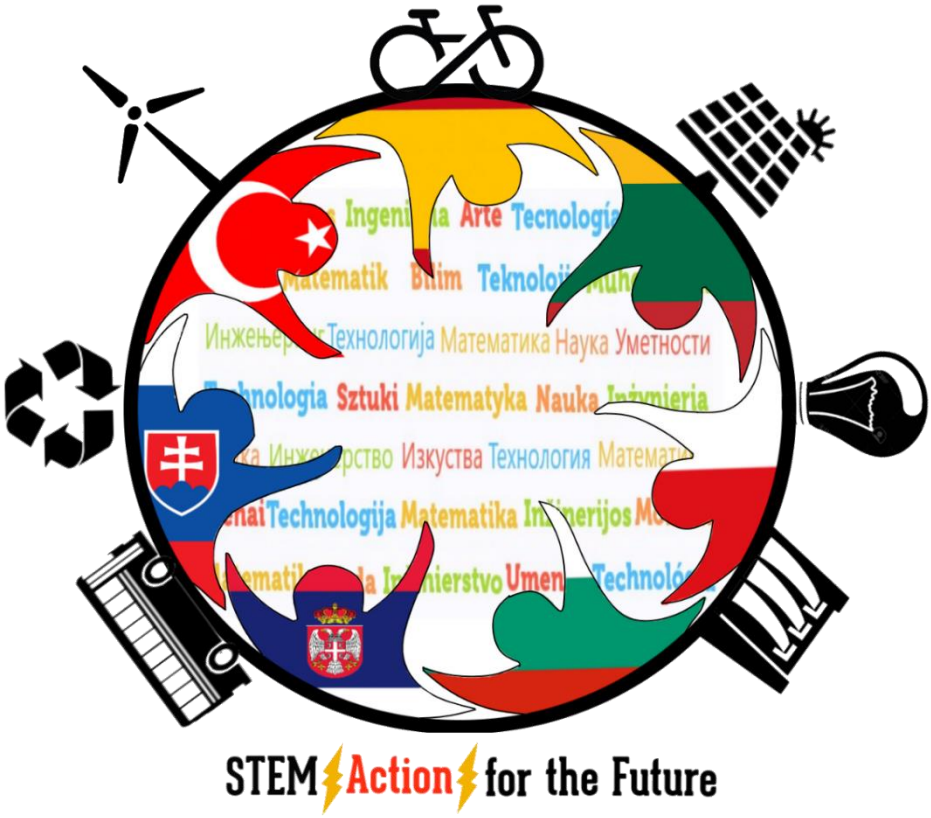
Funded by the European Union




**“STEMAction for the Future”**

**2021-1-ES01-KA220-SCH-000029752**

# SCIENCE CAREER INTEREST OF THE STUDENTS

# ANALYSIS & RESULTS

## INTRODUCTION

In this report, the effectiveness of the student trainings conducted in the Mobilities was investigated.

## PROCEDURE

We measured the effectiveness of the trainings by using a semi-experimental research design. A 12-item Science Career Interest Scale (see Appendix 1) was used to measure the effectiveness of STEM trainings. All items were 5-point Likert Style from 1 (Strongly Disagree) to 5 (Strongly agree). The lowest score that can acquired from the test is 12 and the highest is 60.

The students of the partner countries were given a pre-test on the first day of each mobility before the trainings started. The post-test was administered on the last day after the STEM trainings ended. There were 5 days between the pre-test and post-test. The effectiveness of the trainings was analyzed by Paired Samples t-test.

All analysis were conducted with Jamovi 2.4.8. In order to evaluate the suitability of the data for analysis, reliability analysis was first examined, and it was checked whether the data exhibited a normal distribution. We performed, internal consistency in order to determine the reliability of the scale. If the data were reliable and normally distributed, Paired Samples t-tests was conducted. However, Wilcoxon Signed-Rank Test was used for the cases that did not exhibit normal distribution.

