



May 2024

STEM for Inclusive Schools

REPORT

**on survey research and
focus group interviews**



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Co-funded by
the European Union



STEM for Inclusive Schools

Report on survey research and focus group interviews (WP2, A2.2)

Project Title: STEM for Inclusive Schools

Acronym: STEMInSCH

Reference number: **2023-1-DE02-KA220-000151162**

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Introduction:

This report summarizes the survey and focus group interviews conducted as part of Work Package 2 (STEM Activities Design and OER), Activity 2.2 (Collecting Data and Field Research). According to the project application, the target group was teachers and students. Activities related to the research were carried out following the methodology previously developed by the Action Leader, Łukasiewicz - Institute for Sustainable Technologies (P4), with the participation of other partners.

The research aimed to understand the needs, challenges, and opportunities associated with integrating digital technologies in STEM learning and teaching, and to identify best practices for increasing participation in STEM fields. It explored how teachers could effectively use digital tools in the teaching process, how to adapt educational materials to the diverse learning styles of students, and how to support teachers in identifying and solving learning difficulties. In addition, the study also aimed to identify the challenges that STEM teachers faced in terms of female students' participation in STEM, to increase their participation in science and encourage them to pursue education in this field.

Research Target Group:

The study involved teachers and students from various schools (both primary and secondary schools) who were engaged in the STEM learning and teaching process. Among teachers, both those experienced in using digital technologies in education and those who were just starting to work in this area were identified, providing a comprehensive understanding of the outcomes. Study participants represented various STEM fields and education levels. Taking into account the provisions of the project application regarding the underrepresentation of women/girls in STEM subjects, emphasis was placed on gender parity.

Methodology:

The structure of the research was divided into two phases and was carried out by partners in each country (Germany, Poland, Romania, Portugal, Türkiye).

PHASE 1: The first stage involved conducting a survey among teachers and students to collect quantitative data. The questionnaire examined various aspects of STEM education and related issues, such as the frequency of use of technology in teaching, perceptions of the importance of STEM education for future career opportunities, challenges associated with teaching STEM, and suggestions for improving the process. Additionally, various social issues were explored, such as gender differences



in STEM, parental support, the integration of different social groups in STEM education, and the influence of media and popular culture on interest in science. The questionnaire was divided into two blocks: Block 1 for teachers, and Block 2 for students (Appendix 1). While the project application specified a minimum of 20 participants (10 teachers and 10 students), efforts were made to survey as many respondents as possible. A larger sample size increased the likelihood of obtaining results that were representative of the entire population and minimized errors stemming from random group differences. Furthermore, increasing the number of respondents enhanced the statistical power of the study, leading to greater confidence in the accuracy of the results and conclusions.

Surveys were conducted both in person and via an online form. Paper questionnaires (in the language version of a given partner) were printed, distributed to respondents, and then collected by the person coordinating the research. The online form was developed by the Activity leader (P4) and forwarded to the other partners for translation. A link to the form in the partner's language version was provided to respondents.

If respondents completed paper versions of the form, the person coordinating the process had to enter the results into a Google Form (the same link that respondents completing the online questionnaire received). This enabled efficient collection of results in one database and integration of the results into one collective file.

PHASE 2: The second step involved identifying a minimum of 10 students and 10 teachers to participate in a focus group interview, which served as an in-depth follow-up to the previously conducted surveys. These interviews could be conducted either face-to-face or through available digital platforms (e.g., Zoom, Teams, Google Meet, etc.). The insights gathered from these interviews enriched the study by providing qualitative data within the subject area. The structure and method of the interviews adhered to the following guidelines:

- **Organization of the interview:** Each interview took place in an atmosphere of complete trust by adhering to the following guidelines: (1) Greeting participants in a warm and friendly manner to build a sense of comfort and trust. (2) Demonstrating understanding and empathy towards participants, listening to them carefully, and showing interest in their experiences and opinions. (3) Emphasizing that all opinions were valuable and would not be judged, which encouraged open sharing of views.
- **Introduction:** Introducing the purpose of the interview and providing participants with clarity about its importance was crucial. This involved explaining how their



insights would contribute to advancing understanding in the field, shaping educational practices, and ultimately benefiting students' learning experiences.

- **Conduction of the interview:** During the interview, open questions were asked (as outlined in Appendix 2) to encourage participants to freely share their experiences, opinions, and reflections. Dialogue and exchange of views between participants were encouraged to foster a more open and dynamic atmosphere. Notes were kept for each question, containing the most important insights from respondents' answers, ensuring valuable contributions were captured effectively.
- **Summary:** At the end of the interview, the main points discussed were summarized, highlighting key insights and perspectives shared by the participants. Then, participants were invited to provide any additional comments or questions they might have, ensuring that their voices were fully heard and addressing any lingering concerns or ideas they wished to share.
- **Completing the report:** After summarizing the main points discussed during the interview, the interviewer proceeded to fill out the results form as outlined in Appendix 3. This involved documenting the key findings, insights, and observations derived from the interview. Each section of the form was completed accurately to ensure that all relevant information was captured and properly recorded for analysis.

If required by national law, participants in surveys and/or focus group interviews were asked to sign declarations of consent to participate in the research. The declaration form was attached as Appendix 4, outlining the purpose of the research, the voluntary nature of participation, and the confidentiality of their responses. Participants were given the opportunity to review the form and ask any questions before providing their consent.

Indicators:

Number of teachers participating in Phase 1: **107** (assumed in the methodology: 60)

Number of students participating in Phase 1: **166** (assumed in the methodology: 60)

Number of teachers participating in Phase 2: **60** (assumed in the methodology: 60)

Number of students participating in Phase 2: **80** (assumed in the methodology: 60)

Research reports on Phase 2 (prepared by each partner) = **6** (assumed in the methodology: 6)

All the assumed indicators were achieved.



Deadlines of individual phases of the research:

25 March 2024 – Approval of the final version of the questionnaire and questions for in-depth interview.

27 March 2024 – Development of an online form (Google Forms) by the Activity leader, P4.

2 April 2024 – Translation of the questionnaire and questions for in-depth interviews into national languages.

26 April 2024 – Conducting a survey and in-depth interviews.

3 May 2024 - Completion of response forms (providing the quantitative results [Excel database from Google Forms] and qualitative research results) by each partner.

17 May 2024 – Preparation of the final report by the task leader (P4).

The completion of this phase is an important milestone in the project schedule as all indicators have been successfully achieved and will allow the project to move on to the next phases. The following sections of this report will present detailed insights and analyses derived from the data collected.

Results:

The first part below presents tables containing survey research results from individual countries (percentage data), then summary results presented in charts. The second part presents the results of focus group interviews from individual partner countries and summarizes the most important insights recurring in different countries. The number of individual answers is given in brackets next to the percentages. It should be noted that some questions allowed for more than one answer. A green filled cell indicates the highest percentage.

Survey research results: Block 1 – Filled in by teachers

Research sample by country:

Germany (P1): **10**

Poland (P4): **14**

Portugal (P6): **24**

Romania 1 (P2): **17**

Romania 2 (P3): **26**

Türkiye (P5): **16**

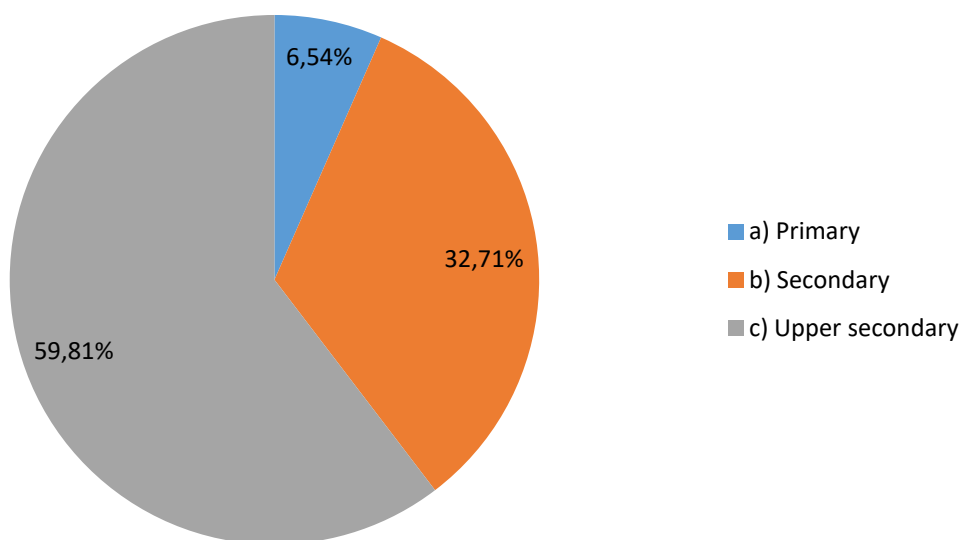
TOTAL: 107



1.1. What school are you a teacher at?

	a) Primary school	b) Secondary school (lower secondary)	c) Upper secondary school (high school, vocational school)
Germany			100% (10)
Poland	14,3% (2)	-	85,7% (12)
Portugal	-	25% (6)	75% (18)
Romania 1	-	-	94,1% (16)*
Romania 2	7,7% (2)	88,5% (23)	3,8% (1)
Türkiye	18,8% (3)	37,5% (6)	43,8% (7)
TOTAL	6,54% (7)	32,71% (35)	59,81% (64)

* In Romania, one university teacher also took part in the study (5,9%).



The vast majority of teachers from upper secondary schools (59,81%) and secondary schools (32,71%) participated in the research study. In addition, one academic teacher also completed the survey.

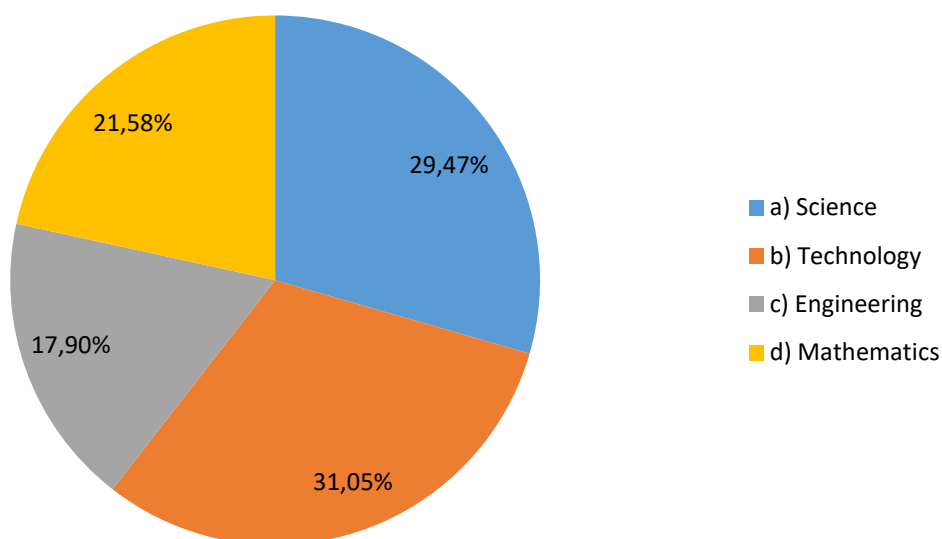
1.2. In which country is your school located?

	a) Germany	b) Poland	c) Portugal	d) Romania	e) Türkiye
Germany	100% (10)	-	-	-	-
Poland	-	100% (14)	-	-	-
Portugal	-	-	100% (24)	-	-
Romania1	-	-	-	100% (17)	-
Romania 2	-	-	-	100% (26)	-
Türkiye	-	-	-	-	100% (16)



1.3. Which STEM subjects are you most interested in? (Select all that apply)

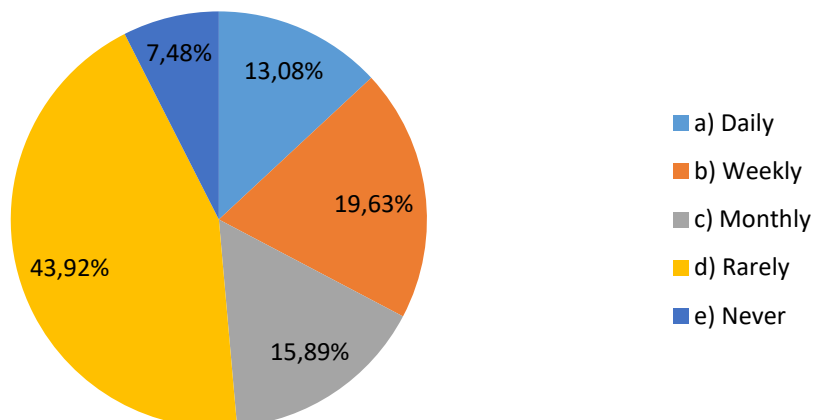
	a) Science	b) Technology	c) Engineering	d) Mathematics
Germany	50% (5)	10% (1)	20% (2)	20% (2)
Poland	71,4% (10)	71,4% (10)	85,7% (12)	71,4% (10)
Portugal	25% (6)	70,8% (17)	20,8% (5)	20,8% (5)
Romania 1	47,2% (7)	64,7% (11)	52,9% (9)	23,5% (4)
Romania 2	68% (17)	40% (10)	4% (1)	44% (11)
Türkiye	68,8% (11)	62,5% (10)	31,3% (5)	56,3% (9)
TOTAL	29,47% (56)	31,05% (59)	17,90% (34)	21,58% (41)



The results regarding interest in specific STEM disciplines are more or less even. However, a slight advantage in the study group can be observed in the case of technology (31,05%).

1.4. How often do you engage in STEM-related activities outside of school?

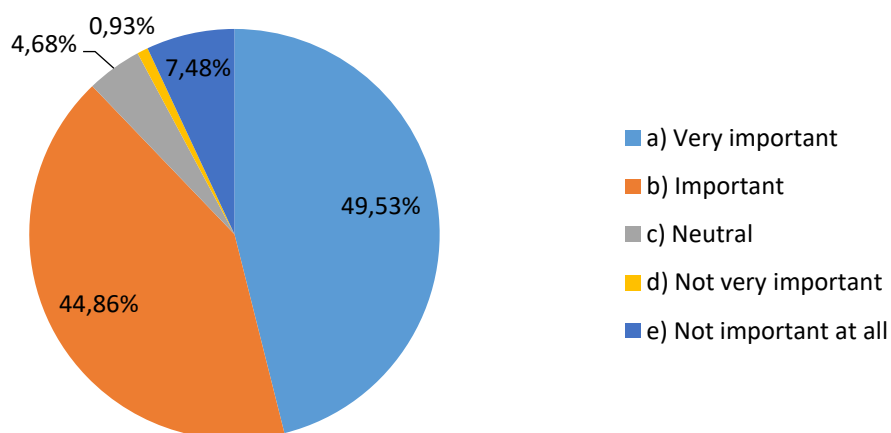
	a) Daily	b) Weekly	c) Monthly	d) Rarely	e) Never
Germany	10% (1)	20% (2)	50% (5)	20% (2)	-
Poland	28,6% (4)	57,1% (8)	-	14,3% (2)	-
Portugal	20,8% (5)	8,3% (2)	8,3% (2)	45,8% (11)	16,7% (4)
Romania 1	17,6% (3)	17,6% (3)	17,6% (3)	41,2% (7)	5,9% (1)
Romania 2	-	11,5% (3)	11,5% (3)	65,4% (17)	11,5% (3)
Türkiye	6,3% (1)	18,8% (3)	25% (4)	50% (8)	-
TOTAL	13,08% (14)	19,63% (21)	15,89% (17)	43,92% (47)	7,48% (8)



More than half of the respondents admitted that they rarely (43,92%) or never (7,48%) engage in STEM-related activities outside of school. Nevertheless, almost half admitted that they participate in this type of activities. In this case, the largest percentage of teachers engage in them weekly.

1.5. How important do you think STEM education is for future career opportunities?

	a) Very important	b) Important	c) Neutral	d) Not very important	e) Not important at all
Germany	30% (3)	40% (4)	20% (2)	10% (1)	-
Poland	71,4% (10)	14,3% (2)	14,3% (2)	-	-
Portugal	45,8% (11)	54,2% (13)	-	-	-
Romania 1	41,2% (7)	58,8% (10)	-	-	-
Romania 2	46,2% (12)	50% (13)	3,8% (1)	-	-
Türkiye	62,5% (10)	37,5% (6)	-	-	-
TOTAL	49,53% (53)	44,86% (48)	4,68% (5)	0,93% (1)	-

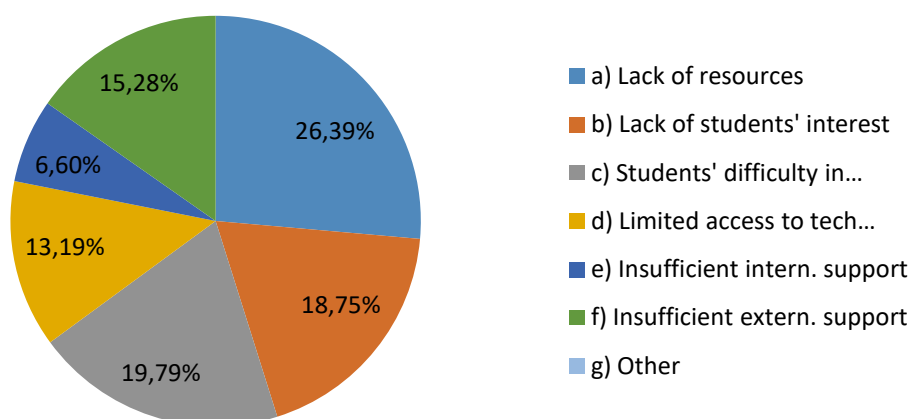




The surveyed teachers admitted that STEM education is very important (49,53%) or important (44,86%) for future career opportunities. None indicated the answer "e) Not important at all".

1.6 What challenges do you face in teaching STEM subjects? (Select all that apply)

	a) Lack of resources	b) Lack of students' interest	c) Students' difficulty in understanding concepts	d) Limited access to technology	e) Insufficient internal support (headmaster, other peers)	f) Insufficient external support (national and local government units, associations, etc.)	g) Other (please specify):
Germany	90% (9)	90% (9)	100% (10)	30% (3)	-	10% (1)	-
Poland	57,1% (8)	42,9% (6)	42,9% (6)	42,9% (6)	14,3% (2)	42,9% (6)	-
Portugal	66,7% (16)	45,8% (11)	54,3% (13)	54,3% (13)	33,3% (8)	29,2% (7)	-
Romania 1	52,9% (9)	70,6% (12)	64,7% (11)	29,4% (5)	5,9% (1)	41,2% (7)	-
Romania 2	84,6% (22)	23,1% (6)	38,5% (10)	19,2% (5)	3,8% (1)	61,5% (16)	-
Türkiye	75% (12)	62,5% (10)	43,8% (7)	37,5% (6)	43,8% (7)	43,8% (7)	-
TOTAL	26,39% (76)	18,75% (54)	19,79% (57)	13,19% (38)	6,60% (19)	15,28% (44)	-

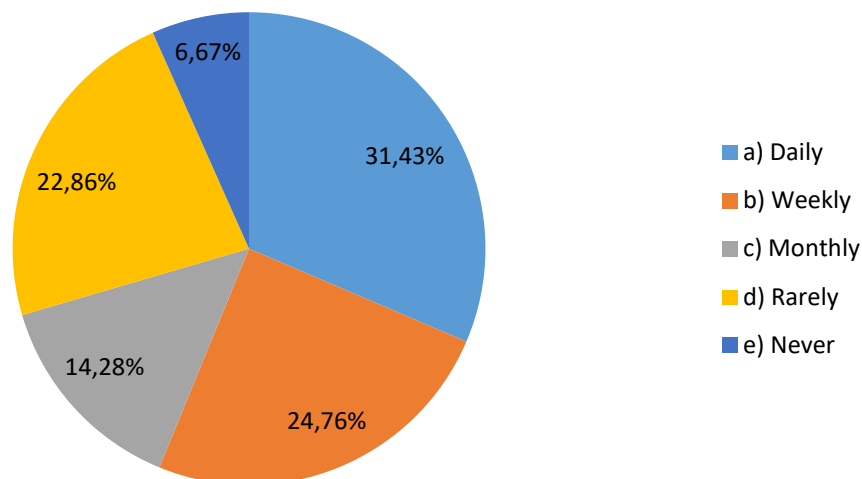


Respondents most often indicated a lack of resources (26,39%), students' difficulty in understanding concepts (19,79%), lack of students' interest (18,75%), and insufficient external support (15,28%). The results allow to conclude that one of the most common challenges are those related to the students themselves, not only with access to resources, technology, or support.



1.7. How often do you use technology in your STEM teaching?

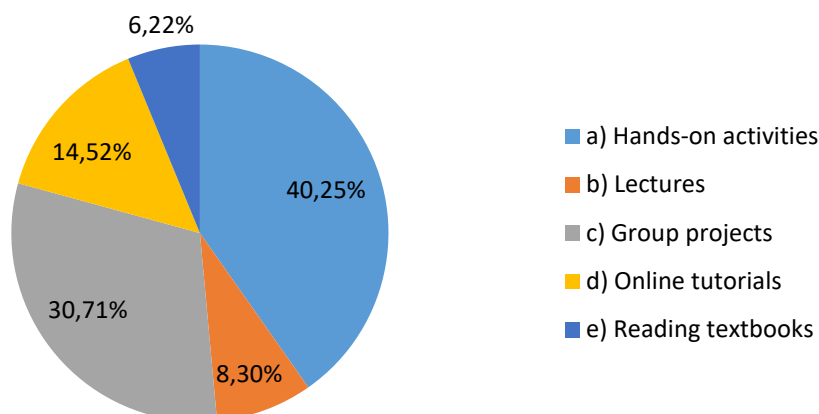
	a) Daily	b) Weekly	c) Monthly	d) Rarely	e) Never
Germany	-	40% (4)	50% (5)	10% (1)	-
Poland	83,3% (10)	-	-	-	16,7% (2)
Portugal	29,2% (7)	16,7% (4)	25% (6)	16,7% (4)	12,5% (3)
Romania 1	11,8% (2)	47,1% (8)	11,8% (2)	23,5% (4)	5,9% (1)
Romania 2	34,6% (9)	19,2% (5)	7,7% (2)	34,6% (9)	3,8% (1)
Türkiye	31,3% (5)	31,3% (5)	-	37,5% (6)	-
TOTAL	31,43% (33)	24,76% (26)	14,28% (15)	22,86% (24)	6,67% (7)



The surveyed teachers answered that they use various types of technologies in STEM teaching daily (31,43%) or weekly (24,76%). Despite this, a large percentage still admitted that they use technology in STEM teaching more rarely than monthly (22,86%) or never (6,67%).

1.8. How do you prefer to teach STEM subjects? (Select all that apply)

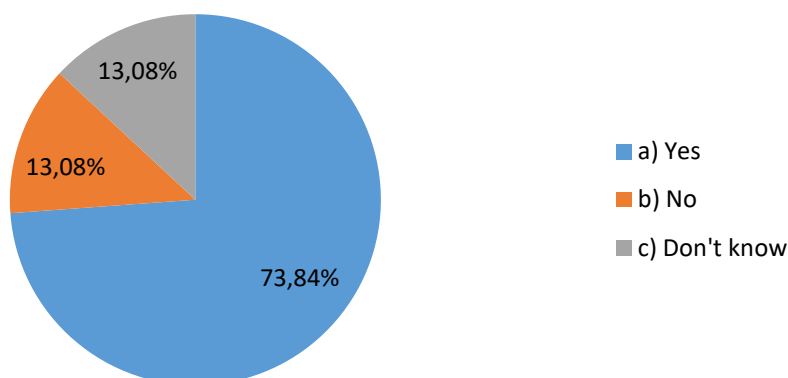
	a) Hands-on activities	b) Lectures	c) Group projects	d) Online tutorials	e) Reading textbooks
Germany	100% (10)	80% (8)	100% (10)	80% (8)	50% (5)
Poland	85,7% (12)	-	71,4% (10)	14,3% (2)	14,3% (2)
Portugal	91,7% (22)	-	58,3% (14)	20,8% (5)	-
Romania 1	88,2% (15)	23,5% (4)	58,8% (10)	35,3% (6)	5,9% (1)
Romania 2	92% (23)	8% (2)	68% (17)	36% (9)	16% (4)
Türkiye	93,8% (15)	37,5% (6)	81,3% (13)	31,3% (5)	18,8% (3)
TOTAL	40,25% (97)	8,30% (20)	30,71% (74)	14,52% (35)	6,22% (15)



The surveyed teachers mostly prefer to teach STEM through hands-on activities (40,25%) and group projects (30,71%). Lectures (8,30%) and reading textbooks (6,22%) were considered the least preferred form of teaching.

1.9. Do you think STEM education adequately prepares students for real-world challenges?

	a) Yes	b) No	c) Don't know
Germany	70% (7)	30% (3)	-
Poland	71,4% (10)	28,6% (4)	-
Portugal	62,5% (15)	12,5% (3)	25% (6)
Romania 1	70,6% (12)	5,9% (1)	23,5% (4)
Romania 2	76,9% (20)	7,7% (2)	15,4% (4)
Türkiye	93,8% (15)	6,3% (1)	-
TOTAL	73,84% (79)	13,08% (14)	13,08% (14)

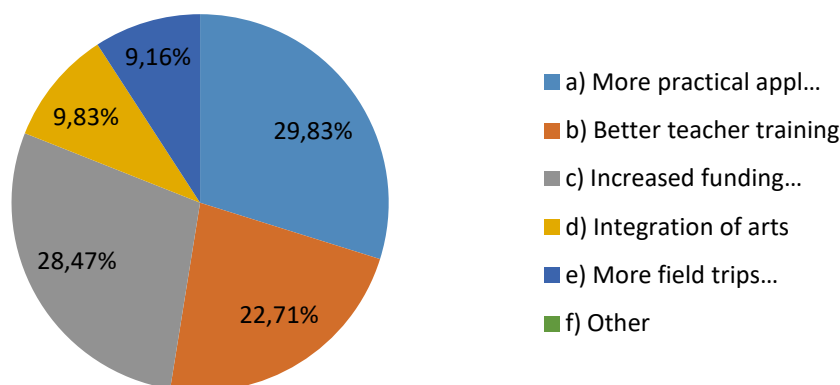


Almost three-quarters of respondents believed that STEM education adequately prepares students for real-world challenges (73,84%). 13,08% indicated that it does not prepare students for real-world challenges, and the same percentage (13,08%) admitted that they do not know.



1.10. What improvements would you suggest for enhancing STEM education? (Select all that apply)

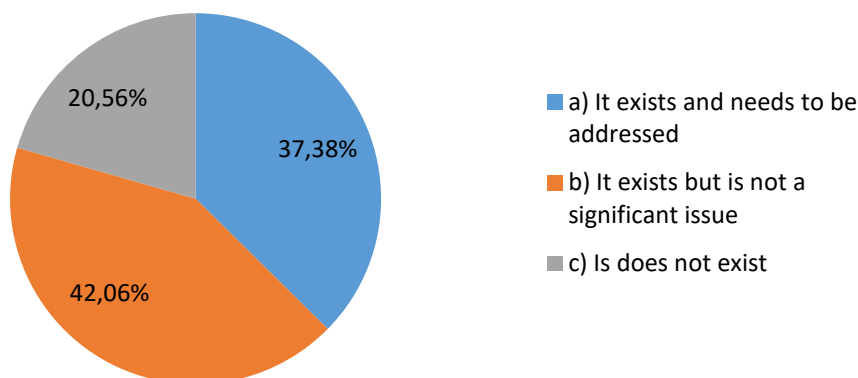
	a) More practical applications	b) Better teacher training	c) Increased funding for resources	d) Integration of arts (STEAM)	e) More field trips and guest speakers	f) Other (please specify):
Germany	70% (7)	90% (9)	90% (9)	-	-	-
Poland	85,7% (12)	57,1% (8)	100% (14)	14,3% (2)	14,3% (2)	-
Portugal	70,8% (17)	83,3% (20)	58,3% (14)	16,7% (4)	8,3% (2)	-
Romania 1	88,2% (15)	52,9% (9)	82,4% (14)	17,6% (3)	35,3% (6)	-
Romania 2	80,8% (21)	42,3% (11)	88,5% (23)	46,2% (12)	30,8% (8)	-
Türkiye	100% (16)	62,5% (10)	62,5% (10)	50% (8)	56,3% (9)	-
TOTAL	29,83% (88)	22,71% (67)	28,47% (84)	9,83% (29)	9,16% (27)	-



According to respondents, to enhance STEM education it is necessary to use more practical applications (29,83%), increase funding for resources (28,47%), and provide better teacher training (22,71%). Almost every tenth survey participant indicated integration of arts (9,83%) and more field trips and guest speakers (9,16%).

1.11. Do you perceive the gender gap in STEM fields?

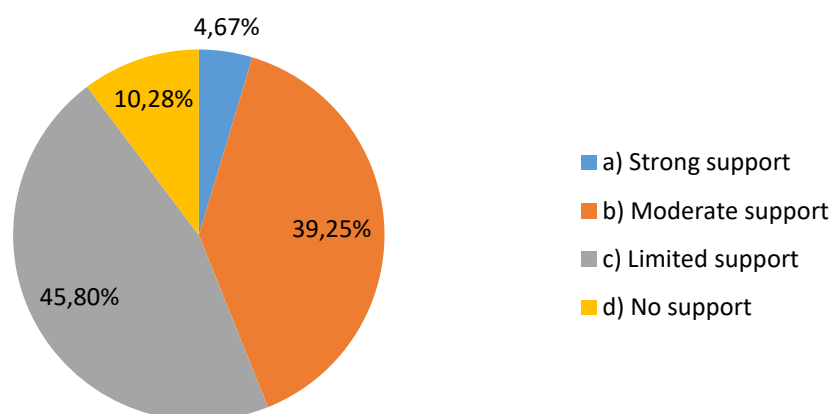
	a) It exists and needs to be addressed	b) It exists but is not a significant issue	c) It does not exist
Germany	50% (5)	30% (3)	20% (2)
Poland	28,6% (4)	57,1% (8)	14,3% (2)
Portugal	41,7% (10)	50% (12)	8,3% (2)
Romania 1	17,6% (3)	47,1% (8)	35,3% (6)
Romania 2	34,6% (9)	42,3% (11)	23,1% (6)
Türkiye	56,3% (9)	18,8% (3)	25% (4)
TOTAL	37,38% (40)	42,06% (45)	20,56% (22)



Almost 80% of the surveyed teachers noticed the gender gap in STEM fields, of which 42,06% believe that it is not a significant issue, and 37,38% admitted that it needed to be addressed. The remaining 20,56% of respondents believe that the gender gap in STEM fields does not exist.

1.12. How do you rate the level of support for STEM education in your community?

	a) Strong support	b) Moderate support	c) Limited support	d) No support
Germany	20% (2)	60% (6)	20% (2)	-
Poland	-	42,9% (6)	42,9% (6)	14,3% (2)
Portugal	-	33,3% (8)	58,3% (14)	8,2% (2)
Romania 1	5,9% (1)	47,1% (8)	41,2% (7)	5,9% (1)
Romania 2	3,8% (1)	30,8% (8)	42,3% (11)	23,1% (6)
Türkiye	6,3% (1)	37,5% (6)	56,3% (9)	-
TOTAL	4,67% (5)	39,25% (42)	45,80% (49)	10,28% (11)

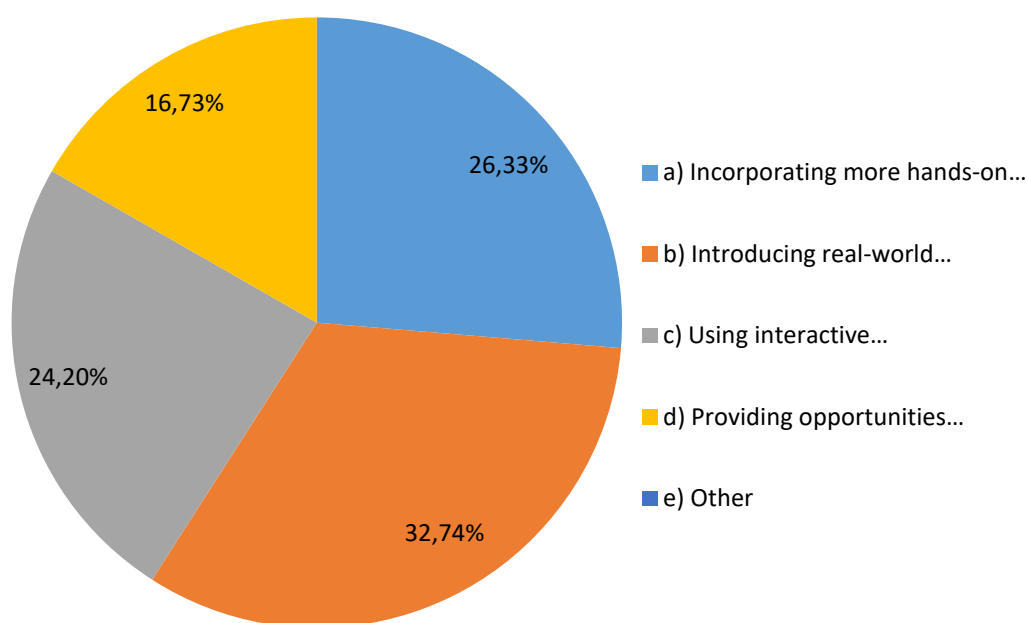


The majority of respondents rated the level of support for STEM education in their communities as limited (45,80%) and moderate (39,25%). Only 4,67% admitted that the level of support is strong, but every tenth (10,28%) admitted that there is no support in this matter at all in their community.



1.13. How do you think STEM education could be made more engaging for students?
(Select all that apply)

	a) Incorporating more hands-on experiments	b) Introducing real-world problem-solving activities	c) Using interactive technology tools	d) Providing opportunities for creativity within STEM subjects	e) Other (please specify):
Germany	60% (6)	100% (10)	60% (6)	40% (4)	-
Poland	57,1% (8)	85,7% (12)	71,4% (10)	42,9% (6)	-
Portugal	70,8% (17)	83,3% (20)	41,7% (10)	41,7% (10)	-
Romania 1	76,5% (13)	94,1% (16)	76,5% (13)	35,3% (6)	-
Romania 2	61,5% (16)	76,9% (20)	61,5% (16)	38,5% (10)	-
Türkiye	87,5% (14)	87,5% (14)	81,3% (13)	68,8% (11)	-
TOTAL	26,33% (74)	32,74% (92)	24,20% (68)	16,73% (47)	-

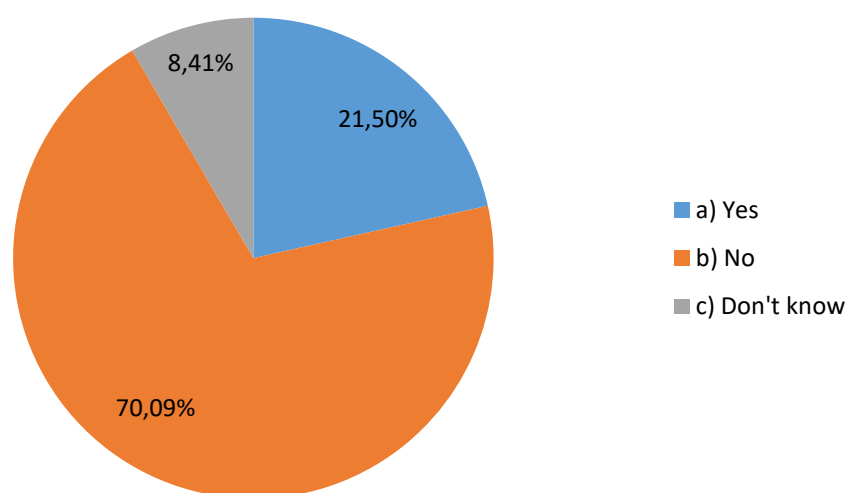


In each country surveyed, the largest number of teachers believed that STEM education could be more engaging for students through the introduction of real-world problem-solving activities, which gave a total score of 32,74%. Next, respondents indicated incorporating more hands-on experiments (26,44%) and using interactive technology tools (24,20%). The least engaging according to respondents is providing opportunities for creativity within STEM subjects (16,73%).



