



Parents Involvement through Hands-On Science Activity Development

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Abstract

This study was set up a parental involvement group to discuss parents' involvement and hands-on science activities for their kids. Parents who joined this group were asked to design and revise science activities and work with their children at home. How parents felt about the activities and how they interacted with their children were also investigated. At the end, this study provided a broad framework for developing good popular science activities for kids.

1. Introduction

Family does play a very important part in children's learning. A child's home is a unique environment: not only does it provide emotional nurture; it also has a strong influence on their attitudes to learning. Science education ought to begin at home, reinforcing parents' science knowledge as well as helping the children to learn.

The last two decades have seen growing importance placed on research in parental participation in their children's science learning. However, to date, there has been relatively little work conducted on this topic in Taiwan. To emphasize this point, the purpose of this study was to engaged parents to develop or revising hands-on science activities for family and having parents and kids work together at home with hands-on, inquiry science activities.

This article describes the first two years of the project designed to use hands-on science activities to enhance parents' involving in their children's learning. The purpose was to investigate (1) the process of development of hands-on science activities by parents, (2) parents' opinion about what makes a good science activity for kids, and (3) the parents' view toward working together at home with hands-on science activities. The researchers also tried to investigate the possibility and effectiveness about take-home hands-on science activities.

2. Background

Family does play a very important part in children's learning. A child's home is a unique environment: not only does it provide emotional nurture; it also has a strong influence on their attitudes to learning. Science education ought to begin at home, reinforcing parents' science knowledge as well as helping the children to learn.

Other authors have noted the importance of parental participation in their children's learning. If parents helped out with homework, for example, the children often improved their test results and overall performance. Parents and children cooperation in science inquiry activities usually resulted in the children's greater persistence in and to deeper understanding of learning. Clearly, the family had a profound influence on children's life and growth, and children learned subconsciously from their parents when they were taught by their parents' examples (Cheng, Chang, Chang & Chen, 2010; Fler & Rillero, 1999; Hall & Schaverien, 2001; Linney & Verberg, 1983).

Gennaro and Lawrenz (1992) have found that using "Science kits" could improve parents' attitude toward science activities and encourage parents to participate in their children's science learning. Further, other authors stated that few children are exposed to stimulating out-of-school experiences, such as using various tools, playing scientific toys, solving problems, or spending time observing the

scientific phenomena around them. This lack of experience causes children to see science as difficult and uninteresting.

Based on the ideas, this study was a long-term project to encourage parents to take part in their children's science learning. At the beginning stage of the project, parents were invited to discuss the issue of science learning with their children. They were also asked to read some books and documents about science learning, inquiry, and family involvement. Then they were involved in developing or revising take-home science activities, and giving some thoughts and coming up with some recommendations. After hands-on science activities were completely developed, they were also asked to do the activities with their kids at home and give some suggestion to revise the activities again.

3. Method and Design

The project began in September 2011. A parental science learning group was set up in the first year of the project, targeting the family member (usually a parent) who participated in the group. 12 volunteer parents of first, second, and third graders took part in this study. A two-phase study was designed to achieve these objectives.

Phase I- the study was set up a parental science learning group in a Taiwan elementary school. From 2011 to Jan 2013, study group meetings of 2 hours' duration were arranged biweekly. Participants were urged to attend every session. During the group meetings, the participants learned about science, science learning, inquiry and how to be involved in their children's science learning. And then, they were asked to read and discuss different kinds of science books (such as popular science books for kids or hands-on science activity books). After 10 group meetings, participants were familiar with science activities. They were asked to develop a science activity by themselves or chose a science activity from book and revise it for their kids. The science activities were expected to be designed with inquiry oriented and simulated discussion between parents and their children.

Following group meeting, 2-3 participants were selected to interview for approximately half an hour about their views about science, science learning, and hands-on science activities.

Phase II- after each group meeting, participants were asked to do hands-on science activities with their kids at home, complete worksheets and give suggestion to revise the activities. 12 participants discussed and revised the science activities again based on the feedbacks during the group meeting. There were 12 hands-on science activities for family developed or revised by parents. All science activities are related to science concepts in everyday life and science courses in schools and contain workbook, equipments and a parents' guide designed for parents and children to work together.

