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Description	一般講演要旨

**MARIE CURIE AND SCIENCE EDUCATION IV**  
**Lesson of Marie Curie –Science Show Program,**  
**KAMISHIBAI performance and Science Experiments-**

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The loss of women's talent through gender stereotyping cannot be resolved without properly resourced primary education services. To stimulate young girls for science, "*Science Studio Marie*" launched a science show program consisting of KAMISHIBAI (the Japanese story telling with a series of pictures) performance and experiment shows for young children and mothers. In April, 2008 an event, Lesson of Marie Curie –Science Show Program, consisting of KAMISHIBAI performance, Science Experiments and Prof. Akira Fujishima's "Science is wonderful", was held co-sponsored by Gakushikai and the Electrochemical Society of Japan (ECSJ) is briefly described.

**1. MADAME CURIE by KAMISHIBAI and Experiment shows from Leçons de Marie Curie**

KAMISHIBAI is a traditional story telling show for children with a series of pictures that are displayed associated with a narration. Normally one story consists of 12 pictures. Each one takes *approx.* one minute to read.

KAMISHIBAI is believed to be initiated in 1930's in Tokyo, and became popular until 1970's. It was one of the most popular pleasures for children all over Japan before TV era. We have adopted KAMISHIBAI as a handy & mobile device, easy understanding with pictures, and an effective face to face communication tool.

There are *approx.* one thousand KAMISHIBAI products in Japan. However, there has not been published a KAMISHIBAI on "MARIE CURIE". We have produced a KAMISHIBAI on Madame Curie. Emphasis is placed on her hard work in elucidating nature of radioactivity and in leading her to first female laureate of Nobel Prize, together with her husband Pierre Curie and Henri Becquerel. Experiments in the show are taken from "Leçons de Marie Curie"<sup>[1]</sup>, notebook of her lessons of elementary physics for children of the class organized with her colleagues in 1907-1908.

**2. Lesson of Marie Curie –Science Show Program, KAMISHIBAI performance and Science Experiments- and Prof. Akira Fujishima's lecture on " Science is wonderful"**

Science Studio Marie (SSM)<sup>[2]</sup> has made an effort to make children and young women more friendly to science since 2002. We have already given nearly fifty performances since autumn 2003 in primary schools, kindergartens, libraries, science museums. Our audience includes both boys and girls, and sometimes their parents, and grandparents.

In April, 2008 Lesson of Marie Curie Science Show was held at The Gakushikaikan, Tokyo, co-sponsored by Gakushikai<sup>[3]</sup>, and The Electrochemical Society of Japan (ECSJ)<sup>[4]</sup>, and supported by The Society of Polymer Science, Japan (SPSJ), The Institute of Electrical Engineers of Japan (IEEJ), la Société Franco-Japonaise des Technique Industrielles, The Chemical Society of Japan (CSJ), The Vacuum Society of Japan (VSJ), and The Japan Society for Analytical Chemistry (JSAC). (Fig. 1)

The program consisted of three parts; Part I was “Science is wonderful” by Professor Akira Fujishima,<sup>[5]</sup> President of Kanagawa Academy of Science and Technology (KAST), Honorary professor emeritus of the University of Tokyo, and Ex-president of ECSJ. Part II was Marie Curie KAMISHIBAI, and Marie Curie’s six experiment shows based on “Leçons de Marie Curie”; (No1) Air Bubbles to make air visual. (No2) Float or sink? Story of density. (No 3) Weight of air, Madame Curie’s three instruments. (No4) How large is 1kg of air? (No5) Archimedes’ Principle. (No6) Vacuum and Magdeburg Hemispheres. Part III was Experiment programs for children with three Professors ; Dr Isao Okada, Professor Emeritus of Tokyo Institute of Technology , Dr Noboru Mashiko, Professor Emeritus of University of Tokyo, and Dr Tatsuo Okano, Professor of University of Tokyo.

This Tokyo event in April was registered as “150ème anniversaire des relations franco-japonaises” the Japan-France 150<sup>th</sup> Friendship in 2008. As Mme. Marie Curie is one of the most well known and most popular French Scientists in Japan. The experiment at her legendary science class are also well known to Japanese people from the famous biography by her daughter, Ève Curie. In the past performances the KAMISHIBAI show on her life attracted children’s interest in science.

### 3. REACTIONS

We distributed questionnaires to see the participant’s reaction to the event. Total 102 boys and girls, women and men at the ages from 4 to over 90s, have returned to questionnaires. (See Table1) Interesting results were elucidated from the returns.

