

# Development of Visual Teaching Material based on the Event to Encourage Female Students in STEM by Astrophysics Researchers

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## Abstract

The realization of a diversity-inclusive society is one of the critical challenges, and it also needs to promote the activities of female researchers and engineers in Japan. We held an online talk event focused on nuclear astrophysics to show role models and encourage female students to choose a career path in STEM. A female nuclear astrophysics researcher lectured, and another female astrophysicist navigated the event. We also have developed a visual teaching material based on the event and provided it as YouTube. Therefore, such materials could contribute to encouraging female students in STEM.

## Introduction

- The realization of a diversity-inclusive society is one of the important challenges.
  - The promotion of female participation is also an important issue.
- There is an urgent need to promote the activities of female researchers and engineers in Japan.

### In Japan

- The rates of female students
    - Faculty of Science: 27.8%
    - Faculty of Engineering: 15.7%
  - The rate of female students in STEM\* is low compared to the average of OECD countries.
- \*STEM: Science, Technology, Engineering, and Mathematics

The number of female students studying in STEM fields, which form the population of such researchers and engineers, is low.

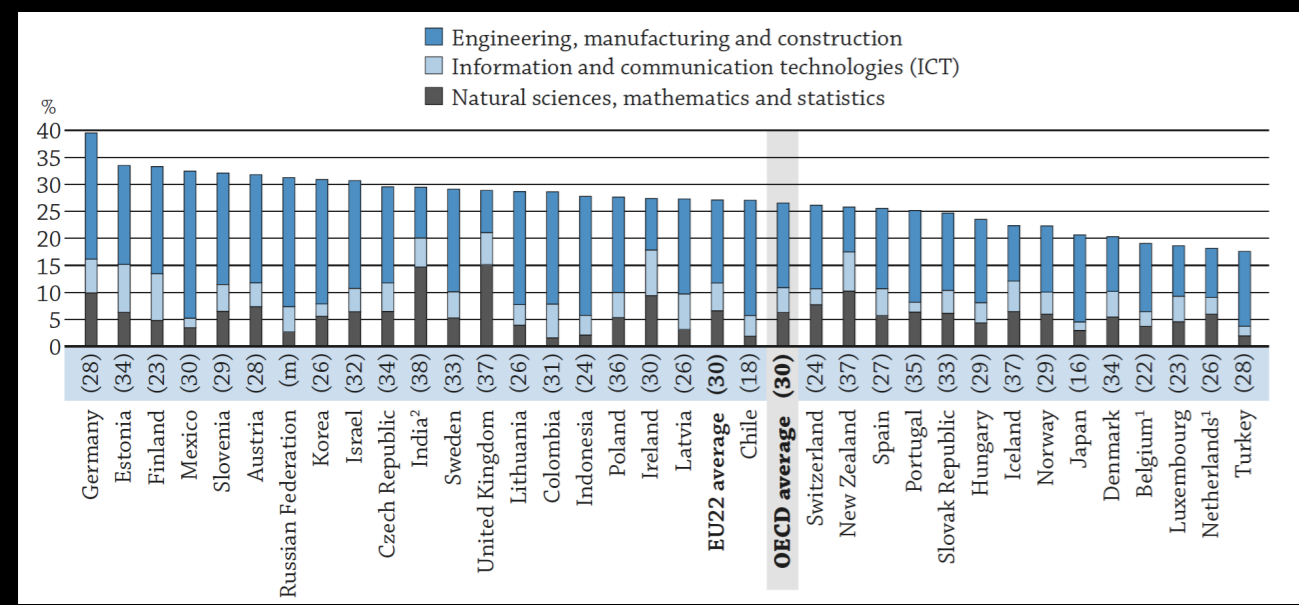


Fig.1 Distribution of new entrants to tertiary education, by STEM field of study and share of women in these fields (2015)[1]

- To show role models and encourage female students to choose a career path in STEM,
- We held an online talk event focused on nuclear astrophysics.
  - We developed a visual teaching material based on the event.