1.14. Do you think there is sufficient emphasis on STEM education in your school curriculum?

	a) Yes	b) No	c) Don't know
Germany	50% (5)	50% (5)	-
Poland	28,6% (4)	71,4% (10)	-
Portugal	20,8% (5)	58,3% (14)	20,8% (5)
Romania 1	23,5% (4)	70,6% (12)	5,9% (1)
Romania 2	15,4% (4)	76,9% (20)	7,7% (2)
Türkiye	6,3% (1)	87,5% (14)	6,3% (1)
TOTAL	21,50% (23)	70,09% (75)	8,41% (9)

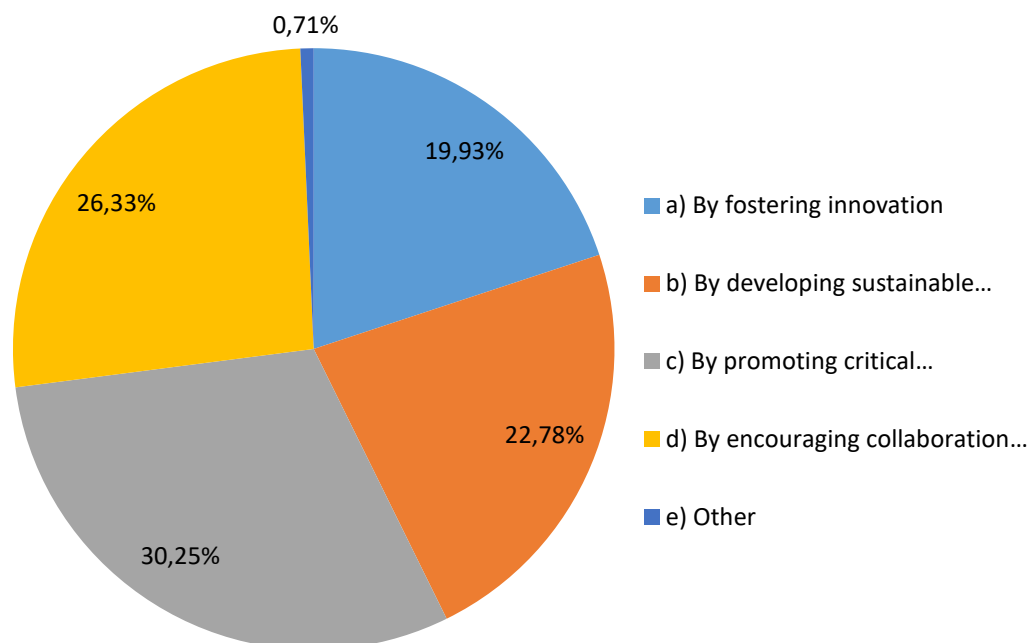


The vast majority of respondents believe that their school curriculum does not place sufficient emphasis on STEM education (70,09%). Only 21,50% believe that this emphasis is sufficient, and 8,41% do not know.

1.15. How do you think STEM education can help address global challenges? (Select all that apply)

	a) By fostering innovation	b) By developing sustainable solutions	c) By promoting critical thinking and problem-solving skills	d) By encouraging collaboration across disciplines	e) Other (please specify):
Germany	20% (2)	90% (9)	10% (1)	10% (1)	-
Poland	57,1% (8)	14,3% (2)	100% (14)	85,7% (12)	14,3% (2)*
Portugal	62,5% (15)	58,3% (14)	95,8% (23)	75% (18)	-
Romania 1	41,2% (7)	64,7% (11)	88,2% (15)	64,7% (11)	-
Romania 2	50% (13)	53,8% (14)	76,9% (20)	69,2% (18)	-
Türkiye	73,3% (11)	93,3% (14)	80% (12)	93,3% (14)	-
TOTAL	19,93% (56)	22,78% (64)	30,25% (85)	26,33% (74)	0,71% (2)

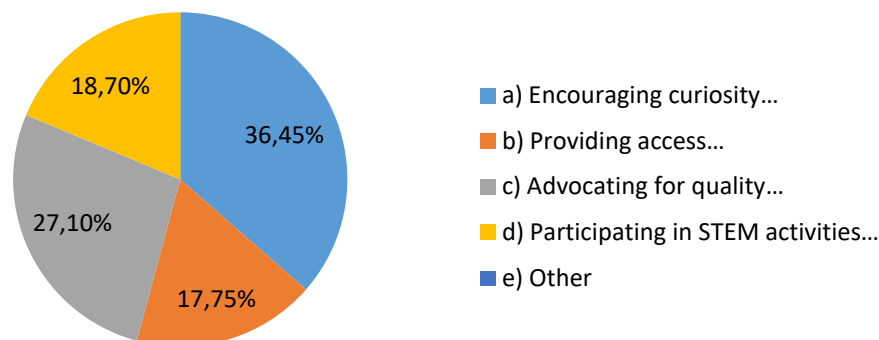
*additional responses provided by teachers from Poland: (1) Working with real-world problems rather than those that exist only in school; (2) Equipping future generations with the tools necessary for effective action in a dynamic and complex world.



When asked how STEM education can help in facing global challenges, the percentages of answers are similar, with a slight advantage in the promotion of critical thinking and problem-solving skills (30,25%). The answers given in section "e) Other" (0,71%) are nevertheless similar to the above.

1.16. What role do you think parents should play in supporting STEM education?

	a) Encouraging curiosity and exploration	b) Providing access to STEM resources	c) Advocating for quality STEM education in schools	d) Participating in STEM activities with their children	e) Other (please specify):
Germany	10% (1)	50% (5)	40% (4)	-	-
Poland	14,3% (2)	14,3% (2)	42,9% (6)	28,6% (4)	-
Portugal	50% (12)	-	20,8% (5)	29,2% (7)	-
Romania 1	35,3% (6)	29,4% (5)	29,4% (5)	5,9% (1)	-
Romania 2	46,2% (12)	19,2% (5)	19,2% (5)	15,4% (4)	-
Türkiye	37,5% (6)	12,5% (2)	25% (4)	25% (4)	-
TOTAL	36,45% (39)	17,75% (19)	27,10% (29)	18,70% (20)	-

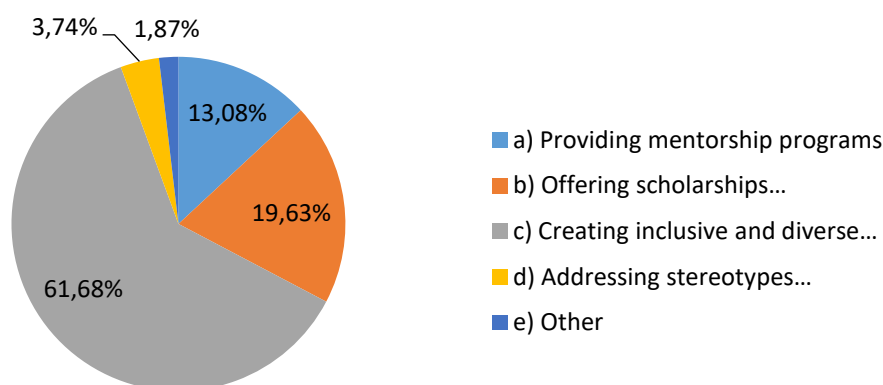


According to respondents, parents should primarily encourage curiosity and exploration among their children (36,45%) and advocate for quality STEM education in schools (27,10%). 18,70% of them think that parents should participate in STEM activities with their children, and 17,75% believe that they should also provide access to STEM resources.

1.17. How do you think STEM education can be made more inclusive for underrepresented groups?

	a) Providing mentorship programs	b) Offering scholarships and financial support	c) Creating inclusive and diverse learning environments	d) Addressing stereotypes and biases in STEM fields	e) Other (please specify):
Germany	-	40% (4)	60% (6)	-	-
Poland	-	57,1% (8)	14,3% (2)	14,3% (2)	14,3% (2)*
Portugal	12,5% (3)	-	79,2% (19)	8,3% (2)	-
Romania 1	35,3% (6)	11,8% (2)	52,9% (9)	-	-
Romania 2	11,5% (3)	19,2% (5)	69,2% (18)	-	-
Türkiye	12,5% (2)	12,5% (2)	75% (12)	-	-
TOTAL	13,08% (14)	19,63% (21)	61,68% (66)	3,74% (4)	1,87% (2)

*additional responses provided by teachers from Poland: (1) There is no such a need; (2) It is inclusive already.

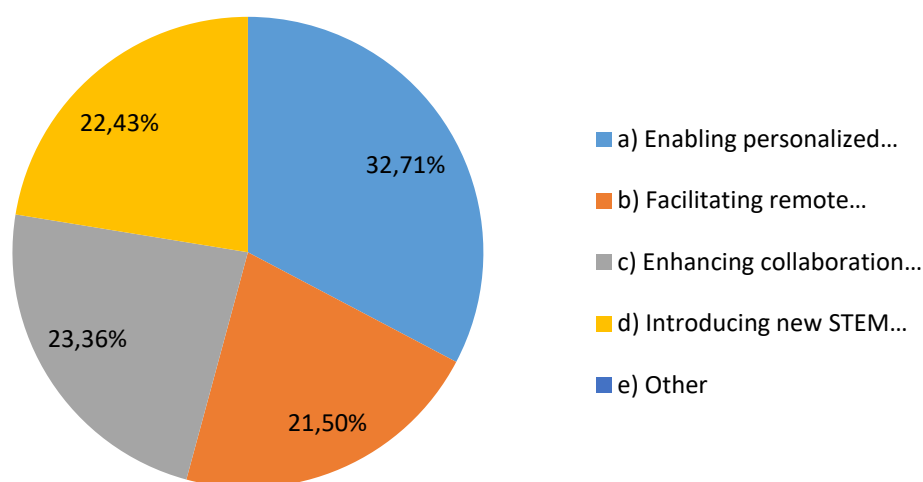




The majority of surveyed teachers believe that to make STEM education more inclusive for underrepresented groups, it is necessary to create inclusive and diverse learning environments (61.68%). Every fifth respondent believes that offering scholarships and financial support would be such an action (19.63%). Only two teachers from Poland believe that there is no such need in their country or that this education is already inclusive.

1.18. What impact do you think emerging technologies will have on STEM education?

	a) Enabling personalized learning experiences	b) Facilitating remote learning opportunities	c) Enhancing collaboration among students and educators	d) Introducing new STEM career opportunities	e) Other (please specify):
Germany	-	60% (6)	20% (2)	20% (2)	-
Poland	-	42,9% (6)	42,9% (6)	14,3% (2)	-
Portugal	54,2% (13)	12,5% (3)	20,8% (5)	12,5% (3)	-
Romania 1	29,4% (5)	5,9% (1)	23,5% (4)	41,2% (7)	-
Romania 2	46,2% (12)	11,5% (3)	19,2% (5)	23,1% (6)	-
Türkiye	31,3% (5)	25% (4)	18,8% (3)	25% (4)	-
TOTAL	32,71% (35)	21,50% (23)	23,36% (25)	22,43% (24)	-

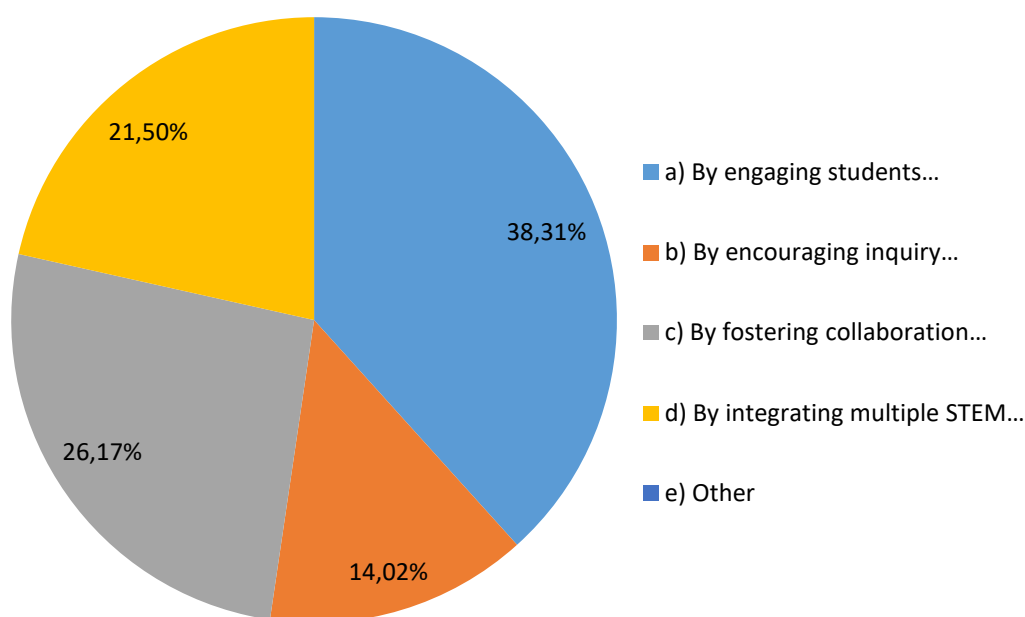


Regarding the impact of emerging technologies on STEM education, the answers are distributed in approximately similar percentages. However, enabling personalized learning experiences (32,71%) has a slight advantage as the factor having the greatest impact on STEM education.



1.19. How do you think project-based learning can promote STEM literacy among students?

	a) By engaging students in authentic, real-world challenges	b) By encouraging inquiry and investigation	c) By fostering collaboration and communication skills	d) By integrating multiple STEM disciplines into projects	e) Other (please specify):
Germany	30% (3)	10% (1)	50% (5)	10% (1)	-
Poland	28,6% (4)	14,3% (2)	14,3% (2)	42,9% (6)	-
Portugal	45,8% (11)	4,2% (1)	20,8% (5)	29,2% (7)	-
Romania 1	52,9% (9)	5,9% (1)	29,4% (5)	11,8% (2)	-
Romania 2	38,5% (10)	3,8% (1)	34,6% (9)	23,1% (6)	-
Türkiye	25% (4)	56,3% (9)	12,5% (2)	6,3% (1)	-
TOTAL	38,31% (41)	14,02% (15)	26,17% (28)	21,50% (23)	-

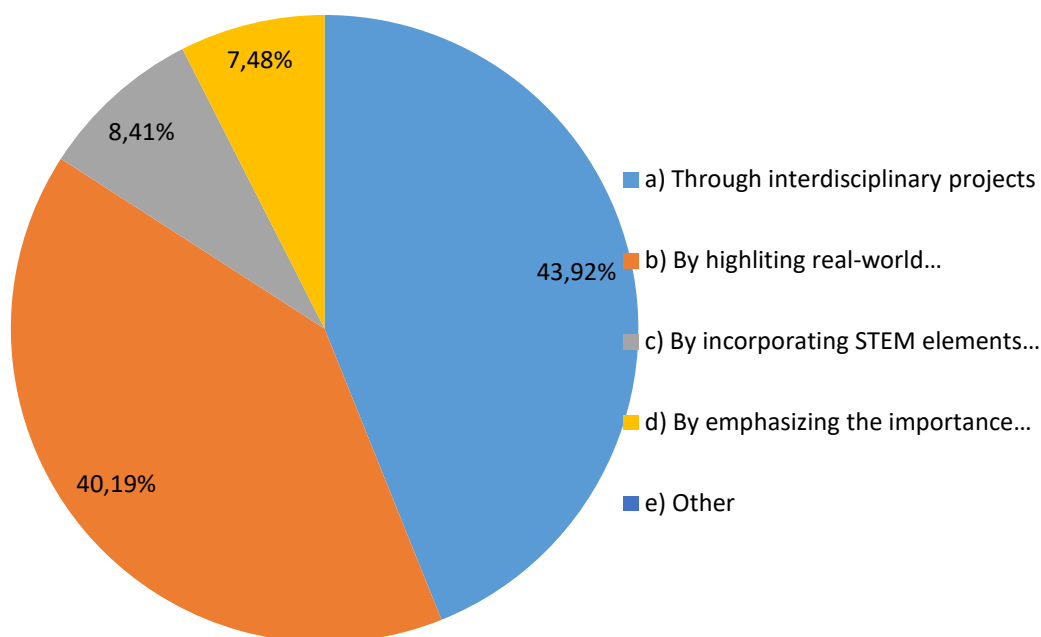


Most teachers believe that project-based learning can promote STEM literacy among students by engaging them in authentic, real-world challenges (38,31%). The next most important factors from the respondents' point of view are fostering collaboration and communication skills (26,17%) and integrating multiple STEM disciplines into projects (21,50%). The least popular is encouraging inquiry and investigation (14,02%).



1.20. How do you think STEM education can be integrated with other subjects?

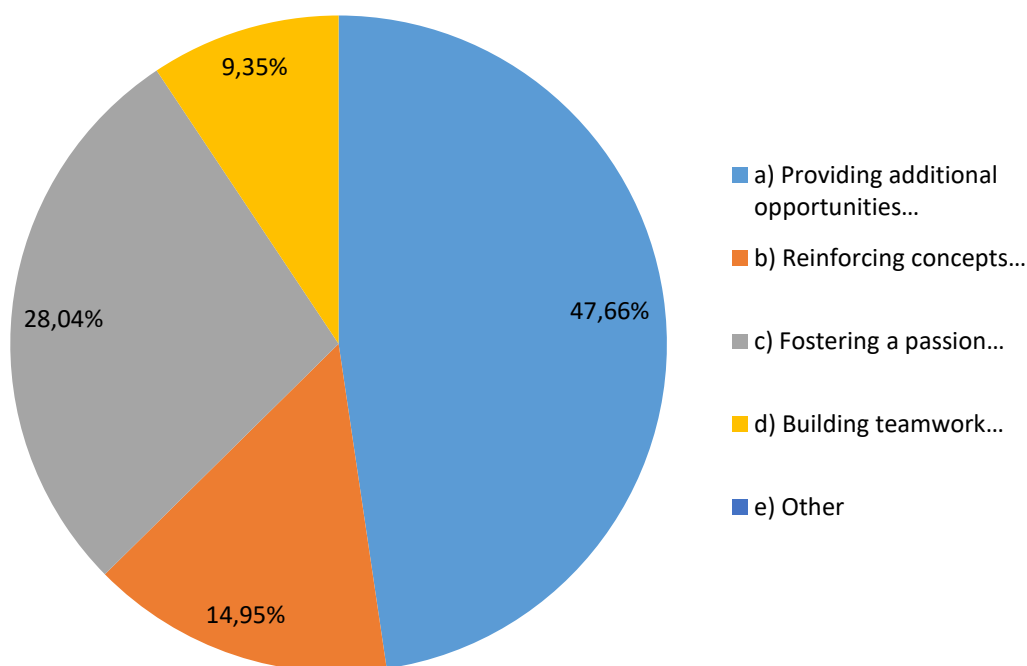
	a) Through interdisciplinary projects	b) By highlighting real-world connections	c) By incorporating STEM elements into arts and humanities subjects	d) By emphasizing the importance of STEM in various fields	e) Other (please specify):
Germany	-	100% (10)	-	-	-
Poland	28,6% (4)	57,1% (8)	-	14,3% (2)	-
Portugal	75% (18)	16,7% (4)	4,2% (1)	4,2% (1)	-
Romania 1	47,1% (8)	52,9% (9)	-	-	-
Romania 2	34,6% (9)	34,6% (9)	15,4% (4)	15,4% (4)	-
Türkiye	50% (8)	18,8% (3)	25% (4)	6,3% (1)	-
TOTAL	43,92% (47)	40,19% (43)	8,41% (9)	7,48% (8)	-



Respondents taking part in the study think that STEM education can be integrated with other subjects through interdisciplinary projects (43,92%) and through highlighting real-world connections (40,19%). Only 8,41% believe that it can be done by incorporating STEM elements into arts and humanities subjects, and 7,48% believe that this can be done by emphasizing the importance of STEM in various fields.

1.21. What role do you think extracurricular STEM programs play in students' education?

	a) Providing additional opportunities for exploration and learning	b) Reinforcing concepts taught in the classroom	c) Fostering a passion for STEM subjects	d) Building teamwork and leadership skills	e) Other (please specify):
Germany	30% (3)	40% (4)	30% (3)	-	-
Poland	-	14,3% (2)	85,7% (12)	-	-
Portugal	79,2% (19)	12,5% (3)	8,3% (2)	-	-
Romania 1	17,6% (3)	23,5% (4)	35,3% (6)	23,5% (4)	-
Romania 2	57,7% (15)	7,7% (2)	15,4% (4)	19,2% (5)	-
Türkiye	68,8% (11)	6,3% (1)	18,8% (3)	6,3% (1)	-
TOTAL	47,66% (51)	14,95% (16)	28,04% (30)	9,35% (10)	-

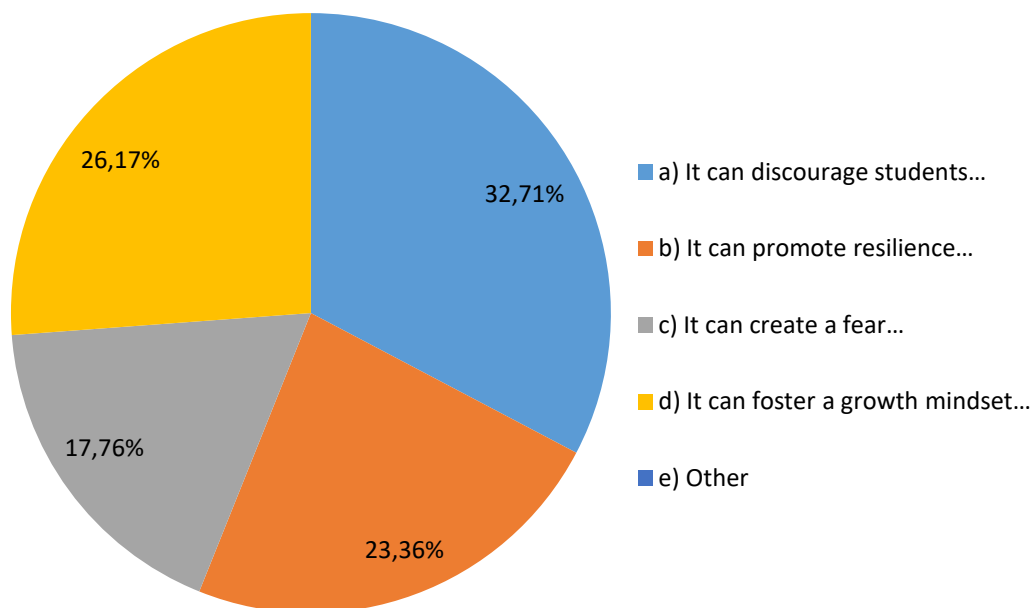


Almost half of respondents believe that extracurricular STEM programs in students' education play the role of providing additional opportunities for exploration and learning (47,66%). Almost one third believe that they play the role of fostering a passion for STEM subjects (28,04%), only 14,95% believe that they play the role of reinforcing concepts taught in the classroom, and 9,35% pointed to building teamwork and leadership skills.



1.22. How do you think the perception of failure impacts STEM education?

	a) It can discourage students from taking risks and exploring new ideas	b) It can promote resilience and problem-solving skills	c) It can create a fear of failure that hinders learning	d) It can foster a growth mindset and a willingness to learn from mistakes	e) Other (please specify):
Germany	30% (3)	60% (6)	10% (1)	-	-
Poland	28,6% (4)	21,4% (3)	28,6% (4)	21,4% (3)	-
Portugal	20,8% (5)	25% (6)	-	54,2% (13)	-
Romania 1	35,3% (6)	23,5% (4)	23,5% (4)	17,6% (3)	-
Romania 2	30,8% (8)	7,7% (2)	30,8% (8)	30,8% (8)	-
Türkiye	56,3% (9)	25% (4)	12,5% (2)	6,3% (1)	-
TOTAL	32,71% (35)	23,36% (25)	17,76% (19)	26,17% (28)	-

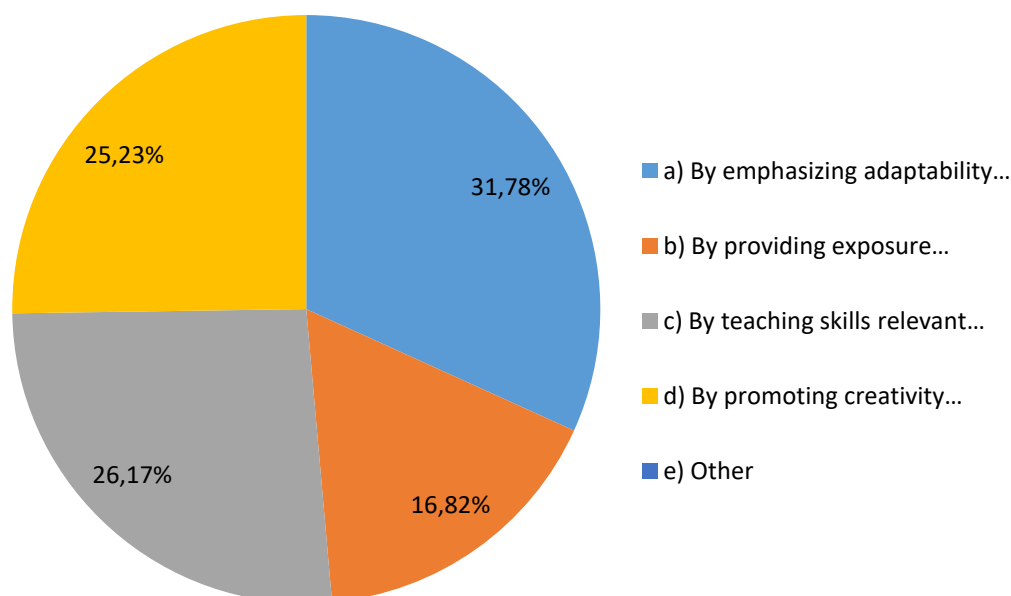


According to every third respondent, the perception of failure affects STEM education because it can discourage students from taking risks and exploring new ideas (32,71%). Every fourth believes that the perception of failure can be a positive factor that fosters a growth mindset and a willingness to learn from mistakes (26,17%). The answer that it can promote resilience and problem-solving skills is also similar (23,36%), and the smallest percentage of respondents stated that it can create a fear of failure that hinders learning (17,76%).



1.23. How do you think STEM education can better prepare students for careers in emerging fields?

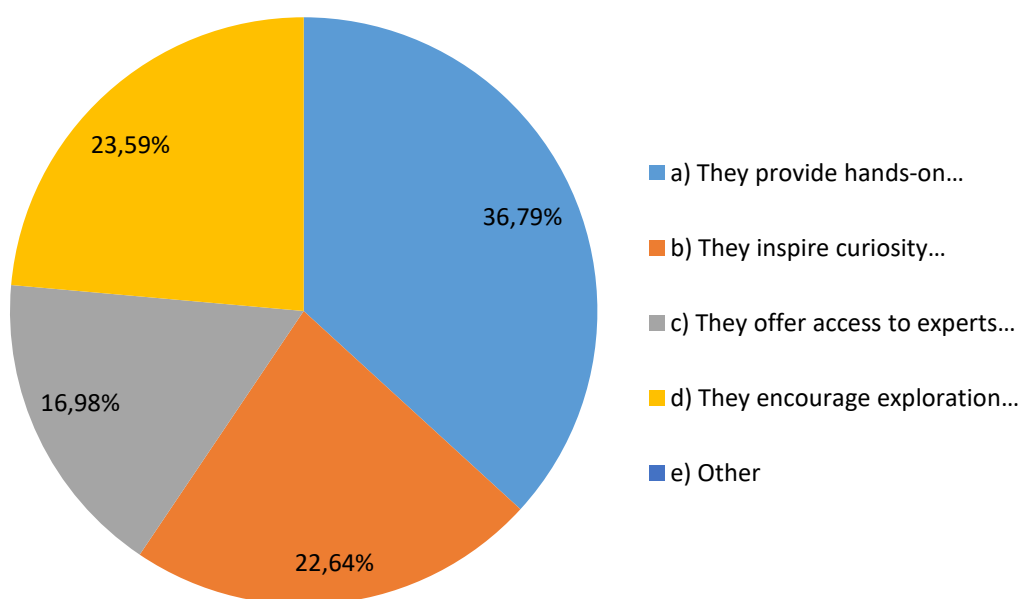
	a) By emphasizing adaptability and lifelong learning	b) By providing exposure to cutting-edge technologies	c) By teaching skills relevant to future job market demands	d) By promoting creativity and innovation	e) Other (please specify):
Germany	-	20% (2)	60% (6)	20% (2)	-
Poland	28,6% (4)	42,9% (6)	14,3% (2)	14,3% (2)	-
Portugal	29,2% (7)	8,3% (2)	33,3% (8)	29,2% (7)	-
Romania 1	64,7% (11)	11,8% (2)	-	23,5% (4)	-
Romania 2	23,1% (6)	19,2% (5)	38,5% (10)	19,2% (5)	-
Türkiye	37,5% (6)	6,3% (1)	12,5% (2)	43,8% (7)	-
TOTAL	31,78% (34)	16,82% (18)	26,17% (28)	25,23% (27)	-



Most teachers (31,78%) believe that STEM education can better prepare students for careers in new fields by emphasizing adaptability and lifelong learning. Every fourth thinks that they can prepare students for careers in new fields by teaching skills relevant to future job market demands (26,17%) and by promoting creativity and innovation (25,23%). Only 16,82% indicated that this can be achieved by providing exposure to cutting edge technologies.

1.24. How do you think informal STEM learning experiences (e.g., museums, and science centers) contribute to education?

	a) They provide hands-on learning opportunities outside the classroom	b) They inspire curiosity and a love for STEM subjects	c) They offer access to experts and professionals in STEM fields	d) They encourage exploration and experimentation	e) Other (please specify):
Germany	-	50% (5)	40% (4)	10% (1)	-
Poland	14,3% (2)	28,6% (4)	28,6% (4)	28,6% (4)	-
Portugal	58,3% (14)	12,5% (3)	4,2% (1)	25% (6)	-
Romania 1	25% (4)	25% (4)	18,8% (3)	31,3% (5)	-
Romania 2	42,3% (11)	23,1% (6)	11,5% (3)	23,1% (6)	-
Türkiye	50% (8)	12,5% (2)	18,8% (3)	18,8% (3)	-
TOTAL	36,79% (39)	22,64% (24)	16,98% (18)	23,59% (25)	-

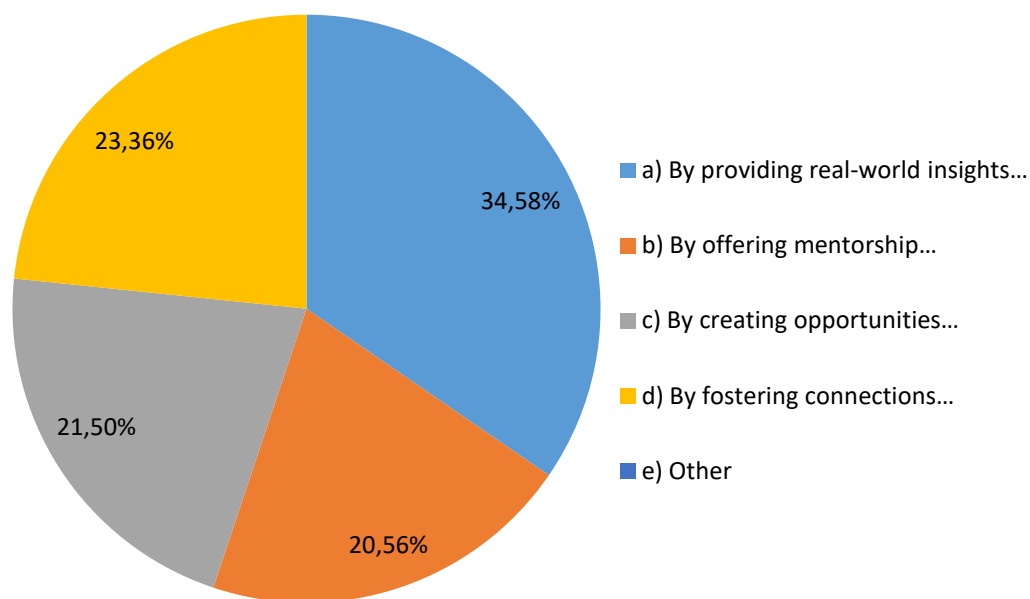


Most respondents (36,79%) believe that informal STEM learning experiences contribute to education because they provide hands-on learning opportunities outside the classroom. Other factors, according to them, are that these activities encourage exploration and experimentation (23,59%), as well as they inspire curiosity and a love for STEM subjects (22,64%). The lowest impact was attributed to the answer that they offer access to experts and professionals in STEM fields (16,98%).



1.25. How do you think collaboration with industry professionals can enhance STEM education?

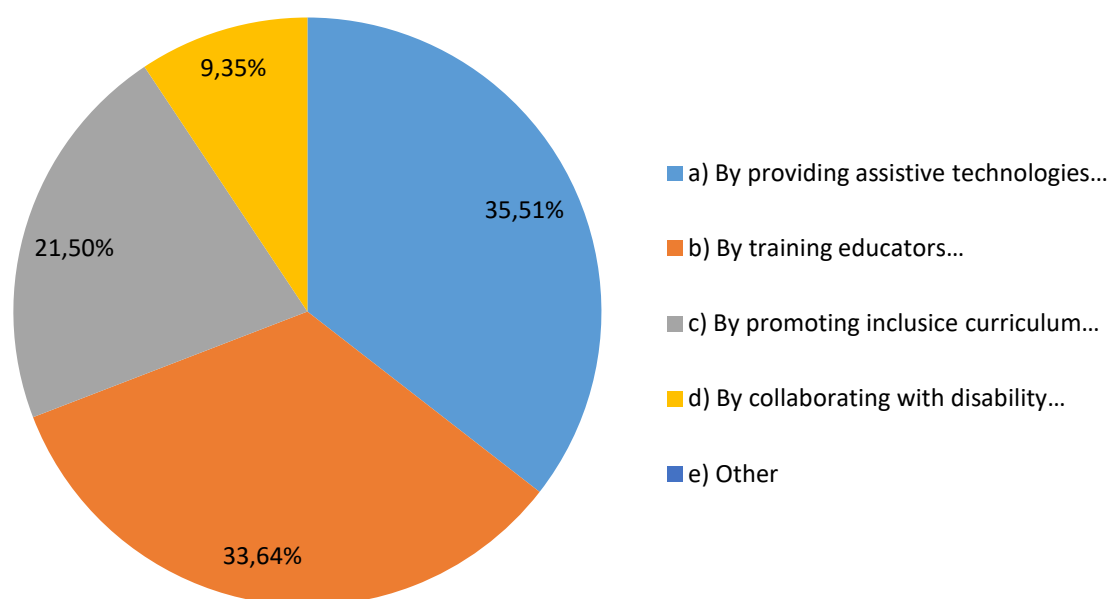
	a) By providing real-world insights and experiences	b) By offering mentorship and career guidance	c) By creating opportunities for internships and apprenticeships	d) By fostering connections between education and industry needs	e) Other (please specify):
Germany	10% (1)	70% (7)	20% (2)	-	-
Poland	42,9% (6)	14,3% (2)	14,3% (2)	28,6% (4)	-
Portugal	29,2% (7)	8,3% (2)	33,3% (8)	29,2% (7)	-
Romania 1	23,5% (4)	23,5% (4)	29,4% (5)	23,5% (4)	-
Romania 2	46,2% (12)	11,5% (3)	21,1% (6)	19,2% (5)	-
Türkiye	43,8% (7)	25% (4)	-	31,5% (5)	-
TOTAL	34,58% (37)	20,56% (22)	21,50% (23)	23,36% (25)	-



According to respondents, collaboration with industry professionals can enhance STEM education by providing real-world insights and experiences (34,58%). The remaining choices received a similar percentage of responses, and they indicated that this collaboration can enhance STEM education by fostering connections between education and industry needs (23,36%), by creating opportunities for internships and apprenticeships (21,50%), and by offering mentoring and career guidance (20,56%).

1.26. How do you think the accessibility of STEM education can be improved for students with disabilities?

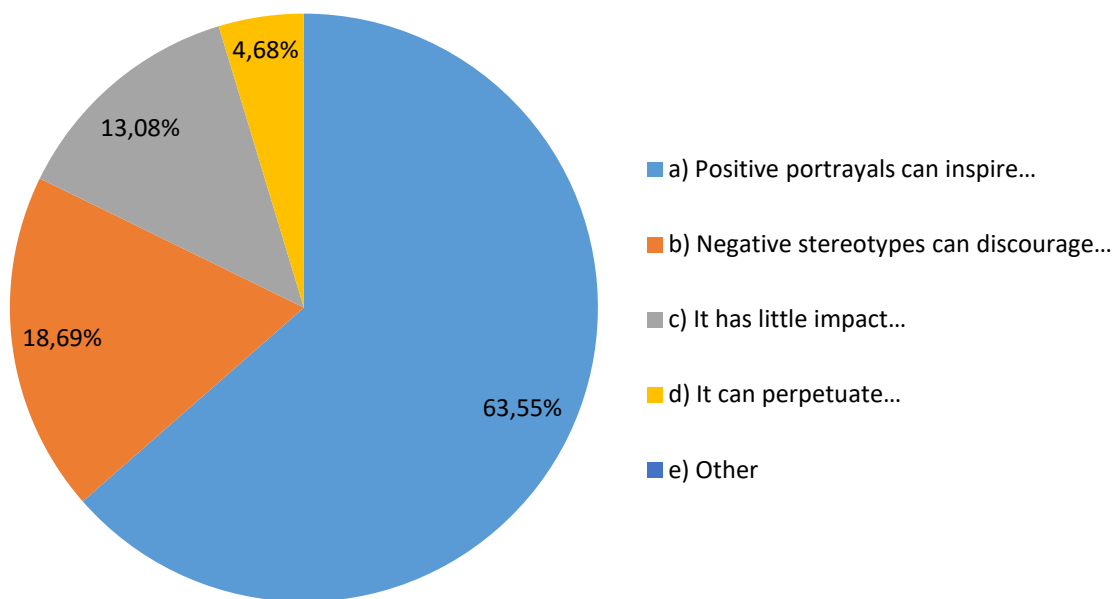
	a) By providing assistive technologies and accommodations	b) By training educators to support diverse learning needs	c) By promoting inclusive curriculum design	d) By collaborating with disability advocacy organizations	e) Other (please specify):
Germany	10% (1)	80% (8)	-	10% (1)	-
Poland	71,4% (10)	-	28,6% (4)	-	-
Portugal	50% (12)	29,2% (7)	12,5% (3)	8,3% (2)	-
Romania 1	35,3% (6)	35,3% (6)	11,8% (2)	17,6% (3)	-
Romania 2	19,2% (5)	42,3% (11)	23,1% (6)	15,4% (4)	-
Türkiye	25% (4)	25% (4)	50% (8)	-	-
TOTAL	35,51% (38)	33,64% (36)	21,50% (23)	9,35% (10)	-



Every third teacher participating in the research study indicated that the accessibility of STEM education can be improved for students with disabilities by providing assistive technologies and accommodations (35,51%) and by training educators to support diverse learning needs (33,64%). Every fifth (21,50%) admitted that it could be improved by promoting inclusive curriculum design, and only 9,35% of respondents stated that collaborating with disability advocacy organizations could improve accessibility.