There was an obvious difference in the source of information on this event between men and women. Major source of information was acquaintances for women (58%), and Gakushikai Magazine and Journal of ECSJ for men (38%). These are membership publications, and they are subscribed by men.

Fig. 1 Lesson of MC Science Show flyer

France-Japan  
Partnership

2008 4/20 (日)

午後13:30～

午前10:30～

藤嶋昭先生 講演会

「研究にはセンスと雰囲気、そして」  
プラスαが必要！光触媒を例にして」

13:30～16:30

13:00 開場  
13:30～14:00 藤嶋昭先生のお話  
「理科は面白い！」  
14:00～15:30 キュリー夫人の理科教室  
(紙芝居と実験ショー)  
15:30～16:30 キュリー夫人と遊ぼう！  
(自由参加型実験)

午後参加無料

午前参加  
学生会員 1,000円  
一般 1,500円

お申込み：(社)電気化学会  
TEL 03-3234-4213 FAX 03-3234-3599  
E-mail: tachibana@electrochem.jp

お申込み：学生会 事務局  
TEL 03-3292-5931(代表)  
平日 9:00～17:00  
E-mail: info@gakushikai.or.jp  
※本会名は登録商標・商標(先生講演会)とは  
お名前・住所・電話番号・人数を明記下さい。

神奈川科学技術アカデミー理事長  
東京大学特別栄誉教授  
電気化学会元会長

学生会員 十時開場 十時三十分～十二時  
学生会館 二〇二号室

共催：(社)電気化学会 (社)電気化学会、日仏工業技術協会、(社)日本化学会、(社)日本真空協会、(社)日本分析化学会  
協賛：(社)高分子学会、(社)電気化学会、日仏工業技術協会、(社)日本化学会、(社)日本真空協会、(社)日本分析化学会

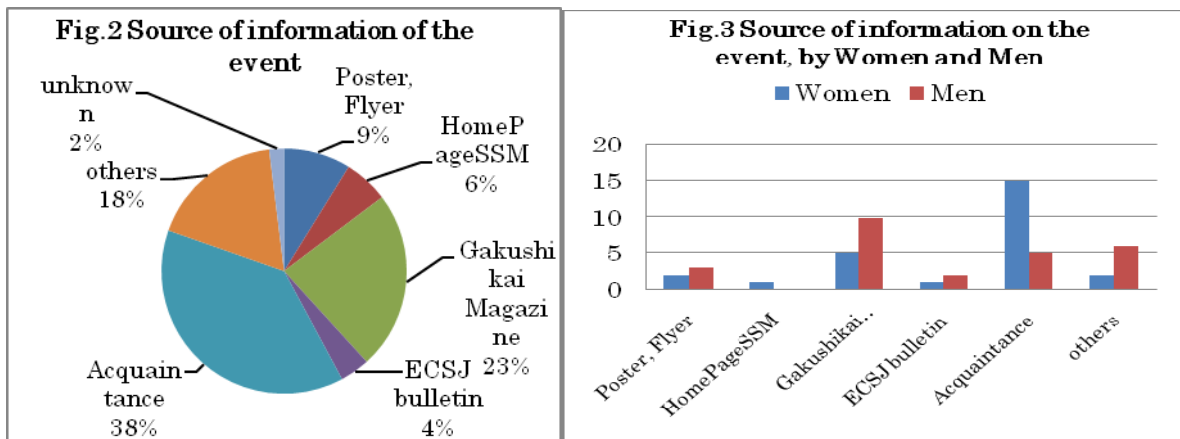
Table 1 Number of Children and Adults among questionnaire returns

ES 1-3 and ES 4-6 denote lower and higher grades of elementary school, respectively

JH and H denote junior high and high school, respectively

Age	Kindergarten, ES 1-3	ES 4-6	JH, H	20s	30s	40s	50s	60s	70s over	Unknown	Subtotal
Girls	11	10	3	-	-	-	-	-	-	-	24
Boys	6	8	4	-	-	-	-	-	-	-	18
Unknown	3	5	0	-	-	-	-	-	-	-	8
Women	-	-	-	1	7	7	1	7	1	2	26
Men	-	-	-	0	3	10	6	3	3	1	26
Grand total											102

Web site on the internet was useful as well as posters & flyers. (Fig. 2 & Fig.3)