## Method

- We held an online talk event to show role models and encourage female students to choose a career path in STEM.
- We organized the event focused on nuclear astrophysics to coincide with the publication of the Japanese edition of "Women Scientists Who Made Nuclear Astrophysics," a calendar produced by Dr. Maria Lugaro, Vice-Chair of COST Action ChETEC, and others.
- One of the calendar's authors, a female nuclear astrophysics researcher, gave a lecture at the event.
- The event was also navigated and talked together by one of the calendar's translated members, a female astrophysicist.



Fig.2 Calendar in English ver.[2]



Fig.3 Calendar in Japanese ver.[3]

The calendar was translated and published in 27 languages. The Japanese version was translated mainly by the Japan Forum of Nuclear Astrophysics (Unukurren), an organization of researchers in nuclear astrophysics[3].



Table.1 The Timetable of online talk event

Contents of the Event	
15 min.	Opening: Introducing Calendars
20 min.	Lecture: Prof. Chiaki Kobayashi
20 min.	Talk session: Navigator: Shio Kawagoe
5 min.	Closing

## Summary

- To show role models and encourage female students to choose a career path in STEM, We held an online talk event focused on nuclear astrophysics.
- The results indicate that the event was effective in increasing interest in astrophysics.
- We developed a visual teaching material based on the event. The materials could contribute to encouraging female students in STEM.
- In the future, we would like to conduct a follow-up survey to determine whether the event led to choosing a career in STEM.

## Results

### Online Talk Event

- The participants were 28 females and 25 males in the event.
- Since parents significantly influence female students' career paths, the parental generation is also targeted
- 28 people filled out questionnaires.
- Many participants were interested in the contents of the event and nuclear astrophysics and wanted to hear what the researchers lecture.