1.27. How do you think the portrayal of STEM professionals in media and popular culture affects students' interest in STEM?

	a) Positive portrayals can inspire and motivate students to pursue STEM careers	b) Negative stereotypes can discourage students, especially those from underrepresented groups	c) It has little impact on students' perceptions of STEM fields	d) It can perpetuate misconceptions about STEM careers and fields	e) Other (please specify):
Germany	10% (1)	40% (4)	30% (3)	20% (2)	-
Poland	42,9% (6)	42,9% (6)	14,3% (2)	-	-
Portugal	79,2% (19)	4,2% (1)	8,3% (2)	8,3% (2)	-
Romania 1	52,9% (9)	17,6% (3)	23,5% (4)	5,9% (1)	-
Romania 2	76,9% (20)	15,4% (4)	7,7% (2)	-	-
Türkiye	81,3% (13)	12,5% (2)	6,3% (1)	-	-
TOTAL	63,55% (68)	18,69% (20)	13,08% (14)	4,68% (5)	-



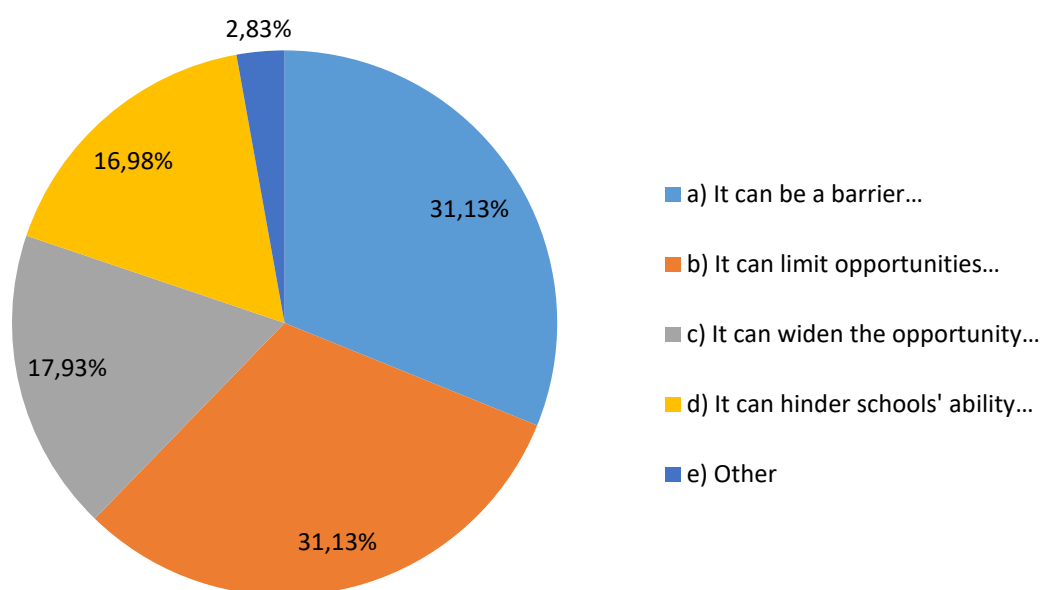
The vast majority of respondents believe that the positive portrayal of STEM professionals in the media and popular culture affects students' interest in STEM as they can inspire and motivate students to pursue STEM careers (63,55%). On the other hand, 18,69% believe that negative stereotypes can discourage students, especially those from underrepresented groups. 13,08% of respondents believe that such a portrayal has little impact on students' perceptions of STEM fields, and almost every twentieth (4,68%) believe that it can perpetuate misconceptions about STEM careers and fields.



1.28. How do you think the affordability of STEM resources and materials affects access to STEM education?

	a) It can be a barrier for students from low-income backgrounds	b) It can limit opportunities for hands-on learning experiences	c) It can widen the opportunity gap in STEM education	d) It can hinder schools' ability to provide quality STEM education	e) Other (please specify):
Germany	-	50% (5)	30% (3)	20% (2)	-
Poland	42,9% (6)	28,6% (4)	-	28,6% (4)	-
Portugal	29,2% (7)	45,8% (11)	8,3% (2)	16,7% (4)	-
Romania 1	23,5% (4)	35,3% (6)	35,3% (6)	5,9% (1)	-
Romania 2	46,2% (12)	15,4% (4)	15,4% (4)	23,1% (6)	-
Türkiye	26,7% (4)	20% (3)	26,7% (4)	6,7% (1)	20% (3)*
TOTAL	31,13% (33)	31,13% (33)	17,93% (19)	16,98% (18)	2,83% (3)

*additional response provided by teachers from Türkiye: (1) I guess the problem is that it's not affordable; (2) & (3) *Not specified*.

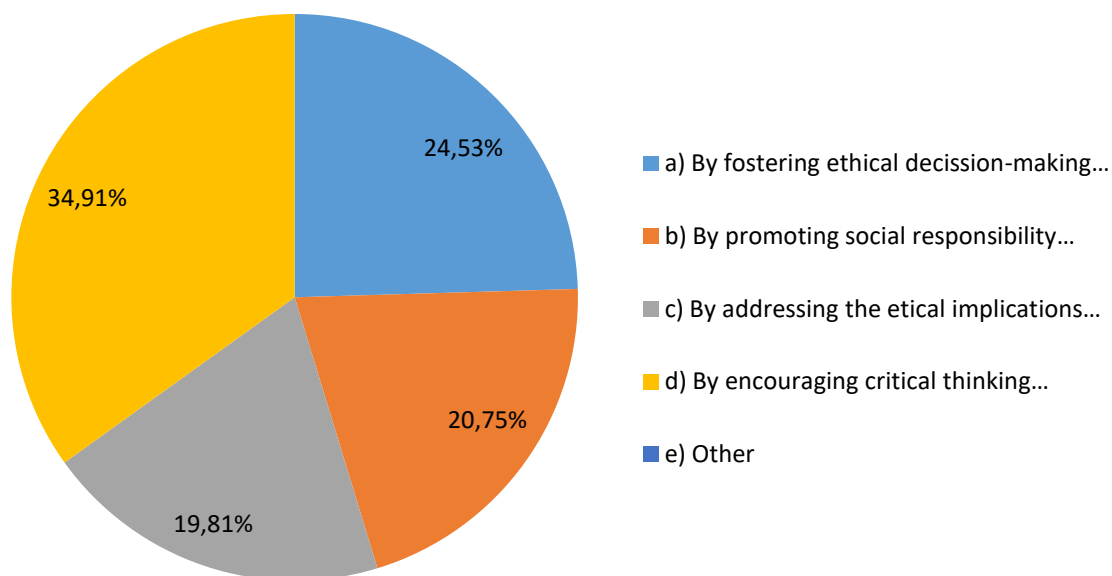


The answers to the question of how the affordability of STEM resources and materials affects access to STEM education are quite diverse. Almost one-third of respondents believe that it can be a barrier for students from low-income backgrounds (31,13%). The same percentage believes that it can limit opportunities for hands-on learning experiences (31,13%). 17,93% stated that it can widen the opportunity gap in STEM education, and one percent less (16,98%) stated that it can hinder schools' ability to provide quality STEM education.



1.29. How do you think the integration of ethics into STEM education can benefit students?

	a) By fostering ethical decision-making skills	b) By promoting social responsibility in STEM fields	c) By addressing the ethical implications of technological advancements	d) By encouraging critical thinking about the ethical implications of scientific research	e) Other (please specify):
Germany	-	30% (3)	30% (3)	40% (4)	-
Poland	14,3% (2)	-	42,9% (6)	42,9% (6)	-
Portugal	41,7% (10)	20,8% (5)	12,5% (3)	25% (6)	-
Romania 1	23,5% (4)	35,3% (6)	5,9% (1)	35,3% (6)	-
Romania 2	24% (6)	24% (6)	8% (2)	44% (11)	-
Türkiye	25% (4)	12,5% (2)	37,5% (6)	25% (4)	-
TOTAL	24,53% (26)	20,75% (22)	19,81% (21)	34,91% (37)	-

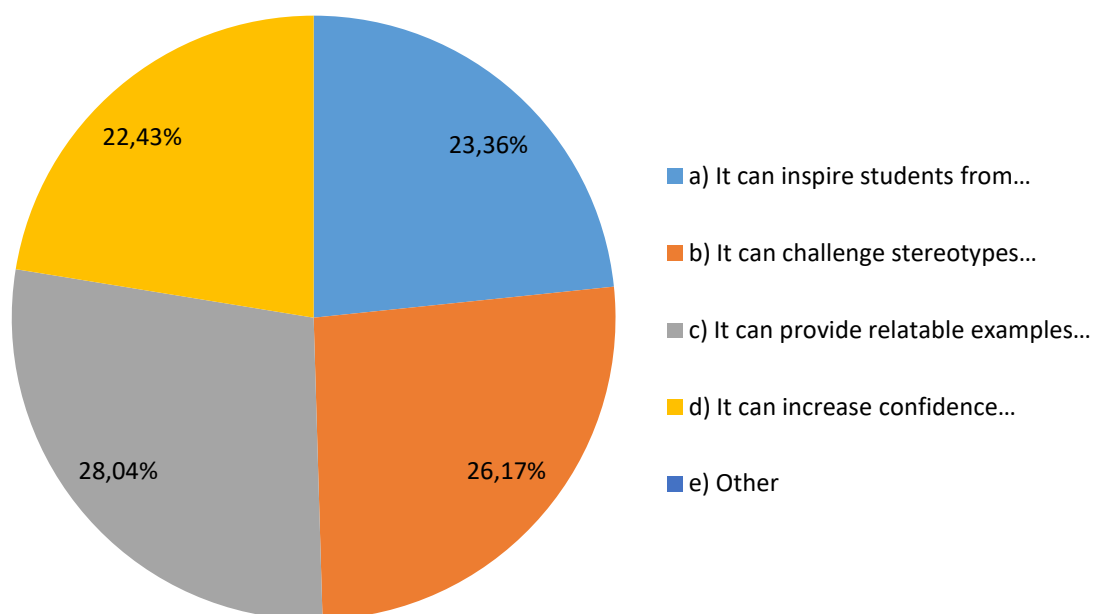


When asked how the integration of ethics into STEM education can benefit students, respondents gave varied answers, with a slight advantage of answer stating that such an action could benefit students by encouraging critical thinking about the ethical implications of scientific research (34,91%). The remaining choices had similar percentage results, which were as follows: by fostering ethical decision-making skills (24,53%), by promoting social responsibility in STEM fields (20,75%), and by addressing the ethical implications of technological advancements (19,81%).



1.30. How do you think the representation of diverse role models in STEM fields can impact students' aspirations?

	a) It can inspire students from underrepresented groups to pursue STEM careers	b) It can challenge stereotypes and biases about who can succeed in STEM fields	c) It can provide relatable examples of success in STEM for all students	d) It can increase confidence and self-efficacy in STEM subjects	e) Other (please specify):
Germany	20% (2)	60% (6)	20% (2)	-	-
Poland	14,3% (2)	14,3% (2)	14,3% (2)	57,1% (8)	-
Portugal	33,3% (8)	25% (6)	16,7% (4)	25% (6)	-
Romania 1	11,8% (2)	35,3% (6)	29,4% (5)	23,5% (4)	-
Romania 2	30,8% (8)	19,2% (5)	34,6% (9)	15,4% (4)	-
Türkiye	18,8% (3)	18,8% (3)	50% (8)	12,5% (2)	-
TOTAL	23,36% (25)	26,17% (28)	28,04% (30)	22,43% (24)	-

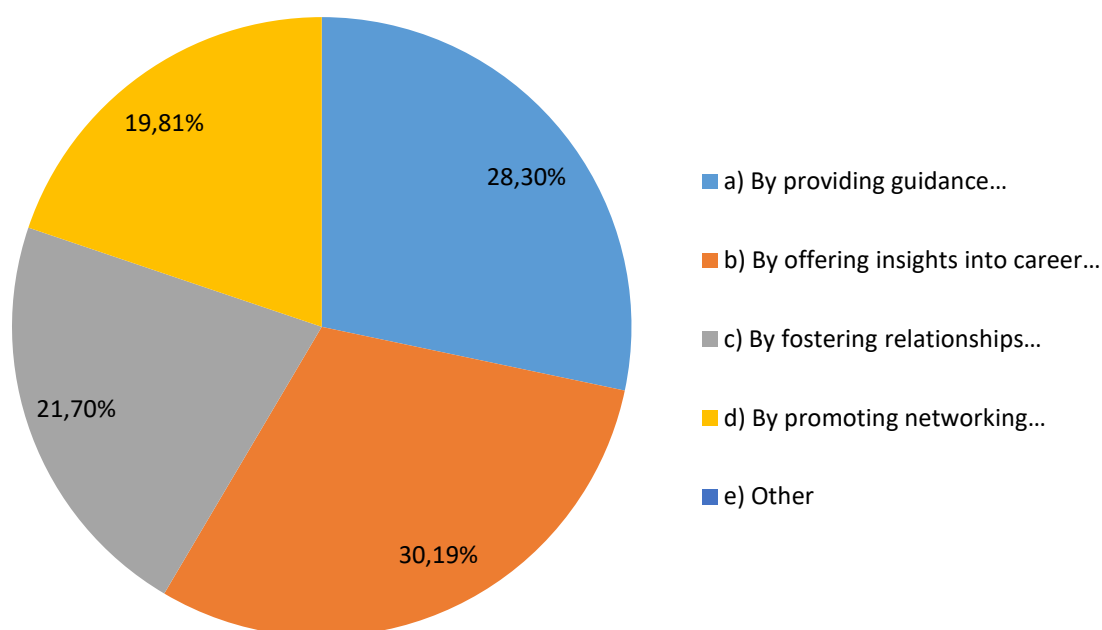


Respondents' answers on how the representation of diverse role models in STEM fields can impact students' aspirations were divided almost equally, showing only small percentage deviations. The percentage of teachers' responses is broken down as follows: it can provide relatable examples of success in STEM for all students (28,04%), it can challenge stereotypes and biases about who can succeed in STEM fields (26,17%), it can inspire students from underrepresented groups to pursue STEM careers (23,36%), and it can increase confidence and self-efficacy in STEM subjects (22,43%).



1.31. How do you think informal mentorship opportunities can support STEM education?

	a) By providing guidance and support from experienced professionals	b) By offering insights into career pathways and opportunities in STEM fields	c) By fostering relationships between students and industry professionals	d) By promoting networking and collaboration in STEM communities	e) Other (please specify):
Germany	-	60% (6)	-	40% (4)	-
Poland	14,3% (2)	28,6% (4)	-	57,1% (8)	-
Portugal	25% (6)	33,3% (8)	25% (6)	16,7% (4)	-
Romania 1	37,5% (6)	25% (4)	37,5% (6)	-	-
Romania 2	46,2% (12)	23,1% (6)	23,1% (6)	7,7% (2)	-
Türkiye	25% (4)	25% (4)	31,3% (5)	18,8% (3)	-
TOTAL	28,30% (30)	30,19% (32)	21,70% (23)	19,81% (21)	-



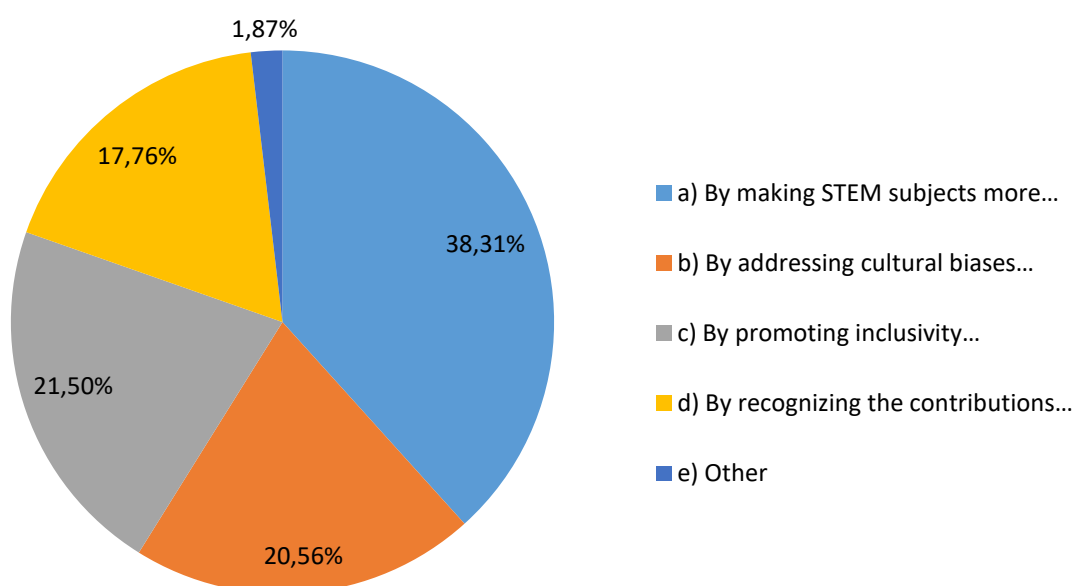
According to 30,19% of respondents, informal mentorship opportunities can support STEM education by offering insights into career pathways and opportunities in STEM fields. Slightly less, 28,30% believe that informal mentoring can support STEM education by providing guidance and support from experienced professionals. Every fifth teacher believes that such a mentorship can be support education by fostering relationships between students and industry professionals (21,70%) and by promoting networking and collaboration in STEM communities (19,81%).



1.32. How do you think the inclusion of culturally relevant content can improve STEM education for diverse learners?

	a) By making STEM subjects more relatable and engaging	b) By addressing cultural biases and stereotypes in STEM fields	c) By promoting inclusivity and equity in STEM learning environments	d) By recognizing the contributions of diverse cultures to STEM fields	e) Other (please specify):
Germany	10% (1)	40% (4)	30% (3)	20% (2)	-
Poland	28,6% (4)	28,6% (4)	14,3% (2)	14,3% (2)	14,3% (2)*
Portugal	33,3% (8)	8,3% (2)	25% (6)	33,3% (8)	-
Romania 1	52,9% (9)	23,5% (4)	17,6% (3)	5,9% (1)	-
Romania 2	69,2% (18)	15,4% (4)	15,4% (4)	-	-
Türkiye	6,3% (1)	25% (4)	31,3% (5)	37,5% (6)	-
TOTAL	38,31% (41)	20,56% (22)	21,50% (23)	17,76% (19)	1,87% (2)

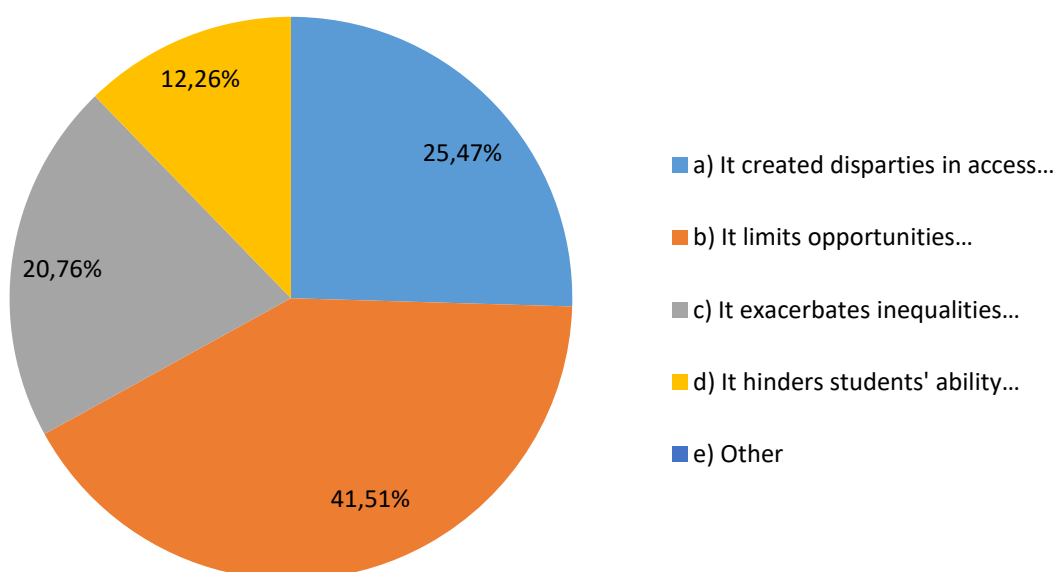
*additional response provided by teachers from Poland: (1) I don't see the need to include culturally relevant content in STEM education; (2) This will not improve STEM education.



The majority of survey respondents believe that including culturally relevant content can improve STEM education for diverse students by making STEM subjects more relatable and engaging (38,31%). For the remaining responses, the choices were a similar percentage, where teachers stated that including this content could improve STEM education for diverse students by promoting inclusivity and equity in STEM learning environments (21,50%), by addressing cultural biases and stereotypes in STEM fields (20,56%), and by recognizing the contributions of diverse cultures to STEM fields (17,76%). Two teachers from Poland (1,87%) believe that there is no need to include culturally relevant content in STEM education and that it will not improve it.

1.33. How do you think the digital divide impacts access to STEM education?

	a) It creates disparities in access to technology and internet connectivity	b) It limits opportunities for digital literacy and online learning	c) It exacerbates inequalities in STEM education outcomes	d) It hinders students' ability to participate in virtual STEM activities	e) Other (please specify):
Germany	-	60% (6)	40% (4)	-	-
Poland	-	42,8% (6)	28,6% (4)	28,6% (4)	-
Portugal	13% (3)	43,5% (10)	39,1% (9)	4,3% (1)	-
Romania 1	52,9% (9)	23,5% (4)	-	23,5% (4)	-
Romania 2	38,5% (10)	42,3% (11)	11,5% (3)	7,7% (2)	-
Türkiye	31,3% (5)	43,8% (7)	12,5% (2)	12,5% (2)	-
TOTAL	25,47% (27)	41,51% (44)	20,76% (22)	12,26% (13)	-

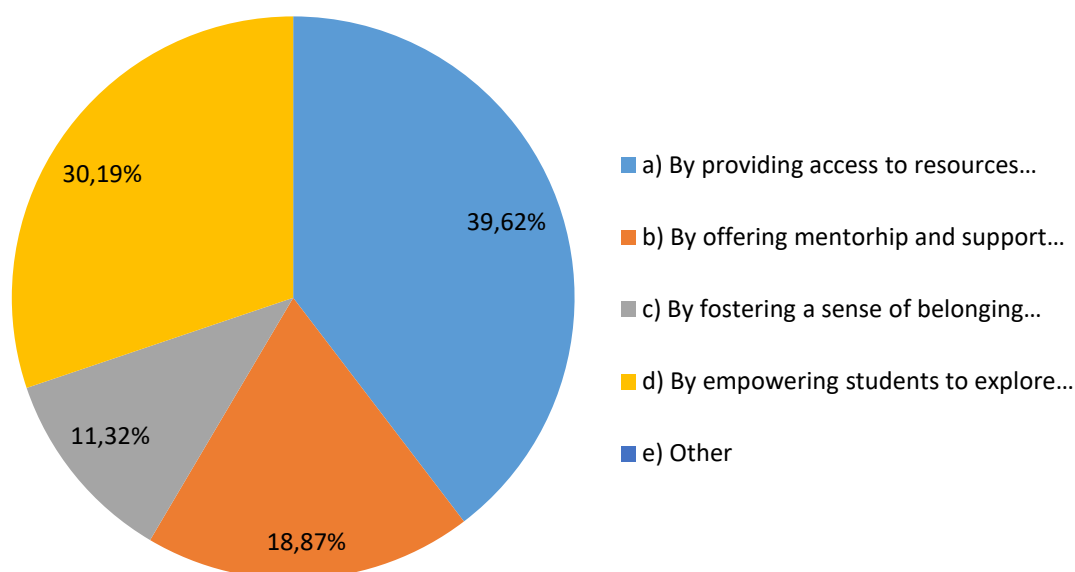


According to the majority of respondents, the digital divide impacts access to STEM education as it limits opportunities for digital literacy and online learning (41,51%). Every fourth survey participant thinks that it creates disparities in access to technology and internet connectivity (24,47%), every fifth thinks that it exacerbates inequalities in STEM education outcomes (20,76%), and only 12,26% stated that it hinders students' ability to participate in virtual STEM activities.



1.34. How do you think extracurricular STEM programs can address equity gaps in STEM education?

	a) By providing access to resources and opportunities outside the school curriculum	b) By offering mentorship and support for underrepresented students	c) By fostering a sense of belonging and community among participants	d) By empowering students to explore STEM subjects at their own pace	e) Other (please specify):
Germany	20% (2)	50% (5)	20% (2)	10% (1)	-
Poland	14,3% (2)	-	28,6% (4)	57,1% (8)	-
Portugal	54,2% (13)	4,2% (1)	-	41,7% (10)	-
Romania 1	50% (8)	25% (4)	6,3% (1)	18,8% (3)	-
Romania 2	50% (13)	19,2% (5)	7,7% (2)	23,1% (6)	-
Türkiye	25% (4)	31,3% (5)	18,8% (3)	25% (4)	-
TOTAL	39,62% (42)	18,87% (20)	11,32% (12)	30,19% (32)	

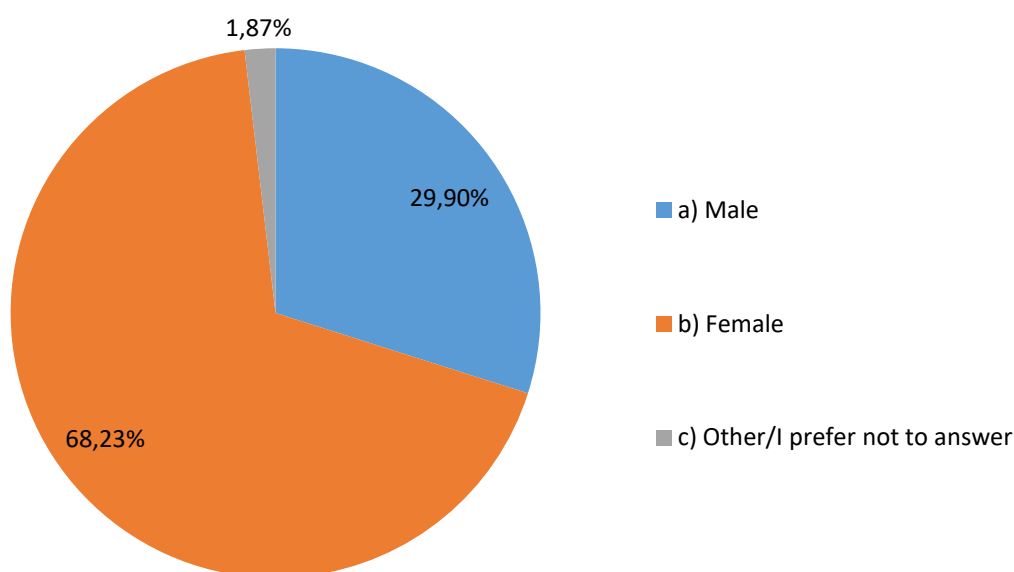


When asked how extracurricular STEM programs can address equity gaps in STEM education, teachers mostly agreed that this could happen by providing access to resources and opportunities outside the school curriculum (39,62%), and by empowering students to explore STEM subjects at their own pace (30,19%). A smaller percentage indicated that such gaps could be addressed by offering mentorship and support for underrepresented students (18,87%) and by fostering a sense of belonging and community among participants (11,32%).



1.35. (Statistical question) Please indicate your gender:

	a) Male	b) Female	c) Other/I prefer not to answer
Germany	50% (5)	40% (4)	10% (1)
Poland	42,9% (6)	50% (7)	7,1% (1)
Portugal	33,3% (8)	66,7% (16)	-
Romania 1	-	100% (17)	-
Romania 2	11,5% (3)	88,5% (23)	-
Türkiye	62,5% (10)	37,5% (6)	-
TOTAL	29,90% (32)	68,23% (73)	1,87% (2)



Among the teachers participating in the research study, 68,23% were female, 29,90% were male and 1,87% of respondents indicated other gender or did not want to answer this statistical question.

Survey research results: Block 2 – Filled in by students

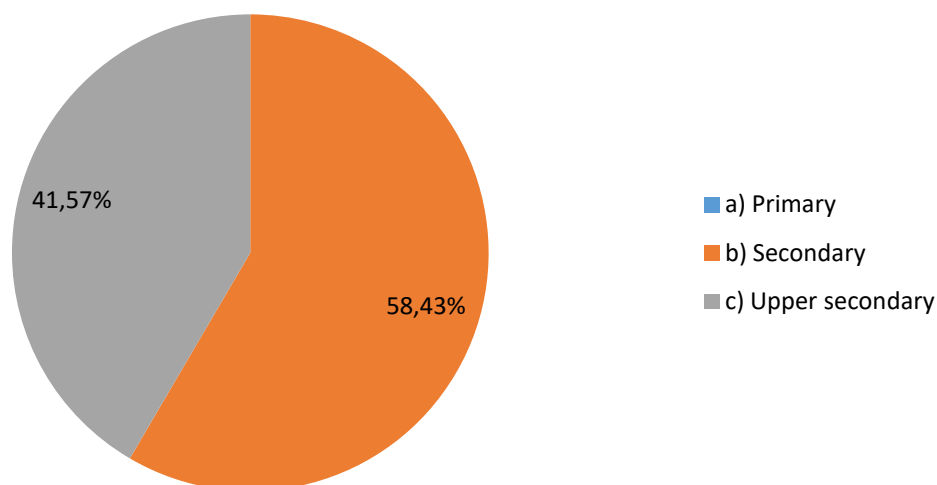
Research sample by country:

Germany (P1): **10**
Poland (P4): **14**
Portugal (P6): **12**
Romania 1 (P2): **33**
Romania 2 (P3): **78**
Türkiye (P5): **19**
TOTAL: 166



2.1. What school do you study at?

	a) Primary school	b) Secondary school (lower secondary)	c) Upper secondary school (high school, vocational school)
Germany	-	50% (5)	50% (5)
Poland	-	-	100% (14)
Portugal	-	91,7% (11)	8,3% (1)
Romania 1	-	-	100% (33)
Romania 2	-	85,9% (67)	14,1% (11)
Türkiye	-	73,7% (14)	26,3% (5)
TOTAL	-	58,43% (97)	41,57% (69)



Slightly more survey respondents were lower secondary school students (58,43%). Upper secondary school (high school, vocational school) students constituted 41,57% of the study participants. No primary school students took part in the survey research.

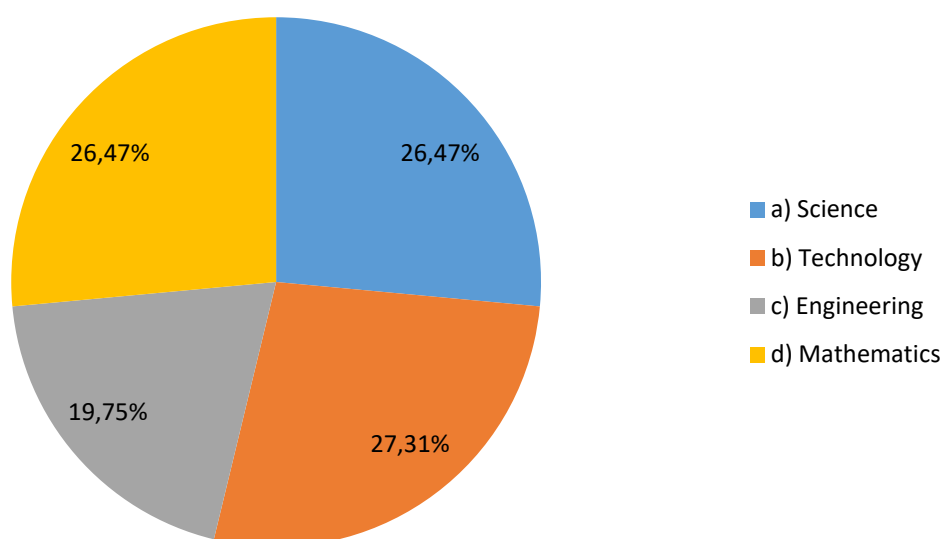
2.2. In which country is your school located?

	a) Germany	b) Poland	c) Portugal	d) Romania	e) Türkiye
Germany	100% (10)	-	-	-	-
Poland	-	100% (14)	-	-	-
Portugal	-	-	100% (12)	-	-
Romania 1	-	-	-	100% (33)	-
Romania 2	-	-	-	100% (78)	-
Türkiye	-	-	-	-	100% (19)



2.3. Which STEM subjects are you most interested in? (Select all that apply)

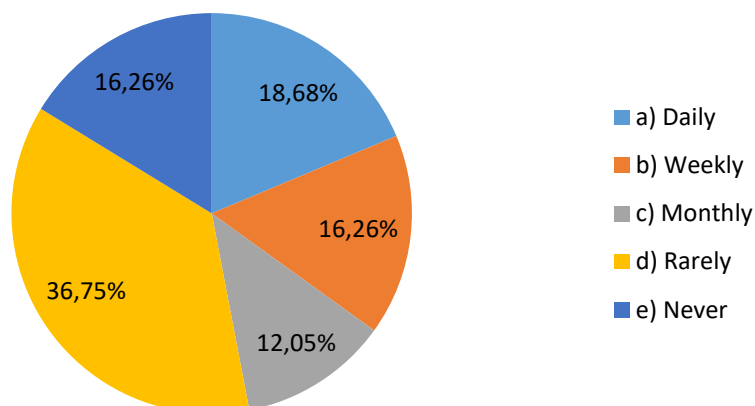
	a) Science	b) Technology	c) Engineering	d) Mathematics
Germany	20% (2)	40% (4)	20% (2)	20% (2)
Poland	28,6% (4)	57,1% (8)	50% (7)	21,4% (3)
Portugal	41,7% (5)	33,3% (4)	33,3% (4)	41,7% (5)
Romania 1	34,4% (11)	21,9% (7)	71,9% (23)	15,6% (5)
Romania 2	45,2% (33)	35,6% (26)	5,5% (4)	54,8% (40)
Türkiye	42,1% (8)	84,2% (16)	36,8% (7)	42,1% (8)
TOTAL	26,47% (63)	27,31% (65)	19,75% (47)	26,47% (63)



The results regarding interest in specific STEM disciplines are more or less even. However, a slight advantage in the study group can be observed in the case of technology (27,31%).

2.4. How often do you engage in STEM-related activities outside of school?

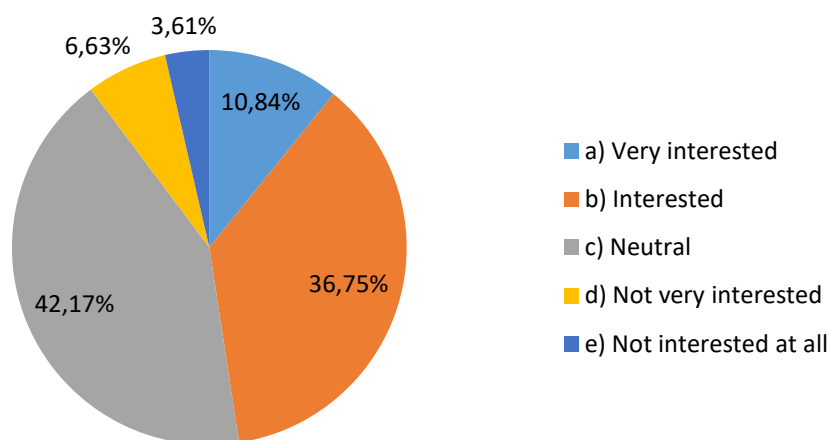
	a) Daily	b) Weekly	c) Monthly	d) Rarely	e) Never
Germany	10% (1)	10% (1)	40% (4)	30% (3)	10% (1)
Poland	21,4% (3)	28,6% (4)	14,3% (2)	14,3% (2)	21,4% (3)
Portugal	16,7% (2)	-	-	41,7% (5)	41,7% (5)
Romania 1	39,4% (13)	6,1% (2)	6,1% (2)	48,5% (16)	-
Romania 2	15,4% (12)	14,1% (11)	14,1% (11)	38,5% (30)	17,9% (14)
Türkiye	-	47,4% (9)	5,3% (1)	26,3% (5)	21,1% (4)
TOTAL	18,68% (31)	16,26% (27)	12,05% (20)	36,75% (61)	16,26% (27)



More than half of the respondents admitted that they rarely (36,75%) or never (16,26%) engage in STEM-related activities outside of school. Nevertheless, almost half admitted that they participate in this type of activities. In this case, the largest percentage of students engage in them daily (18,68%).