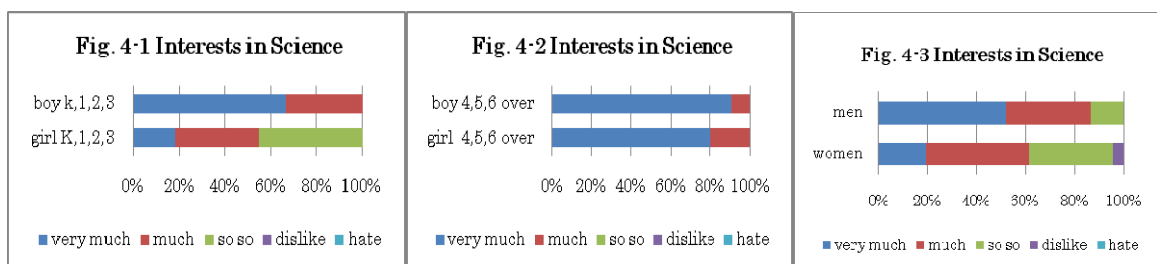


Following points were observed.

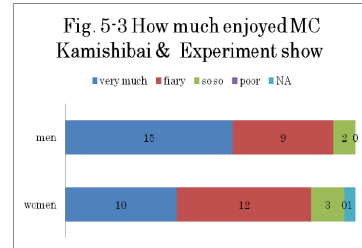
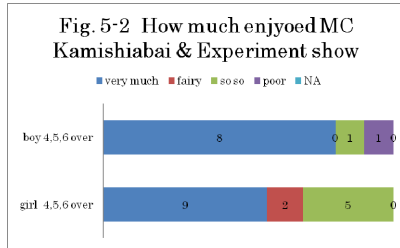
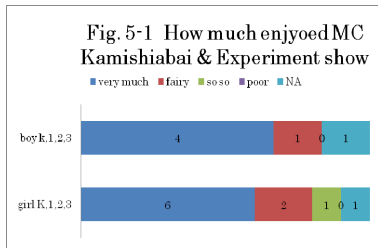
- The percentages who know of Marie Curie were 71% for girls, and 61% for boys, respectively. Women and men showed the same figure of 96% (Table 2).
- There is an obvious difference in “interests in science” between boys and girls; male and female.
- Among children, there are not “hate and dislike science”.

Table 2 Knowing MC

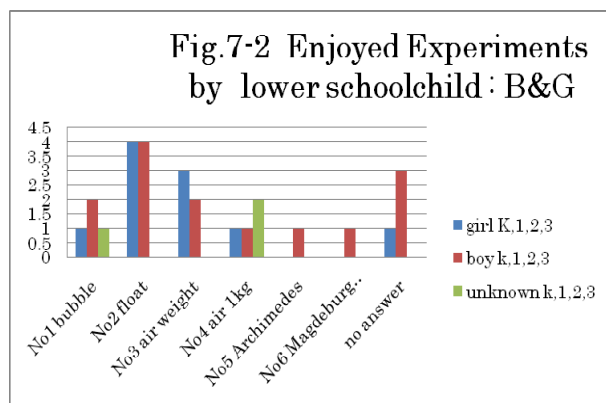
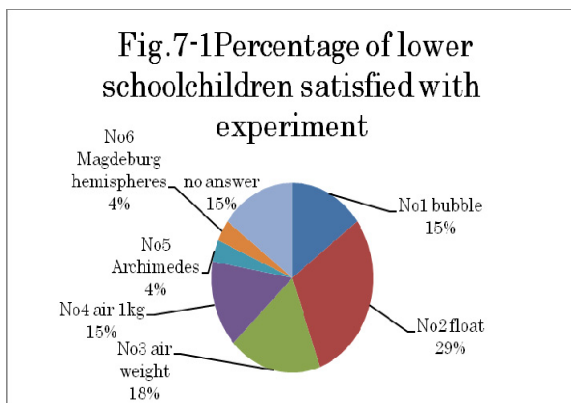
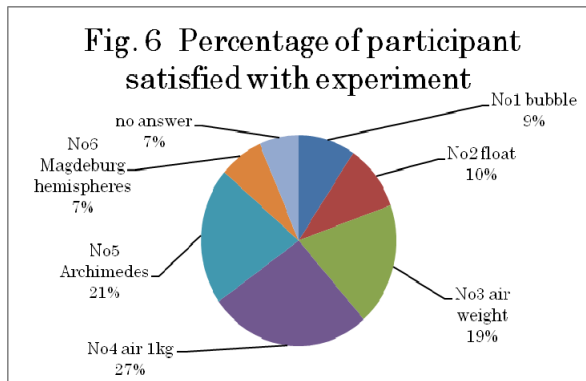
	YES	NO
Girls	71%	29%
Boys	61%	31%
Women	96%	4%
Men	96%	4%