## FINDINGS

### C4 LITHUANIA MOBILITY

A total of 30 students participated from six countries to the Lithuania Mobility. Each partner country sent 5 five students. The 70% of the sample was female and 30% was male. Most of the students were at the age of 13 (66,7%). Detailed sociodemographic characteristics of students in Lithuania Mobility is shown in Table 1 below.

**Table 1**

*Sociodemographic Characteristics of Students in Lihuania Mobility (N=30)*

| Characteristics | Level | n | % |
|---|---|---|---|
| Gender | Female | 21 | 70,0 |
| | Male | 9 | 30,0 |
| Country | Lithuania | 5 | 16,7 |
| | Turkiye | 5 | 16,7 |
| | Bulgaria | 5 | 16,7 |
| | Spain | 5 | 16,7 |
| | Slovakia | 5 | 16,7 |
| | Poland | 5 | 16,7 |
| Age | 12 | 7 | 23,3 |
| | 13 | 20 | 66,7 |
| | 14 | 3 | 10,0 |

For the Lithuania data set, Cronbach's alpha of pre-test and post-test of the 12-item science career interest test were .88 and .90 respectively. In this case, we can propose that the data was reliable.

A Paired samples t-test was conducted to determine the effect of training on science career interest test score.

**Table 2**

*Paired Samples Correlations*

| | | N | r | p. |
|---|---|---|---|---|
| Pair 1 | PreTest & PostTest | 30 | ,460 | <,01 |

The correlation coefficient shows that there is a significant positive relationship between science career interest test score before the training and science career interest test score after the training [r(30) = .46, p = .01].

**Table 3**

*Results of pair samples t-test of pre-test and post-test of science career interest*

| Parameter | Pre-test | | | Post-test | | | *t*(29) | *p* | Cohen's *d* |
|---|---|---|---|---|---|---|---|---|---|
| | *N* | *M* | *SD* | *N* | *M* | *SD* | | | |
| Science Career Interest | 30 | 36,1 | 8,1 | 30 | 43,7 | 7,85 | -5,04 | <,001 | -,92 |

The results indicate a significant difference between science career interest score before training (M=36,1; SD=8,06) and science career interest test score after training (M=43,7; SD=7,84); [t(29) = 5,036, p = <,01].

The 95% confidence interval of the difference between the means ranged from [-10,68 to -4,51] and indicated a significant difference between the means of the samples. After the training, science career interest of the students was increased significantly. We, therefore, conclude that there is a significant effect of the training on a science career interest of the students.

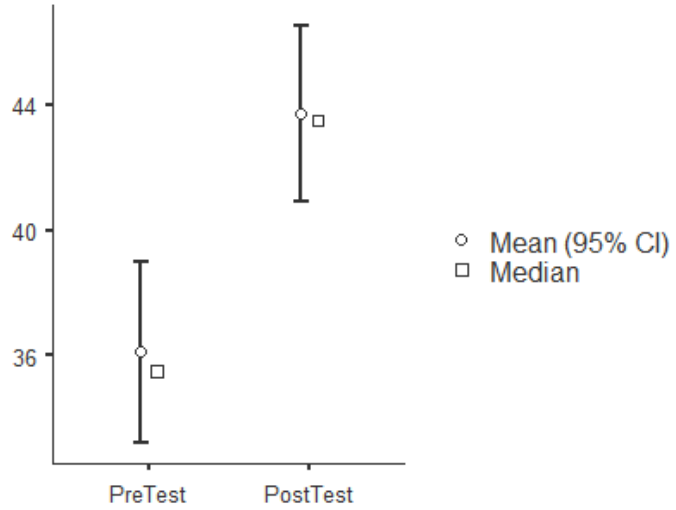



**Figure 1.** Descriptive Plots of Pre-test and Post-test

**C5 BULGARIA MOBILITY**

A total of 30 students participated from six countries to the Bulgaria Mobility. Each partner country sent 5 five students. The 73,3% of the sample was female and 26,7% was male. Most of the students were at the age of 12 (56,7%). Detailed sociodemographic characteristics of students in Bulgaria Mobility is shown in Table 4 below.