2.5. How do you rate your interest in STEM subjects?

	a) Very interested	b) Interested	c) Neutral	d) Not very interested	e) Not interested at all
Germany	-	30% (3)	40% (4)	20% (2)	10% (1)
Poland	14,3% (2)	28,6% (4)	42,9% (6)	7,1% (1)	7,1% (1)
Portugal	16,7% (2)	25% (3)	33,3% (4)	16,7% (2)	8,3% (1)
Romania 1	9,1% (3)	36,4% (12)	51,5% (17)	3% (1)	-
Romania 2	11,5% (9)	39,7% (31)	39,7% (31)	6,4% (5)	2,6% (2)
Türkiye	10,5% (2)	42,1% (8)	42,1% (8)	-	5,3% (1)
TOTAL	10,84% (18)	36,75% (61)	42,17% (70)	6,63% (11)	3,61% (6)

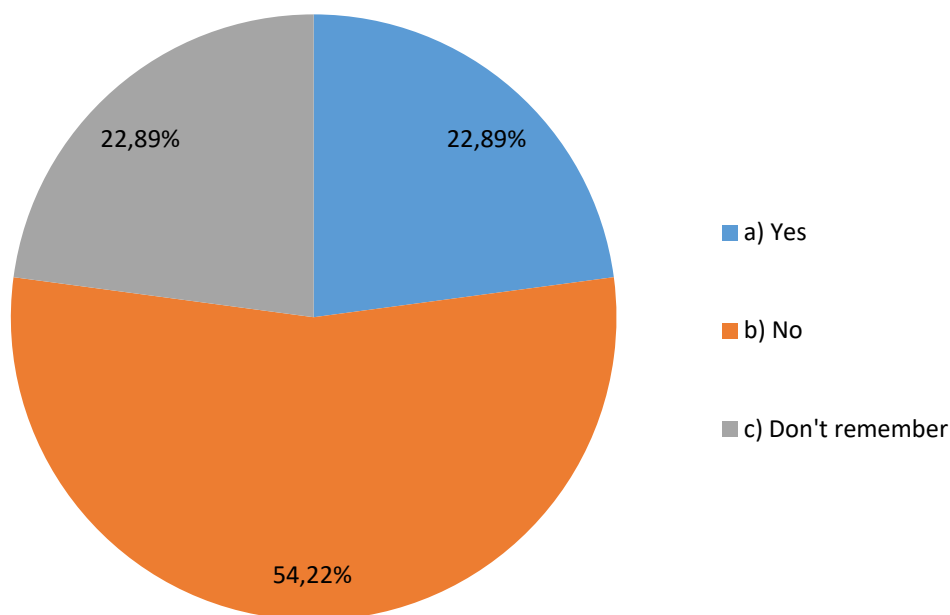




The largest percentage of students participating in the study admitted that they have a neutral interest in STEM subjects (42,17%). 36,75% answered that they are interested in these subjects, and every tenth (10,84%) stated that they are very interested. The rest answered that they are not very interested in STEM subjects (6,63%) or not interested at all (3,61%).

2.6. Have you ever participated in any STEM competitions or challenges?

	a) Yes	b) No	c) Don't remember
Germany	-	70% (7)	30% (3)
Poland	28,6% (4)	50% (7)	21,4% (3)
Portugal	25% (3)	50% (6)	25% (3)
Romania 1	33,3% (11)	45,5% (15)	21,2% (7)
Romania 2	20,5% (16)	55,1% (43)	24,4% (19)
Türkiye	21,1% (4)	63,2% (12)	15,7% (3)
TOTAL	22,89% (38)	54,22% (90)	22,89% (38)

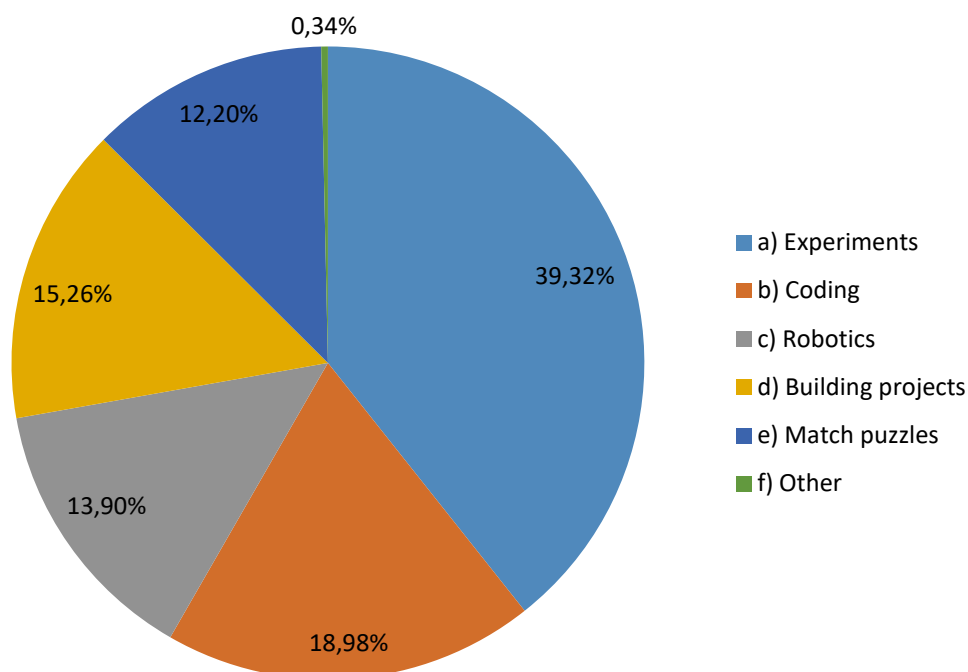


More than half of the students (54,22%) have never participated in any STEM competitions or challenges. Only 22,89% admitted that they had ever participated in such activities. The same percentage (22,89%) answered that they do not remember.

2.7. What type of STEM activities do you enjoy the most? (Select all that apply)

	a) Experiments	b) Coding	c) Robotics	d) Building projects	e) Math puzzles	f) Other (please specify):
Germany	20% (2)	40% (4)	10% (1)	20% (2)	10% (1)	-
Poland	57,1% (8)	50% (7)	35,7% (5)	7,1% (1)	28,6% (4)	-
Portugal	90,9% (10)	18,2% (2)	27,3% (3)	-	27,3% (3)	-
Romania 1	90,9% (30)	15,2% (5)	12,1% (4)	36,4% (12)	6,1% (2)	-
Romania 2	74,4% (58)	33,3% (26)	20,5% (16)	28,2% (22)	23,1% (18)	1,3% (1)*
Türkiye	42,1% (8)	63,2% (12)	63,2% (12)	42,1% (8)	42,1% (8)	-
TOTAL	39,32% (116)	18,98% (56)	13,90% (41)	15,26% (45)	12,20% (36)	0,34% (1)

*additional response provided by student from Romania 2: (1) Sports competitions.

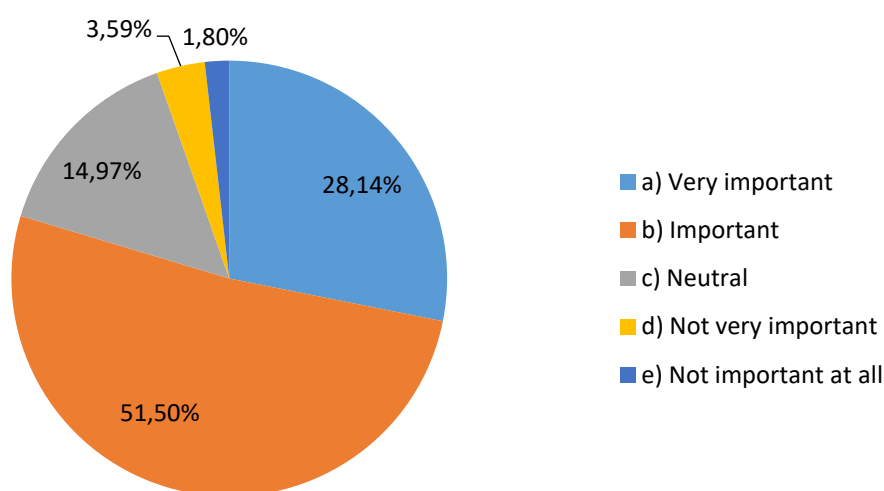


When asked about the type of STEM activities they enjoy the most, students mostly indicated experiments (39,32%). The remaining activities had a similar percentage share, of which the next type of activity most frequently undertaken is coding (18,98%), building projects (15,26%), robotics (13,90%), and math puzzles (12,20%).



2.8. How important do you think STEM education is for future career opportunities?

	a) Very important	b) Important	c) Neutral	d) Not very important	e) Not important at all
Germany	10% (1)	40% (4)	30% (3)	20% (2)	-
Poland	21,4% (3)	50% (7)	21,4% (3)	-	7,1% (1)
Portugal	33,3% (4)	50% (7)	16,7% (2)	-	-
Romania 1	48,5% (16)	45,5% (15)	6,1% (2)	-	-
Romania 2	20,5% (16)	57,7% (45)	15,4% (12)	3,8% (3)	2,6% (2)
Türkiye	36,8% (7)	42,1% (8)	15,8% (3)	5,3% (1)	-
TOTAL	28,14% (47)	51,50% (86)	14,97% (25)	3,59% (6)	1,80% (3)



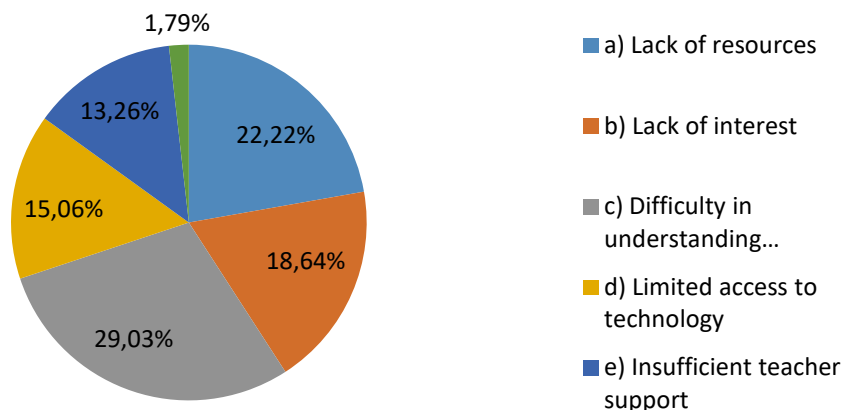
More than three-quarters of students surveyed agreed that STEM education is important (51,50%) or very important (28,14%) for future career opportunities. 14,97% of respondents found it neutrally important. Only 3,59% indicated that it is not very important, and 1,80% that it is not important at all.

2.9. What challenges do you face in learning STEM subjects? (Select all that apply)

	a) Lack of resources	b) Lack of interest	c) Difficulty in understanding concepts	d) Limited access to technology	e) Insufficient teacher support	f) Other (please specify):
Germany	10% (1)	40% (4)	60% (6)	50% (5)	20% (2)	-
Poland	28,6% (4)	14,3% (2)	35,7% (5)	50% (7)	50% (7)	-
Portugal	33,3% (4)	41,7% (5)	83,3% (10)	16,7% (2)	33,3% (4)	-
Romania 1	45,5% (15)	36,4% (12)	45,5% (15)	39,4% (13)	15,2% (5)	3% (1)*
Romania 2	42,3% (33)	32,1% (25)	52,6% (41)	12,8% (10)	19,2% (15)	-
Türkiye	29,4% (5)	23,5% (4)	23,5% (4)	29,4% (5)	23,5% (4)	23,5% (4)**
TOTAL	22,22% (62)	18,64% (52)	29,03% (81)	15,06% (42)	13,26% (37)	1,79% (5)

*additional response provided by student from Romania 1: (1) *Not specified*.

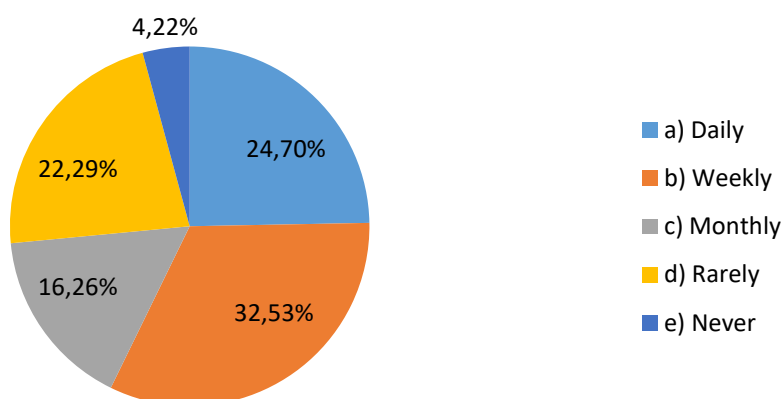
**additional responses provided by student from Türkiye: (1) Lack of experience; (2) None; (3) My brain can't take it; (4) *Not specified*.



When asked about the challenges that students face when learning STEM subjects, the answers varied greatly. Most respondents indicated difficulty in understanding concepts (29,03%). In second place is a lack of resources (22,22%). The next ones are lack of interest (18,64%), limited access to technology (15,06%), and insufficient teacher support (13,26%).

2.10. How often do you use technology in your STEM learning?

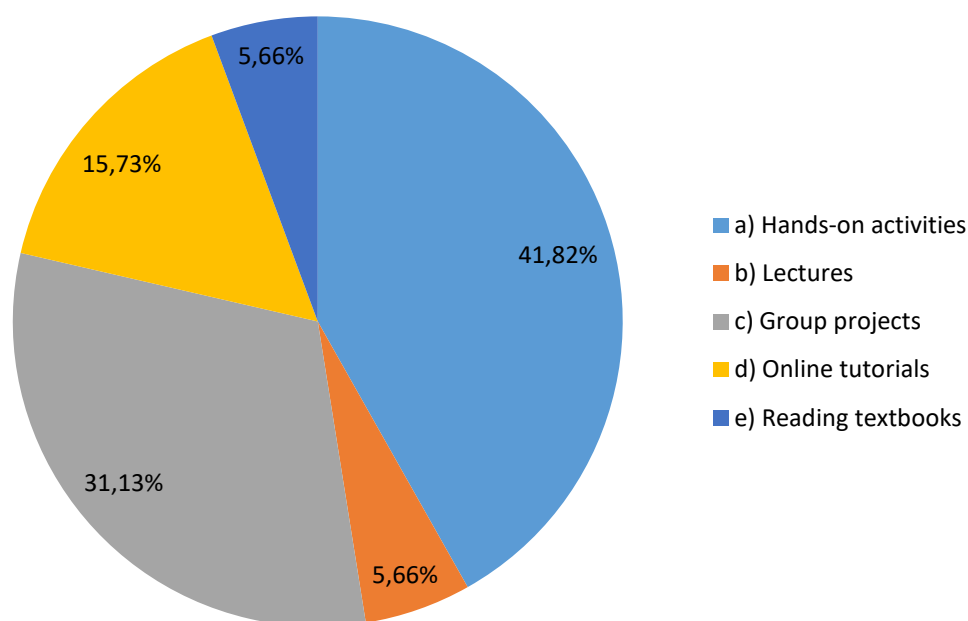
	a) Daily	b) Weekly	c) Monthly	d) Rarely	e) Never
Germany	-	30% (3)	20% (2)	40% (4)	10% (1)
Poland	21,4% (3)	28,6% (4)	21,4% (3)	21,4% (3)	7,1% (1)
Portugal	16,7% (2)	16,7% (2)	16,7% (2)	50% (6)	-
Romania 1	57,6% (19)	33,3% (11)	9,1% (3)	-	-
Romania 2	17,9% (14)	29,5% (23)	20,5% (16)	25,6% (20)	6,4% (5)
Türkiye	15,8% (3)	57,9% (11)	5,3% (1)	21,1% (4)	-
TOTAL	24,70% (41)	32,53% (54)	16,26% (27)	22,29% (37)	4,22% (7)





More than half of the surveyed students admitted that they use technology in STEM learning daily (24,70%) or weekly (32,53%). 16,26% use technology in learning monthly. Every fifth student (22,29%) rarely uses them, and 4,22% indicated that they never use it.

2.11. How do you prefer to learn STEM subjects? (Select all that apply)					
	a) Hands-on activities	b) Lectures	c) Group projects	d) Online tutorials	e) Reading textbooks
Germany	40% (4)	10% (1)	40% (4)	30% (3)	-
Poland	85,7% (12)	21,4% (3)	64,3% (9)	42,9% (6)	14,3% (2)
Portugal	83,3% (10)	25% (3)	66,7% (8)	16,7% (2)	16,7% (2)
Romania 1	81,8% (27)	3% (1)	69,7% (23)	30,3 (10)	12,1% (4)
Romania 2	80,8% (63)	6,4% (5)	60,3% (47)	32,1% (25)	12,8% (10)
Türkiye	89,5% (17)	26,3% (5)	42,1% (8)	21,1% (4)	-
TOTAL	41,82% (133)	5,66% (18)	31,13% (99)	15,73% (50)	5,66% (18)

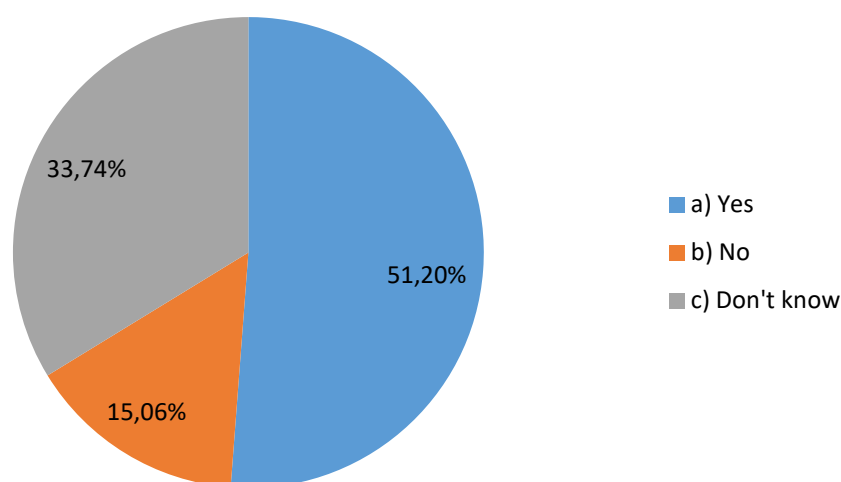


Most respondents indicated that they prefer to learn STEM subjects through hands-on activities (41,82%) and group projects (31,13%). The remaining choice options received significantly fewer responses: 15,73% for online tutorials, 5,66% for lectures, and 5,66% for reading textbooks.



2.12. Do you think STEM education adequately prepares students for real-world challenges?

	a) Yes	b) No	c) Don't know
Germany	40% (4)	50% (5)	10% (1)
Poland	50% (7)	14,3% (2)	35,7% (5)
Portugal	25% (3)	33,3% (4)	41,7% (5)
Romania 1	66,7% (22)	-	33,3% (11)
Romania 2	60,3% (47)	11,5% (9)	28,2% (22)
Türkiye	10,5% (2)	26,3% (5)	63,2% (12)
TOTAL	51,20% (85)	15,06% (25)	33,74% (56)



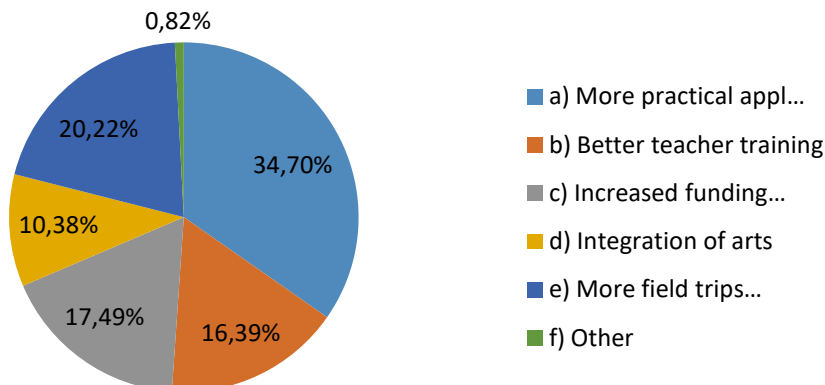
Over half of respondents believe that STEM education adequately prepares students for real-world challenges (51,20%). 15,06% indicated that it does not prepare students for real-world challenges, and 33,74% admitted that they do not know.

2.13. What improvements would you suggest for enhancing STEM education? (Select all that apply)

	a) More practical applications	b) Better teacher training	c) Increased funding for resources	d) Integration of arts (STEAM)	e) More field trips and guest speakers	f) Other (please specify):
Germany	80% (8)	40% (4)	20% (2)	10% (1)	50% (5)	-
Poland	71,4% (10)	57,1% (8)	64,3% (9)	42,9% (6)	50% (7)	-
Portugal	66,7% (8)	33,3% (4)	50% (6)	8,3% (1)	16,7% (2)	16,7% (2)*
Romania 1	81,8% (27)	30,3% (10)	36,4% (12)	33,3% (11)	57,6% (19)	3% (1)**
Romania 2	74,4% (58)	35,9% (28)	37,2% (29)	23,1% (18)	44,9% (35)	-
Türkiye	84,2% (16)	31,6% (6)	31,6% (6)	5,3% (1)	31,6% (6)	-
TOTAL	34,70% (127)	16,39% (60)	17,49% (64)	10,38% (38)	20,22% (74)	0,82% (3)

*additional responses provided by students from Portugal: (1) Easier explanations to understand; (2) *Not specified*.

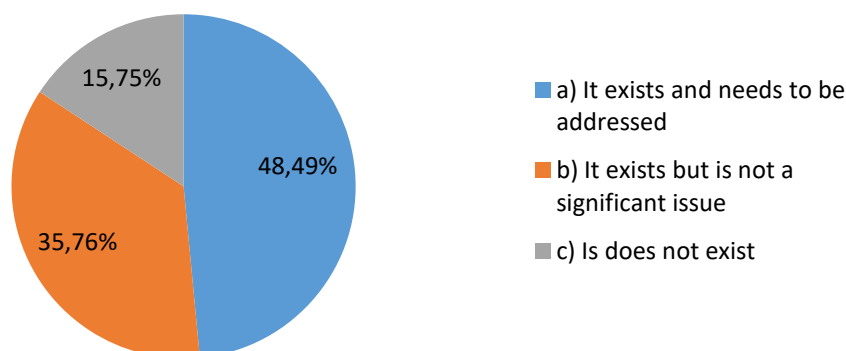
**additional response provided by student from Romania 1: (1) *Not specified*.



According to respondents, to enhance STEM education it is necessary to use more practical applications (34,70%), and more field trips and guest speakers are needed (20,22%). 17,49% of students suggested that increase funding for resources would enhance STEM education, 16,39% indicated better teacher training, and only 10,38% suggested integration of arts.

2.14. Do you perceive the gender gap in STEM fields?

	a) It exists and needs to be addressed	b) It exists but is not a significant issue	c) It does not exist
Germany	30% (3)	30% (3)	40% (4)
Poland	71,4% (10)	21,4% (3)	7,1% (1)
Portugal	50% (6)	33,3% (4)	16,7% (2)
Romania 1	42,4% (14)	51,5% (17)	6,1% (2)
Romania 2	53,8% (42)	35,9% (28)	10,3% (8)
Türkiye	27,8% (5)	22,2% (4)	50% (9)
TOTAL	48,49% (80)	35,76% (59)	15,75% (26)

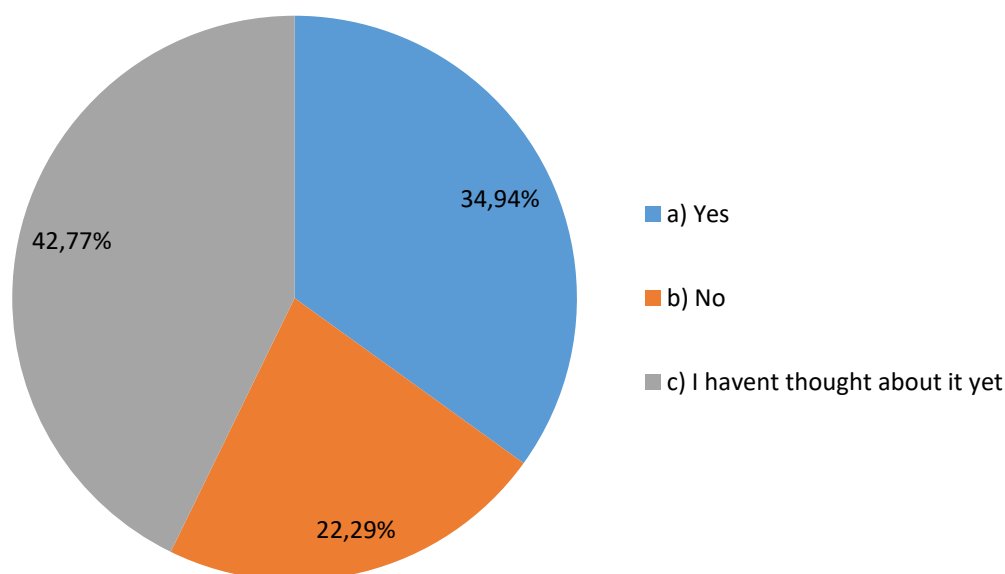




Over 84% of the surveyed students noticed the gender gap in STEM fields, of which 48,49% admitted that it needed to be addressed, and 35,75% believe that it is not a significant issue. The remaining 15,75% of respondents believe that the gender gap in STEM fields does not exist.

2.15. Have you ever considered pursuing a career in a STEM field?

	a) Yes	b) No	c) I haven't thought about it yet
Germany	60% (6)	30% (3)	10% (1)
Poland	35,7% (5)	28,6% (4)	35,7% (5)
Portugal	41,7% (5)	25% (3)	33,3% (4)
Romania 1	33,3% (11)	24,2% (8)	42,4% (14)
Romania 2	34,6% (27)	21,8% (17)	43,6% (34)
Türkiye	21,1% (4)	10,5% (2)	68,4% (13)
TOTAL	34,94% (58)	22,29% (37)	42,77% (71)



When asked whether they had ever considered pursuing a career in a STEM field, most respondents answered that they had not thought about it yet (42,77%). 34,94% considered such a career and 22,29% indicated that they had never considered a career in STEM fields.

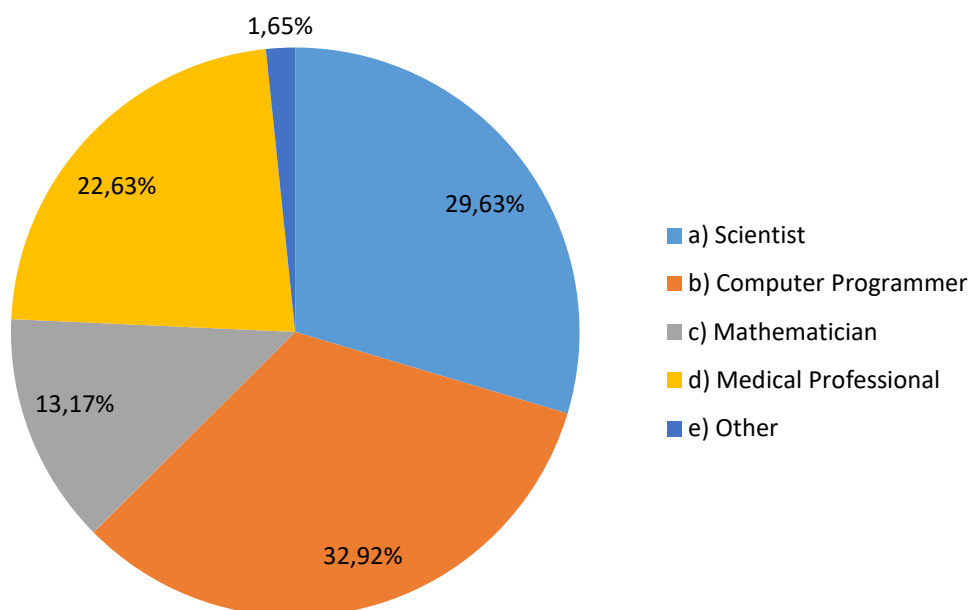


2.16. Which STEM careers do you find most appealing? (Select all that apply)

	a) Scientist	b) Computer Programmer	c) Mathematician	d) Medical Professional	e) Other (please specify):
Germany	30% (3)	50% (5)	20% (2)	-	-
Poland	42,9% (6)	64,3% (9)	21,4% (3)	42,9% (6)	-
Portugal	18,2% (2)	36,4% (4)	27,3% (3)	36,4% (4)	9,1% (1)*
Romania 1	48,5% (16)	33,3% (11)	3% (1)	42,4% (14)	9,1% (3)**
Romania 2	44,9% (35)	48,7% (38)	26,9% (21)	33,3% (26)	-
Türkiye	52,6% (10)	68,4% (13)	10,5% (2)	26,3% (5)	-
TOTAL	29,63% (72)	32,92% (80)	13,17% (32)	22,63% (55)	1,65% (4)

*additional response provided by student from Portugal: (1) Employed in a company.

**additional responses provided by students from Romania 1: (1) Technician; (2) & (3) *Not specified*.



Every third of surveyed students indicated that in their case the most appealing STEM career is the profession of computer programmer (32,92%) and scientist (29,63%). Medical professional is slightly less popular (22,63%), while the fewest students chose mathematician as a profession (13,17%).

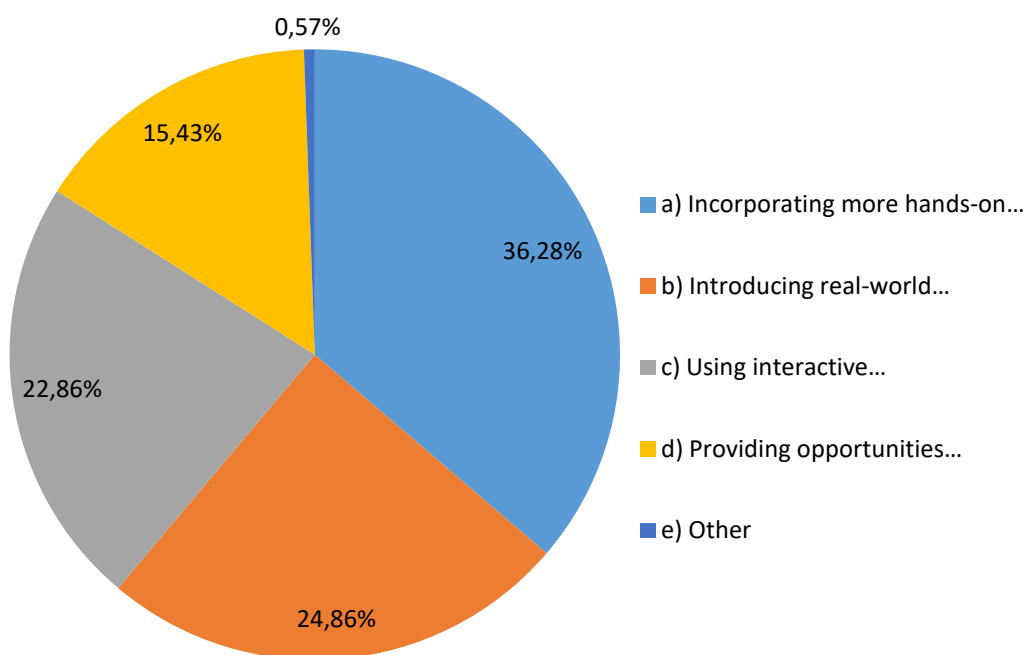


2.17. How do you think STEM education could be made more engaging for students?
(Select all that apply)

	a) Incorporating more hands-on experiments	b) Introducing real-world problem-solving activities	c) Using interactive technology tools	d) Providing opportunities for creativity within STEM subjects	e) Other (please specify):
Germany	40% (4)	50% (5)	20% (2)	20% (2)	-
Poland	85,7% (12)	50% (7)	35,7% (5)	42,9% (6)	-
Portugal	83,3% (10)	58,3% (7)	41,7% (5)	33,3% (4)	8,3% (1)*
Romania 1	87,9% (29)	57,6% (19)	66,7% (22)	42,4% (14)	-
Romania 2	71,8% (56)	56,4% (44)	47,4% (37)	28,2% (22)	1,3% (1)**
Türkiye	84,2% (16)	26,3% (5)	47,4% (9)	31,6% (6)	-
TOTAL	36,28% (127)	24,86% (87)	22,86% (80)	15,43% (54)	0,57% (2)

*additional response provided by student from Portugal: (1) *Not specified*.

**additional response provided by student from Romania 2: (1) Introduction of the arts.

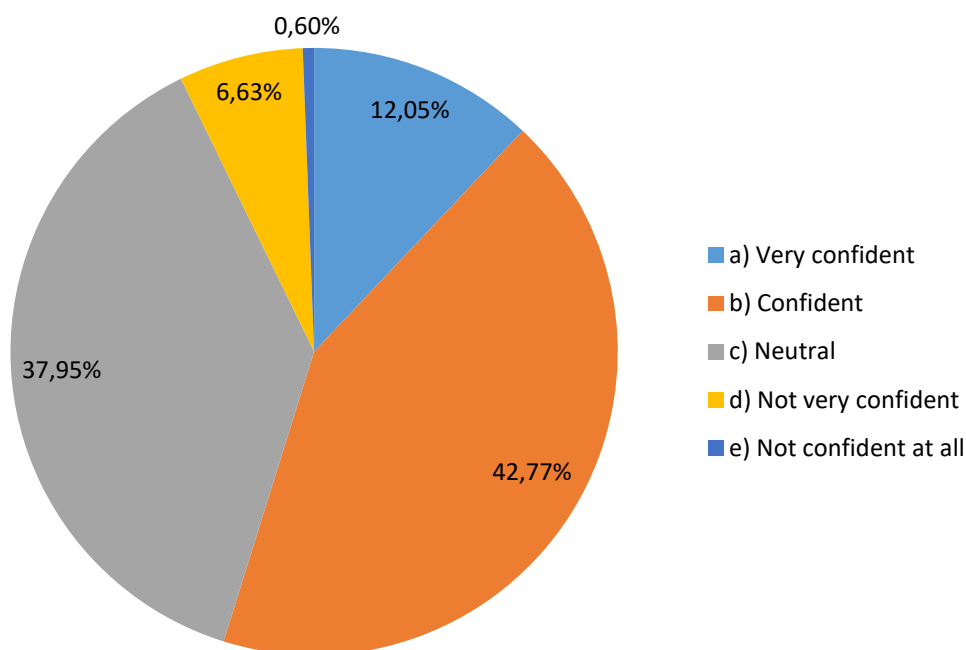


In almost all countries surveyed, the largest number of students believe that STEM education could be more engaging for students through incorporating more hands-on experiments, which gave a total score of 36,28%. Next, respondents indicated the introduction of real-world problem-solving activities (24,86%), and using interactive technology tools (22,86%). The least engaging according to respondents is providing opportunities for creativity within STEM subjects (15,43%).



2.18. How do you rate your confidence level in STEM subjects?

	a) Very confident	b) Confident	c) Neutral	d) Not very confident	e) Not confident at all
Germany	20% (2)	40% (4)	30% (3)	10% (1)	-
Poland	7,1% (1)	28,6% (4)	50% (7)	14,3% (2)	-
Portugal	-	41,7% (5)	41,7% (5)	16,7% (2)	-
Romania 1	3% (1)	57,6% (19)	39,4% (13)	-	-
Romania 2	19,2% (15)	38,5% (30)	33,3% (26)	7,7% (6)	1,3% (1)
Türkiye	5,3% (1)	47,4% (9)	47,4% (9)	-	-
TOTAL	12,05% (20)	42,77% (71)	37,95% (63)	6,63% (11)	0,60% (1)



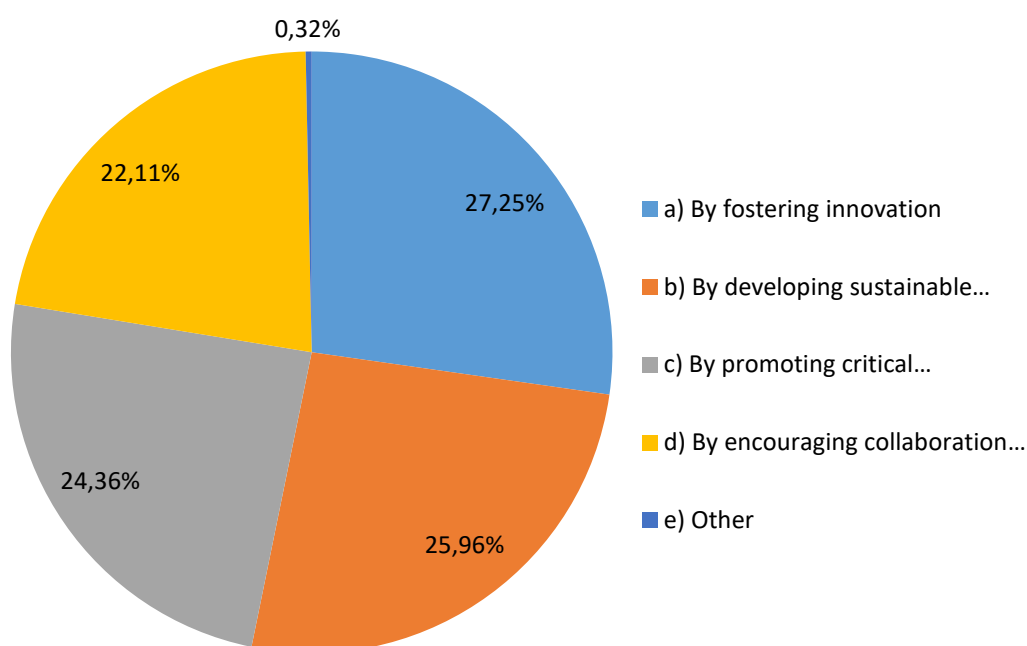
More than half of the students surveyed admit that their level of confidence in STEM subjects is high. 42,77% of them feel confident in STEM subjects, and 12,05% feel very confident. A neutral level of confidence is indicated by 37,95% of students, while 6,63% do not feel very confident in this area and 0,60% feel not confident at all.



