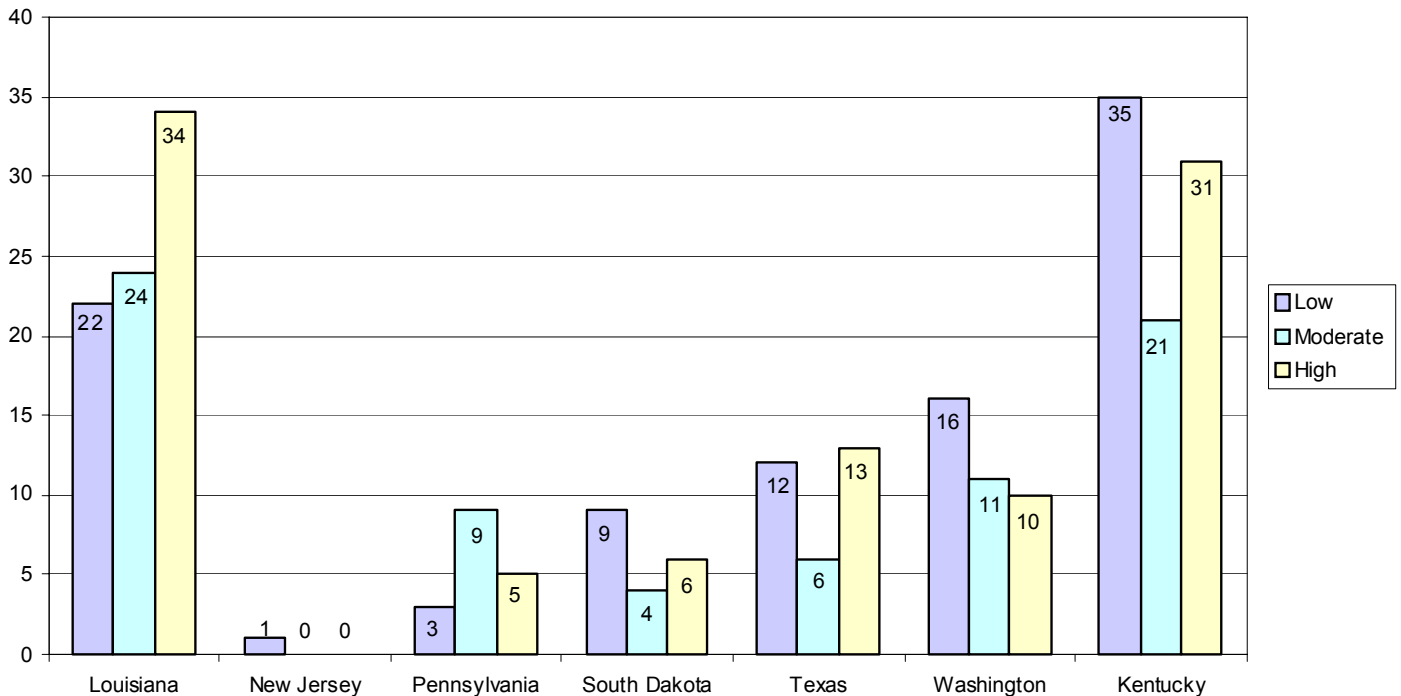
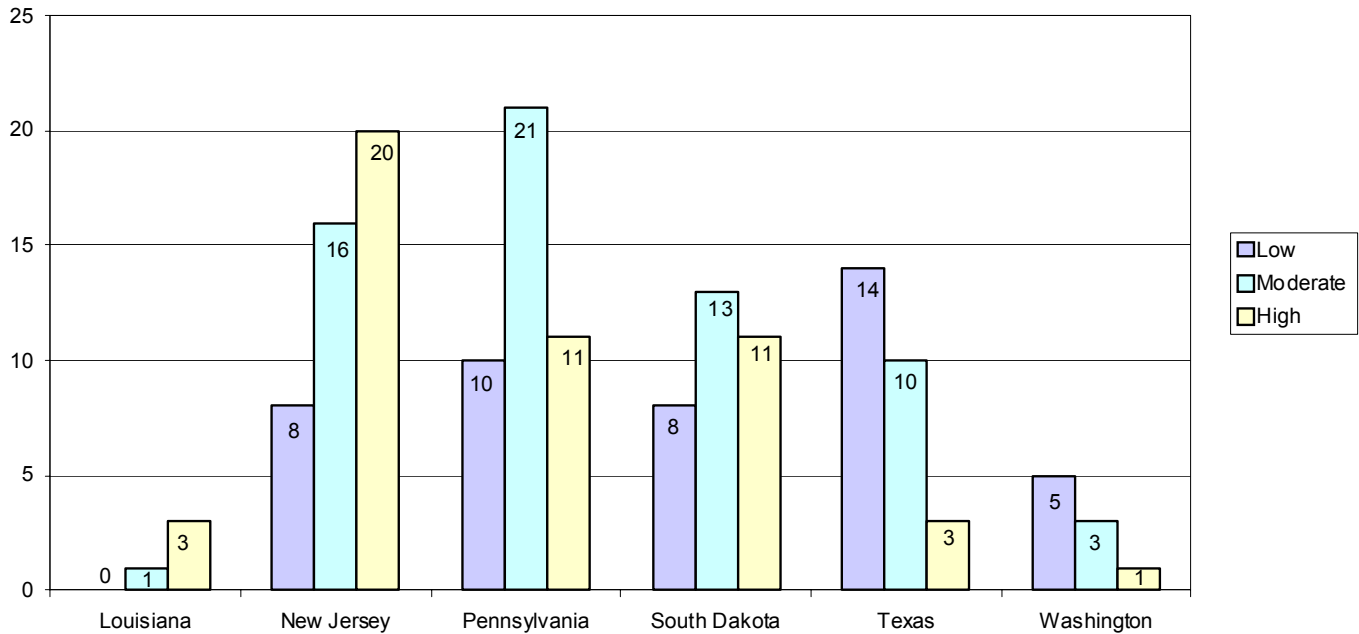