**Table 4**

*Sociodemographic Characteristics of Students in Bulgaria Mobility (N=30)*

| Characteristics | Level | n | % |
|---|---|---|---|
| Gender | Female | 22 | 73,3 |
| | Male | 8 | 26,7 |
| Country | Lithuania | 5 | 16,7 |
| | Turkiye | 5 | 16,7 |
| | Bulgaria | 5 | 16,7 |
| | Spain | 5 | 16,7 |
| | Slovakia | 5 | 16,7 |
| | Poland | 5 | 16,7 |
| Age | 11 | 1 | 3,3 |
| | 12 | 17 | 56,7 |
| | 13 | 2 | 6,7 |
| | 14 | 8 | 26,7 |
| | 15 | 2 | 6,7 |

For the Bulgaria data set, Cronbach's alpha of pre-test and post-test of the 12-item science career interest test were .86 and .87 respectively. In this case, we can propose that the data was reliable.

A Paired samples t-test was conducted to determine the effect of training on science career interest test score.

**Table 5**

*Paired Samples Correlations*

| | | N | r | p. |
|---|---|---|---|---|
| Pair 1 | PreTest & PostTest | 30 | ,72 | < .01 |

The correlation coefficient shows that there is a significant positive relationship between science career interest test score before the training and science career interest test score after the training [r(30) = .72, p = .<01].

**Table 6**

*Results of pair samples t-test of pre-test and post-test of science career interest*

| Parameter | Pre-test | | | Post-test | | | *t*(29) | *p* | Cohen's *d* |
|---|---|---|---|---|---|---|---|---|---|
| | *N* | *M* | *SD* | *N* | *M* | *SD* | | | |
| Science Career Interest | 30 | 43,1 | 7,2 | 30 | 47,5 | 7,2 | -4,44 | < .001 | -,81 |

The results indicate a significant difference between science career interest score before training (M=43,1; SD=7,2) and science career interest test score after training (M=47,5; SD=7,2); [t(29) = -4,44, p = <,01].

After the training, science career interest of the students was increased significantly. We, therefore, conclude that there is a significant effect of the training on a science career interest of the students.

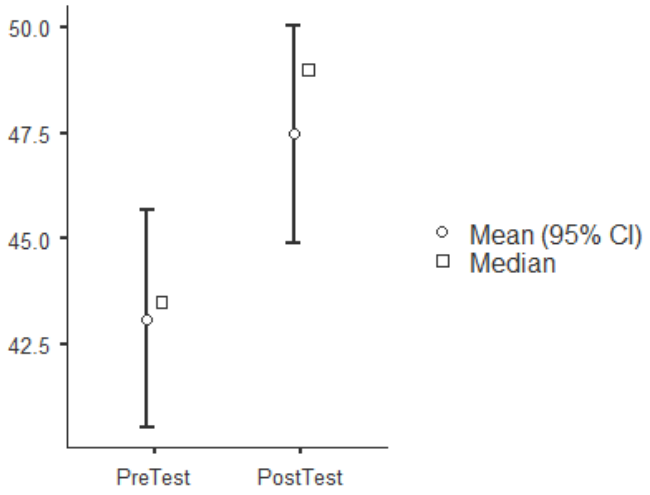



**Figure 2.** Descriptive Plots of Pre-test and Post-test

**C6 SLOVAKIA MOBILITY**

A total of 30 students participated from six countries to the Slovakia Mobility. Each partner country sent 5 five students. The 70% of the sample was female and 30 % was male. Most of the students were at the age of 14 (36,7%). Detailed sociodemographic characteristics of students in Slovakia Mobility is shown in Table 7 below.

**Table 7**

*Sociodemographic Characteristics of Students in Slovakia Mobility (N=30)*

| Characteristics | Level | n | % |
|---|---|---|---|
| Gender | Female | 21 | 70 |
| | Male | 9 | 30 |
| Country | Lithuania | 5 | 16,7 |
| | Turkiye | 5 | 16,7 |
| | Bulgaria | 5 | 16,7 |
| | Spain | 5 | 16,7 |
| | Slovakia | 5 | 16,7 |
| | Poland | 5 | 16,7 |
| Age | 12 | 3 | 10,0 |
| | 13 | 11 | 53,3 |
| | 14 | 16 | 36,7 |

For the Slovakia data set, Cronbach's alpha of pre-test and post-test of the 12-item science career interest test were .92 and .92 respectively. In this case, we can propose that the data was reliable.