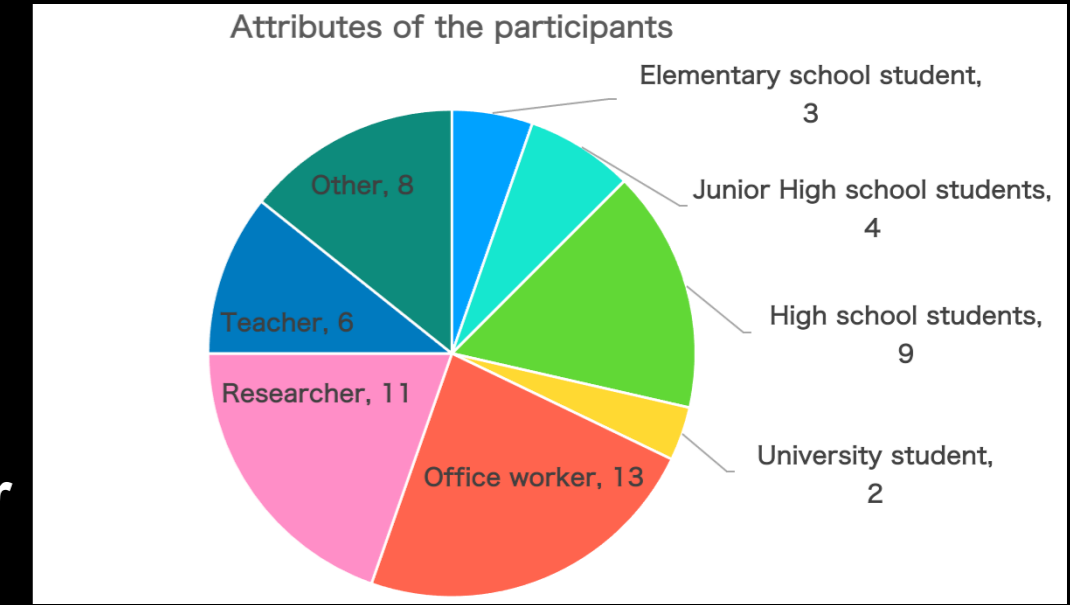


Fig.4 Attributes of the participants

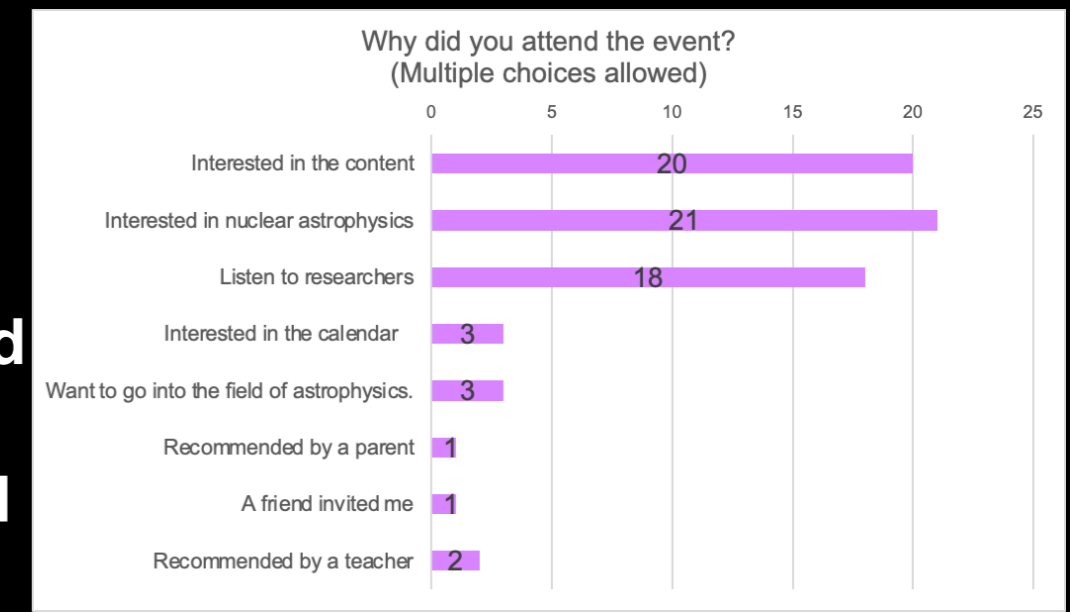


Fig.5 Reason for attending the event

- All respondents answered "enjoyable" and "easy to understand of the lecture."
- They would also like to participate again if such a talk event hold.
- Free description of the questionnaire
  - I enjoyed the dialogue between female researchers
  - I would like to learn more about astrophysics.



Fig.6 Results of the questionnaire(1)