Exhibit 20 reveals variations within the cohort that did not provide information on its level. For this cohort, librarians in Washington appeared to have the greatest fidelity while those in several other states were more likely to have moderate fidelity.

Exhibit 20. Fidelity of Implementation for the Level Two Cohort Librarians



Mathematics and Science Skills Addressed by the Cohorts

Exhibit 21 lists the mathematics and science skills covered in the manual and the number of participants who reported that they addressed those skills by cohort. Librarians who submitted program reports most frequently implemented activities related to *Numbers and Operations*, *Geometry and Spatial Sense*, and *Patterns, Functions, and Algebra* from the mathematics skills set. They were most likely to address *Sorting and Classifying*, *Recognizing Relationships*, and *Estimating and Predicting* from the science skills set. Level One cohort participants were more likely than their peers to report that they addressed specific skills.

Exhibit 21. Math and Science Skills and Processes Addressed by Cohort

Skills	Level One Cohort	Level Two Cohort
Math Problem Solving	13	5
Math Reasoning and Proof	4	2
Math Communicating	33	5
Making Connections	10	2
Math Representing	48	11
Math Numbers and Operations	114	58
Geometry and Spatial Sense	81	48
Patterns, Functions, and Algebra	55	27
Measurement	46	17
Data Analysis, Statistics, Probability	27	15
Asking Scientific Questions	3	4
Collecting and Using Data	21	9
Communicating Information and Ideas	41	15
Designing and Making Models	2	17
Estimating and Predicting	56	35
Experimenting	22	12
Finding Patterns	0	19
Measuring	24	12
Noticing Changes Over Time	17	10
Observing	44	27
Recognizing Relationships	75	46
Sorting and Classifying	76	47
Using Simple Tools of Science	8	3

Mathematics and Science Vocabulary Used in Story Hours

Librarians were asked to identify specific vocabulary words they used while implementing the *What's the BIG Idea?*[™] activities. Reports revealed substantial variation in the vocabulary used most often by librarians from the cohorts. As shown in Exhibits 22 and 23, the most frequently articulated words across the different cohorts were the words *attribute*, *pattern*, *words denoting various shapes*, and *prediction*. It is clear from the Exhibits that librarians did not often reiterate words they used in the past and that many of the librarians were not intentionally using the vocabulary as specified. There was also evidence that the Level One cohort was somewhat more likely to use the terms.