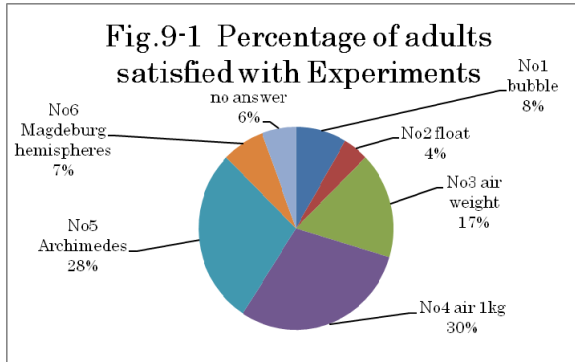
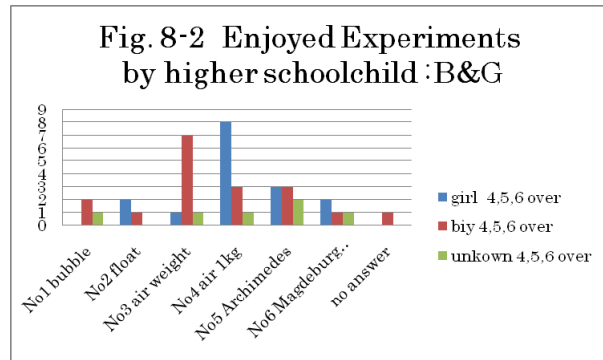
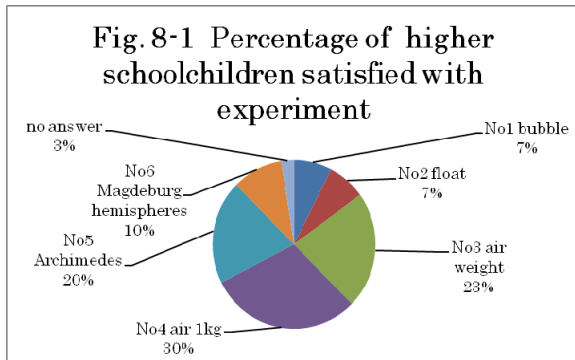


- The results of evaluation of KAMISHIBAI and experiment show are shown in Fig.5-1 and 5-2. About 83 % of boys and 80% of girls at lower schoolchildren (kindergarten, elementary school grade 1, 2 and 3) enjoyed KAMISHIBAI and experiment show. Among higher schoolchildren (elementary school grade 4, 5 and 6, and over) 80% of boy and 79% of girls enjoyed. For Adults, 93% of men and 84% of women enjoyed. ( See Fig.5-3) Male tends to enjoy more than female. Eighty percent of boys and girls answered that they enjoyed. Specifically, Men showed extremely high percentage, 90% of satisfaction.

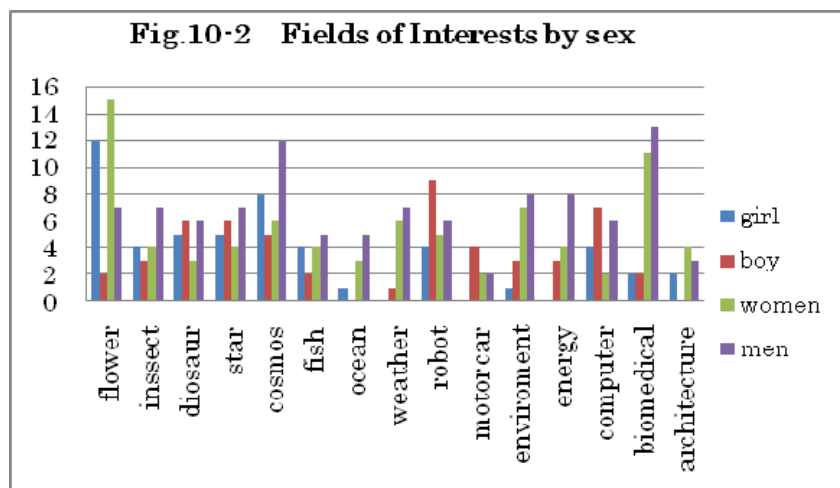
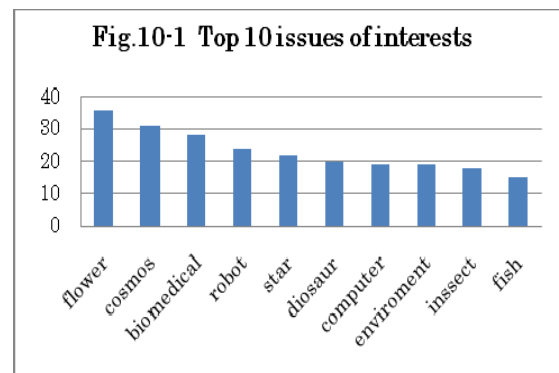