2.19. How do you think STEM education can help address global challenges? (Select all that apply)

	a) By fostering innovation	b) By developing sustainable solutions	c) By promoting critical thinking and problem-solving skills	d) By encouraging collaboration across disciplines	e) Other (please specify):
Germany	30% (3)	60% (6)	30% (3)	10% (1)	-
Poland	64,3% (9)	35,7% (5)	35,7% (5)	35,7% (5)	-
Portugal	90,9% (10)	54,5% (6)	81,8% (9)	54,5% (6)	9,1% (1)*
Romania 1	45,5% (15)	45,5% (15)	42,2% (14)	57,6% (19)	-
Romania 2	46,2% (36)	44,9% (35)	47,4% (37)	44,9% (35)	-
Türkiye	63,2% (12)	73,7% (14)	42,1% (8)	15,8% (3)	-
TOTAL	27,25% (85)	25,96% (81)	24,36% (76)	22,11% (69)	0,32% (1)

*additional response provided by student from Portugal: (1) Development of useful characteristics and skills necessary to solve problems.

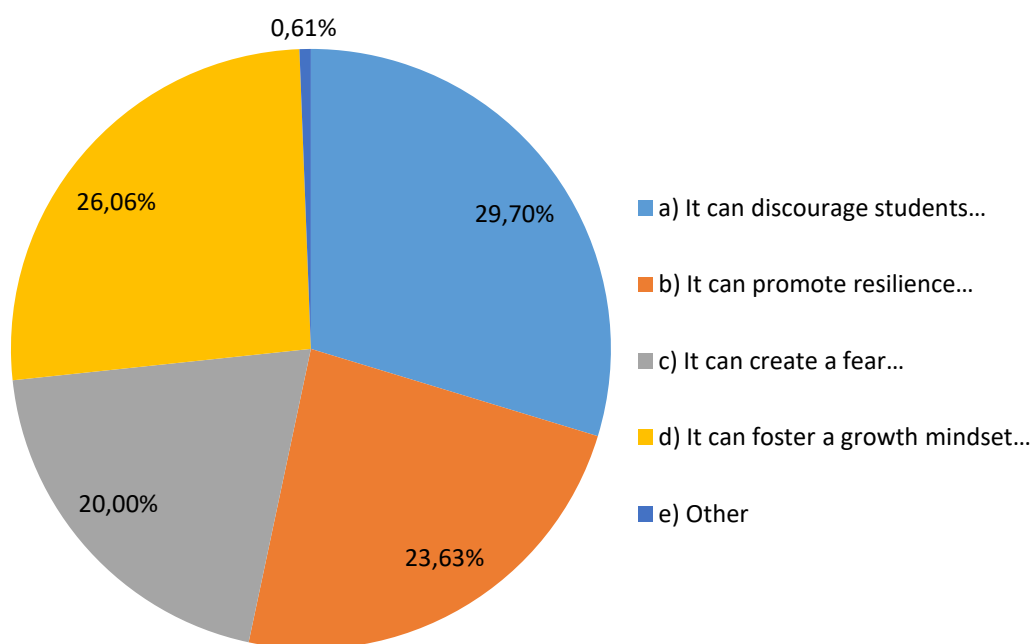


When asked how STEM education can help address global challenges, the percentages of answers are similar, with a slight advantage in the fostering innovation (27,25%). The next choices indicated by students are the development of sustainable solutions (25.96%), the promotion of critical thinking and problem-solving skills (24.36%), and encouraging collaboration across disciplines (22.11%).

2.20. How do you think the perception of failure impacts STEM education?

	a) It can discourage students from taking risks and exploring new ideas	b) It can promote resilience and problem-solving skills	c) It can create a fear of failure that hinders learning	d) It can foster a growth mindset and a willingness to learn from mistakes	e) Other (please specify):
Germany	10% (1)	50% (5)	20% (2)	20% (2)	-
Poland	35,7% (5)	21,4% (3)	35,7% (5)	7,1% (1)	-
Portugal	-	45,5% (5)	18,2% (2)	27,3% (3)	9,1% (1)*
Romania 1	9,1% (3)	15,2% (5)	27,3% (9)	48,5% (16)	-
Romania 2	38,5% (30)	21,8% (17)	15,4% (12)	24,4% (19)	-
Türkiye	52,6% (10)	21,1% (4)	15,8% (3)	10,5% (2)	-
TOTAL	29,70% (49)	23,63% (39)	20% (33)	26,06% (43)	0,61% (1)

*additional response provided by student from Portugal: (1) Depending on the person, any of the following situations may occur.



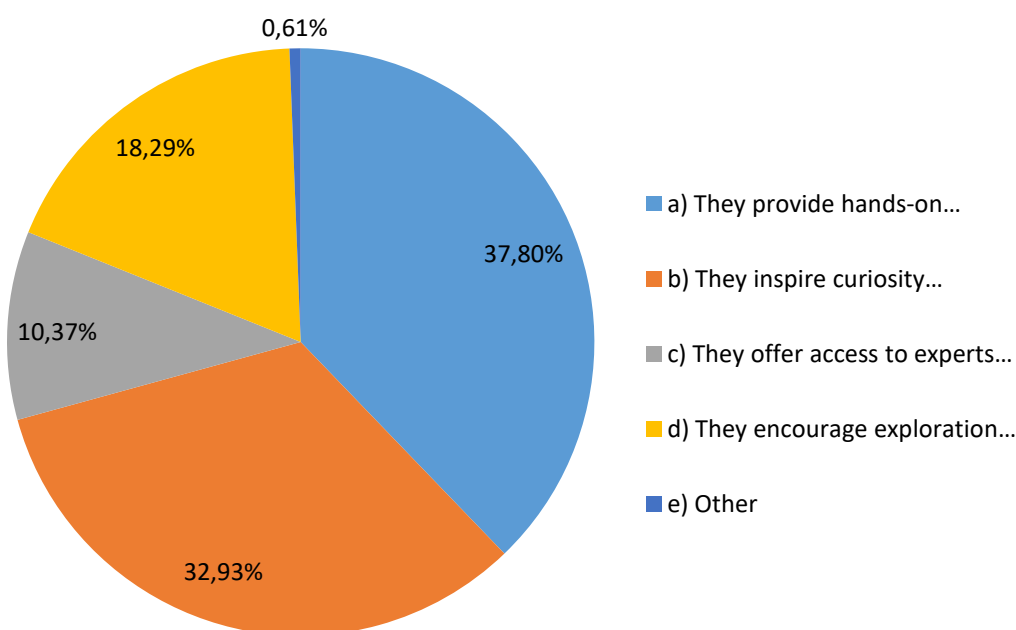
According to every third respondent, the perception of failure affects STEM education because it can discourage students from taking risks and exploring new ideas (29,70%). Every fourth believes that the perception of failure can be a positive factor that fosters a growth mindset and a willingness to learn from mistakes (26,06%). The answer that it can promote resilience and problem-solving skills is also similar (23,63%), and the smallest percentage of respondents stated that it can create a fear of failure that hinders learning (20%).



2.21. How do you think informal STEM learning experiences (e.g., museums, and science centers) contribute to education?

	a) They provide hands-on learning opportunities outside the classroom	b) They inspire curiosity and a love for STEM subjects	c) They offer access to experts and professionals in STEM fields	d) They encourage exploration and experimentation	e) Other (please specify):
Germany	10% (1)	40% (4)	40% (4)	10% (1)	-
Poland	64,3% (9)	21,4% (3)	7,1% (1)	7,1% (1)	-
Portugal	54,5% (5)	27,3% (3)	9,1% (1)	9,1% (1)	-
Romania 1	54,5% (18)	12,1% (4)	3% (1)	27,3% (9)	3% (1)*
Romania 2	33,3% (26)	42,3% (33)	7,7% (6)	16,7% (13)	-
Türkiye	15,8% (3)	36,8% (7)	21,1% (4)	26,3% (5)	-
TOTAL	37,80% (62)	32,93% (54)	10,37% (17)	18,29% (30)	0,61 (1)

*additional response provided by student from Romania 1: (1) *Neutral*.

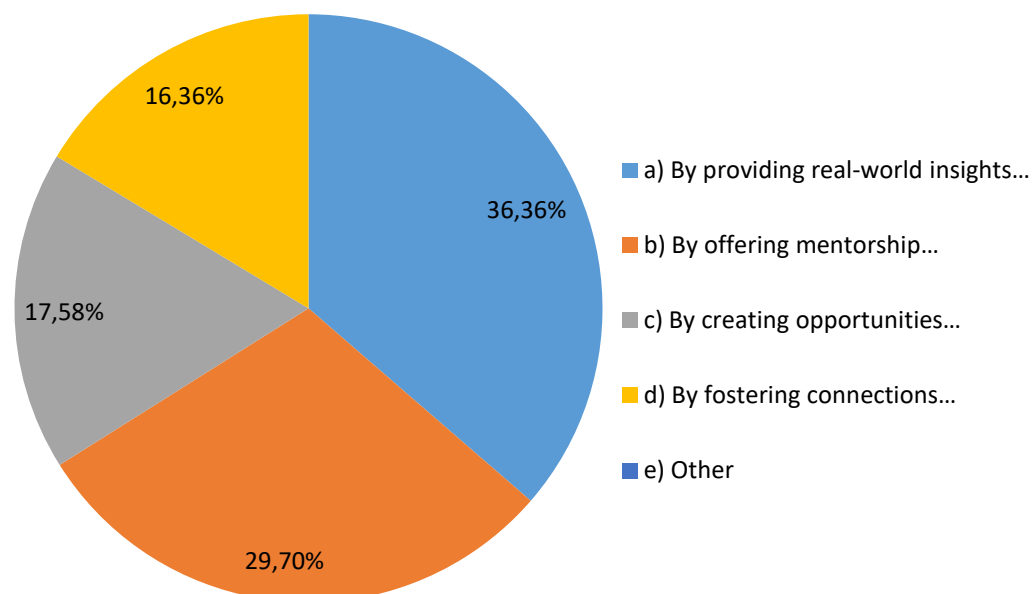


Most respondents (37,80%) believe that informal STEM learning experiences contribute to education because they provide hands-on learning opportunities outside the classroom. Other factors, according to them, are that these activities inspire curiosity and a love for STEM subjects (32,93%), as well as they encourage exploration and experimentation (18,29%). The lowest impact was attributed to the answer that they offer access to experts and professionals in STEM fields (10,37%).



2.22. How do you think collaboration with industry professionals can enhance STEM education?

	a) By providing real-world insights and experiences	b) By offering mentorship and career guidance	c) By creating opportunities for internships and apprenticeships	d) By fostering connections between education and industry needs	e) Other (please specify):
Germany	10% (1)	60% (6)	10% (1)	20% (2)	-
Poland	42,9% (6)	21,4% (3)	21,4% (3)	14,3% (2)	-
Portugal	36,4% (4)	27,3% (3)	36,4% (4)	-	-
Romania 1	27,3% (9)	24,2% (8)	18,2% (6)	30,3% (10)	-
Romania 2	35,9% (28)	35,9% (28)	16,7% (13)	11,5% (9)	-
Türkiye	63,2% (12)	5,3% (1)	10,5% (2)	21,1% (4)	-
TOTAL	36,36% (60)	29,70% (49)	17,58% (29)	16,36% (27)	-



According to respondents, collaboration with industry professionals can enhance STEM education by providing real-world insights and experiences (36,36%). Almost every third respondent (29,70%) believes that such a collaboration can bring effect through offering mentorship and career guidance. The remaining choices received a similar percentage of responses, and they indicated that this collaboration can enhance STEM education by creating opportunities for internships and apprenticeships (17,58%), and by fostering connections between education and industry needs (16,36%).

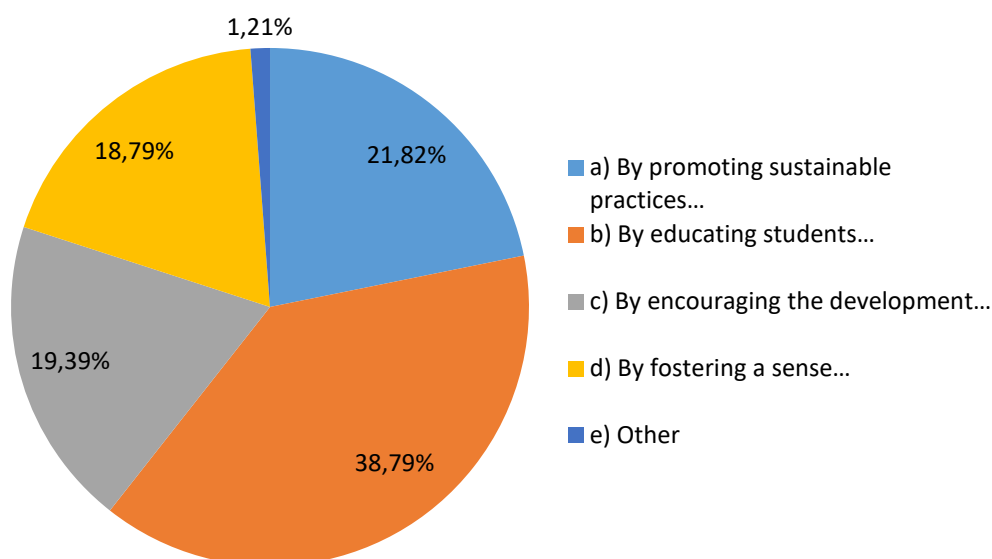


2.23. How do you think STEM education can address environmental challenges?

	a) By promoting sustainable practices and innovations	b) By educating students about the impact of human activities on the environment	c) By encouraging the development of green technologies	d) By fostering a sense of responsibility and stewardship towards the environment	e) Other (please specify):
Germany	10% (1)	20% (2)	50% (5)	20% (2)	-
Poland	35,7% (5)	21,4% (3)	21,4% (3)	21,4% (3)	-
Portugal	-	45,5% (5)	9,1% (1)	36,4% (4)	9,1% (1)*
Romania 1	12,1% (4)	54,5% (18)	12,1% (4)	21,2% (7)	-
Romania 2	25,6% (20)	43,6% (34)	20,5% (16)	10,3% (8)	-
Türkiye	31,6% (6)	10,5% (2)	15,8% (3)	36,8% (7)	5,3% (1)**
TOTAL	21,82% (36)	38,79% (64)	19,39% (32)	18,79% (31)	1,21% (2)

*additional response provided by student from Portugal: (1) All options.

**additional response provided by student from Türkiye: (1) A technological system can be developed by raising students' awareness and meeting environmental challenges.



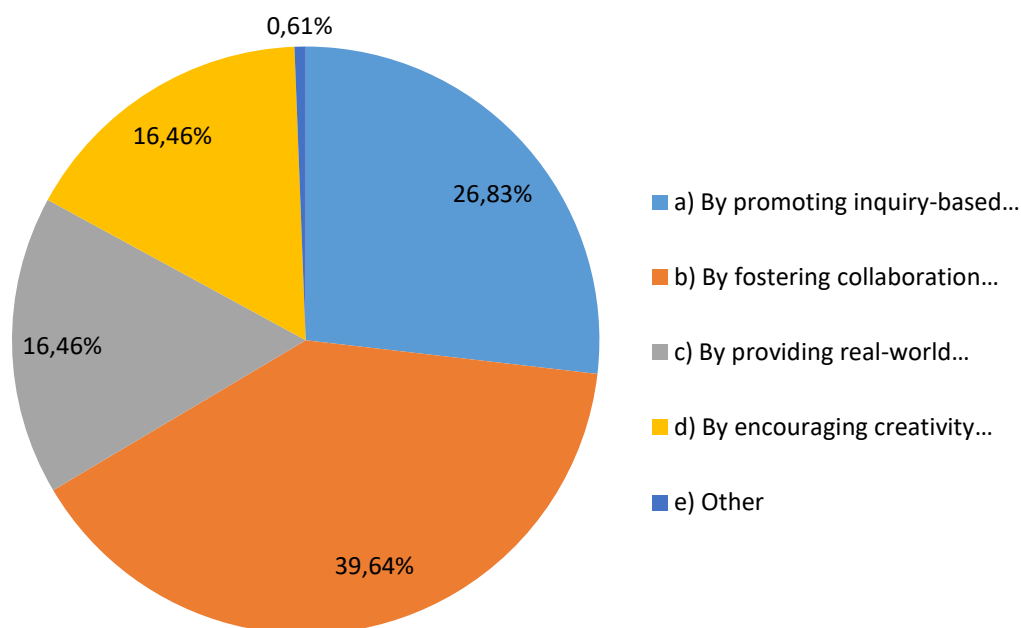
According to the majority of respondents (38,79%), STEM education can address environmental challenges by educating students about the impact of human activities on the environment. In other cases, the number of responses from the surveyed teachers was similar: by promoting sustainable practices and innovations (21,82%), by encouraging the development of green technologies (19,39%), and by fostering a sense of responsibility and stewardship towards the environment (18,79%). Additionally, one student from Portugal mentioned all the options, and one from Türkiye added that STEM education can address environmental challenges through a technological system that raises awareness.



2.24. How do you think project-based learning can enhance STEM education?

	a) By promoting inquiry-based learning and problem-solving skills	b) By fostering collaboration and teamwork	c) By providing real-world context and relevance to learning	d) By encouraging creativity and innovation	e) Other (please specify):
Germany	10% (1)	50% (5)	40% (4)	-	-
Poland	28,6% (4)	7,1% (1)	42,9% (6)	21,4% (3)	-
Portugal	54,5% (5)	27,3% (3)	9,1% (1)	-	9,1% (1)*
Romania 1	27,3% (9)	45,5% (15)	18,2% (6)	9,1% (3)	-
Romania 2	26,9% (21)	42,3% (33)	10,3% (8)	20,5% (16)	-
Türkiye	21,1% (4)	42,1% (8)	10,5% (2)	26,3% (5)	-
TOTAL	26,83% (44)	39,64% (65)	16,46% (27)	16,46% (27)	0,61% (1)

*additional response provided by student from Portugal: (1) Update yourself about the world.

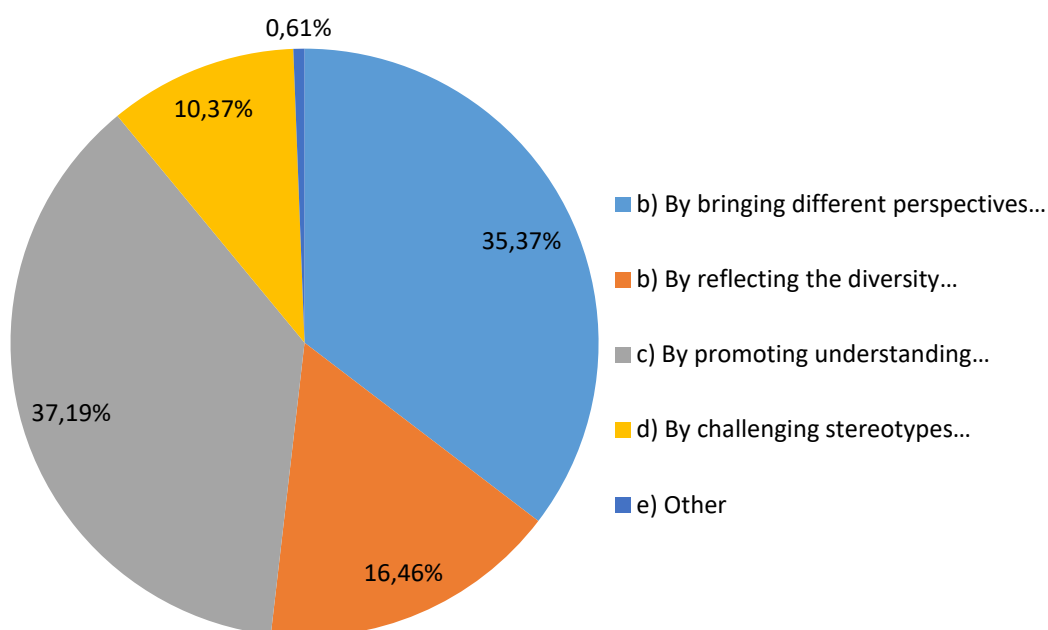


When asked how project-based learning can enhance STEM education, most respondents (39,64%) answered that it could be done by fostering collaboration and teamwork. 26,83% of students believe that project-based learning can enhance STEM education by promoting inquiry-based learning and problem-solving skills. Two answers received the same number of percentage points (16,46%): by providing real-world context and relevance to learning, and by encouraging creativity and innovation.

2.25. How do you think cultural diversity contributes to STEM education?

	a) By bringing different perspectives and approaches to problem-solving	b) By reflecting the diversity of the global workforce in STEM fields	c) By promoting understanding and collaboration across cultures	d) By challenging stereotypes and biases in STEM fields	e) Other (please specify):
Germany	20% (2)	20% (2)	60% (6)	-	-
Poland	50% (7)	21,4% (3)	14,3% (2)	14,3% (2)	-
Portugal	27,3% (3)	9,1% (1)	27,3% (3)	36,4% (4)	-
Romania 1	30,3% (10)	9,1% (3)	51,5% (17)	9,1% (3)	-
Romania 2	34,6% (27)	20,5% (16)	37,2% (29)	7,7% (6)	-
Türkiye	50% (9)	11,1% (2)	22,2% (4)	11,1% (2)	5,6% (1)*
TOTAL	35,37% (58)	16,46% (27)	37,19% (61)	10,37% (17)	0,61% (1)

*additional response provided by student from Türkiye: (1) Promoting understanding and cooperation between different perspectives, approaches and cultures.

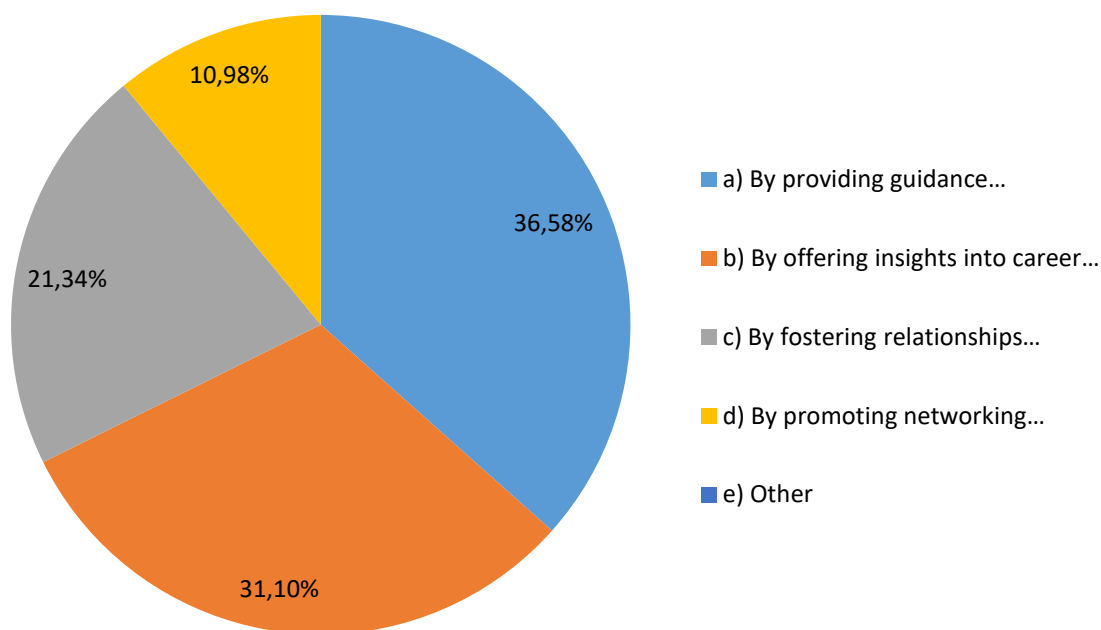


In terms of contribution of cultural diversity, respondents mainly indicated two factors that may have an impact on STEM education: bringing different perspectives and approaches to problem-solving (35,37%), and promoting understanding and collaboration across cultures (37,19%). 16,46% indicated that cultural diversity could influence STEM education by reflecting the diversity of the global workforce in STEM fields, 10,37% that it would challenge stereotypes and biases in STEM fields.



2.26. How do you think informal mentorship opportunities can support STEM education?

	a) By providing guidance and support from experienced professionals	b) By offering insights into career pathways and opportunities in STEM fields	c) By fostering relationships between students and industry professionals	d) By promoting networking and collaboration in STEM communities	e) Other (please specify):
Germany	20% (2)	50% (5)	10% (1)	20% (2)	-
Poland	28,6% (4)	28,6% (4)	35,7% (5)	7,1% (1)	-
Portugal	36,4% (4)	36,4% (4)	27,3% (3)	-	-
Romania 1	37,5% (12)	25% (8)	25% (8)	12,5% (4)	-
Romania 2	41% (32)	34,6% (27)	15,4% (12)	9% (7)	-
Türkiye	31,6% (6)	15,8% (3)	31,6% (6)	21,1% (4)	-
TOTAL	36,58% (60)	31,10% (51)	21,34% (35)	10,98% (18)	-



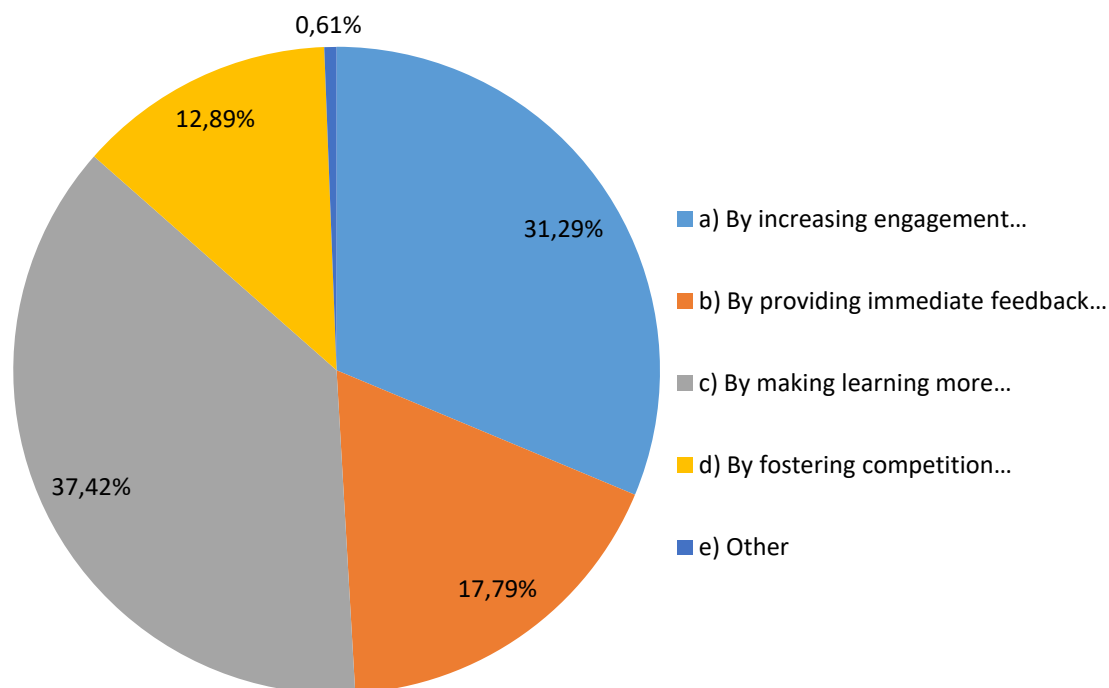
According to 36,58% of respondents, informal mentorship opportunities can support STEM education by providing guidance and support from experienced professionals. Slightly less, 31,10% believe that informal mentoring can support STEM education by offering insights into career pathways and opportunities in STEM fields. Every fifth student believes that such a mentorship can be support education by fostering relationships between students and industry professionals (21,34%), every tenth that by promoting networking and collaboration in STEM communities (10,98%).



2.27. How do you think gamification can enhance STEM learning experiences?

	a) By increasing engagement and motivation	b) By providing immediate feedback and rewards	c) By making learning more interactive and fun	d) By fostering competition and teamwork	e) Other (please specify):
Germany	10% (1)	40% (4)	10% (1)	40% (4)	-
Poland	14,3% (2)	21,4% (3)	50% (7)	14,3% (2)	-
Portugal	50% (5)	30% (3)	10% (1)	-	10% (1)*
Romania 1	36,4% (12)	15,2% (5)	33,3% (11)	15,2% (5)	-
Romania 2	32,5% (25)	9,1% (7)	46,8% (36)	11,7% (9)	-
Türkiye	31,6% (6)	36,8% (7)	26,3% (5)	5,3% (1)	-
TOTAL	31,29% (51)	17,79% (29)	37,42% (61)	12,89% (21)	0,61% (1)

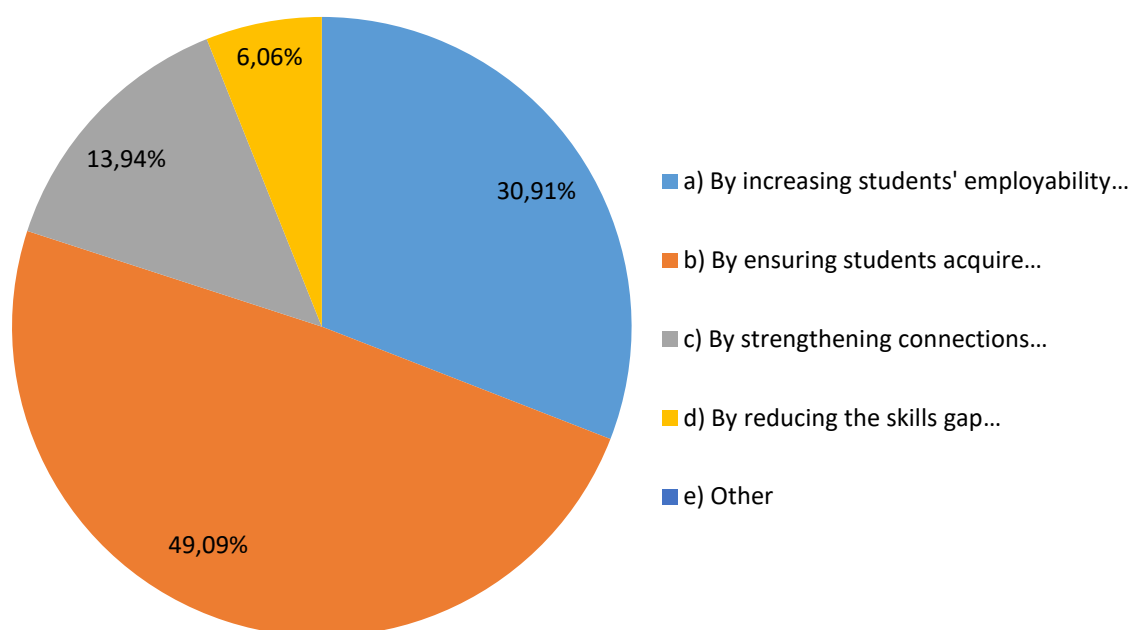
*additional response provided by student from Portugal: (1) Understand the subject better.



Respondents asked how gamification can enhance STEM learning experiences mainly indicated two factors: by making learning more interactive and fun (37,42%), and by increasing engagement and motivation (31,29%). 17,79% indicated that gamification can enhance STEM learning experiences by providing immediate feedback and rewards, and 12,89% by fostering competition and teamwork.

2.28. How do you think the alignment of STEM education with workforce needs can benefit students?

	a) By increasing students' employability and career readiness	b) By ensuring that students acquire relevant skills for future job opportunities	c) By strengthening connections between education and industry	d) By reducing the skills gap in STEM fields	e) Other (please specify):
Germany	-	30% (3)	50% (5)	20% (2)	-
Poland	21,4% (3)	57,1% (8)	7,1% (1)	14,3% (2)	-
Portugal	9,1% (1)	90,9% (10)	-	-	-
Romania 1	33,3% (11)	48,5% (16)	18,2% (6)	-	-
Romania 2	35,9% (28)	46,2% (36)	12,8% (10)	5,1% (4)	-
Türkiye	42,1% (8)	42,1% (8)	5,3% (1)	10,5% (2)	-
TOTAL	30,91% (51)	49,09% (81)	13,94% (23)	6,06% (10)	-



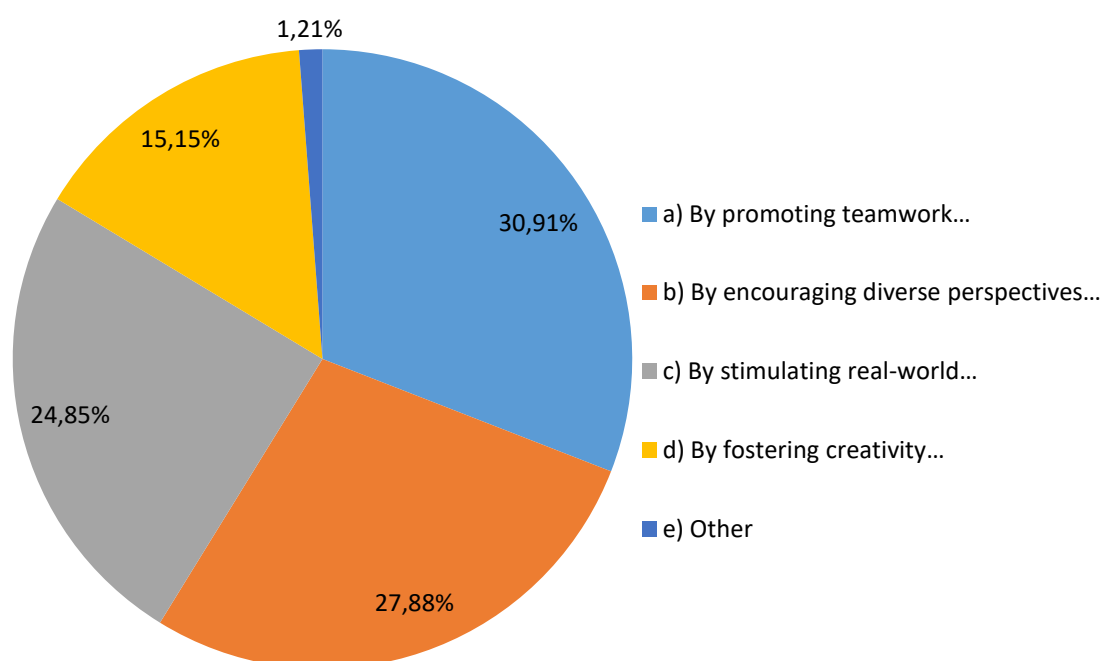
Almost half of respondents (49,09%) believe that the alignment of STEM education with workforce needs can benefit students by ensuring that students acquire relevant skills for future job opportunities. Every third respondent (30,91%) believed that it can benefit students by increasing students' employability and career readiness. The rest indicated that such alignment can benefit by strengthening connections between education and industry (13,94%), and by reducing the skills gap in STEM fields (6,06%).

2.29. How do you think collaborative problem-solving activities can enhance STEM education?

	a) By promoting teamwork and communication skills	b) By encouraging diverse perspectives and approaches to problem-solving	c) By simulating real-world challenges and scenarios	d) By fostering creativity and innovation	e) Other (please specify):
Germany	-	30% (3)	70% (7)	-	-
Poland	35,7% (5)	28,6% (4)	35,7% (5)	-	-
Portugal	18,2% (2)	36,4% (4)	36,4% (4)	-	9,1% (1)*
Romania 1	42,4% (14)	9,1% (3)	27,3% (9)	21,2% (7)	-
Romania 2	34,6% (27)	32,1% (25)	16,7% (13)	16,7% (13)	-
Türkiye	15,8% (3)	36,8% (7)	15,8% (3)	26,3% (5)	5,3% (1)**
TOTAL	30,91% (51)	27,88% (46)	24,85% (41)	15,15% (25)	1,21% (2)

*additional response provided by student from Portugal: (1) Simulating real-world challenges and scenarios and encouraging diverse perspectives and approaches to problem-solving.

**additional response provided by student from Türkiye: (1) By encouraging diverse perspectives, teamwork and communication skills

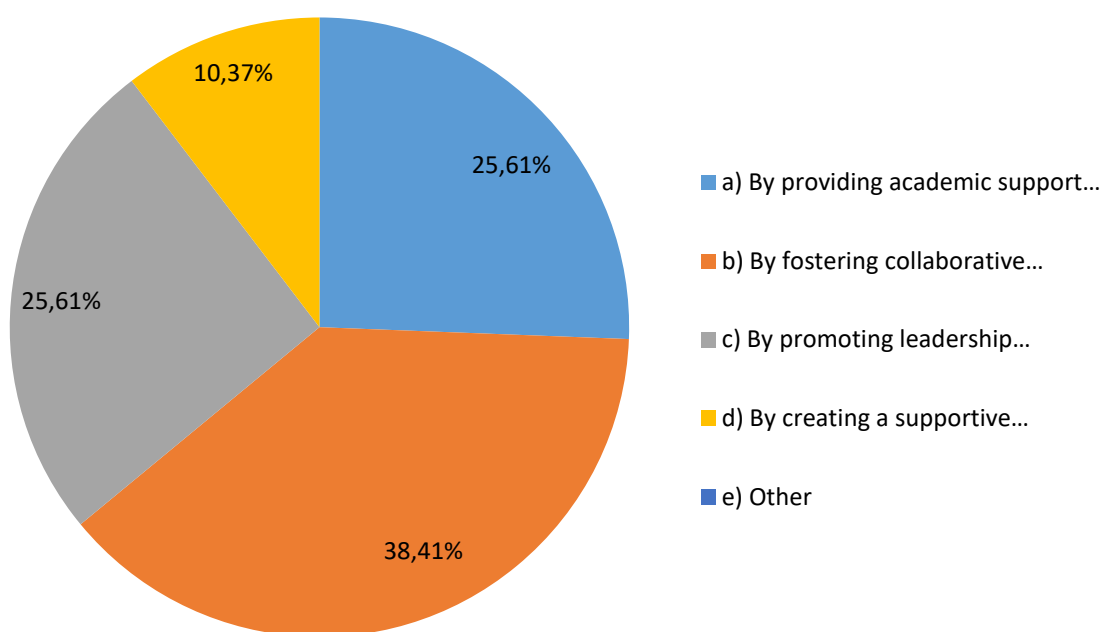


Respondents asked how collaborative problem-solving activities can enhance STEM education mainly indicated two factors: by promoting teamwork and communication skills (30,91%), and by encouraging diverse perspectives and approaches to problem-solving (27,88%). 24,85% indicated that collaborative problem-solving can enhance STEM education by simulating real-world challenges and scenarios, and 15,15% by fostering creativity and innovation.