**Exhibit 22. Frequency of Use of
Mathematics and Science Vocabulary
by Level One Cohort Librarians**

Vocabulary	Total
Count/Counting	42
Pattern	38
Attribute	37
Sort	23
Prediction	22
Shape	22
Different	21
Graph	20
Square	19
Triangle	19
Compare	18
Set	18
Circle	14
Same	14
Sorting	14
Predict	13
Rectangle	13
Weight	11
Around	10
Data	10

**Exhibit 23. Frequency of Use of
Mathematics and Science Vocabulary
by Level Two Cohort Librarians**

Vocabulary	Total
Triangle	28
Pattern	23
Square	22
Circle	15
Compare	14
Number	14
Rectangle	14
Same	12
Count/Counting	12
Attribute	12
Set	12
Biggest	11
Soil	11
Roots	11
Plants	11
Shape	10
Size	10
Trapezoid	8

Types of Questions Posed to Children

Exhibit 24 lists the frequency of the types of questions participants asked the children during the story hours. The ‘what’ questions are the most frequently asked among all of the cohorts, followed by the questions ‘how many’ and ‘how.’ Questions addressing where, when, and who were least frequently asked. The question ‘why?’ was not as frequently posed as the manual suggested.

Exhibit 24. Frequency of Types of Questions Posed to Children by Librarians

Questions Asked	Level One Cohort	Level Two Cohort
How?	119	110
How many?	105	131
Where?	24	0
Which?	58	45
What?	301	335
When?	3	7
Who?	20	33
Why?	34	39
Other:		
Can you (make/do)?	58	44
Can you (identify/assess/predict)?	27	29
Tell/Describe, demonstrate	20	3

Books Utilized During the *What’s the BIG Idea?*™ Sessions

Exhibits 25 and 26 list the books used by participants during the *What’s the BIG Idea?*™ sessions they conducted. The Exhibits show that most of the librarians used the books provided to them. Some traditional children’s books, such as *The Three Pigs*, *Pattern Fish*, *The Very Hungry Caterpillar*, and *Jack in the Beanstalk* remained the books used most often by the librarians. It appears as though many of the books were used by at least one librarian though no clear pattern of use emerged. Titles under the “Other” books are books that librarians chose themselves that were not in the manual. Participants may have relied on the bibliography for these other books. Many of the same titles were used widely among the different cohorts.

**Exhibit 25. What's the Big Idea?™ Program
Books Used by Level One Cohort Librarians**

Content Area	Book Title	Number of Times Used
Animal Growth	<i>The Very Hungry Caterpillar</i>	2
	<i>I'm Growing</i>	1
Building and Construction	<i>The Three Little Pigs</i>	10
	<i>Let's Try it With Towers and Bridges</i>	4
	<i>How Is a House Built?</i>	3
Gardens	<i>Flower Garden</i>	1
Maps and Mapping	<i>Me on the Map</i>	1
	<i>Rosie's Walk</i>	1
Measurement	<i>Actual Size</i>	3
	<i>How Big Is a Foot?</i>	2
	<i>Just a Little Bit</i>	2
More Than Counting	<i>How Do You Count a Dozen Ducklings?</i>	3
	<i>Ten, Nine, Eight</i>	3
	<i>The Doorbell Rang</i>	3
Patterns	<i>Pattern Fish</i>	8
	<i>The Little Red Hen</i>	6
	<i>Lots and Lots of Zebra Stripes</i>	2
Seeds and Plants	<i>Jody's Beans</i>	2
	<i>From Seed to Plant</i>	1
	<i>Jack and the Beanstalk</i>	1
Shapes	<i>Mouse Shapes</i>	5
	<i>Shape Capers</i>	5
	<i>Grandfather Tan's Story</i>	1
Sorting	<i>The Button Box</i>	2
	<i>If You Find a Rock</i>	1
	<i>Let's Go Rock Collecting</i>	1
Weather	<i>Who Sank the Boat?</i>	5
	<i>Clouds</i>	3
	<i>The Snowy Day</i>	2
Other	<i>Every Friday</i>	3
	<i>Knuffle Bunny</i>	3
	<i>Five Little Monkeys Jumping on the Bed</i>	5
Books not listed in the manual	<i>Bear in a Square</i>	4
	<i>It Looked Like Spilt Milk</i>	4

