Science program for groups of mothers and their children

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Abstract

We organize a 'work in turn for one another' (**Pumaci** in Korean) program for mothers and their children who want to access science and mathematics easily. Four mothers and their children belong to a group, that is a learning community, and do scientific experiments once a week. Representatives of groups visit the WISE center once a month to learn experiments of science and math for their group. Each group posts their work of experiment on the WISE-science mom website and they learn much from each other. WISE center gives them feedbacks. Adult women can take part in *e*-learning system using high technology freely for learning and teaching their children. Through this program, women understand science and technology better and would guide their children into the related fields better.

Keywords: work in turn program, learning community, education focused on experiment

1. Introduction

For children who have a great curiosity to science but are not educated by appropriate education within school system, we'd like to provide children opportunities to do scientific experiment together with their mothers at home. Maintaining and developing children's curiosity on our nature and human world would make them good qualified human resources in the future. Especially to increase the number of students who choose science and engineering fields in their academic route, the scientific mind and atmosphere at home is of most important because environment is the first consideration in the education of children. Supporting mothers to be a science communicator for their children is a good tool to change home ambiance to be friendly and supportive to science.

In WISE-science mom academy, members should join group activities with 4-5 children members and form a learning community. All mothers can be a teacher and a student in turn for one another. In Korean, we traditionally call this system 'pumaci'. During group activities, mothers and children have good chances to communicate opinions, to debate on questions, and to present experimental results, which are hard to do in man-to-man study between mother and child alone.

Our main purposes of the WISE-science mom academy are as followings:

1) Contribution to build infrastructures of math and science education and experiment in daily life
2) Encouraging home background science-friendly
3) Making mothers have a sense of sovereignty and independence on public education
4) Acquainting adult women with science and technology
5) Growing confidence of women in teaching science and using e-learning system
6) Picking out talented women in science to take a job

2. System of the WISE-science mom academy

The WISE-science mom academy is operated by monthly schedule providing off-line and on-line programs periodically. For on-line education and activities, we set up the exclusive web site(www.wisemom.or.kr) for members only.

1) All members can be registered as a member of a group.
2) Teach math and science experiment to mothers not to children by faculties at the university and support mothers to teach their children as a group at home
3) Provide on-line education system and encourage mothers take part in e-learning
4) Members should report results of experiment after group activity once a week
5) Representatives submit children's reporting papers to the WISE center
6) All members can have a chance to manage an activity booth at science festivals if they want.

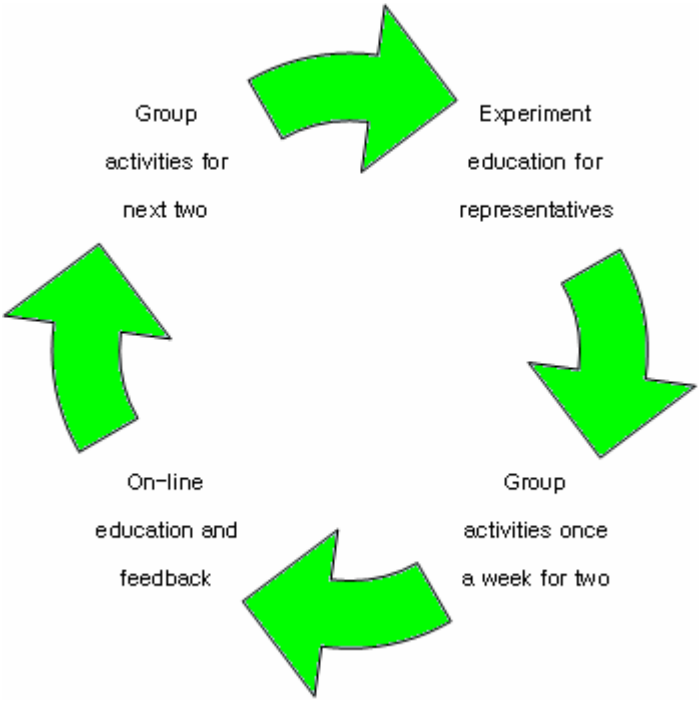

Figure 1 Monthly schedule of the program

After the first year pilot operation from November 2003 at the WISE main center in Ewha womans university, this program is handed over to 6 regional WISE centers. Up to now, 164 groups with 629 mom members and the same or more children members joined this program. All the seven WISE centers use the common web site. Managers as well as members share contents and know-how in the cyber space.

Mothers can obtain information about events, culture, and people related with science. Several members show their ability to produce good materials for science communication. They communicate, develop and share science in cyber community. Giving mother and adult women roles as a science communicator is a good tool to spread science culture into homes, schools, and in advance into their communities.