2.30. How do you think peer mentoring programs can support STEM education?

	a) By providing academic support and guidance from peers	b) By fostering collaborative learning and teamwork	c) By promoting leadership and communication skills	d) By creating a supportive community for STEM learners	e) Other (please specify):
Germany	-	40% (4)	40% (4)	20% (2)	-
Poland	14,3% (2)	21,4% (3)	50% (7)	14,3% (2)	-
Portugal	18,2% (2)	36,4% (4)	18,2% (2)	27,3% (2)	-
Romania 1	21,2% (7)	54,5% (18)	15,2% (5)	9,1% (3)	-
Romania 2	33,3% (26)	34,6% (27)	24,4% (19)	7,7% (6)	-
Türkiye	26,3% (5)	36,8% (7)	26,3% (5)	10,5% (2)	-
TOTAL	25,61% (42)	38,41% (63)	25,61% (42)	10,37% (17)	-

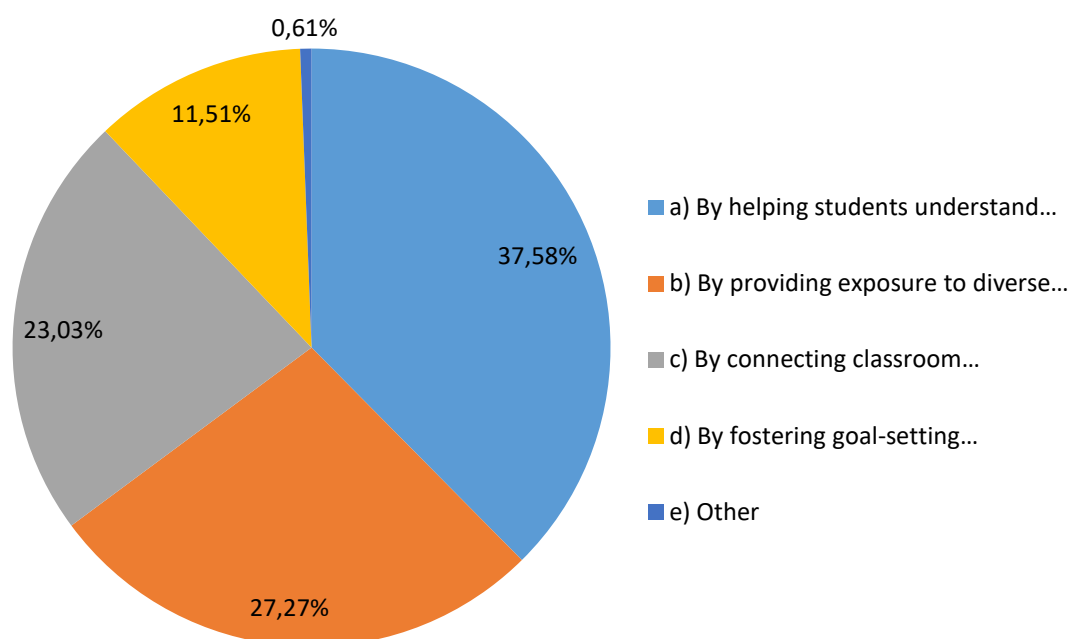


The majority of surveyed students believe that peer mentoring programs can support STEM education by fostering collaborative learning and teamwork (38,41%). Every fourth believes that by providing academic support and guidance from peers (25,61%), and by promoting leadership and communication skills (25,61%). The rest believe that it would create a supportive community for STEM learners (10,37%).

2.31. How do you think the integration of career exploration activities can enhance STEM education?

	a) By helping students understand the relevance of STEM subjects to future careers	b) By providing exposure to diverse career pathways in STEM fields	c) By connecting classroom learning to real-world job opportunities	d) By fostering goal-setting and planning skills	e) Other (please specify):
Germany	30% (3)	70% (7)	-	-	-
Poland	35,7% (5)	35,7% (5)	28,6% (4)	-	-
Portugal	36,4% (4)	36,4% (4)	18,2% (2)	-	9,1% (1)*
Romania 1	48,5% (16)	21,2% (7)	21,2% (7)	9,1% (3)	-
Romania 2	35,9% (28)	26,9% (21)	26,9% (21)	10,3% (8)	-
Türkiye	31,6% (6)	5,3% (1)	21,1% (4)	42,1% (8)	-
TOTAL	37,58% (62)	27,27% (45)	23,03% (38)	11,51% (19)	0,61% (1)

*additional response provided by student from Portugal: (1) Helping students understand the relevance of STEM disciplines for future careers and connecting classroom learning to real-world employment opportunities.

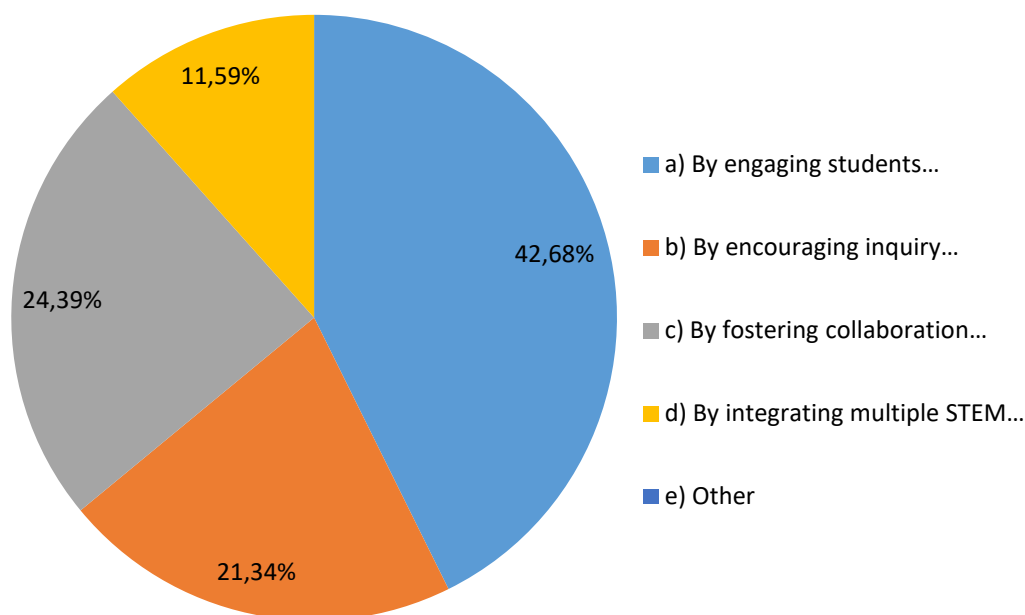


According to the majority of respondents, the integration of career exploration activities can enhance STEM education by helping students understand the relevance of STEM subjects to future careers (37,58%). 27,27% believed that it would provide exposure to diverse career pathways in STEM fields, 23,03% would connect classroom learning to real-world job opportunities, and every tenth student would favor fostering goal-setting and planning skills (11,51%).



2.32. How do you think project-based learning can promote STEM literacy among students?

	a) By engaging students in authentic, real-world challenges	b) By encouraging inquiry and investigation	c) By fostering collaboration and communication skills	d) By integrating multiple STEM disciplines into projects	e) Other (please specify):
Germany	20% (2)	30% (3)	20% (2)	30% (3)	-
Poland	53,8% (7)	15,4% (2)	23,1% (3)	7,7% (1)	-
Portugal	54,4% (6)	9,1% (1)	27,3% (3)	9,1% (1)	-
Romania 1	45,5% (15)	24,2% (8)	18,2% (6)	12,1% (4)	-
Romania 2	42,3% (33)	19,2% (15)	26,9% (21)	11,5% (9)	-
Türkiye	36,8% (7)	31,6% (6)	26,3% (5)	5,3% (1)	-
TOTAL	42,68% (70)	21,34% (35)	24,39% (40)	11,59% (19)	-

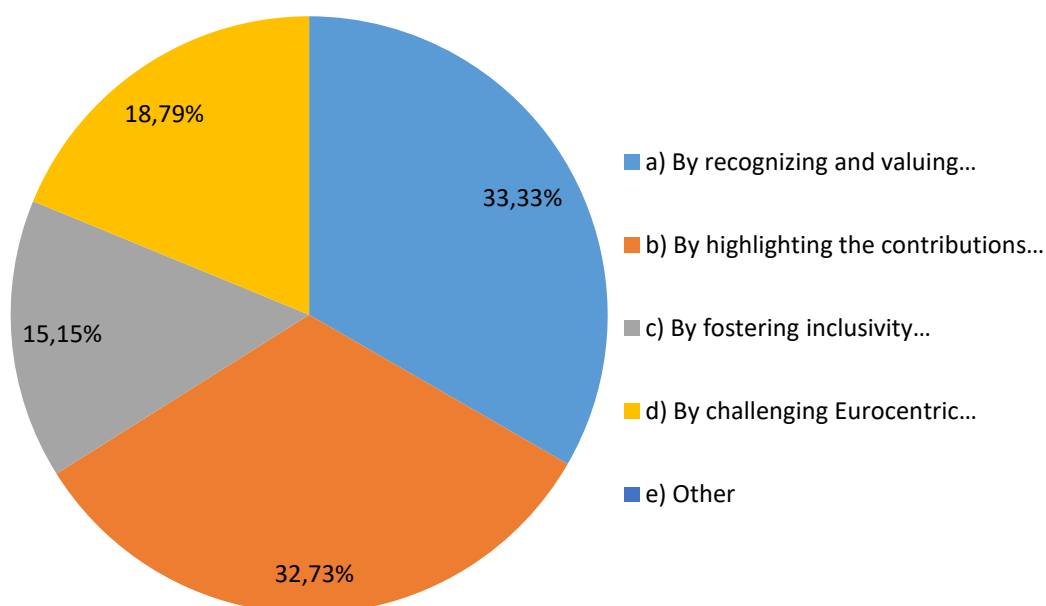


Most respondents believe that project-based learning can promote STEM literacy among students by engaging them in authentic, real-world challenges (42,68%). The next most important factors from the students' point of view are fostering collaboration and communication skills (24,39%) and encouraging inquiry and investigation (21,34%). The least popular is integrating multiple STEM disciplines into projects (11,59%).



2.33. How do you think integrating cultural perspectives into the STEM curriculum can promote diversity in STEM fields?

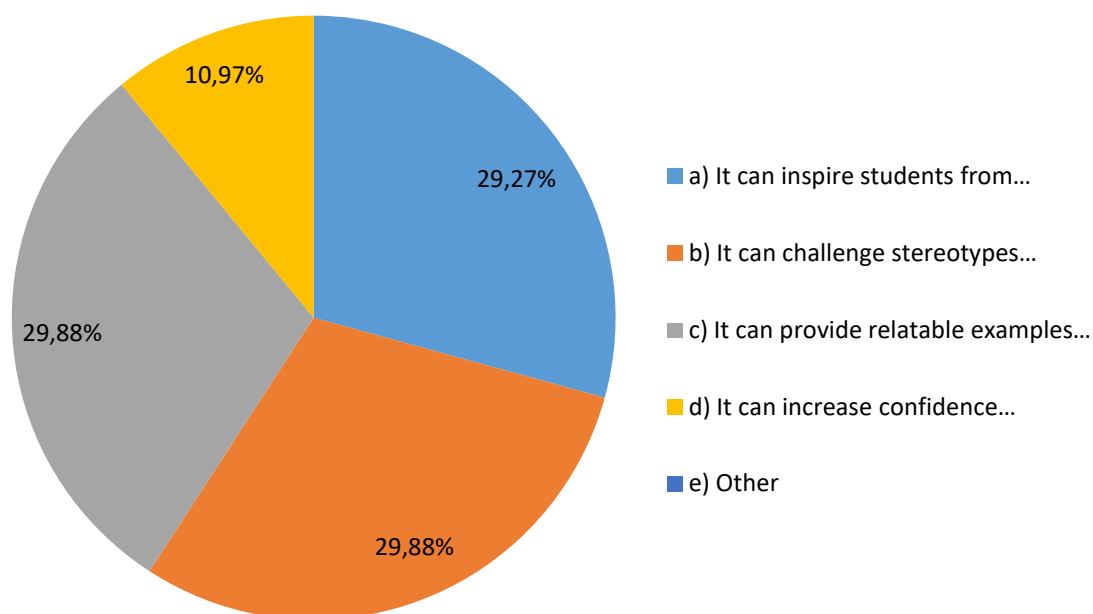
	a) By recognizing and valuing diverse ways of knowing and problem-solving	b) By highlighting the contributions of diverse cultures to scientific knowledge	c) By fostering inclusivity and representation in STEM learning materials	d) By challenging Eurocentric narratives in STEM education	e) Other (please specify):
Germany	20% (2)	30% (3)	40% (4)	10% (1)	-
Poland	28,6% (4)	14,3% (2)	35,7% (5)	21,4% (3)	-
Portugal	63,6% (7)	18,2% (2)	9,1% (1)	9,1% (1)	-
Romania 1	30,3% (10)	30,3% (10)	24,2% (8)	15,2% (5)	-
Romania 2	37,2% (29)	35,9% (28)	7,7% (6)	19,2% (15)	-
Türkiye	15,8% (3)	47,4% (9)	5,3% (1)	31,6% (6)	-
TOTAL	33,33% (55)	32,73% (54)	15,15% (25)	18,79% (31)	-



Every third of surveyed students indicated that integrating cultural perspectives into the STEM curriculum can promote diversity in STEM fields by recognizing and valuing diverse ways of knowing and problem-solving (33,33%). Slightly less (32,73%) would highlight the contributions of diverse cultures to scientific knowledge. 18,79% of respondents indicated that diversity in this context can be promoted by fostering inclusivity and representation in STEM learning materials, and 15,15% challenging Eurocentric narratives in STEM education.

2.34. How do you think the representation of diverse role models in STEM fields can impact students' aspirations?

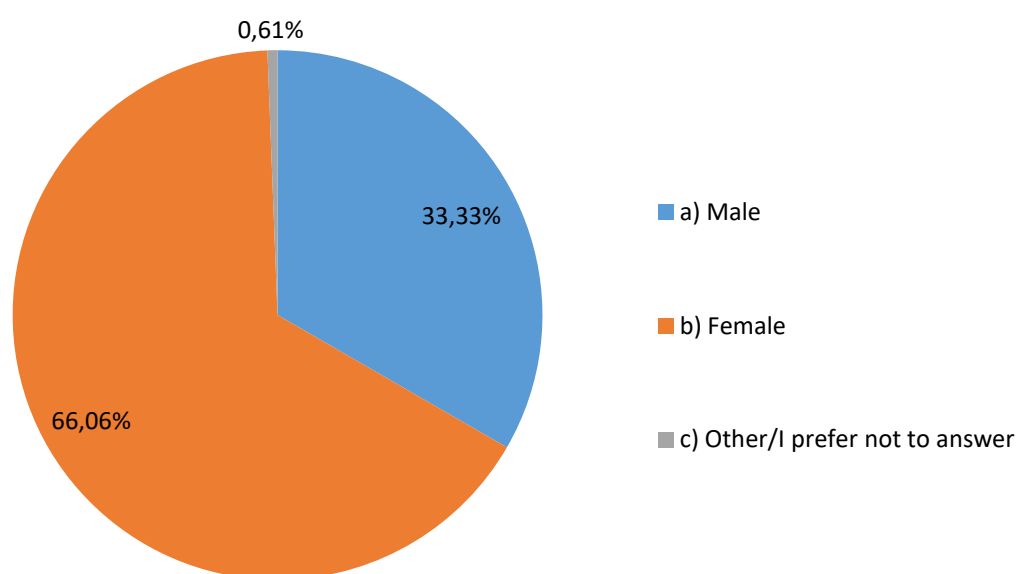
	a) It can inspire students from underrepresented groups to pursue STEM careers	b) It can challenge stereotypes and biases about who can succeed in STEM fields	c) It can provide relatable examples of success in STEM for all students	d) It can increase confidence and self-efficacy in STEM subjects	e) Other (please specify):
Germany	20% (2)	30% (3)	40% (4)	10% (1)	-
Poland	23,1% (3)	30,8% (4)	38,5% (5)	7,7% (1)	-
Portugal	27,3% (3)	54,5% (6)	9,1% (1)	9,1% (1)	-
Romania 1	45,5% (15)	24,2% (8)	21,2% (7)	9,1% (3)	-
Romania 2	26,9% (21)	26,9% (21)	35,9% (28)	10,3% (8)	-
Türkiye	21,1% (4)	36,8% (7)	21,1% (4)	21,1% (4)	-
TOTAL	29,27% (48)	29,88% (49)	29,88% (49)	10,97% (18)	-



Respondents' answers on how the representation of diverse role models in STEM fields can impact students' aspirations were divided almost equally among three options. The percentage of students' responses is broken down as follows: it can challenge stereotypes and biases about who can succeed in STEM fields (29,88%), it can provide relatable examples of success in STEM for all students (29,88%), it can inspire students from underrepresented groups to pursue STEM careers (29,27%). The smallest percentage of students believe that these role models can increase confidence and self-efficacy in STEM subjects (10,97%).

2.35. (Statistical question) Please indicate your gender:

	a) Male	b) Female	c) Other/I prefer not to answer
Germany	70% (7)	30% (3)	-
Poland	28,6% (4)	71,4% (10)	-
Portugal	45,5% (5)	54,5% (6)	-
Romania 1	27,3% (9)	72,7% (24)	-
Romania 2	29,5% (23)	70,5% (55)	-
Türkiye	36,8% (7)	57,9% (11)	5,3% (1)
TOTAL	33,33% (55)	66,06% (109)	0,61% (1)



Among the students participating in the research study, 66,06% were female, 33,33% were male and 0,61% of respondents indicated other gender or did not want to answer this statistical question.

Comparative analysis of selected questions

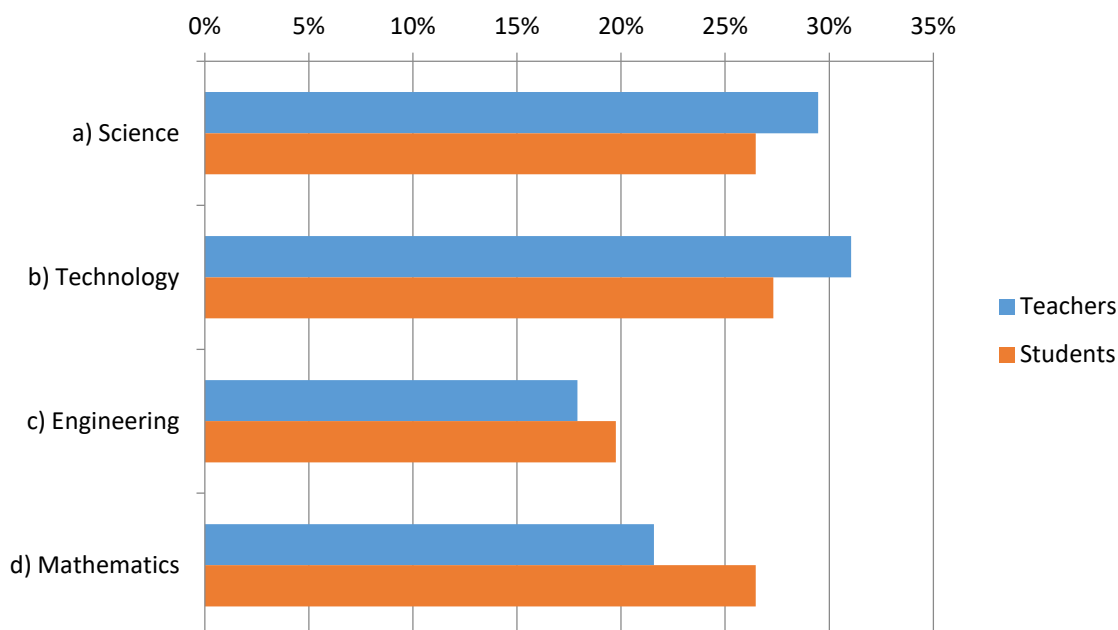
Many questions in both blocks were formulated to enable comparison of the answers given by teachers and students. This allows to look at the problem from different perspectives and examine whether the perception of given aspects is the same among both groups. It also enables the elaboration of recommendations for specific areas.

On the following pages of the report are the results of a comparative analysis of the answers provided by all respondents in individual blocks (without division into individual countries).



1.3. & 2.3. Which STEM subjects are you most interested in?

	a) Science	b) Technology	c) Engineering	d) Mathematics
Teachers	29,47% (56)	31,05% (59)	17, 90% (34)	21,58% (41)
Students	26,47% (63)	27,31% (65)	19,75% (47)	26,47% (63)



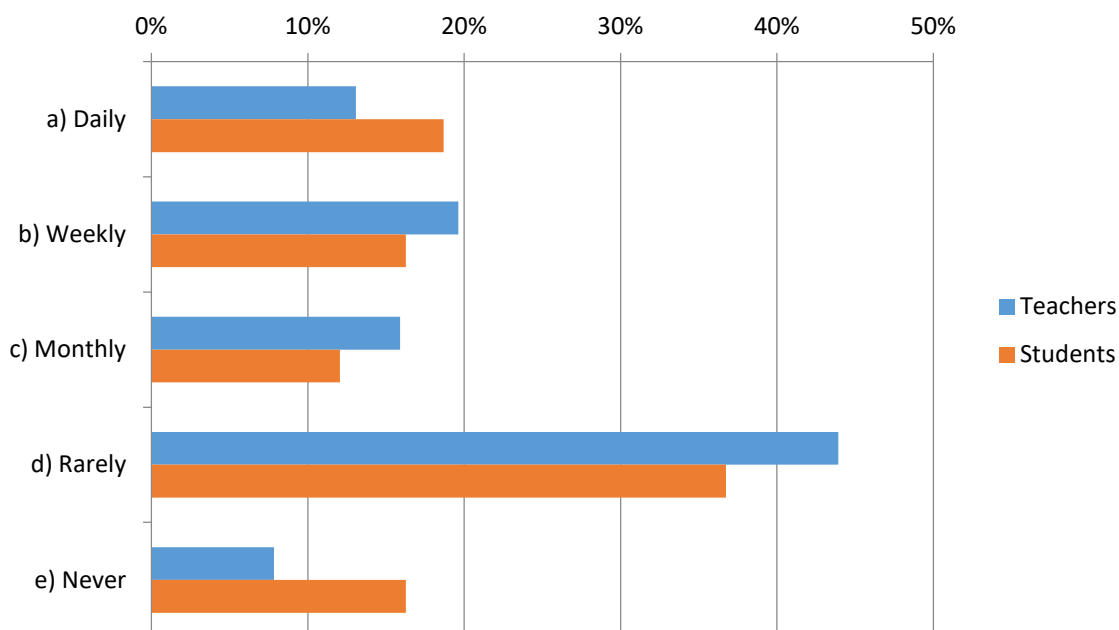
The results among teachers and students show roughly similar interest in the various STEM disciplines, with both teachers and students in a slight majority indicating a particular interest in technology. Technology is the most preferred field by teachers (31,05%), which may suggest that teachers see it as having the greatest potential in preparing students for future careers. Mathematics and Engineering are more popular among students than teachers, indicating students' growing interest in these fields. Science, on the other hand, enjoys almost equal interest among both teachers and students, although teachers show slightly more interest.

Based on the above results and conclusions, the following recommendations can be made:

- 1) Educational programs should take into account the preferences of both teachers and students, focusing on technology as the area with the greatest potential according to teachers.
- 2) Additional support and resources should be directed towards mathematics and engineering to meet the growing interest of students.
- 3) It is also worth ensuring a balance between science and other STEM fields to meet the diverse learning needs of both teachers and students.

1.4. & 2.4. How often do you engage in STEM-related activities outside of school?

	a) Daily	b) Weekly	c) Monthly	d) Rarely	e) Never
Teachers	13,08% (14)	19,63% (21)	15,89% (17)	43,92% (47)	7,48% (8)
Students	18,68% (31)	16,26% (27)	12,05% (20)	36,75% (61)	16,26% (27)



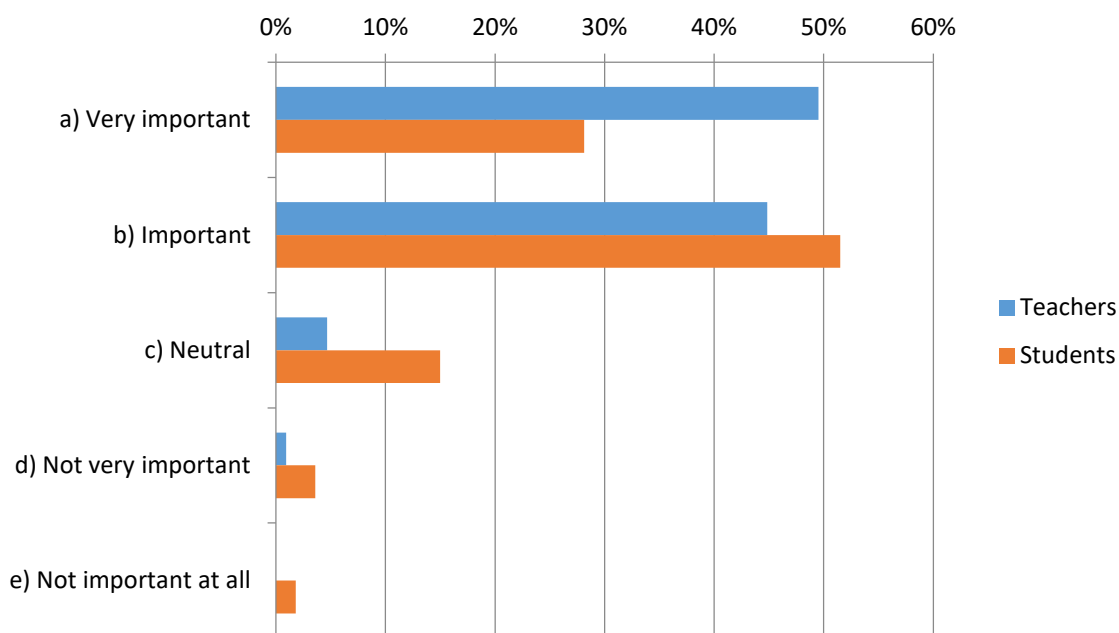
Students are more likely to engage in daily STEM activities, while teachers are more likely to engage in STEM activities once a week. The frequency of engaging in STEM activities each month is similar in both groups. Most respondents from both groups report engaging in STEM activities rarely, with a higher percentage among teachers. A much larger percentage of students never engage in STEM activities compared to teachers.

Based on the above results and conclusions, the following recommendations can be made:

- 1) The availability of daily and weekly STEM activities should be increased, for example by creating programs and resources that encourage both teachers and students to engage in STEM regularly.
- 2) Educational initiatives and after-school programs can increase students' interest in STEM, especially those who never get involved.
- 3) Additional support for teachers is recommended, as facilitating their access to materials and training may help them engage in STEM activities regularly.

1.5. & 2.8. How important do you think STEM education is for future career opportunities?

	a) Very important	b) Important	c) Neutral	d) Not very important	e) Not important at all
Teachers	49,53% (53)	44,86% (48)	4,68% (5)	0,93% (1)	-
Students	28,14% (47)	51,50% (86)	14,97% (25)	3,59% (6)	1,80% (3)



Teachers, more than students, consider STEM education to be very important for future career opportunities. Both groups, teachers and students, similarly regard STEM education as important, indicating a general appreciation of its importance. Students are more likely than teachers to be neutral about the importance of STEM education. Only a small number of teachers and students view STEM education as not very important or unimportant, suggesting that most respondents see value in STEM education. A small number of students consider STEM education to be completely unimportant, while no teachers share this view.

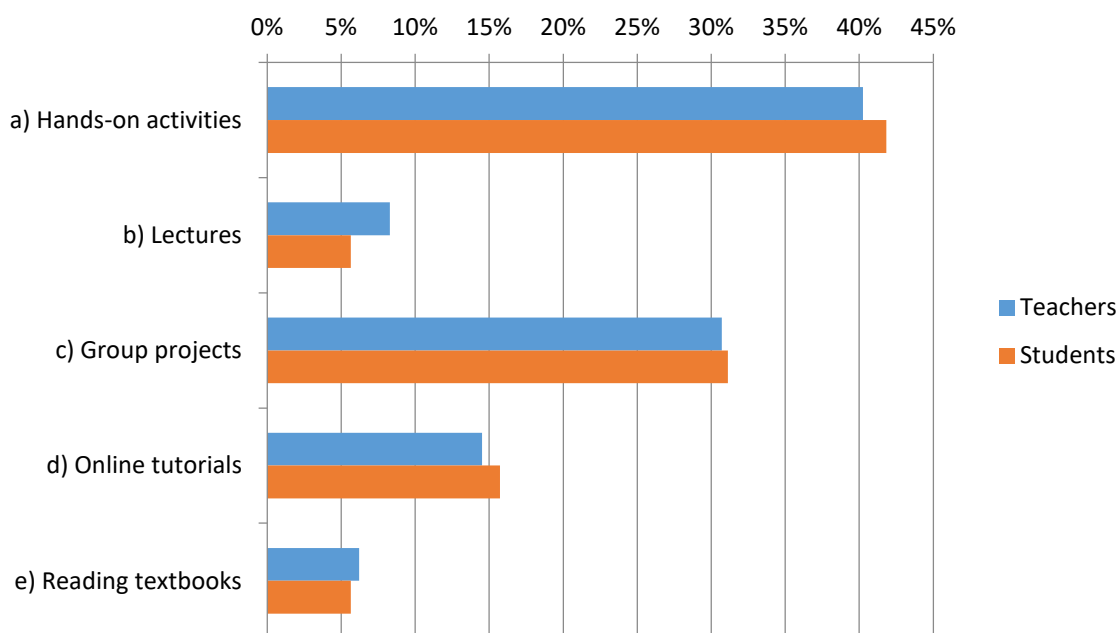
Based on the above results and conclusions, the following recommendations can be made:

- 1) Awareness campaigns and programs should be conducted to increase students' awareness of the importance of STEM education for their future career opportunities.
- 2) Strengthen support for teachers by providing them with the appropriate resources to effectively communicate the importance of STEM education to students.
- 3) Creating programs that motivate students to engage in STEM by showing the real benefits and opportunities that this education brings.
- 4) Regularly surveying the opinions of both teachers and students about STEM education to adapt educational programs to their needs and expectations.



1.8. & 2.11. How do you prefer to teach (for teachers) / learn (for students) STEM subjects?

	a) Hands-on activities	b) Lectures	c) Group projects	d) Online tutorials	e) Reading textbooks
Teachers	40,25% (97)	8,30% (20)	30,71% (74)	14,52% (35)	6,22% (15)
Students	41,82% (133)	5,66% (18)	31,13% (99)	15,73% (50)	5,66% (18)



The percentages among students and teachers are very similar for each choice option. The most preferred method by both teachers and students is hands-on activities. This suggests that interactive and engaging forms of learning are crucial in STEM education. The second most frequently chosen method, demonstrating the value of collaboration and teamwork in STEM teaching and learning, is group projects. According to respondents, online tutorials are an important method, especially in the context of the growing importance of technology and distance education. The least preferred methods by both groups of respondents are lectures and reading textbooks, which may suggest the need to rethink traditional forms of teaching in favor of more interactive approaches.

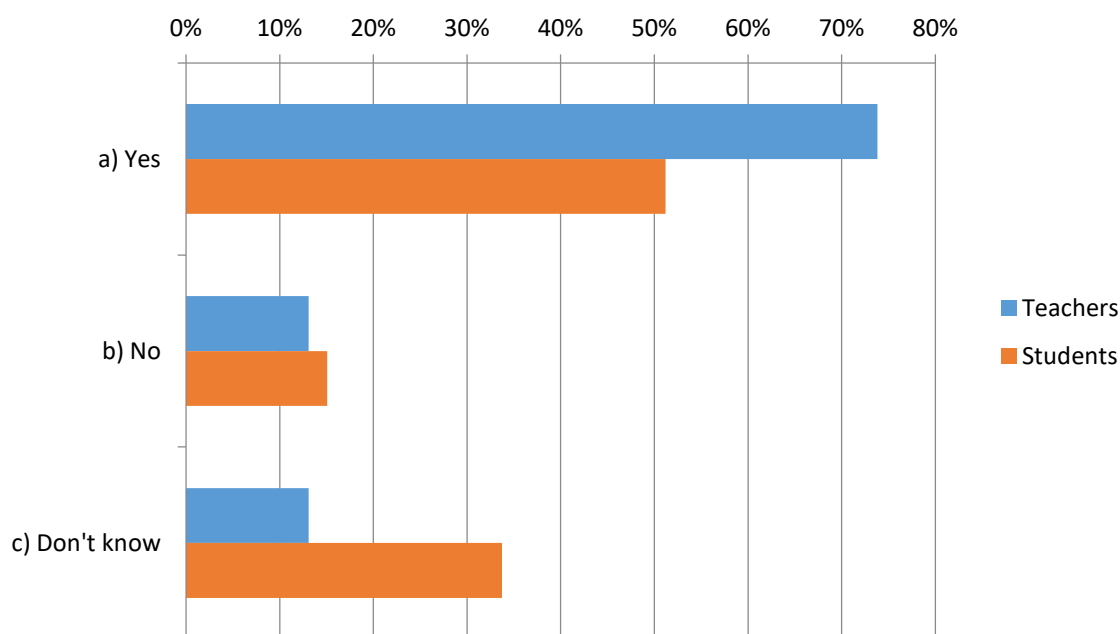
Based on the above results and conclusions, the following recommendations can be made:

- 1) Schools and educational institutions should increase the number of hands-on activities that allow students to have direct experience and experimentation.
- 2) Group projects should be promoted and part of the curriculum to develop students' collaboration and communication skills.
- 3) There is a need to invest in high-quality online learning materials and platforms that can complement traditional teaching methods, as well as use open educational resources (OER).
- 4) There is a need to review the role of lectures and textbooks in the context of contemporary educational needs, which may require their integration with more interactive teaching methods.



1.9. & 2.12. Do you think STEM education adequately prepares students for real-world challenges?

	a) Yes	b) No	c) Don't know
Teachers	73,84% (79)	13,08% (14)	13,08% (14)
Students	51,20% (85)	15,06% (25)	33,74% (56)



The vast majority of teachers (73,84%) believe that STEM education adequately prepares students for real-world challenges, and only just over half of students (51,20%) share this opinion. The percentage of both groups of respondents who believe that STEM education does not adequately prepare students for real-world challenges is similar, although slightly higher among students, suggesting a need to better inform students about the benefits and applications of STEM education. A significantly greater percentage of students are unsure whether STEM education is preparing them for real-world challenges, compared to teachers.

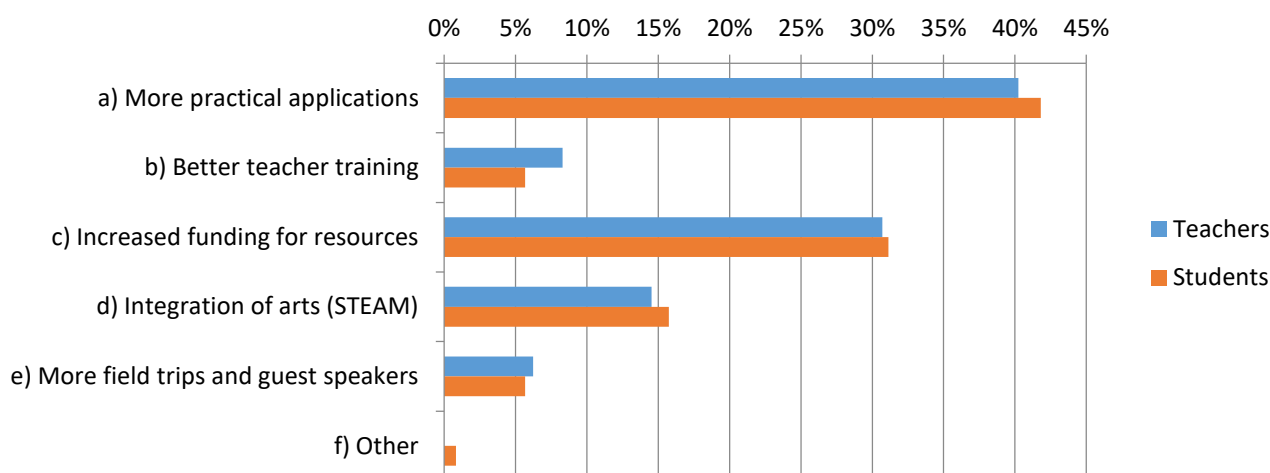
Based on the above results and conclusions, the following recommendations can be made:

- 1) Initiatives to better inform students about the practical applications and benefits of STEM education can help reduce uncertainty and increase their awareness.
- 2) Integrating more projects and activities based on real-world challenges can help students see practical applications of their knowledge.
- 3) Consideration should be given to introducing a system for collecting feedback from graduates and employers - it can provide valuable feedback on the effectiveness of STEM education and help in its continuous improvement.
- 4) There is a need to provide teachers with additional resources and training so that they can better prepare students for real-world challenges.