The data collection sessions were conducted individually and were video recorded for later coding and analysis. Field-notes, questionnaires, worksheets, and artifacts were also collected to supplement the findings of study. Data analysis for each family science activity consisted of utilizing and categorizing the data collected during 30 videotaping averaging 1 hour each.

4. Results and Discussion

During the three semesters (one and half years) in participation, participants had had 30 meetings and developed 12 parent-child hands-on science activities at home. Detailed instructions and guidelines for parents were included in these activities.

4.1 Process of hands-on science activity development

The development process of hands-on science activity for family are presented in Figure 1, which is adapted and revised from Singer's curriculum development and revision cycle (Singer, 2000) to reflect the findings of the present study. Figure 1 illustrates the development process and revision cycle of hands-on science activities for family. How well a science activity is organized has far-reaching influence on children and also influence parents-children interaction. The development of activity is very similar to the development of curriculum development. After establishing goals, a development should first go through a pilot testing, data collection, evaluation, data analysis, and rewrite based

upon analysis, before it can be finally enacted. Moreover, even after enactment, continuation of data collection, evaluation, data analysis and rewrite based upon analysis is still required. This makes an interactive cycle.

During the three semesters (one and half years) in participation, participants had had 30 meetings and completed 12 parent-child hands-on science activities at home. 12 hands-on science activities for family were developed or revised by parents.

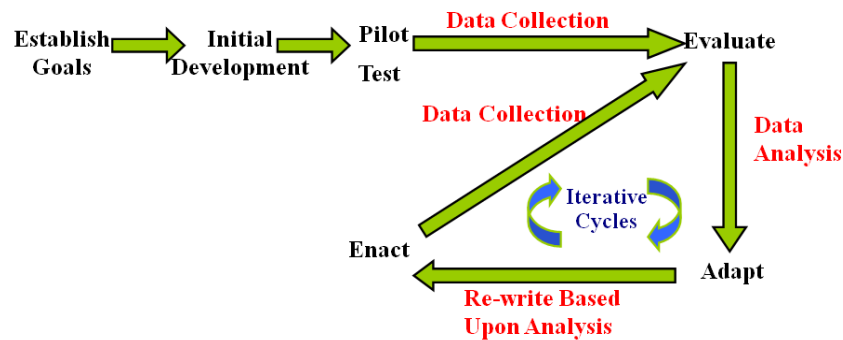


Fig.1. Development process of hands-on science activities

4.2 Parents' opinion about what makes a good science activity

During the group meetings, the parents were asked to read and discuss different kinds of science books (such as popular science books for kids or hands-on science activity books). They were also asked to discuss the standards what makes a good science activity for kids. And then they developed or revised the science activities for their kids based on the standards. The science activities were expected to be designed with inquiry oriented and promoted discussion between parents and their children.

After the science activities were completed, parents were asked to do hands-on science activities with their children at home and revised these activities depending on their children's need. And then they provided their opinion and suggestion when they come back to the meeting. All the parents opinion about what makes a good science activity were collected. The results revealed that parents believe that the most important factor of a good science activity for kids to be interesting, accurate, and that have extra spark of inspiration that will extend children's thinking.

Based on parents' opinion, a good science activity should have two parts, one is for kids, the other is for parents. The Kids part should be included 1) a story, scenario or narrative to arouse kids' motivation, 2) material and tools, including alternate material, 3) process, including text and pictures, 4) questions, which can cause kids thinking deeply and active inquiry. The parents part should be included 1) science concept - use easy examples in our daily life to explain science concept and help parents to explain to their children. 2) reminder - remind parents for operation safety and improve the success rate of experiments. 3) activity for extended learning - help parents and kids to get more information about this topic. Figure 2 and 3 are some examples of science activities developed by parents.

