

Survey findings – Science and Mathematics in the Classroom

In 2016, a standardised online survey was employed in order to investigate participating PSTs' experience with the Primary Elective activity. The survey consisted of five sections, including 20 questions in total: overall experience, knowledge change, attitude/identity change, capacity/practice change, and students' engagement. The online survey was administered to 23 PSTs via *SurveyMonkey*. A total number of 3 usable responses were collected, which indicates a relatively low responding rate of 13.04 per cent.

Overall experience with the activity

An absolute majority of respondents reported positively on their overall experiences with the activity with only one of them reporting neutrally for one question. Two-thirds of responding PSTs strongly agreed with all of the five questions in relation to their overall experiences. Table 1 shows the responses to the five questions in relation to participants' overall experiences.

Table 1. Responses from PSTs to their overall experiences with the activity

Question	2	1	0	-1	-2
16. I felt the ReMSTEP activity worked well	66.67%	33.33%	0.00%	0.00%	0.00%
17. I enjoyed the process of participating in this project	66.67%	33.33%	0.00%	0.00%	0.00%
18. The process was effective in supporting my learning/professional development	66.67%	33.33%	0.00%	0.00%	0.00%
19. I gained a lot by interacting with science/mathematics professional(s) in the project	66.67%	0.00%	33.33%	0.00%	0.00%
20. This has been a valuable part of my teacher education/professional development experience	66.67%	33.33%	0.00%	0.00%	0.00%

2=Strongly Agree, 1=Somewhat Agree, 0=Neither Agree nor Disagree, -1=Somewhat Disagree, -2=Strongly Disagree

Knowledge change

This activity intended to bring the participating PSTs contemporary science and mathematics knowledge and practices. According to the survey responses, the activity succeeded in teaching the respondents useful and interesting science concept. All respondents agreed that they have benefited in this aspect. A majority of the respondents (66.67 per cent) claimed that they gained new insights into scientists' research and development practices and roles, and have been surprised by what they learnt about science/mathematics practices and how these might be represented in the curriculum. Table 2 presents the details of responses to the three questions in relation to PSTs' knowledge change.

Table 2. Responses from PSTs to their knowledge change as a result of the activity

Question	2	1	0	-1	-2	N/A
1. I gained new insights into scientists' research and development practices and roles	0.00%	66.67%	0.00%	0.00%	0.00%	33.33%

3. I learnt some useful and interesting science concepts	66.67%	33.33%	0.00%	0.00%	0.00%	0.00%
6. I have been surprised by what I learnt about science/mathematics practices, and how these might be represented in the curriculum	66.67%	0.00%	33.33%	0.00%	0.00%	0.00%

Attitude/identity change

This particular activity resulted in various degrees of attitude change. Two-thirds respondents claimed moderate changes in their perceptions of scientists as people and in their understanding of the role of science teacher. More significant changes were observed in PSTs' attitude towards science and/or science teaching, which were strongly agreed by two-thirds respondents. There was one respondent reported negatively, giving the reason that he/she has already recognised the importance of science education. The specific responses to the three questions in this dimension are documented in Table 3.

Table 3. Responses from PSTs to their attitude/identity change as a result of the activity

Question	2	1	0	-1	-2
2. My perceptions of scientists as people changed in a positive way	0.00%	66.67%	33.33%	0.00%	0.00%
4. There has been a positive change in my attitude towards science and/or teaching science	66.67%	0.00%	0.00%	0.00%	33.33%
5. There has been a change in my understanding of the role of science teacher	0.00%	66.67%	0.00%	0.00%	33.33%

Capacity/practice change

Spectacular results have been achieved through this activity in terms of improving participating PSTs' capability of providing quality science/mathematics teaching. All respondents agreed that they gained ideas about bringing contemporary science practices into the school curriculum, experience in understanding and communicating science/mathematics ideas to students, and insights about supporting students to learn about science/mathematics professionals' thinking and practices. Two-thirds respondents strongly agreed with the benefits of engaging in new and interesting approaches to teaching science, learning new things about integrating contemporary science in their future teaching, and gaining more confidence in teaching science related subjects. It could be noticed that one respondent reported either neutrally or negatively to the three questions, as he/she commented that he/she has been already confident in teaching the content area.

Table 4. Responses from PSTs to their capacity/practice change as a result of the activity

Question	2	1	0	-1	-2
7. I was engaged in new and interesting approaches to teaching science	66.67%	0.00%	33.33%	0.00%	0.00%
8. I have learnt things about engaging with contemporary science that will influence my teaching in the future	66.67%	0.00%	0.00%	33.33%	0.00%
9. I gained ideas for how to bring contemporary science practices into the school curriculum	66.67%	33.33%	0.00%	0.00%	0.00%

10. I have gained experience in understanding and communicating science/mathematics ideas to students	33.33%	66.67%	0.00%	0.00%	0.00%
11. I gained valuable ideas about how to support students to learn about what science/mathematics professionals do, and their thinking	33.33%	66.67%	0.00%	0.00%	0.00%
12. I feel more confident in teaching science/mathematics-related subjects at school	66.67%	0.00%	0.00%	0.00%	33.33%

Students' engagement

From the PSTs' perspective, school students who involved in the activity have been benefited in a number of ways. All responding PSTs agreed that students had been productively engaged with learning science, and the activity has positively impacted on students' engagement with science. Two thirds of them observed that students had developed new understanding of the nature of scientific practices. Table 5 presents the results of the answers to the three questions investigating the impacts on students' engagement.

Table 5 Responses from PSTs to the impact on students' engagement as a result of the activity

Question	2	1	0	-1	-2
13. Students developed new understanding of the nature of scientific practices	33.33%	33.33%	33.33%	0.00%	0.00%
14. Students were productively engaged with learning science	33.33%	66.67%	0.00%	0.00%	0.00%
15. These activities featuring contemporary scientific practices positively impact on students' engagement with science	66.67%	33.33%	0.00%	0.00%	0.00%