**Exhibit 26. What's the BIG Idea?™ Program
Books Used by Level Two Cohort Librarians**

Content Area	Book Title	Number of Times Used
Animal Growth	<i>The Very Hungry Caterpillar</i>	9
	<i>A New Frog, Growing Like</i>	1
	<i>Monarch Butterfly</i>	1
Building and Construction	<i>Twenty-One Elephants</i>	4
	<i>Albert's Alphabet,</i>	2
	<i>The Three Little Pigs</i>	2
Gardens	<i>Flower Garden and Home Lovely</i>	1
Maps and Mapping	<i>Jonathan and His Mommy</i>	2
	<i>Rosie's Walk</i>	1
Measurement	<i>Actual Size</i>	4
	<i>Just a Little Bit</i>	3
	<i>How big Is a Foot</i>	1
More Than Counting	<i>How Many, How Many, How Many</i>	4
	<i>The Doorbell Rang</i>	3
	<i>1,2 Buckle My Shoe</i>	2
Patterns	<i>Lots and Lots of Zebra's Stripes</i>	2
	<i>MaFound Two Sticks</i>	1
	<i>Nature's Paintbrush</i>	1
Seeds and Plants	<i>How a Seed Grows</i>	1
	<i>Jack and the Beanstalk</i>	1
Shapes	<i>I Spy Shapes in Art</i>	9
	<i>The Shape of Things</i>	5
	<i>Grandfather Tang's Story</i>	4
	<i>The Wing on a Flea</i>	4
Sorting	<i>The Button Box</i>	4
	<i>Hannah's Collection</i>	1
Weather	<i>Clouds</i>	2
	<i>Come on Rain!</i>	1
Other	<i>Who Sank the Boat</i>	4
	<i>Bunny Cakes</i>	3
	<i>Let's Try It Out on the Water</i>	3
Non <i>What's the BIG Idea?™</i> books	<i>I Ain't Gonna Paint No More</i>	4
	<i>Three Pigs, One Wolf and Seven Magic</i>	3
	<i>Shapes</i> <i>Color Zoo</i>	3

Changes in Acquisition of Library Resources Over Time

Exhibit 27 shows the results of the analyses conducted to determine the extent to which participation in the *What's the BIG Idea?™* training increased the availability of mathematics, science, and professional development resources in libraries between the time after librarians attended the BIG Idea training and the administration of the follow-up survey. Results indicate no statistically significant increases over this time period in any of the five areas. The Exhibit

does show that librarians who were trained by Level One trainers showed decreases in the availability of resources while those librarians trained by Level Two trainers showed increases in resources over this time period.

Exhibit 27. Differences Over Time in the Availability of Library Resources in Mathematics and Science by Cohort

Area	Trainer Level	Number of Librarians	Before the Training		After the Training		Significant Increases Across Time	Significant Differences Between Trainer Levels
			Mean	SD	Mean	SD		
Resources for teaching mathematics to young children.	1	76	3.34	.64	3.39	.66	.78	.37
	2	40	3.48	.60	3.38	.63		
Resources for teaching science to young children.	1	76	3.38	.61	3.46	.68	.74	.52
	2	40	3.53	.60	3.50	.64		
Resources to help parents teach mathematics to young children.	1	74	3.14	.71	3.22	.69	.79	.61
	2	39	3.21	.89	3.18	.76		
Resources to help parents teach science to young children.	1	76	3.18	.71	3.26	.70	.61	.79
	2	40	3.23	.86	3.25	.74		
Professional development activities for librarians.	1	75	3.24	.71	3.11	.71	.61	.05*
	2	40	3.25	.71	3.48	.68		

Note. Responses were rated on a 4-point scale where 1 = Not at all, 2 = A little, 3 = Some, and 4 = A lot. * $p \leq .05$, two-tailed test.

Impact of Librarian Participation in the *What's the BIG Idea?*™ Training on Participating Children

Librarians' immediate responses (pre/post) to survey items about program impacts on participating children are shown in Exhibit 28. About one third of the respondents noted positive changes in children. Most frequently, librarians reported that children checked out the books that were read to them. Librarians also noted that children appeared to have greater interest in nonfiction books. Librarians did not find that children were more frustrated with story hour activities.

