Effects of special STEAM programme on gifted young girls

Dr. Manabu Sumida
Faculty of Education, Ehime University
Japan
Japanese children’s images of scientist
(Sumida, Nakayama & Inagaki, 2001)
Female Students in the Japanese Universities (MEXT, 2017)

Female PhD in science and engineering (Peng, et al., 2017)
A Strong Start in STEM Education for Girls

The effect of gender was not statistically significant for any group (Black, Hispanic, and White) of high-ability students. (Anderson & Ward, 2013).

Women in STEM are sensitive to cost-benefit calculation in their decision-making about graduate education. (Xu, 2016).

Even though most children aged 10/11 years, the majority already see science careers as “not for me.” (Archer, et al., 2012).

Girls’ early intense science interests were related to higher science self-concepts at age 8. In addition, early interests predicted science achievement in girls but not in boys. (Leibham, Alexander, & Johnson, 2013).
Programs targeted towards the earliest years

- Preschool programs
- Schooling
- Job training

Rate of return to investment in human capital

0-3: Preschool
4-5: School
Post-school

Age

Heckman, 2008
A model of talent realization in women

Modified from Reis, 1998

Realization of Talent in Women in:
- Arts, Literature, Research, Social causes, Maternity and Family
- Mathematics, History, Social Sciences, Business, Science, Athletics, etc.

Perceived Importance of Talent Manifestation

Environment:
- Family & Peer Support
- Time & Opportunities

Personality Traits
- Determination, Creativity, Motivation, Risk Taking, Patience

Belief in
- Self-Concept, Self-Esteem, Sense of Purpose and Destiny

Desire to Develop One’s Talent

Above Average Intelligence, Contextual Intelligence, Special Talents
Research on STEM Education for Gifted Girls and Rural Students in the Japanese Context
Ehime University Kids Academy (2009～)

- A special science education programme that targets gifted children aged 5 to 8.
- Courses are held at the university twice monthly on Saturdays.
- Approximately 10 children are accepted each year.
Follow-up Survey
Subjects

- The parents of 47 children (26 responses)
  13 Boys and 10 Girls
- A survey by mail
Children who visited the places at least once in six months after the Kids Academy.
Self-esteem, Moral Consciousness, etc.

- I like myself
- I give up my seat to the elders and physically disabled people
- I wish to make lives better
- We should follow the rules of society
- I wish to continue until the end of a completion

Scores indicated by 0-4 scale:
- Girls
- Boys

Strongly Agree
Family relationships

- to talk about the things s/he learned and discovered
- to think about surrounding natural events and phenomena together
- to respect his/her independence
- to visit learning events and facilities together
- to look up words in books, dictionaries, and internet together

Strongly Increased
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<th>年度</th>
<th>事業</th>
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※ 調査を除くものが「科学以外」で頑張ったもの
※ 実験は「科学以外」の研究
※ 記録賞は大会の標準記録を上回った者に対して授与された
The 53rd Science Research Competition in Ehime

Top 10% Awardee

<table>
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<th>Grade</th>
<th>Number</th>
<th>Total</th>
<th>Percentage</th>
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<tr>
<td>Grade 1</td>
<td>4 girls out of 10 awardee</td>
<td>10</td>
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<td>8</td>
<td>13</td>
<td>62%</td>
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<tr>
<td>Grade 3</td>
<td>15</td>
<td>27</td>
<td>56%</td>
</tr>
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