1.10. & 2.13. What improvements would you suggest for enhancing STEM education?

	a) More practical applications	b) Better teacher training	c) Increased funding for resources	d) Integration of arts (STEAM)	e) More field trips and guest speakers	f) Other (please specify):
Teachers	29,83% (88)	22,71% (67)	28,47% (84)	9,83% (29)	9,16% (27)	-
Students	34,70% (127)	16,39% (60)	17,49% (64)	10,38% (38)	20,22% (74)	0,82% (3)



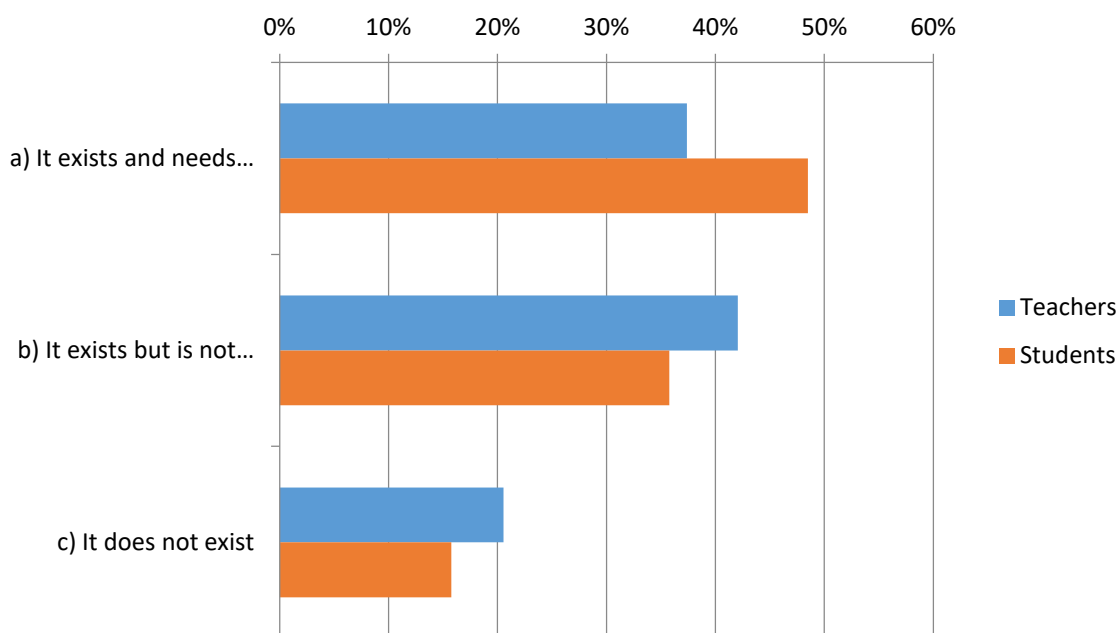
Both teachers and students agree that increasing more practical applications in STEM education is key, with students showing greater interest in this suggestion. Teachers are more likely to point out the need for better training, which suggests that they see gaps in the current training system. Increasing funding for resources is an important issue for teachers, while students are less likely to mention this aspect. Art integration is rated similarly by both groups, indicating an interest in combining creative elements with traditional STEM subjects, but only one in ten respondents considered this aspect important. Students are much more likely to indicate the need for field trips and meetings with guest speakers, which suggests that such experiences are more engaging and inspiring for them. A very small percentage of students indicate other suggestions, which means that most needs are covered by the categories above.

Based on the above results and conclusions, the following recommendations can be made:

- 1) It is recommended to implement more practical classes, laboratories, and projects.
- 2) Invest in developing training programs for teachers to make them better prepared to teach STEM.
- 3) Securing additional funds for the purchase of modern resources and technologies.
- 4) Introducing art into STEM curricula to develop students' creativity.
- 5) It is suggested that more educational tours and guest speakers be organized so that students can see practical applications of STEM in the real world.

1.11. & 2.14. Do you perceive the gender gap in STEM fields?

	a) It exists and needs to be addressed	b) It exists but is not a significant issue	c) It does not exist
Teachers	37,38% (40)	42,06% (45)	20,56% (22)
Students	48,49% (80)	35,76% (59)	15,75% (26)



A larger percentage of students (48,49%) than teachers (37,38%) believe that the gender gap in STEM exists and requires remedial action. This indicates a stronger belief among students in the need to address this issue. The majority of teachers (42,06%) believe that the gender gap exists but is not a significant problem, suggesting that they perceive the problem as less urgent compared to students. A significant percentage of teachers (20,56%) and students (15,75%) believe that the gender gap in STEM does not exist. Although a minority, these numbers indicate important differences in perception of this issue.

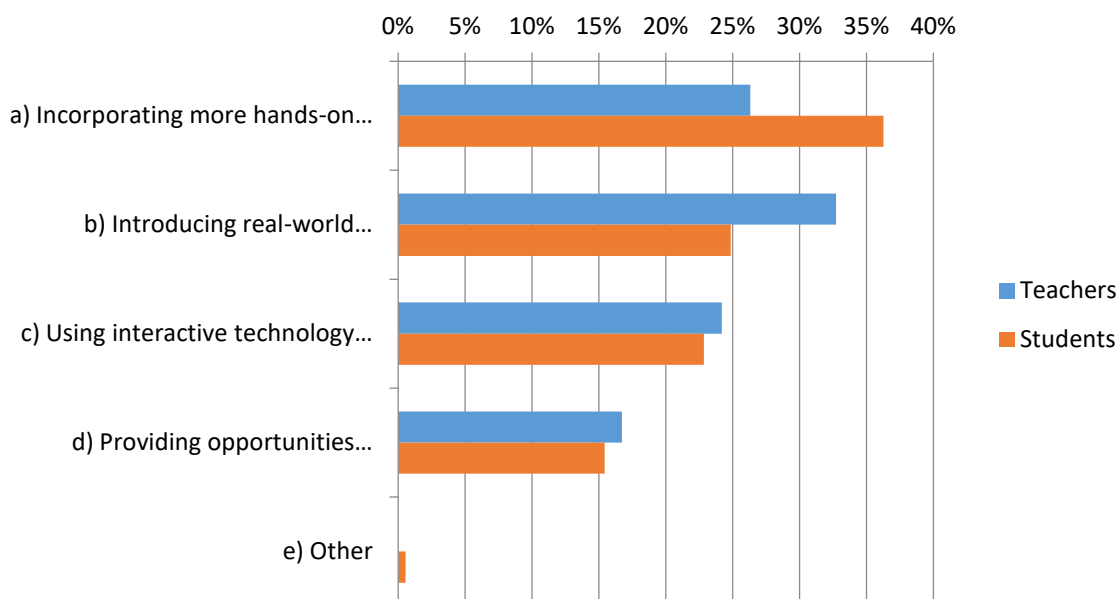
Based on the above results and conclusions, the following recommendations can be made:

- 1) Information and education campaigns regarding the gender gap in STEM can help increase awareness, better understanding and recognition of this issue by all parties.
- 2) Implement programs to promote gender equality in STEM, both at school and professional levels, to address existing barriers.
- 3) Creating mentorships and support programs for girls interested in STEM to increase their engagement and participation in these fields.
- 4) Schools should review their policies and curricula to ensure they support gender equality and encourage the participation of students of both genders in STEM activities.
- 5) Regularly collect and analyze data on student participation and achievement in STEM by gender to monitor progress and identify areas for improvement.



1.13. & 2.17. How do you think STEM education could be made more engaging for students?

	a) Incorporating more hands-on experiments	b) Introducing real-world problem-solving activities	c) Using interactive technology tools	d) Providing opportunities for creativity within STEM subjects	e) Other (please specify):
Teachers	26,33% (74)	32,74% (92)	24,20% (68)	16,73% (47)	-
Students	36,28% (127)	24,86% (87)	22,86% (80)	15,43% (54)	0,57% (2)



Most students prefer a more hands-on approach through experiments, which highlights their need for engaging and interactive teaching methods. Teachers are more likely to indicate the need to introduce real-world problem-solving activities, which may indicate their understanding of the value of the practical application of theoretical knowledge. Both groups see value in using interactive technology tools, although teachers are slightly more than students. A similar percentage of teachers and students believe that having the opportunity to be creative in STEM subjects is important, although this is a less popular option compared to others. A very small percentage of students indicate other suggestions, which may mean that most of their needs are covered by the categories above.

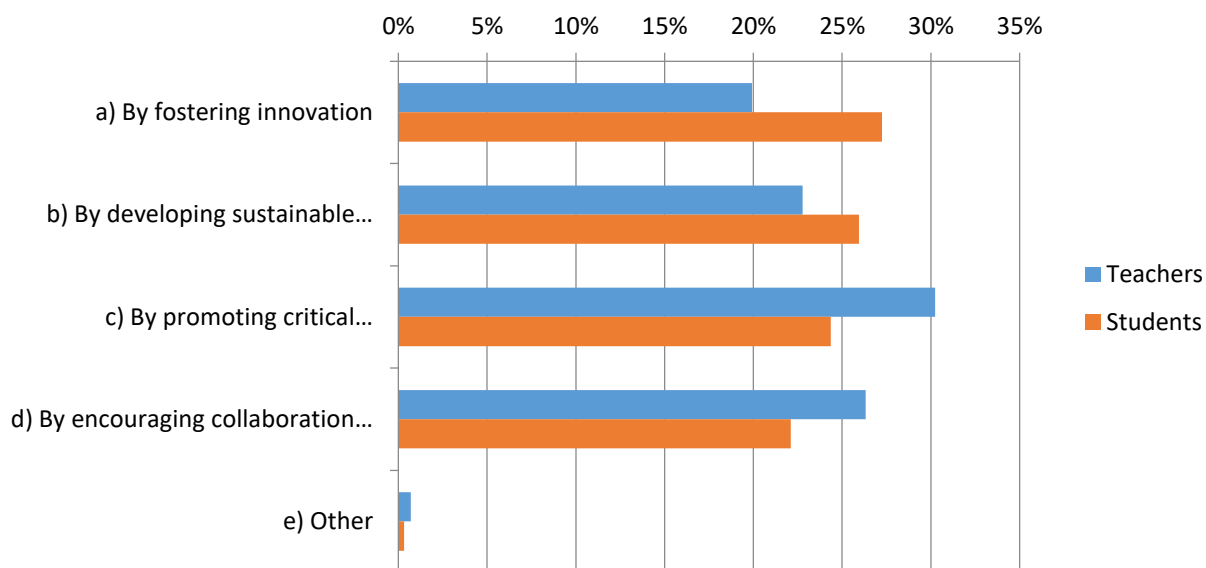
Based on the above results and conclusions, the following recommendations can be made:

- 1) It is suggested to introduce more activities and hands-on experiments that engage students in direct experiences.
- 2) Implementing tasks that require solving real-world problems, which can help students understand practical applications of knowledge.
- 3) Increase the use of interactive technology tools such as simulations, programming, and other technologies that can increase student engagement.
- 4) Providing opportunities for students to be creative within STEM subjects, for example through projects and tasks that require innovative thinking.



1.15. & 2.19. How do you think STEM education can help address global challenges?

	a) By fostering innovation	b) By developing sustainable solutions	c) By promoting critical thinking and problem-solving skills	d) By encouraging collaboration across disciplines	e) Other (please specify):
Teachers	19,93% (56)	22,78% (64)	30,25% (85)	26,33% (74)	0,71% (2)
Students	27,25% (85)	25,96% (81)	24,36% (76)	22,11% (69)	0,32% (1)



A larger percentage of students (27,25%) than teachers (19,93%) believe that STEM education can help solve global challenges by fostering innovation. This suggests that students see great potential in innovation to address contemporary problems. Both groups of respondents appreciate the role of STEM education in developing sustainable solutions, although students (25,96%) indicate this option slightly more often than teachers (22,78%). Teachers are more likely than students (30,25% vs. 24,36%) to believe that STEM education should promote critical thinking and problem-solving skills, which suggests that they see these skills as the key to solving global challenges. Teachers are also more likely than students (26,33% vs. 22,11%) to see value in collaboration across disciplines as a way to deal with global challenges.

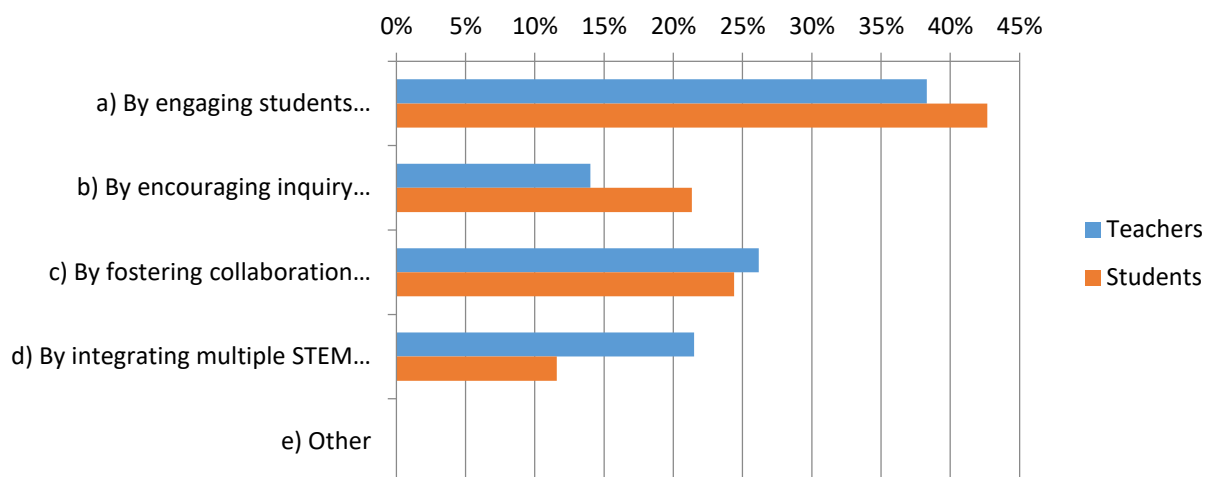
Based on the above results and conclusions, the following recommendations can be made:

- 1) Schools should place greater emphasis on projects and initiatives that promote innovation by engaging students in creative problem-solving.
- 2) Introduce topics related to ecology and sustainability into the curriculum so that students can work on practical solutions to these problems.
- 3) Curricula and teaching methods should be developed that promote critical thinking and problem-solving skills through challenges and tasks requiring analysis and reflection.
- 4) Encouraging cooperation between various fields of science, organizing interdisciplinary projects that teach teamwork and integration of knowledge from various areas.



1.19. & 2.32. How do you think project-based learning can promote STEM literacy among students?

	a) By engaging students in authentic, real-world challenges	b) By encouraging inquiry and investigation	c) By fostering collaboration and communication skills	d) By integrating multiple STEM disciplines into projects	e) Other (please specify):
Teachers	38,31% (41)	14,02% (15)	26,17% (28)	21,50% (23)	-
Students	42,68% (70)	21,34% (35)	24,39% (40)	11,59% (19)	-



Students (42,68%) and teachers (38,31%) agree that engaging students in authentic, real-world challenges can significantly support the development of STEM reading comprehension skills. This indicates that both groups appreciate the value of a hands-on approach to learning. Students (21,34%) show more interest than teachers (14,02%) in encouraging inquiry and investigation. This suggests that students see value in developing research skills as a way to better understand STEM topics. Both groups, teachers (26,17%) and students (24,39%), emphasize the importance of fostering collaboration and communication skills as a key design element of STEM teaching. This indicates a widespread awareness of the need to develop these skills in the context of STEM education. Teachers (21,50%) emphasize the importance of integrating multiple STEM disciplines into projects more often than students (11,59%). Students attach less importance to this aspect, which may suggest that they see other elements as more important for their development in STEM education.

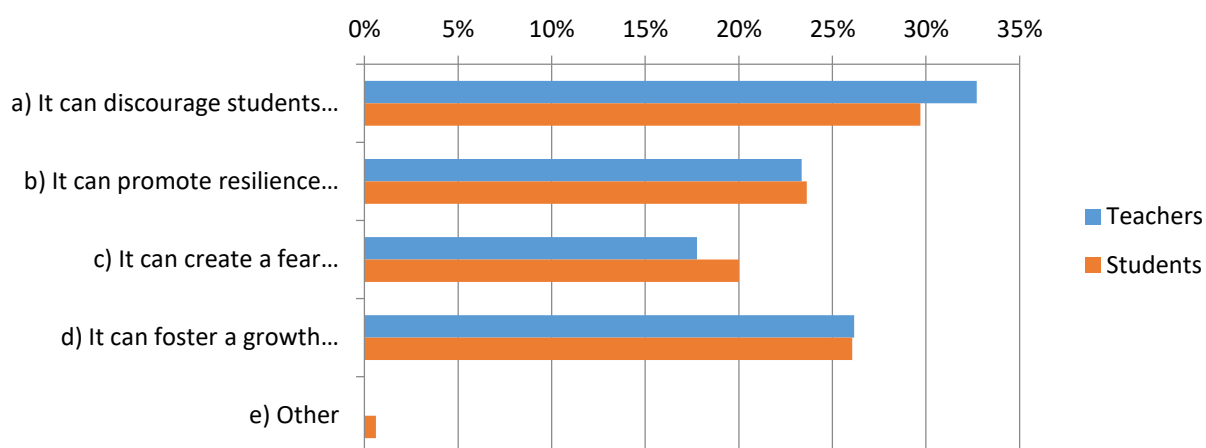
Based on the above results and conclusions, the following recommendations can be made:

- 1) Focus on projects that engage students in authentic, real-world challenges related to STEM problems to develop their STEM reading comprehension skills.
- 2) Encouraging students to independently investigate and come to conclusions, which can be achieved through structured tasks and research projects.
- 3) Supporting the development of cooperation and communication skills through the organization of group projects and interactive forms of work.
- 4) Consider integrating various STEM disciplines, but as a complement, not necessarily as the main goal of design-led learning.



1.22. & 2.20. How do you think the perception of failure impacts STEM education?

	a) It can discourage students from taking risks and exploring new ideas	b) It can promote resilience and problem-solving skills	c) It can create a fear of failure that hinders learning	d) It can foster a growth mindset and a willingness to learn from mistakes	e) Other (please specify):
Teachers	32,71% (35)	23,36% (25)	17,76% (19)	26,17% (28)	-
Students	29,70% (49)	23,63% (39)	20% (33)	26,06% (43)	0,61% (1)



Both groups, teachers (32,71%) and students (29,70%), agree that negative perceptions of failure may discourage students from taking risks and exploring new ideas in the context of STEM education. This indicates the importance of psychological comfort in the creative learning process. Both groups also see the positive impact of failure on the development of resilience and problem-solving skills. A similar percentage of teachers (23,36%) and students (23,63%) believe that failure can promote resilience and problem-solving skills, which can be crucial in STEM education, where experimenting and trying new approaches are often essential. Despite lower support, both groups agree that fear of failure can be a barrier to effective learning in a STEM context. This highlights the need to create a safe learning environment that does not punish mistakes but encourages learning from them. A similar percentage of teachers and students believe that a positive approach to failure can foster growth mindset and a willingness to learn from mistakes. This suggests that both teachers and students see value in an approach that emphasizes learning and reflection on mistakes.

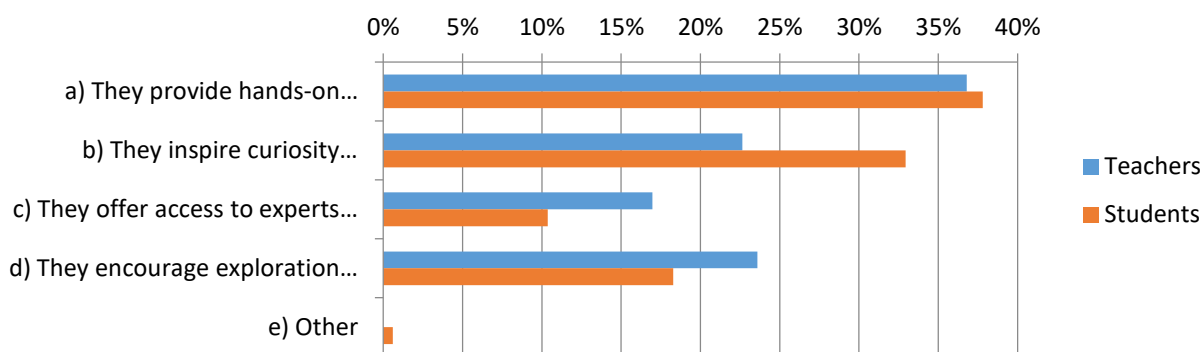
Based on the above results and conclusions, the following recommendations can be made:

- 1) Encouraging a safe learning environment that promotes experimentation and learning from failure.
- 2) Introducing teaching strategies that support the development of mental resilience and problem-solving skills through experiencing failure.
- 3) Educating teachers about the importance of a culture that does not punish mistakes but encourages reflection and use of them as a way to learn.



1.24. & 2.21. How do you think informal STEM learning experiences (e.g., museums, and science centers) contribute to education?

	a) They provide hands-on learning opportunities outside the classroom	b) They inspire curiosity and a love for STEM subjects	c) They offer access to experts and professionals in STEM fields	d) They encourage exploration and experimentation	e) Other (please specify):
Teachers	36,79% (39)	22,64% (24)	16,98% (18)	23,59% (25)	-
Students	37,80% (62)	32,93% (54)	10,37% (17)	18,29% (30)	0,61 (1)



Both teachers and students agree that informal STEM learning experiences provide opportunities for hands-on learning outside the classroom. This highlights the value of hands-on experiences that expand educational horizons beyond traditional teaching methods. Students (32,93%) are more likely than teachers (22,64%) to believe that informal STEM learning experiences inspire curiosity and love for STEM subjects. This highlights the role of museums and science centers as places that motivate people to explore science and technology. Both groups, teachers and students, see value in access to experts and professionals in STEM fields, although teachers' support in this matter is slightly higher. This points to the additional educational value that non-formal experiences can bring. Teachers (23,59%) are more likely than students (18,29%) to believe that informal STEM learning experiences encourage exploration and experimentation. This suggests that teachers see these experiences as ways to develop research and exploration skills.

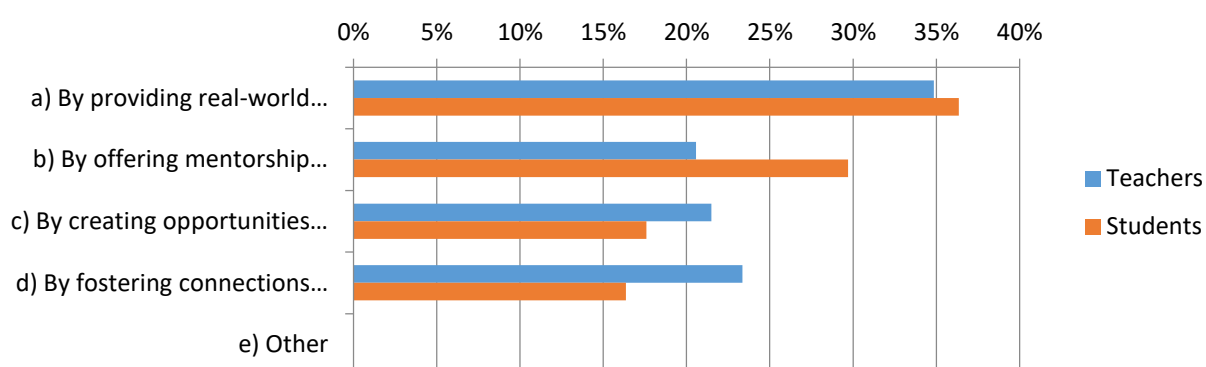
Based on the above results and conclusions, the following recommendations can be made:

- 1) Promoting students' visits to museums and science centers to expand their experiences and practical skills beyond the classroom.
- 2) Organizing programs that would inspire curiosity and develop a love of STEM subjects among students.
- 3) Supporting access to experts and professionals so that students can develop their interests and career aspirations in STEM fields.
- 4) Creating experiences that encourage students to explore, experiment, and develop research skills.



1.25. & 2.22. How do you think collaboration with industry professionals can enhance STEM education?

	a) By providing real-world insights and experiences	b) By offering mentorship and career guidance	c) By creating opportunities for internships and apprenticeships	d) By fostering connections between education and industry needs	e) Other (please specify):
Teachers	34,58% (37)	20,56% (22)	21,50% (23)	23,36% (25)	-
Students	36,36% (60)	29,70% (49)	17,58% (29)	16,36% (27)	-



Both teachers and students agree that collaboration with industry professionals can provide real-world insights and experiences related to industrial realities. This highlights the value of practical and real-world applications of STEM knowledge. Students (29,70%) are more likely than teachers (20,56%) to believe that working with industry professionals can offer mentorship and career guidance. This points to the role of inspiration and support in professional development that can be provided by people working in the STEM industry. Teachers (21,50%) are more likely than students (17,58%) to see the benefits of creating internship opportunities through collaboration with industry professionals. Teachers (23,36%) are more likely than students (16,36%) to believe that collaboration with industrial professionals can foster connections between educational needs and industrial requirements. This suggests that teachers see value in adapting curricula to the real needs of the labor market.

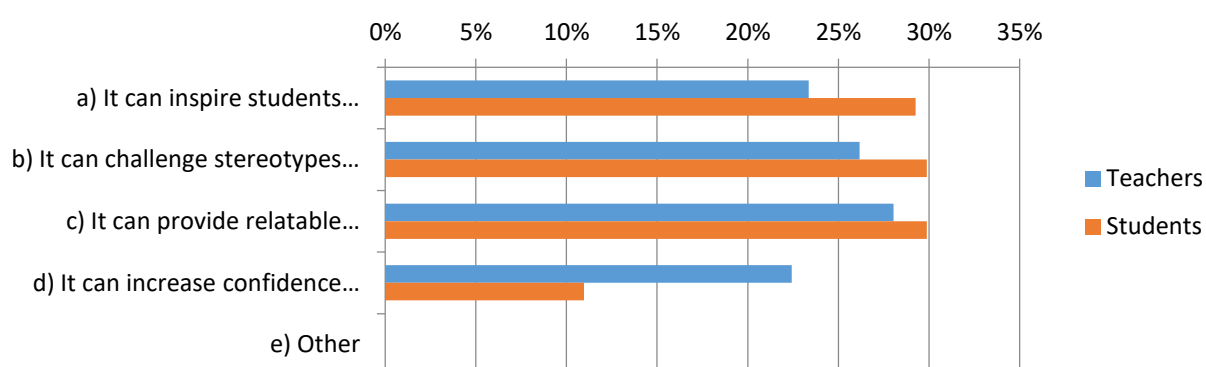
Based on the above results and conclusions, the following recommendations can be made:

- 1) Encouraging regular meetings with industry professionals to provide students with real-world experiences and first-hand insights.
- 2) Organizing mentoring and career guidance programs that can inspire and support students in their career development in STEM fields.
- 3) Developing internship and apprenticeship programs that enable students to gain practical work experience and combine theory with practice.
- 4) Supporting initiatives that integrate educational needs with industry requirements to better prepare students for STEM careers.



1.30. & 2.34. How do you think the representation of diverse role models in STEM fields can impact students' aspirations?

	a) It can inspire students from underrepresented groups to pursue STEM careers	b) It can challenge stereotypes and biases about who can succeed in STEM fields	c) It can provide relatable examples of success in STEM for all students	d) It can increase confidence and self-efficacy in STEM subjects	e) Other (please specify):
Teachers	23,36% (25)	26,17% (28)	28,04% (30)	22,43% (24)	-
Students	29,27% (48)	29,88% (49)	29,88% (49)	10,97% (18)	-



Students (29,27%) are more likely than teachers (23,36%) to believe that the representation of diverse role models in STEM fields can inspire students from underrepresented groups to choose STEM careers. This points to the importance of identifying with the successes and experiences of people similar to them in developing career aspirations. Both groups believe that representing diverse role models in STEM fields can challenge stereotypes and biases about who can succeed in these fields. This highlights the role of role models as a tool for changing social expectations and norms. Teachers and students alike see the value of representing diverse role models of success in STEM as providing examples of success that can be understood and inspired by all students regardless of their background or experiences. Teachers (22,43%) more often than students (10,97%) believe that the representation of diverse role models in STEM fields can increase confidence and self-efficacy in these fields. This suggests that teachers notice the positive impact of role models on students' feelings of competence and confidence in their own abilities.

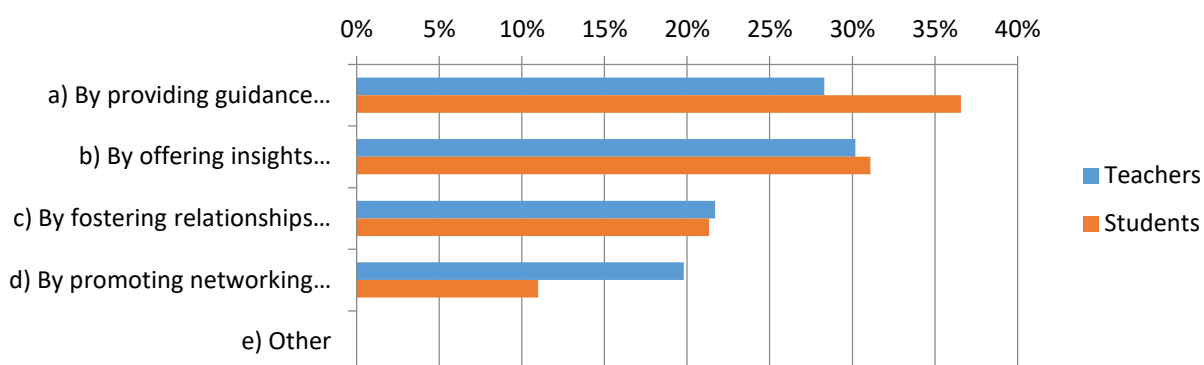
Based on the above results and conclusions, the following recommendations can be made:

- 1) Supporting a variety of initiatives and programs that promote role models in STEM, particularly from the perspective of people from underrepresented groups.
- 2) Educating teachers and students about the importance of representation and its impact on aspirations and sense of belonging in STEM fields.
- 3) Creating educational environments that actively challenge stereotypes and promote diversity in STEM fields.



1.31. & 2.26. How do you think informal mentorship opportunities can support STEM education?

	a) By providing guidance and support from experienced professionals	b) By offering insights into career pathways and opportunities in STEM fields	c) By fostering relationships between students and industry professionals	d) By promoting networking and collaboration in STEM communities	e) Other (please specify):
Teachers	28,30% (30)	30,19% (32)	21,70% (23)	19,81% (21)	-
Students	36,58% (60)	31,10% (51)	21,34% (35)	10,98% (18)	-



Students (36,58%) are more likely than teachers (28,30%) to believe that informal mentoring opportunities can provide guidance and support from experienced professionals. This highlights the value of personal support and guidance in STEM career development. Both groups of respondents see the value of informal mentoring opportunities as a source of insight into career pathways and opportunities in STEM fields. This suggests that mentoring can provide practical information and career perspectives. Both teachers and students see the value of informal mentoring opportunities in fostering relationships between students and industry professionals. This highlights the importance of building networks and professional relationships in STEM career development. Teachers (19,81%) are more likely than students (10,98%) to see the value of informal mentoring opportunities in promoting networking and collaboration in STEM communities. This suggests that teachers recognize the potential of mentoring to build collaboration and integration of STEM knowledge.

Based on the above results and conclusions, the following recommendations can be made:

- 1) Developing informal mentoring programs that provide personal support and guidance to students interested in STEM careers.
- 2) Organizing meetings and events that enable students to gain insight into various career paths and career opportunities in STEM fields.
- 3) Creating opportunities to build relationships and contacts with industry professionals so that students can develop a professional network.
- 4) Promoting collaboration and knowledge exchange in STEM communities through mentoring as a tool for integration and professional development.



Focus group interviews results

Research sample by country:

Teachers:

Germany (P1): **10**
Poland (P4): **12**
Portugal (P6): **5**
Romania 1 (P2): **12**
Romania 2 (P3): **10**
Türkiye (P5): **11**
TOTAL: 60

Students:

Germany (P1): **12**
Poland (P4): **15**
Portugal (P6): **6**
Romania 1 (P2): **16**
Romania 2 (P3): **20**
Türkiye (P5): **11**
TOTAL: 80

The most important conclusions from the discussions in individual countries are presented in the table below:

1. Do you believe the current STEM curriculum is inclusive and representative of diverse perspectives, including those of women and underrepresented groups? If not, what actions do you think should be taken to make STEM education more inclusive?

Germany:

The current STEM curriculum for Germany has made strides towards inclusivity. The problem is that it cannot take all perspectives under account. Therefore, it often falls short of being fully inclusive. Especially not all diverse perspectives represented. Women are often addressed. Nevertheless, they are still the part in German society which is the most disadvantaged group. Despite many efforts, there is still a significant gender gap in STEM fields.

The teachers recognize that girl's day is useful but often it leads not to the needed results. Also, the students said that just one day which is called Boy's or Girls's Day on which they have a look into vocations where the own gender is underrepresented does not really change the mind or the intentions of the learners.

Therefore, longer internships in these fields would be useful.

Poland:

Teachers:

The current STEM curriculum has made progress towards inclusivity, but there are still significant gaps in the representation of diverse perspectives, including women and underrepresented groups. Although efforts are being made to include more women in STEM fields, they are still underrepresented, especially in fields such as engineering and computer science. Curricula often lack female role models and the historical achievements of women in these fields. Additionally, students from lower socioeconomic backgrounds



often face additional challenges in accessing high-quality STEM education, including fewer resources, less experienced teachers, and limited opportunities for exposure to advanced STEM fields.

Students:

Case studies and real-world examples that reflect diverse cultural and social backgrounds should be used. The most encouraging thing is working on joint projects in groups, it also teaches cooperation. To make teaching and learning more accessible to everyone, various resources should be used, not only expensive technologies but also solutions available to everyone (e.g. free online applications). Additionally, small support groups can be created in schools, where students more interested in STEM fields will help others in exchange for, for example, an increase in their behavior grade or exemption from homework.

Portugal:

-Need for a Strategic Approach in STEM Education in Portugal: Participants emphasized that STEM education in Portugal requires a more strategic approach. They noted that while there is awareness of the need for inclusivity, practical steps and strategic planning are lacking. This strategic deficiency hinders the integration of diverse perspectives, including those of women and underrepresented groups.

-Equality in STEM Not a Primary Focus: Some participants pointed out that the issue of equality is not prominently addressed within the current STEM curriculum. The sentiment "This issue of equality is not really raised" reflects that the importance of equality and representation is often overlooked, suggesting a need for increased focus on these issues.

-Lack of Curricular Coordination: A significant concern raised was the absence of curricular coordination. Participants mentioned that there is a need for better articulation within the curriculum ("There should be curricular coordination – which does not exist"). This lack of coordination leads to fragmented efforts and hinders the cohesive integration of diverse perspectives.

Need for Planning, Project Work, and Collaboration: Participants called for comprehensive planning, project-based work, and enhanced collaboration ("Planning, project work, implementation – articulation and collaboration"). They believe that these elements are crucial for creating an inclusive STEM curriculum. Without structured planning and collaborative efforts, it is challenging to address the needs of diverse groups effectively.

-Outdated Content in Portuguese STEM Education: Another critical point was that the current content in the Portuguese STEM curriculum is outdated ("In Portugal, the content is outdated, making this integration very difficult"). This obsolescence makes it difficult to incorporate modern, diverse perspectives, and address the evolving needs of all students, particularly those from underrepresented groups.

Romania 1:

Respondents believe gender disparities persist in STEM fields, with women underrepresented in technical and scientific roles. This underrepresentation of women in



STEM subjects can be attributed to various factors, including stereotypes, biases, and societal expectations. To address these disparities, it aims to promote women's participation in technical fields, encourage gender balance in various roles within STEM disciplines and provide support and mentoring to women pursuing careers in science, technology, engineering, and mathematics. By actively working to overcome gender bias and create more inclusive learning environments, STEM education stakeholders can help close the gender gap and provide equal opportunities for all individuals interested in pursuing STEM-related careers.

In addition to gender disparities, there is also significant underrepresentation of minority groups in STEM education. Students from underrepresented minority groups, including Roma communities, face systemic barriers that limit their access to quality STEM education and opportunities. To address this issue, it is crucial to implement targeted interventions and support systems that aim to increase the representation and participation of underrepresented groups in STEM fields.

This can be achieved through initiatives such as mentoring programs, outreach efforts to disadvantaged communities, and the development of a culturally responsive curriculum that reflects the diversity of the population.