Exhibit 28. Immediate Program Impacts on Participating Children (N = 180)

Impact Area	Percentage of Librarian Respondents
Used mathematics vocabulary from your sessions.	29.4
Used science vocabulary from your sessions.	32.2
Were more interested in nonfiction books.	42.8
Talked about trying the investigations at home.	34.4
Checked out the books you read to them.	55.6
Checked out the family kits.	6.7
Seemed more attentive than usual doing story hour.	34.4
Were more engaged in story hour than usual.	36.1
Were more frustrated with the activities in story hour than usual.	1.1
Interacted with other children more than usual.	26.1
Engaged their parents in activities more than usual.	37.2

Exhibit 29 shows the results of the same survey items when asked of librarians in follow-up interviews. Presumably, the librarians offered more of the *What's the BIG Idea?*TM activities during this period of time. The Exhibit shows perceived increases across most of the areas of impact.

Exhibit 29. Program Impacts on Participating Children

Impact Area	Post-Survey		Follow-up Survey	
	N	Percentage	N	Percentage
Used mathematics vocabulary from your sessions.	180	29.4	127	41.7
Used science vocabulary from your sessions.	180	32.2	127	48.0
Were more interested in nonfiction books.	180	42.8	127	56.7
Talked about trying the investigations at home.	180	34.4	127	50.4
Checked out the books you read to them.	180	55.6	127	81.9
Checked out the family kits.	180	6.7	127	12.6
Seemed more attentive than usual doing story hour.	180	34.4	127	46.5
Were more engaged in story hour than usual.	180	36.1	127	54.3
Were more frustrated with the activities in story hour than usual.	180	1.1	127	3.9
Interacted with other children more than usual	180	26.1	127	44.1
Engaged their parents in activities more than usual.	180	37.2	127	61.4

Differential Impacts on Children

On the post-survey, librarians were asked if they noticed whether there were differential impacts on participating children. The majority of librarians (46%) reported that some children were more interested and engaged than others. About one third (29%) noted that age and developmental differences impacted the children's reaction to the program. About the same percentage said that children whose parents were more involved appeared to be more engaged in the activities.

On the follow-up survey, librarians were asked again about differential impacts on the children. Of the 72 librarians that responded, the majority (49%) once again reported that there were differences and those with involved parents were more engaged. About 37% of librarians stated that children liked the hands-on activities and that attention spans varied. About 18% noted that children were more interested in particular activities and topics than others and that children often requested to participate in particular activities. About 11% reported that the activities provided a new experience for some of the children, and 7% believed that some families implemented the activities in their home environments.

[Participation in BIG Idea] seemed to make the children who were generally shy more active. All the children interacted when we used items from the kits, whereas usually one or two children sits [sic] back and observes during regular story hour. It also kept the hyper children more focused.

Use of Additional VCB Resources

Librarians were asked if they used any of the resources that the VCB created beyond those given at their training. Many of the librarians from both groups visited the Web site. Overall they found the Web site to be helpful and easy to navigate. They liked the fact that some of the activities could be downloaded and printed. They also reported that they visited the Web site to obtain supplemental information, program reports, and order forms for additional materials, and to familiarize themselves with the program to a greater degree. Several of the librarians from both groups also accessed the bibliography and ordered recommended books. They reported that the bibliography was a wonderful resource and that it had books they never thought of using with mathematics and science. They also mentioned that a lot of the mathematics and science books listed on the bibliography were out of print and difficult to find.

Several of the participants commented that the manual was wonderful and easy to use. They also commented on the ease of use and excellence of the materials in the kits they received.

Sustainability

Every participating librarian from both cohorts stated that he/she is very likely to continue providing the activities learned during training. While a few were concerned about time, space, and staffing, most believed that there were no impediments to implementation in the future. A few Level Two participants stated that patron interest would determine if they would implement these programs or not.

Additional Comments

When asked for additional comments, nearly all of the librarians from both cohorts stated that *What's the BIG Idea?*[™] was a wonderful and useful program and that they appreciated the opportunity to participate. Many of them reported that they benefitted professionally by attending the training and implementing the program in their library. Several also mentioned how the children really enjoyed the programs and that the story hour had become a great family experience.