A Paired samples t-test was conducted to determine the effect of training on science career interest test score.

**Table 8**

*Paired Samples Correlations*

| | | N | r | p. |
|---|---|---|---|---|
| Pair 1 | PreTest & PostTest | 30 | ,64 | <,001 |

The correlation coefficient shows that there is a significant positive relationship between science career interest test score before the training and science career interest test score after the training [r(30) = .64, p = .<001].

**Table 9**

*Results of pair samples t-test of pre-test and post-test of science career interest*

| Parameter | Pre-test | | | Post-test | | | *t*(29) | *p* | Cohen's *d* |
|---|---|---|---|---|---|---|---|---|---|
| | *N* | *M* | *SD* | *N* | *M* | *SD* | | | |
| Science Career Interest | 30 | 41,6 | 9,2 | 30 | 44,8 | 8,4 | -2,24 | ,03 | -.41 |

The results indicate a significant difference between science career interest score before training (M=41,6; SD=9,2) and science career interest test score after training (M=44,8; SD=8,4); [t(29) = -2,24, p = <,05].

After the training, science career interest of the students was increased significantly.

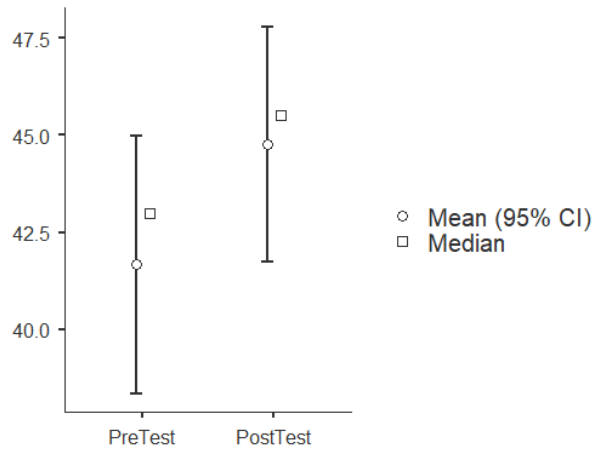



**Figure 3.** Descriptive Plots of Pre-test and Post-test

**C7 TURKIYE MOBILITY**

A total of 30 students participated from six countries to the Turkiye Mobility. Each partner country sent 5 five students. The 53,3 % of the sample was female and 46,7 % was male. Most of the students were at the age of 18 (60%). Detailed sociodemographic characteristics of students in Turkiye Mobility is shown in Table 10 below.

**Table 10**

*Sociodemographic Characteristics of Students in Turkiye Mobility (N=30)*

| Characteristics | Level | n | % |
|---|---|---|---|
| Gender | Female | 16 | 53,3 |
| | Male | 14 | 46,7 |
| Country | Lithuania | 5 | 16,7 |
| | Turkiye | 5 | 16,7 |
| | Bulgaria | 5 | 16,7 |
| | Spain | 5 | 16,7 |
| | Slovakia | 5 | 16,7 |
| | Poland | 5 | 16,7 |
| Age | 12 | 1 | 3,3 |
| | 13 | 18 | 60,0 |
| | 14 | 9 | 30,0 |
| | 15 | 2 | 6,7 |

For the Turkiye data set, Cronbach's alpha of pre-test and post-test of the 12-item science career interest test were .88 and .83 respectively. In this case, we can propose that the data was reliable.

A Paired samples t-test was conducted to determine the effect of training on science career interest test score.

**Table 11**

*Paired Samples Correlations*

| | | N | r | p. |
|---|---|---|---|---|
| Pair 1 | PreTest & PostTest | 30 | ,48 | ,007 |

The correlation coefficient shows that there is a significant positive relationship between science career interest test score before the training and science career interest test score after the training [r(30) = .48, p = .<01].