3. Evaluation on the program by group members

We evaluate this program from 50 groups of the WISE main center in Seoul. The results of evaluation shows us positive signature of change in the attitude for math and science.

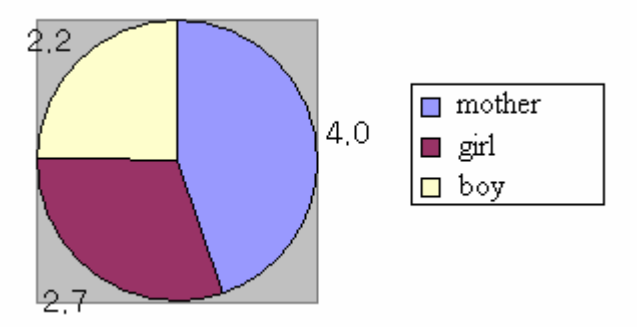

Figure 2 Constituent of members

Average number of each group is 4 mothers and 2 boys and 3 girls. Most groups consist of children's friends and mothers think this program for kids' activity. Over 70% of groups manage their meeting regularly and exchange of roles periodically. Most of members get teaching experiences. Half of respondents post their results of science activities at the web site, but writing reports by children are carried out in the 80% group members. About 70% of members keep the materials provided in order to use in the related curriculum at the school, but the advanced activities are rarely done.

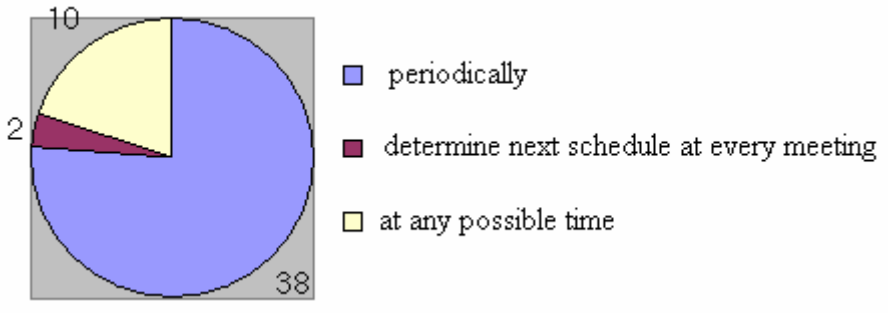

Figure 3 Meeting schedule

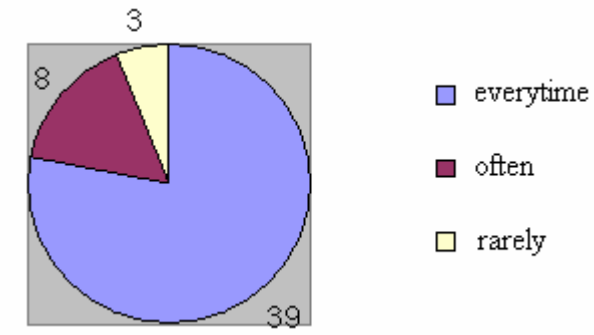

Figure 4 Writing reports by children

The rate of the satisfaction on the math and science contents is over 74%. Especially, 62% of children get helps in terms of creative thinking skill and attitude, 70% of children get highly familiar with math and science. But in the part of relating science with daily life, only 48% children increase their ability in it. This seems that science is a intellectual object to children. Through regular group activities instead of individual action, children improve their cooperative behavior and communication skill. Nevertheless, the ability of discussion or debating on questions and problems does not increase apparently. It needs to implement more detailed and programmed contents.

For mother members, they become to understand personal difference and can consider levels of children's cognitive development. They can have a closer relation and get helps to make a good connection with their children. This shows us that teaching by parent results in high performance in educating and growing children. Women themselves learn much science and become to feel easy about science getting rid of a vague fear for it.