- We notice that boys are more excited at the legendary science experiment show of Madame Curie. Parents and grandparents also enjoyed.
- Younger children, both boys and girls enjoyed experiment No2, which is a simple experiment to guess if materials float or sink in water. Then they confirm by putting them into water. Sample specimens were an apple, a stone, a glass ball, and keys. (See Fig.7-1, Fig. 7-2)
- Among higher schoolchildren of 4 to 6 grades, percentage of experiment that they expressed to have enjoyed was 30% for No4, 23% for No3, and 20% for No5 Archimedes' Principle. However there is a difference between boys and girls. Girls tends to like visual experiments. (See Fig. 8-1, Fig 8-2)





- Portions of adults who enjoyed the experiments were 30% for No4, 28% for No5 and 17% for No3. Women also enjoyed No4 visual experiment. (See Fig.9-1, Fig.9-2)
- Not only children enjoyed the experiments, but also parents and grandparents were much excited Marie Curie experiment show.
- Top ten issues answered to be interested in are shown in Fig. 10-1.
- Looking into the details of these issues, boys showed interests in robot, computer, stars, dinosaur, and cosmos. Girls showed interests in flower, cosmos, dinosaur, and stars.



- Women showed interests in flower, biomedicine, environment, weather and cosmos, whereas men showed interests in biomedicine, cosmos, environment, energy and weather.
- There is an obvious difference between female and male. Girls and women tend to be interested in flower. Adults are interested in Biomedicine. Generally, common interests by all the generation were cosmos, stars and robot. (See Fig. 10-2)

#### 4. CONCLUSIONS

I consider that Marie Curie KAMISHIBAI and experiment show was effective and useful in giving stimulation to the participants.

Over 80% of School children enjoyed “Leçons de Marie Curie” KAMISHIBAI of Marie Curie and the demonstration of six experiments. It is especially noted that nearly 93% of Men and 84% of women enjoyed it. The purpose of Science Studio Marie (SSM) is to make all the people enjoy “lessons of Marie Curie’s fundamental physics” from kindergarten to senior people, both male and female.

Encouraging measures for children, specifically girls in continuing being interested in Science, is important. “Leakage pipe” should not be allowed while they are growing up.

Acknowledgements: I would like to express thankfulness for this event to Prof A. Fujishima for giving intuitive lecture for children. I also appreciate Dr I Okada, Dr N Mashiko and Dr T Okano, for their demonstrative experiments. Special thanks are to co-sponsoring Gakushikai and the Electrochemical Society of Japan (ECSJ), and supported organizations. The questionnaires were partly supported by Otsuka Pharmaceutical Co., Ltd.

#### Reference:

- [1] Leçons de Marie Curie, recueillies par Isabelle Chavannes en 1907, EDP Sciences, 2003, Paris, (Japanese translation was published from Maruzen Publishing Company, November 2004)
- [2] Science Studio Marie (SSM) <http://www.max.hi-ho.ne.jp/min-kko/>
- [3] Gakushikai <http://www.gakushikai.or.jp/>
- [4] The Electrochemical Society of Japan(ECSJ) <http://www.electrochem.jp/>
- [5] Akira Fujishima, “SETOTACHI NI KANDOSURU KOKORO WO SODATEYOU” Foster children to make impressionable – A Scientist’ proposal on education issues- (Tokyo Shoseki, 2008) pp 80, (in Japanese)

**Key words:** KAMISHIBAI (the Japanese Story Telling with Pictures), Leçons de Marie Curie, Science Show, Science Education, Women into Science and Engineering (WISE), Public Understanding of Science and Engineering (PUSE)

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