**Table 12**

*Results of pair samples t-test of pre-test and post-test of science career interest*

| Parameter | Pre-test | | | Post-test | | | *t*(29) | *p* | Cohen's *d* |
|---|---|---|---|---|---|---|---|---|---|
| | *N* | *M* | *SD* | *N* | *M* | *SD* | | | |
| Science Career Interest | 30 | 42,5 | 7,4 | 30 | 49,4 | 6,0 | -5,39 | <,001 | -.99 |

The results indicate a significant difference between science career interest score before training (M=42,5; SD=7,4) and science career interest test score after training (M=49,5; SD=6,0); [t(29) = -5,39, p = <,001].

After the training, science career interest of the students was increased significantly.

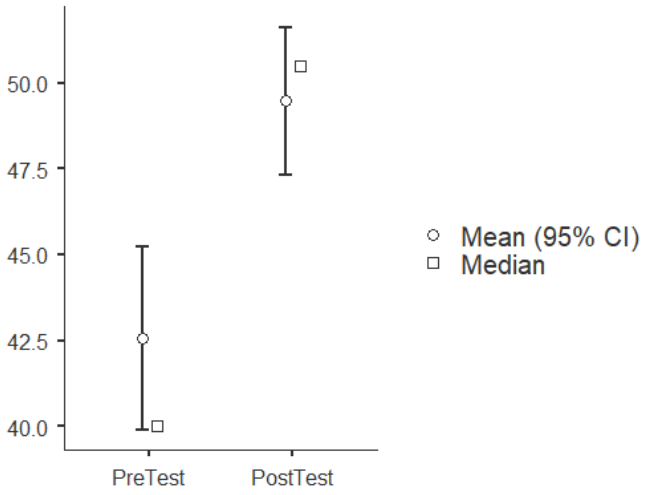



**Figure 4.** Descriptive Plots of Pre-test and Post-test

**C8 POLAND MOBILITY**

A total of 28 students participated from six countries to the Poland Mobility. The 71.4 % of the sample was female and 28,6 % was male. Most of the students were at the age of 18 (60%). Detailed sociodemographic characteristics of students in Poland Mobility is shown in Table 13 below.

**Table 13**

*Sociodemographic Characteristics of Students in Turkiye Mobility (N=30)*

| Characteristics | Level | n | % |
|---|---|---|---|
| Gender | Female | 20 | 71.4 |
| | Male | 8 | 28.6 |
| Country | Lithuania | 5 | 17,9 |
| | Turkiye | 5 | 17,9 |
| | Bulgaria | 5 | 17,9 |
| | Spain | 5 | 17,9 |
| | Slovakia | 5 | 17,9 |
| | Poland | 3 | 10,7 |
| Age | 11 | 1 | 3,6 |
| | 12 | 2 | 7,1 |
| | 13 | 15 | 53,6 |
| | 14 | 9 | 32,1 |
| | 15 | 1 | 3,6 |

For the Poland data set, Cronbach's alpha of pre-test and post-test of the 12-item science career interest test were .95 and .93 respectively. In this case, we can propose that the data was reliable.

A Paired samples t-test was conducted to determine the effect of training on science career interest test score.

**Table 14**

*Paired Samples Correlations*

| | | N | r | p. |
|---|---|---|---|---|
| Pair 1 | PreTest & PostTest | 28 | ,31 | ,105 |

The correlation coefficient shows that there is not a significant relationship between science career interest test score before the training and science career interest test score after the training [r(28) = .31, p = >.05].

**Table 15**

*Results of pair samples t-test of pre-test and post-test of science career interest*

| Parameter | Pre-test | | | Post-test | | | *t*(27) | *p* | Cohen's *d* |
|---|---|---|---|---|---|---|---|---|---|
| | *N* | *M* | *SD* | *N* | *M* | *SD* | | | |
| Science Career Interest | 28 | 33.21 | 9.74 | 28 | 53 | 6,96 | -10.43 | <,001 | -1.97 |

The results indicate a significant difference between science career interest score before training (M=33.21; SD=9.74) and science career interest test score after training (M=53,5; SD=6.96); [t(27) = -10.43, p = <,001].