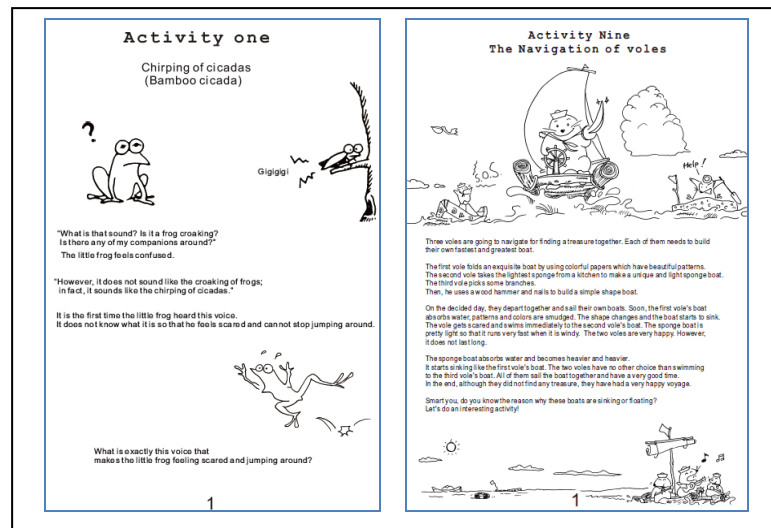


Fig. 2. Kids' first part-- a story or scenario

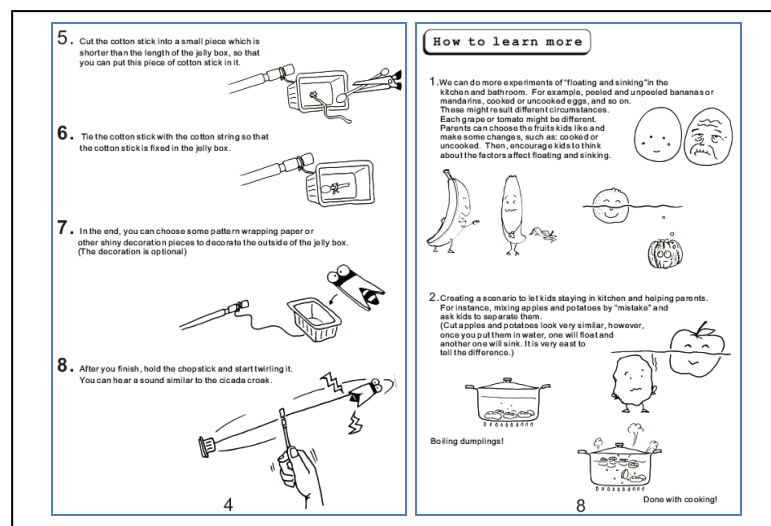


Fig. 3. Process and activities for extended learning

4.3 Parents' view toward working together at home with hands-on science activities

The results revealed that parents appreciated the importance of hands-on learning in science and understood the importance of family involvement in children's science learning after participating activity development and doing science with their kids at home. Most parents were willing to learn from hands-on science activities with their children at home, they also would revise the activities for their children's need. Moreover, through parents' participation, they would find that they are capable of assisting their children in learning science. Parents would enhance their confidence and their attitude and knowledge of science at the same time.

5. Results and Discussion

During the three semesters (one and half years) in participation, participants had developed 12 parent-child hands-on science activities at home. Parents' involvement through hands-on science activity development can enhance parents' understanding of science, science learning and parent involvement. Moreover, the hands-on science activities developed by parents can really increased



science interaction between parents and children, and created a more active learning and inquiry science environment in the family. The third year of the project is going to evaluate the effectiveness and the influence by using the science activities which developed by parents and having families work together at home with hands-on, inquiry science activities. The article concludes with implications for theory, research, and practice.

References

- [1] Cheng, Y. T., Chang, H. P., Chang, W. Y., & Chen, J. Y. (2010). Investigating parents' view about involvement in their children's education through a parental science learning group. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Philadelphia, PA, USA.
- [2] Fleer, M., & Rillero, P. (1999). Family involvement in science education: What are the outcomes for parents and students? *Studies in Science Education*, 34, 93-114.
- [3] Gennaro, E., & Lawrence, F. (1992). The effectiveness of take-home kits at the elementary level. *Journal of Research in Science Teaching*, 29(9), 983-994.
- [4] Hall, R., & Schaverien, L. (2001). Families' engagement with young children's science and technology learning at home. *Science Education*, 85(4), 454-481.
- [5] Linney, J., & Vernberg, E. (1983). Changing patterns of parental employment and the family-school relationship. In C. D. Hayes & S. B. Kamerman (Eds.), *Children of Working Parents: Experiences and Outcomes* (pp. 73-99). Washington, DC: National Academy Press.
- [6] Singer, J. (2000). Constructing extended inquiry projects: Curriculum materials for science education reform. Paper presented at the American Educators of Teachers of Science Annual Meeting, Akron, OH.