This is a wonderful program and I hope it continues. I feel it's [sic] benefited the kids I have worked with and benefited me professionally too. – Level One cohort librarian

The parents absolutely love it. – Level One cohort librarian

This is a unique family experience I haven't observed in story time before; it's fun to use and works well with the kids. I've had younger and older children's parents get involved. My non-English speaking parents got excited and were learning too. – Level One cohort librarian

There has been good reception from the parents and kids. The manual is awesome—if people saw that it would get them hooked. – Level One cohort librarian

It's a great program. We only get one shot working with kids and it really helps them with school. – Level Two cohort librarian

This is the most exciting thing libraries have gotten involved with and a great connection to families. – Level Two cohort librarian

We are taking on a role as being the first encounter with quasi-academic experience with the kids. We are getting them ready for academics. – Level Two cohort librarian

Conclusions

This section provides conclusions based on the analysis of the quantitative and qualitative data.

Surveys, interviews, and analysis of program reports showed that the project was effective by nearly every measure. Specific conclusions are as follows:

- **Results clearly showed that the *What's the BIG Idea?*TM programming attained the same strong impacts no matter who provided the training.** There were significant impacts on all participants in both Level One and Level Two cohorts. Participants in these cohorts had nearly the same results as those librarians who participated in the original *What's the BIG Idea?*TM program.
- **Statistically significant impacts occurred in librarians' knowledge acquisition, confidence and comfort levels in training others, and in implementing mathematics and science activities.** The only area measured that did not show a significant positive change was in the area of designing programs for young children to learn literacy concepts, an area where most librarians already felt competent.
- **Trainers in both Level One and Level Two cohorts felt well prepared to deliver the training.** The only challenges that most trainers reported were in the areas of recruiting librarians to participate in the training and in organizing the training. Nearly all reported that the training was “easy” to provide.
- **There was some variation in the degree of fidelity of the training to the manual and the original training.** While trainers uniformly reported that they “stuck closely to the manual,” data showed that some condensed the information, added activities, or customized approaches to the audiences they had. Level Two trainers were more likely than Level One trainers to vary the training from the original.
- **Trainers found the support they received from VCB to be valuable.** Most strongly agreed that the follow up was responsive and had excellent content.
- **Librarians who received the training from Level One or Level Two trainers rated their experiences as “excellent” or “above average.”** They reported that the length of the training was appropriate, the pacing was “good,” and the utility of the information for their practice was “great.” There was some variation in ratings of the expertise of presenters, with a few trainers from Level Two receiving lower ratings.
- **Librarians had very few suggestions for improving the training, stating that they liked it as it is.** The few who made suggestions generally wanted additional ways to share ideas (mostly electronically), or desired more support especially with creating their own “lessons.” Several librarians who received Level Two training recommended that the purpose of the

training should be clarified and more background information about the training should be given before the workshops.

- **Librarians who received the training also changed their resource acquisition practices.** After receiving the training, librarians were more likely to order nonfiction books and books related to mathematics and science for young children.
- **Impacts endured over time.** Follow-up surveys showed that the impacts on the librarians in terms of their implementation of mathematics and science activities endured and sometimes increased over time.
- **Certain activities were more likely to be implemented than others.** In general, librarians tended to implement activities related to graphing and charting, patterns, shapes, growth, building, and matching more than other activities. Patterns of implementation were somewhat different for those exposed to Level One versus Level Two trainers.
- **Fidelity of implementation was highest for those librarians trained by Level One trainers.** In their training, Level One trainers tended to have more fidelity to the manual. In their implementation, librarians who received training from the Level One cohort tended to have greater fidelity to the manual.
- **There was great variation in fidelity by state.** Several states showed stronger implementation fidelity than others, the fidelity also varied by cohort.
- **Specific skills addressed by librarians in their activities did not vary substantially by cohort.** Librarians in both cohorts tended to address numbers and operations, geometry and spatial sense, estimating and predicting, recognizing relationships, and sorting and classifying more often than other skills.
- **Librarians tended to pose “what,” “how many,” and “how” questions to children most often.** The manual suggests that there is a need to ask “why” questions more often.
- **Librarians noted that children responded very positively to the *What’s the BIG Idea?*TM programming.** Both immediate and longer term estimations of impacts on children revealed that librarians thought children were more likely to use mathematics and science vocabulary, became more interested in nonfiction books, more often checked out both the books read during story hours and the family kits, were more engaged in story hour than usual, interacted with other children more than usual, and engaged their parents in more activities than usual.
- **Librarians who implemented the *What’s the BIG Idea?*TM programming were likely to sustain implementation in the future.**
- **Additional unsolicited comments nearly uniformly showed that librarians and trainers both thought the programming was “wonderful,” useful, worthwhile, and added value to their libraries.**