After the training, science career interest of the students was increased significantly.

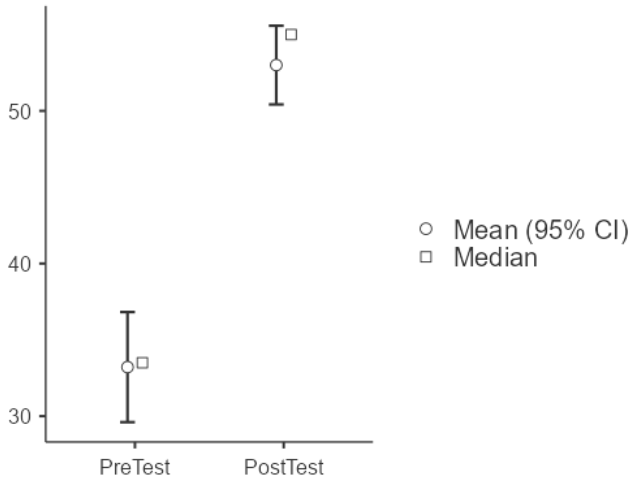



**Figure 5.** Descriptive Plots of Pre-test and Post-test

# Appendix 1. Career Interest Questionnaire

| | |
|---|---|
| **Group :** | ☐ Pre-Test ☐ Post-Test |
| **ID:** …… | Use the year's last two digit and day of your birthday after your name's first letter (ex: A0916 if name Arda and born on the 16th day of any month in 2009. |

Dear Students,

In this questionnaire, you are expected to evaluate your own STEM career interest through the STEM activities held in Nitra, Slovakia between the dates 16th-20th October, 2023. This survey contains 3 parts. Read each statement and then cross out the choice that best shows how you feel. For the success of our project, it is important that you answer each question sincerely. Thank you for your contribution.

STEMAction for the Future Project Team
(ERASMUS+ KA220 | 2021-1-ES01-KA220-SCH-000029752)

**Voluntary Participation Consent**

Participation in the questionnaire is completely voluntary. The answers will be kept completely confidential and evaluated only by the researchers. The data will only be used for scientific purposes and will not be shared with the third parties. The questionnaire does not contain questions and situations that may cause personal discomfort. However, if you feel uncomfortable with the questions or any other reason during participation, you can stop answering.

☐ I voluntarily participate in this study, and I accept the use of my answers for scientific purposes.

**Demographics**

**Gender** : ☐ Female ☐ Male

**Age:** …… **Country:** ……..

**Instructions: Select one level of agreement for each statement to indicate how you feel.**
**SD = Strongly Disagree, D = Disagree, U = Undecided, A = Agree, SA = Strongly Agree**

| **Part 1** | **SD** | **D** | **U** | **A** | **SA** |
|---|---|---|---|---|---|
| 1. I would like to have a career in science. | 1 | 2 | 3 | 4 | 5 |
| 2. My family is interested in the science courses I take. | 1 | 2 | 3 | 4 | 5 |
| 3. I would enjoy a career in science. | 1 | 2 | 3 | 4 | 5 |
| 4. My family has encouraged me to study science. | 1 | 2 | 3 | 4 | 5 |
| 5. I will make it into a good college and major in an area needed for a career in science. | 1 | 2 | 3 | 4 | 5 |
| 6. I will graduate with a college degree in a major area needed for a career in science. | 1 | 2 | 3 | 4 | 5 |
| 7. I will have a successful professional career and make substantial scientific contributions. | 1 | 2 | 3 | 4 | 5 |
| 8. I will get a job in a science-related area. | 1 | 2 | 3 | 4 | 5 |
| 9. Some day when I tell others about my career, they will respect me for doing scientific work. | 1 | 2 | 3 | 4 | 5 |
| 10. A career in science would enable me to work with others in meaningful ways. | 1 | 2 | 3 | 4 | 5 |
| 11. Scientists make a meaningful difference in the world. | 1 | 2 | 3 | 4 | 5 |
| 12. Having a career in science would be challenging. | 1 | 2 | 3 | 4 | 5 |