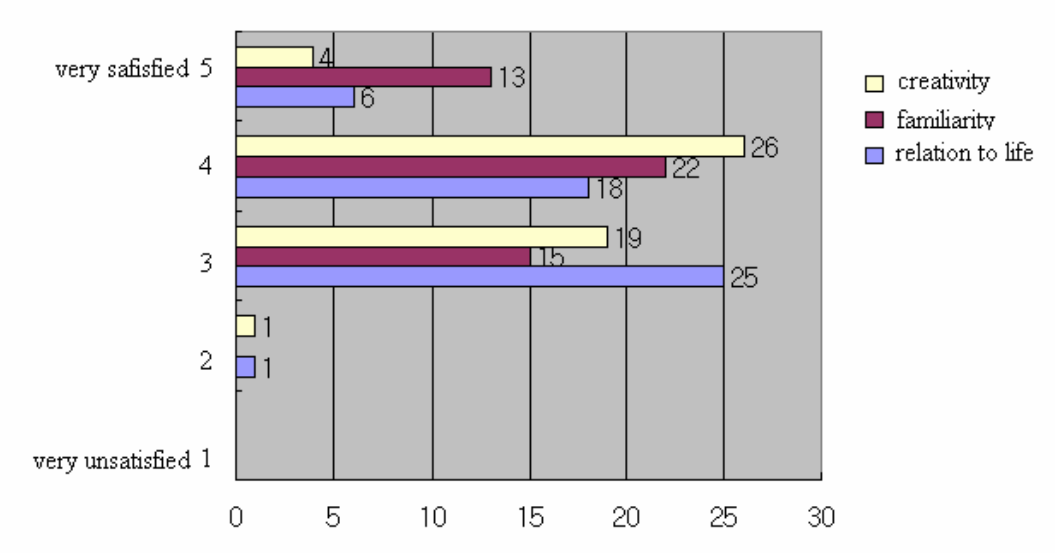

Figure 5 Attitude changes of children

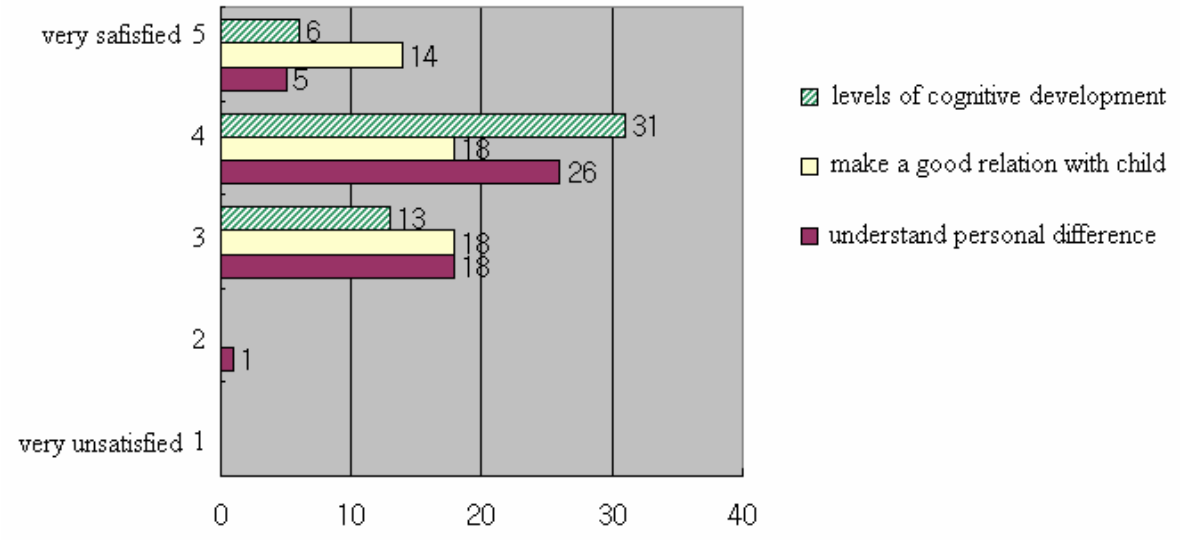

Figure 6 Influence on mothers' attitude

4. Results

We have high spreading effects in building science culture and to communicate science by supporting mothers or adult women to teach and learn science with their children.

1) Mothers

Most of mother members have a e-mail address and use internet freely, though two of third mothers don't have account in cyber space at first. They are taking part in e-learning system by surfing internet and downloading files needed. Mothers are satisfied that they can teach and share their time with their own children by themselves so that they are

respected by their children. Mothers also feel confident that they can also access to science and engineering fields and their children should have scientific knowledge and attitude. After completing the course of the program, a few mother members get a job as a science educator.

2) Children

Children have a playground to practice to communicate their opinions, to debate and discuss problems or questions, and to present their results. They can share their various points of view and ideas with their colleagues so as to expand the range to think and to make the frame of thought flexible. Children recognize that it is important to get training to have concept, not just to calculate in math and that math can be applicable to various fields. For science, children have an attitude to try and examine, then explain what they are curious about, regardless of a success or a failure of the experiment. They are also well aware that everyday life is closely related to math, science and engineering.

3) Home and School

Children often introduce their experiences and activities to teachers at school. Then teachers transfer to other teachers and share those with students in the school. At home, many fathers also have a concern about children's scientific accomplishment and they often take part in the group activities. Therefore home ambient for science could be naturally improved.

13. Conclusion

Supporting mothers to have a role as a science educator and a science communicator in a science learning community program, mothers and their children can access science and mathematics easily. By participating in a learning community, adult women can use the *e*-learning system. Women feel comport to meet science and guide their children into the related fields better. Teachers and fathers also share science with children at school and at home, respectively.