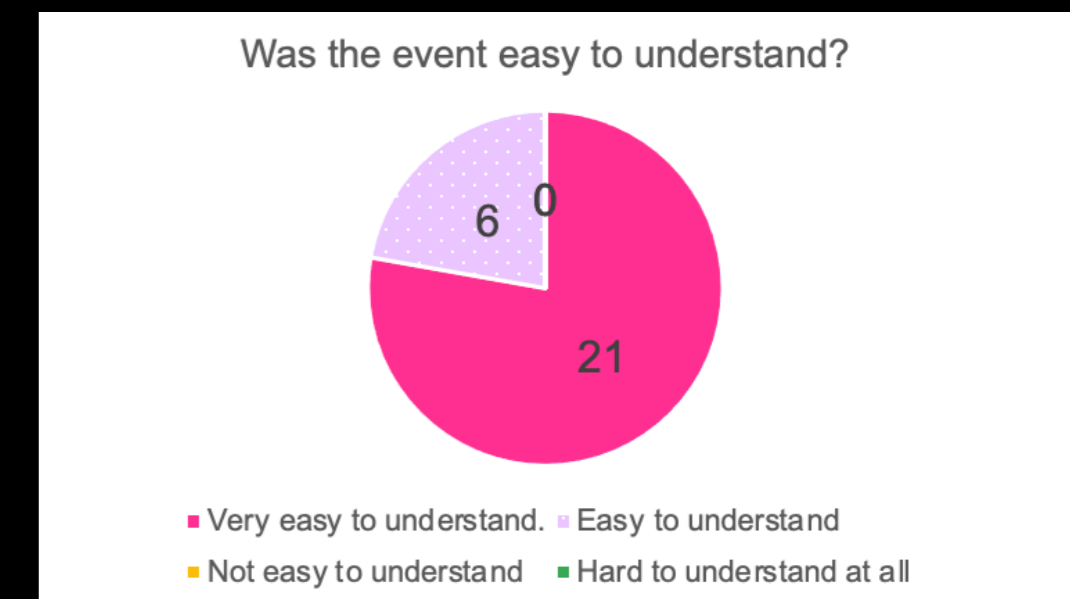


Fig.7 Results of the questionnaire(2)

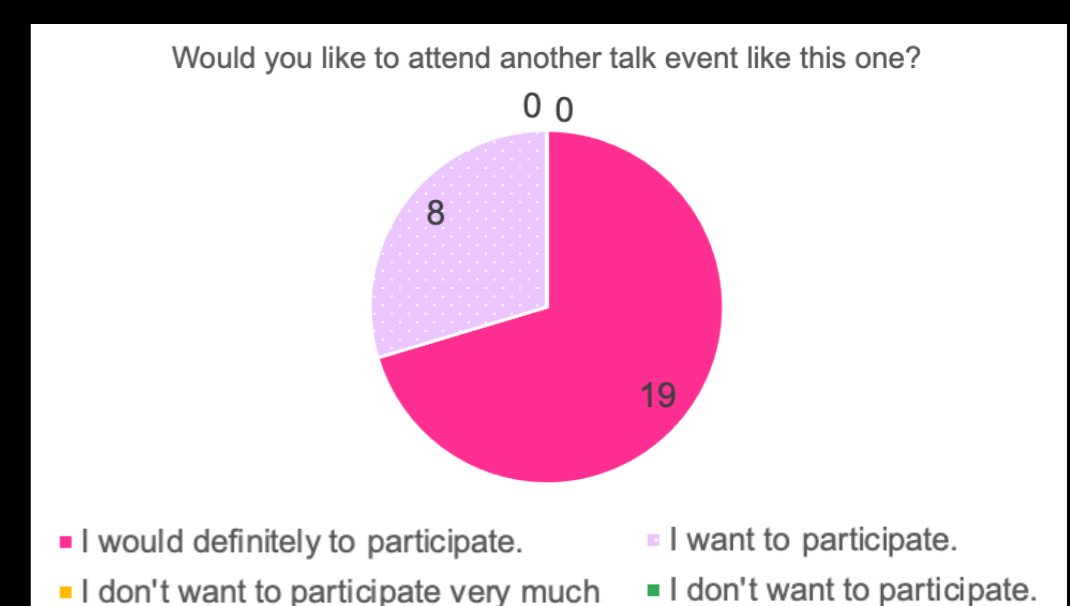


Fig.8 Results of the questionnaire(3)

The results indicate that the event was effective in increasing interest in astrophysics.

### Visual Teaching Material

- We have developed a visual teaching material based on the event.
- The visual materials provided it as YouTube.
- The event was held in Japanese, but we added English subtitles to disseminate globally.
- The material also discusses the social advancement of women.



Fig.9 Eye-catching images of the visual materials

The materials could contribute to encouraging female students in STEM.

## Acknowledgement

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## References

- [1]OECD/UIS/Eurostat (2017), Table C3.1a. See Source section for more information and Annex 3 for notes ([www.oecd.org/education/education-at-a-glance-19991487.htm](http://www.oecd.org/education/education-at-a-glance-19991487.htm))
- [2]ChETEC Homepage, [http://www.chetec.eu/press-outreach/copy\\_of\\_calendar](http://www.chetec.eu/press-outreach/copy_of_calendar)
- [3]JaFNA/Unukurren, <https://www.cns.s.u-tokyo.ac.jp/ukakuren/indexnew.html>