Romania 2:

Actions for making STEM education more inclusive:

- creating personalized strategies considering each student's learning style and background;
- incorporating project-based learning;
- participation in teacher training programs to promote inclusivity in STEM teaching;
- involving parents and the local community;
- highlighting diverse role models: Actively incorporate the stories and achievements of women and minorities who have made significant contributions to STEM fields.

Türkiye:

Teachers

2 out of 11 participating teachers believe in an inclusive STEM curriculum. However, these 2 teachers said, "A more detailed study can be done for each school level." He/She expressed his/her opinion as follows. They also think that "the learning needs of girls and immigrant people are not adequately taken into account. However, they think that the STEM program offers standard STEM education for every student."

Other participants think that the current STEM curriculum in Türkiye is not inclusive enough. Here are their suggestions for making STEM education more inclusive:

- Diversifying educational materials, encouraging student participation in education, presenting role models, and implementing policies that combat discrimination can be effective.
- STEM curricula are not inclusive enough. Efforts should be made to promote



diversity in STEM fields. This may focus on factors such as gender, ethnicity, socioeconomic status and disability. In particular, various programs and events can be organized to attract girls and students from other minority groups into STEM.

- STEM curriculum needs to be enriched with more comprehensive and organized studies.
- Course contents can be updated and educator trainings can be organized to make the STEM curriculum more inclusive.
- To make STEM education more inclusive, STEM curricula should be reviewed and updated to include different cultural, social and gender perspectives. Textbooks, teaching materials, and resources should be diverse to represent different groups and experiences. This can help students feel represented and increase their participation in STEM studies. Students can interact with role models who will inspire them and show them that they can succeed in the STEM field.
- To be more inclusive, more space should be given to practical practices that encourage the participation of female students.

Students:

5 out of 11 participating students believe in an inclusive STEM curriculum. Participating students' suggestions to make STEM education more inclusive are as follows:

- It can be made more inclusive by holding public events and activities.
- More experiments and hands-on activities can be done.
- More fun STEM activities can be designed.
- More encouraging visibility methods and tools regarding STEM applications can be used.
- Experimental activities using digital tools can be implemented.
- More inclusive STEM applications should be developed for individuals with disabilities. Additionally, the physical arrangements of places/schools should encourage participation in STEM practices.

Common insights:

- Gender disparities persist prominently across Germany, Poland, and Romania, where women remain underrepresented in STEM fields despite ongoing efforts. These disparities underscore the necessity for targeted interventions such as promoting female role models and providing mentoring opportunities to encourage greater female participation in STEM.
- Socioeconomic barriers also pose significant challenges, particularly noted in Poland and Romania, where students from lower socioeconomic backgrounds and minority groups encounter obstacles accessing quality STEM education. The integration of tailored strategies and culturally responsive curricula is crucial to mitigate these disparities and ensure equitable opportunities for all students.



- In Portugal and Türkiye, outdated STEM curricula were identified as hindrances to inclusivity, emphasizing the need for curriculum updates that reflect contemporary perspectives and promote diversity.
- Common recommendations across all countries include diversifying educational materials, implementing practical and project-based learning methods, and enhancing teacher training on inclusive pedagogies. These strategies aim to engage students from diverse backgrounds, cater to various learning styles, and foster broader participation in STEM fields.
- Furthermore, the importance of role models in STEM and collaborative efforts among teachers, communities, and policymakers is highlighted. Diverse role models are essential for inspiring underrepresented groups to pursue STEM careers, while collaboration facilitates the creation of inclusive learning environments that support all students.

2. What activities using digital tools would interest you in STEM lessons?

Germany:

The teachers in Germany were interested in Virtual Labs and Simulations and collaborative tools. They said that it is somehow challenging to use digital equipment in school and that “bring your own device” is not always allowed or wanted. More difficult tools like VR/AR or 3D-modeling cannot be seen as realistic in the current school setting. One teacher mentioned that there is a robotic workshop at school.

The teachers also pointed on interactive math tools and digital storytelling

The learners/students said that they would like to work with robot and that robotic is extremely interesting. They are interested in aspects of climate change and also on ecological questions and sustainable solutions for the future. They like to use VR or AR and one learner mentioned also 3D-modeling.

The learners want to get more hands-on approaches and also several of the teachers mentioned that. But, for the teacher problem-solving and creative thinking was much more important.

Poland:

Teachers:

“We can use digital tools to make STEM lessons more engaging and involve students in practical experiences”. Teachers stated that they can utilize virtual laboratories, such as simulation programs, to conduct chemical, physical, and biological experiments in a virtual environment. Alternatively, they can employ interactive 3D models for learning molecular structures or anatomy. For teachers who are not confident in programming, educational tools like educational games, virtual science tours, or economic simulations are available.



They can also use ready-made educational materials such as videos, multimedia presentations, or educational platforms that offer ready-to-use lesson plans and interactive materials. This way, all teachers can enrich their lessons and engage students in STEM topics, even if they do not have advanced programming skills.

Students:

Students can actively participate in STEM classes by using various digital tools. They could explore virtual laboratories and simulations, where they can safely conduct experiments and research. Alternatively, they would like to use programming platforms like Scratch or Python to create their own projects and applications. For those who prefer hands-on experiences, Maker projects such as 3D printing or programming microcontrollers are available, which develop creativity and technical skills. Students can also analyze data and create visualizations using programs like Excel or Google Sheets. Using VR and AR technology can make learning more interactive and engaging. Educational games and online collaboration platforms can be used for learning through play and collaboration with peers. With MOOCs, students can independently deepen their knowledge and skills in selected STEM fields, regardless of their level of advancement.

Portugal:

- Implement Activities that Integrate Various Sciences Linked to the

Curriculum: Participants suggested implementing activities that integrate different branches of science while remaining closely tied to the curriculum. They believe that using digital tools to create interdisciplinary projects can enhance engagement and understanding among students.

- Project-Based Work: Project-based work was highlighted as a key interest area.

Participants expressed a preference for activities that involve hands-on projects, where students can apply digital tools to solve problems, conduct experiments, and present their findings. This approach encourages active learning and critical thinking.

-Connecting to Real Life: Another important point raised was the need to connect STEM lessons to real-life situations. Participants mentioned that activities should use digital tools to demonstrate practical applications of scientific concepts in everyday life. This relevance can make STEM subjects more appealing and relatable to students.

Romania 1:

One of the ways digital tools are integrated into STEM lessons is through online simulations and virtual labs, providing students with interactive learning experiences. These tools provide a virtual space for conducting experiments and exploring scientific concepts in a safe and controlled environment. By using online simulations and virtual labs, students can improve their understanding of complex scientific concepts and theories through hands-on exploration and experimentation.

Romania 2:

- Virtual experiments on simulation software;



- educational games;
- virtual or augmented reality experiences;
- collecting and analyzing data for scientific research;
- prototyping solutions to real life problems by using 3D modeling software;
- coding challenges: Students can use block-based coding platforms like Scratch or Blockly to create games, animations, or solve problems. This helps them develop computational thinking skills and understand core programming concepts in a fun and interactive way.

Türkiye:

Teachers:

- Studies that actively use Web 2 tools are interesting. In addition, engineering applications and virtual laboratory applications are also very useful.
- I am interested in activities that offer interactive and practical experiences, such as coding and programming activities, virtual laboratory experiments, 3D modeling and design projects, simulations and data analysis.
- I can give two examples of this. 1) Simulations: You can visualize the laws of motion with physics simulations or explore the molecular structure with chemistry simulations. 2) Augmented Reality and Virtual Reality: AR and VR technologies can help students make abstract concepts more concrete.
- There may be stages where applications or information will be given.
- Tools that include audio and video are becoming more eye-catching.
- Data Analysis and Visualization, 3D Design and Printing, Virtual Reality (VR) and Augmented Reality (AR), Robotics and Electronics Projects.
- Canva, kahoot and Google documents.
- Workshops with practical applications.
- Practical applications that enable learning by doing. Also, group work that encourages communication and collaboration.

Students:

- Coding activities,
- Robotic applications,
- Drone (unmanned aerial vehicles) applications,
- Smart board applications,
- Simulation programs,
- IT practices,
- Arduino applications,
- Digital educational games and digital game development applications,
- Design applications,
- Design and visual STEM practices.

Common insights:

- Virtual laboratories and simulation programs are universally valued for their ability



to provide interactive environments where students can conduct experiments and explore complex scientific concepts. These tools bridge the gap between theory and practice, offering practical learning opportunities that deepen understanding and engagement.

- There is a strong emphasis on hands-on learning facilitated by digital tools. Whether through programming platforms like Scratch and Python, Maker projects involving 3D printing and robotics, or interactive simulations, teachers and students alike prioritize activities that encourage active experimentation and foster creativity.
- Augmented Reality (AR) and Virtual Reality (VR) technologies are increasingly recognized for their potential to make abstract concepts more tangible and immersive. By simulating real-world scenarios, these technologies enhance student engagement and comprehension of scientific principles.
- Across countries, there is a growing preference for project-based and interdisciplinary learning approaches. These methods involve students in practical projects that require the application of digital tools to solve authentic problems. This approach not only develops critical thinking and problem-solving skills but also makes STEM subjects more relevant and relatable to students' everyday lives.
- Educational games, multimedia presentations, and online collaboration platforms are also highlighted for their role in making STEM lessons interactive and engaging. These tools cater to diverse learning styles and support teachers in delivering content in innovative ways that capture students' interest and encourage active participation.
- Furthermore, there is a recognized need for ongoing teacher training and support to effectively integrate digital tools into STEM education. Equipping teachers with the skills and resources to utilize these technologies ensures that all students benefit from inclusive and enriching STEM learning experiences.

3. Which digital tools or platforms do you find most effective in engaging students in STEM subjects? Do you have any specific examples of their use?

Germany:

Both teachers and learners were aware of Scratch, the visual programming language designed for beginners. Also teachers and learners mentioned GeoGebra, which is a dynamic mathematics software that supports geometry, algebra, and calculus.

One teacher mentioned PhET Interactive Simulations. This is a free interactive math and science simulations from the University of Colorado Boulder.

Another teacher pointed on Tinkercad which is an easy-to-use 3D design and modeling tool. The students also pointed in Kahoot, the quiz-tool which can be used for STEM purposes as well and also on Padlet. Padlet is software that creates a digital pinboard on which texts,



images, videos, links, voice recordings, screen recordings and drawings can be stored. They also mentioned the videos on Youtube and Khan Academy. Khan Academy is a non-profit website. It offers educational material and contains over 13,300 instructional videos in the fields of mathematics, science, computer science, etc. This is used by many learners and many teachers. Also youtube channels like the one about mathematics of Daniel Jung or of Lehrerschmidt were mentioned.

A more STEM related answer was the hint to LabXchange, which is an online platform that provides access to high-quality, curated STEM content and virtual lab experiences. Teachers could also use Edmodo to facilitate group projects in STEM subjects.

Poland:

Teachers:

- PhET Interactive Simulations (it offers a wide range of interactive simulations covering physics, chemistry, biology, earth science, and math topics. These simulations allow teachers to conduct virtual experiments and demonstrate scientific concepts in a visually engaging manner).
- Scratch (it is a user-friendly programming platform developed by MIT. Teachers can use Scratch to introduce programming concepts to students through interactive projects like games, animations, and stories, fostering creativity and problem-solving skills).
- Tinkercad (it is a web-based application for 3D design, electronics, and coding. Teachers can incorporate Tinkercad into STEM lessons to enable students to create 3D models, design circuits, and experiment with coding in a virtual environment).

Students:

- Scratch (they can use Scratch to create their own interactive stories, games, and animations, applying programming concepts learned in class to express their creativity and develop computational thinking skills).
- Tinkercad (it empowers students to design and prototype their own 3D models, circuits, and code-based projects, allowing them to engage in experiential learning and innovation outside the traditional classroom).
- Google Sheets (students can use Google Sheets to analyze and visualize data from scientific investigations or research projects, developing essential data literacy skills and gaining practical experience in data interpretation and presentation).

Portugal:

-Games: Participants highlighted games as an effective tool for engaging students in STEM subjects. They mentioned that educational games can make learning more interactive and enjoyable, thereby increasing student interest and motivation.

-Simulators: Simulators such as GeoGebra and Phythox were noted for their effectiveness. These tools allow students to visualize and experiment with scientific concepts in a virtual



environment. For example, GeoGebra can be used for interactive geometry, algebra, and calculus lessons, while Phyphox enables students to conduct physics experiments using their smartphones.

-Gamification: Gamification platforms like Kahoot, Quizzes, and Mentimeter were also mentioned as highly engaging. These tools introduce elements of game play into learning activities, making them more dynamic and competitive. For instance, Kahoot can be used to create fun quizzes that reinforce learning through friendly competition.

-Activities That Generate Competition: Activities that incorporate a competitive element were deemed very effective. Participants believe that competitions can motivate students to engage more deeply with the material. Digital tools that facilitate competition, such as team-based challenges or timed quizzes, can foster a sense of excitement and involvement in STEM subjects.

Romania1 :

Coding and programming activities have become increasingly popular in STEM education, giving students the opportunity to develop computational thinking and problem-solving skills. Through platforms that teach programming languages like Scratch or Python, students can get involved in creating algorithms, designing programs, and solving real-world challenges. These activities not only improve students' digital literacy, but also stimulate creativity and innovation in STEM fields. By incorporating coding and programming into STEM lessons, educators can equip students with technology skills and prepare them for future careers in the digital age.

The **PhET** platform offers inclusive simulations that allow students to engage with various STEM subjects through interactive simulations.

123edu is a platform with math exercises, Romanian language, and general culture. It is addressed to primary school students and their parents.

Kidibot a platform with gamification learning scenarios, where children are stimulated to complete tests in various fields, entering "Battles of Knowledge".

Mondly is an application for learning foreign languages, with an interface also in Romanian. It's free (with some restrictions like an imposed pace).

BitBenefit an online platform of courses for children in areas such as Programming, Foreign Languages and Personal Development.

Romania 2:

- Google Docs (for working together on projects);
- Google Jamboard (for drawings, writing ideas and schemas).
- PhET Interactive Simulations (for doing virtual experiments in physics and chemistry).
- Kahoot! (for tests and homework).
- Quizizz (for tests and homework).
- Socrative (for tests).
- Quizlet (for flashcards, tests).



- <https://www.mathsisfun.com/> (for educational games, puzzles).
- Padlet (for working together on projects, brainstorming).
- Tinkercad: This browser-based platform allows students to 3D design different objects and simulate electronic circuits. They can experiment with different components and see how they interact in a virtual environment before building real circuits. This fosters creativity and problem-solving skills.
- Google Sheets (for data visualisation).

Türkiye:

Teachers:

- There are many digital tools and platforms to support students' engagement in STEM subjects. For example:
 - Algodoo, Kahoot, web 0.2 tools
 - Virtual physics and chemistry laboratories,
 - Websites containing international STEM application examples,
 - Also, the pinterest website is available.
- Scratch: It is an excellent platform to learn coding and programming, especially for children. It's also an excellent starting point for students new to programming. It offers students the opportunity to create games, animations and interactive stories with block-based programming.
- Khan Academy: It is a platform that offers interactive lessons on mathematics, science and engineering. Students can have a customized experience that allows them to learn at their own pace.
- Code.org: A platform that promotes coding and computer science education. Students can improve their coding skills using visual programming tools.
- Tinkercad: It is a platform that teaches 3D modeling and design. Allows students to create three-dimensional objects.
- PhET Interactive Simulations: It is a platform that offers interactive simulations on science and mathematics subjects.
- Riders,
- Nearpod,
- Arduino: Arduino is a platform that offers students the opportunity to make electronic and robotic projects.
- Energy 3D, Lego Mindstorms and Wedo sets, www.scienceerobot.com (and other open educational resources)

Students:

- Computer: Coding and using various web platforms.
- Unity, Strach, Unreal Angel, Anaconda, code.org, kodgamelab.com, blockbench.com



- Design: Canva, Blander, Tinkercad, Energy 3D, Blender, photoshop
- Mathematics: Geogebra, Electronics and informatics: Arduino.

Common insights:

- Scratch, a beginner-friendly visual programming language, is widely recognized for fostering creativity and computational thinking through interactive projects like games and animations. Similarly, Tinkercad stands out for its utility in 3D design and modeling, enabling students to prototype and experiment with virtual creations ranging from circuits to complex structures.
- Teachers also value PhET Interactive Simulations, which provide immersive experiences across physics, chemistry, and biology. These simulations allow students to conduct virtual experiments and visualize scientific concepts in a dynamic, engaging manner. GeoGebra is praised for its versatility in mathematics education, supporting interactive lessons in geometry, algebra, and calculus.
- Gamification platforms like Kahoot and Quizizz enhance student participation through competitive quizzes and interactive challenges, while platforms such as Google Sheets facilitate data analysis and visualization, crucial for scientific research and project-based learning. Educational games and multimedia resources from Khan Academy and YouTube further enrich learning by providing accessible, curriculum-aligned content in STEM fields.

4. Are there specific resources or teaching materials that you find effective in promoting interest in STEM subjects among students?

Germany:

When it came to specific resources both teachers and students pointed in Khan Academy. This learning provider offers comprehensive instructional videos, practice exercises, and personalized learning dashboards.

With regard to robotics the learner and one teacher pointed on LEGO Mindstorms and LEGO Education Kits. This tool allow students to build and program robots using LEGO bricks and a simple visual programming language.

Moreover, the teachers emphasized that there are good resources and training materials with regard to project-based learning (PBL) in the classroom, which seems to be very effective for STEM training.

With regard to texts the focused on “The Boy Who Harnessed the Wind” by William Kamkwamba, “Hidden Figures” by Margot Lee Shetterly, and the “National Geographic Kids” magazine.

The teachers also mentioned some OER resources from

<https://libguides.mines.edu/stemeducation/oer>

There the American Institute of Mathematics offer an open textbook initiative:



<https://textbooks.aimath.org/>

Also the Google Workspace for Education was mentioned by one teacher. This tool Facilitates collaboration and communication among students.

Poland:

Teachers:

- Engaging students through hands-on experiments and interactive demonstrations that illustrate real-world applications of STEM concepts.
- Organizing STEM challenges or participating in competitions like science fairs, robotics competitions, or coding challenges to stimulate student interest and foster teamwork and problem-solving skills.
- Inviting guest speakers from STEM-related industries or organizing field trips to scientific institutions, laboratories, or technology companies to expose students to real-world STEM careers and applications.
- Providing project-based learning resources and lesson plans that integrate STEM concepts into interdisciplinary projects, allowing students to apply their knowledge in practical and meaningful ways.

Students:

- Offering STEM kits or DIY project materials that allow students to explore STEM concepts through hands-on experimentation and creativity, fostering curiosity and exploration.
- Accessing online learning platforms and tutorials that offer interactive lessons, simulations, and educational videos covering a wide range of STEM topics, catering to different learning styles and interests.
- Introducing students to STEM literature, biographies of prominent scientists and innovators, and stories of scientific discovery and innovation to inspire curiosity and appreciation for the wonders of STEM.
- Providing resources for exploring STEM careers, such as career profiles, job shadowing opportunities, or internships, to help students understand the diverse range of career paths available in STEM fields and envision themselves as future scientists, engineers, or technologists.

Portugal:

-Research Centers, companies and University Visits: Participants highlighted the effectiveness of visits to research centers and universities. These excursions provide students with firsthand experience of advanced scientific environments and the opportunity to interact with professionals in the field. Such experiences can inspire students by exposing them to real-world applications of STEM subjects and potential career paths.

-Engenheiras por um Dia (Engineers for a Day) by IBM: The "Engenheiras por um Dia" program by IBM was specifically mentioned as an impactful initiative. This program is



designed to promote engineering careers among young women by providing them with a day-long experience where they can engage with female engineers, participate in hands-on activities, and learn about the various aspects of engineering. By seeing successful women in STEM roles, students can envision themselves in similar careers, thus promoting gender diversity in the field.

-External Actions: Actions and programs that are external to the school environment were noted as having a lesser impact. While these initiatives, such as community science fairs or external workshops, do contribute positively, their influence can be limited due to their occasional nature and lack of direct integration into the school curriculum. To maximize their effectiveness, these activities need to be closely linked to ongoing educational efforts within schools.

-Diluted Concern: Despite the awareness and concern for promoting STEM interest, participants noted that efforts often get diluted. This dilution can occur due to a lack of continuous and consistent integration of STEM-promoting activities into the regular curriculum. Therefore, there is a need for a more sustained and coordinated approach to maintain high levels of student interest and engagement in STEM subjects.

Romania 1:

Integrating data analysis and visualization tools into STEM lessons can improve students' ability to interpret and communicate scientific findings. By using software applications that enable the creation of models, the analysis of experimental data, and the visualization of results, students can acquire valuable skills in data interpretation and scientific communication. These tools not only facilitate a deeper understanding of STEM concepts, but also allow students to engage in inquiry-based learning and problem solving. By integrating analytics and data visualization tools, educators can equip students with essential skills for success in STEM fields and beyond.

Romania 2:

- Virtual laboratories;
- project-based learning;
- collaborative platforms;
- different educational websites;
- platforms for individual tutoring;
- Youtube educational channels.

Türkiye:

Teachers:

Sample applications given in the curriculum should be expanded,
It should be structured in accordance with the class and group level,
Every activity should be made usable in daily life.
Stem Materials, Maker Sets, Science and Technology Magazines, Computer Games and Stem themed competitions may be interesting.



Interactive Experiences and Simulations.

Films and Documentaries.

Games and Puzzles.

TÜBİTAK publications.

Popular science magazines, books and websites.

Digital communication tools and social media channels such as Zoom and Youtube.

Web 2 tools like Canva and kahoot.

Edmodo, Fetem resources.

Open education resources such as www.scienceerobot.com, www.ev3lesson.com, school education gateway, www.lego.com

Students:

Smart board,

Tablet,

Microsoft applications,

Wikipedia,

Unity,

Tinkercad,

www.youtube.com

www.kodugamelab.com

www.hourofcode.com

www.canva.com

www.google.com

www.scienceerobot.com

www.code.org

www.eba.gov.tr

Common insights:

- Teachers emphasize the impact of interactive and practical experiences such as hands-on experiments, STEM challenges, and participation in competitions like science fairs and robotics contests. These activities not only stimulate curiosity but also develop teamwork, problem-solving skills, and real-world application of STEM concepts.
- Visits to research centers, universities, and industry sites are highlighted as invaluable experiences that expose students to advanced scientific environments and professionals in STEM fields. Guest speakers from industry and field trips to scientific institutions further bridge the gap between classroom learning and real-world applications, inspiring students by showcasing diverse career opportunities in STEM.
- Project-based learning resources are also noted for their effectiveness in integrating



STEM concepts into interdisciplinary projects. Platforms like Khan Academy offer comprehensive instructional videos and interactive exercises that cater to individual learning styles, promoting personalized learning experiences. Similarly, educational literature and biographies of scientists serve to inspire students by highlighting the achievements and contributions of STEM pioneers.

- Digital tools such as virtual laboratories, simulation software (e.g., PhET Interactive Simulations), and coding platforms (e.g., Scratch, Tinkercad) play crucial roles in engaging students through interactive learning experiences. These tools enable students to experiment, create models, and develop digital literacy and computational thinking skills essential for future STEM careers.

5. What recommendations do you have for improving the teaching and learning of STEM subjects with a focus on increasing interest among underrepresented female students?

Germany:

To increase interest among underrepresented female students the teachers suggest a multifaceted approach. They said that the curriculum and the lessons have to ensure that the curriculum reflects the contributions of women. Therefore, it is important to have textbooks which include diverse role models. But the most important thing according to the teacher is to design curriculum content that highlights the relevance of STEM subjects in real life and to focus on authentic situations. Societal challenges like climate change or dealing with the challenges of digitization in economy can be door-openers. They state that it is useful and important to connect STEM concepts to real-world applications. Such issues should resonate with female students and focus on their experiences. Two teachers mentioned that it is useful to facilitate mentorship opportunities for female students. The teachers also have to address unconscious biases in the classroom. To promote equitable participation of male and female students it is necessary to encourage inclusive teaching practices and experiential learning activities. The students also stressed that hands-on approaches are really useful to engage also female persons. Moreover the students would like to have female guest speakers and events or field trips to STEM workplaces where female professionals are active. Here, a role-model approach was mentioned by one teacher.

Poland:

Both students and teachers noticed common activities that can help improve STEM teaching and learning:

- A modern curriculum that includes, for example, the contributions of women and underrepresented groups in STEM fields, highlighting the achievements of women scientists, engineers, and mathematicians can help inspire female students and make STEM subjects more understandable.



- Creating a pleasant place (classroom) where all students feel valued and encouraged to participate, and equal opportunities for all are promoted. There should also be computers in such a classroom so that computer programs can be used.
- Introducing a project-based approach that allows students to solve real-world problems and explore interdisciplinary STEM concepts. Providing meaningful and relevant learning contexts can increase student engagement and interest.
- Increase the use of technology and digital tools that appeal to a variety of learning styles and interests, such as interactive simulations, coding platforms, and multimedia resources. Students who will be able to express themselves in a creative way will certainly remember what they learn best.
- Both students and teachers also noticed that in order for positive changes to occur in schools, great emphasis should be placed on training for teachers, especially older ones who have been teaching in the same way for years, paying no attention to the changing conditions in the current world. Such changes should also come from above to impose the use of certain materials already at the level of the core curriculum (the role of the Ministry of Education).

Portugal:

-Treat the Issue at the Same Level as General Interest Promotion: Participants emphasized that the issue of increasing interest in STEM among underrepresented female students should be treated with the same level of importance as promoting general interest in STEM subjects. They believe that initiatives should be inclusive and designed to benefit all students while also addressing the specific barriers faced by female students.

🔗 **Teacher Training and Sensitization:** Enhancing teacher training to include strategies for fostering an inclusive classroom environment was also suggested. Teachers should be equipped with the skills to encourage female participation in STEM activities actively and to challenge gender stereotypes that may deter girls from pursuing these subjects.

🔗 **Collaborative Projects and Teamwork:** Encouraging collaborative projects that involve teamwork can help build a sense of community and belonging among students. By working in diverse groups, female students can develop their skills in a supportive environment and learn to collaborate effectively with peers of all genders.

Romania 1:

By actively working to address the underrepresentation of minority groups in STEM education, educators and policymakers can create a more inclusive and equitable learning environment that benefits all students.

Romania 2:

- Involving in hands-on, project-based learning experiences;
- investigating the scientific discoveries made by women scientists;
- encouraging creativity and collaboration in learning STEM subjects;
- participating in STEM workshops, competitions, and symposiums;



- developing partnerships with organizations dedicated to increasing diversity in learning STEM subjects.
- using digital platforms and social media to connect with STEM communities and role models.
- counseling, tutoring, and career advice.
- inviting women who have successful careers in STEM fields to speak about their jobs.

Türkiye:

Teachers:

- Courses such as home economics and business education should be included in the curriculum again. Thus, individuals are prepared for life and what is learned is applied.
- Introducing role models for female students, establishing closer relationships with female students' families, developing content and materials that advocate/emphasize gender equality, and creating special clubs and groups for girls may be effective.
- Mentoring programs can be created for female students to know and communicate with successful women in the STEM field. An environment that promotes gender equality should be created in the classroom and throughout the school. This could help break gender-based stereotypes and increase female students' confidence in STEM subjects. Families play an important role in increasing girls' interest in STEM subjects. Families can be informed about creating positive attitudes and supportive environments towards STEM subjects.
- Teachers should be made aware of increasing interest in STEM among female students. In this way, it should be expected that interest in STEM will reflect on students after its greater inclusion in the curriculum.
- More encouraging measures can be taken to increase interest in STEM.
- It is important to address common prejudices among female students about STEM subjects. It can be inspiring for female students to interact with successful female scientists, engineers, and technologists and hear their stories. To this end, schools and communities can organize events and talks that can introduce female STEM professionals to students.
- I think it would be more effective to include STEM applications more in curriculum and to work more with female students.
- More technological opportunities can be provided for girls.
- The learning needs of female students should be collected based on evidence and course activities appropriate to these needs should be developed. Additionally, encouraging role models in the STEM field and practical applications that increase communications with company professionals should be used more. In addition,



simple and practical digital technologies and tools need to be further integrated into the learning process.

Students:

- By using more technological materials or resources that increase girls' interest.
- By gathering girls' interests and learning needs in a more qualified manner, a learning process can be implemented to meet these needs.
- More fun science apps are available for girls.
- More awareness can be raised about the positive contributions STEM will make to their careers in the future.
- STEM is perceived to be more related to the computational field. However, face-to-face or hands-on STEM activities should be increased.
- More participation of experts or professionals from different sectors in STEM can be ensured. These experts can even provide practice and guidance in STEM classes.

Visual and artistic applications may attract girls' attention more. Therefore, such STEM applications can be developed.

Common insights:

- It's crucial to revise curricula and teaching materials to include diverse role models and highlight the relevance of STEM in addressing real-world challenges like climate change and digital transformation. This contextualization can resonate with female students by showing the practical applications and societal impacts of STEM concepts.
- Creating inclusive classroom environments through mentorship programs, female guest speakers, and field trips to STEM workplaces where women are actively engaged serves to provide visible role models and break down gender stereotypes. Hands-on learning approaches are consistently cited as effective, encouraging active engagement and skill development among female students.
- Teacher training plays a pivotal role in fostering inclusive teaching practices and challenging unconscious biases. By equipping teachers with the skills to support and encourage female students in STEM activities, schools can create supportive learning environments that promote confidence and participation.
- Integrating digital tools and technology-rich resources, such as interactive simulations and multimedia platforms, caters to diverse learning styles and enhances creativity and engagement in STEM subjects. This technological integration should be accompanied by a sustained effort to promote STEM careers and pathways through partnerships with industry, STEM workshops, and competitions.



Any additional comments or questions?
Germany:
One student mentioned that a hackathons would be interesting. Moreover the teachers stated several times that a collaborate with local organizations, universities, and industry partners is useful for schools and offers new insights. Another teacher mentioned that providing resources and information to parents ais also important in the field of STEM and that this may also help to overcome the gender gap. Also one teacher reminded the group there is a need to inspire students with real-live stories that introduces them to diverse role models in STEM fields. An important aspect seems also to be that a teacher must help students to visualise and present STEM concepts creatively. This can enhance both communication skills and STEM competences. In total all teachers and all students agreed that STEM education is a key to the future and more important than ever.
Poland:
-
Portugal:
-
Romania 1:
Encouraging collaboration and critical thinking in STEM activities and beyond is an effective way to improve learning outcomes and increase student interest. Collaborative projects allow students to work together, share ideas and learn from each other, fostering a sense of teamwork and camaraderie. By engaging in group activities, students can develop essential interpersonal skills such as communication, negotiation and leadership that are valuable in both school and professional settings. In addition, collaboration promotes a diverse exchange of perspectives and approaches, encouraging students to think critically and consider multiple points of view when solving problems. This not only improves their understanding of STEM concepts, but also fosters a culture of innovation and creativity in the classroom. By incorporating collaborative and critical thinking components into STEM activities, educators can create a stimulating learning environment that inspires curiosity, exploration, and a passion for lifelong learning.
Romania 2:
-
Türkiye:
In particular, after choosing courses in the STEM field, both teachers and students can be informed about STEM education.



Türkiye consists of a wide variety of socio-cultural structures. Therefore, conducting STEM studies in every region and even increasing these studies may be more effective.

Conclusions

This report synthesizes findings from a comprehensive survey and focus group interviews conducted across Germany, Poland, Romania, Portugal, and Türkiye, as part of Work Package 2 (STEM Activities Design and OER), Activity 2.2 (Collecting Data and Field Research). The study targeted teachers and students, aiming to discern needs, challenges, and opportunities in integrating digital technologies into STEM education while promoting greater participation in STEM fields.

Across all countries, persistent gender disparities in STEM were noted, underscoring the need for targeted interventions to promote female role models, mentorship, and educational strategies that attract and retain women in STEM. Socioeconomic barriers were identified in Poland and Romania, highlighting disparities in access to quality STEM education among students from lower socioeconomic backgrounds and minority groups. Strategies such as culturally responsive curricula and tailored educational initiatives were recommended to address these challenges effectively.

The study revealed a strong preference among both teachers and students for technology-related STEM fields, suggesting a perceived alignment with future career opportunities. It emphasized the importance of updating curricula to reflect contemporary perspectives and cater to diverse learning styles, supported by practical, project-based learning methods. Teachers advocated for increased support in accessing materials and training to facilitate regular engagement in STEM activities, reflecting their pivotal role in fostering student interest and success in these disciplines.

Moreover, the integration of digital tools such as virtual laboratories, simulation software, and coding platforms was highlighted as pivotal for enhancing interactive and experiential learning experiences. These tools not only bridge the gap between theory and practice but also nurture critical thinking, problem-solving, and digital literacy essential for future STEM careers.

Collaborative efforts with industry professionals emerged as crucial for providing real-world insights and mentorship opportunities, thereby connecting educational content with industry needs. Informal STEM learning experiences, including visits to museums and interactions with experts, were valued for inspiring curiosity and fostering a passion for



STEM among students, complementing formal education with practical, hands-on experiences.

Addressing perceptions of the gender gap in STEM, enhancing the visibility of STEM careers through mentorship programs, and promoting inclusive teaching practices were identified as priorities across all surveyed countries. Recommendations also included expanding hands-on activities, promoting interdisciplinary approaches, and fostering a positive attitude towards failure as opportunities for growth and learning.

In conclusion, this report underscores the importance of inclusive STEM education strategies that embrace diversity, leverage digital tools, and cultivate a supportive learning environment. By addressing these multifaceted challenges and harnessing emerging opportunities, educational stakeholders can empower the next generation with the skills and motivation needed to thrive in STEM fields and contribute to global innovation and sustainability efforts.



Appendix 1

STEM for Inclusive Schools (ERASMUS+)

No. 2023-1-DE03-KA220-SCH-000151162

Questionnaire

Dear Participant,

Thank you for taking part in this survey focused on STEM (Science, Technology, Engineering, and Mathematics) teaching and learning. This questionnaire aims to gather your perspectives, experiences, and suggestions regarding STEM subjects. Your responses will contribute to our efforts to enhance educational practices, promote inclusivity, and foster a passion for STEM among students. Your participation is entirely voluntary, and your responses will remain anonymous and confidential. Please answer each question thoughtfully and honestly, based on your experiences and insights.

Please note that the questionnaire is divided into blocks: Block 1 for teachers, and Block 2 for students. Depending on whether you are a teacher or a student, complete the appropriate block. You can add your answer to some questions - please write in capital letters.

Completing the survey will take approximately 30 minutes.

BLOCK 1 – TO BE FILLED IN BY TEACHERS

1.1. What school are you a teacher at?

- a) Primary school
- b) Secondary school (lower secondary)
- c) Upper secondary school (high school, vocational school)

1.2. In which country is your school located?

- a) Germany
- b) Poland
- c) Portugal
- d) Romania
- e) Türkiye

1.3. Which STEM subjects are you most interested in? (Select all that apply):

- a) Science



- b) Technology
- c) Engineering
- d) Mathematics

1.4. How often do you engage in STEM-related activities outside of school?

- a) Daily
- b) Weekly
- c) Monthly
- d) Rarely
- e) Never

1.5. How important do you think STEM education is for future career opportunities?

- a) Very important
- b) Important
- c) Neutral
- d) Not very important
- e) Not important at all

1.6. What challenges do you face in teaching STEM subjects? (Select all that apply)

- a) Lack of resources
- b) Lack of students' interest
- c) Students' difficulty in understanding concepts
- d) Limited access to technology
- e) Insufficient internal support (headmaster, other peers)
- f) Insufficient external support (national and local government units, associations, etc.)
- g) Other (please specify):

1.7. How often do you use technology in your STEM teaching?

- a) Daily
- b) Weekly
- c) Monthly
- d) Rarely
- e) Never

1.8. How do you prefer to teach STEM subjects? (Select all that apply)

- a) Hands-on activities
- b) Lectures
- c) Group projects
- d) Online tutorials
- e) Reading textbooks



1.9. Do you think STEM education adequately prepares students for real-world challenges?

- a) Yes
- b) No
- c) Don't know

1.10. What improvements would you suggest for enhancing STEM education? (Select all that apply)

- a) More practical applications
- b) Better teacher training
- c) Increased funding for resources
- d) Integration of arts (STEAM)
- e) More field trips and guest speakers
- f) Other (please specify):

1.11. Do you perceive the gender gap in STEM fields?

- a) It exists and needs to be addressed
- b) It exists but is not a significant issue
- c) It does not exist

1.12. How do you rate the level of support for STEM education in your community?

- a) Strong support
- b) Moderate support
- c) Limited support
- d) No support

1.13. How do you think STEM education could be made more engaging for students? (Select all that apply)

- a) Incorporating more hands-on experiments
- b) Introducing real-world problem-solving activities
- c) Using interactive technology tools
- d) Providing opportunities for creativity within STEM subjects
- e) Other (please specify):

1.14. Do you think there is sufficient emphasis on STEM education in your school curriculum?

- a) Yes
- b) No
- c) Don't know

1.15. How do you think STEM education can help address global challenges? (Select all that apply)

- a) By fostering innovation



- b) By developing sustainable solutions
- c) By promoting critical thinking and problem-solving skills
- d) By encouraging collaboration across disciplines
- e) Other (please specify):

1.16. What role do you think parents should play in supporting STEM education?

- a) Encouraging curiosity and exploration
- b) Providing access to STEM resources
- c) Advocating for quality STEM education in schools
- d) Participating in STEM activities with their children
- e) Other (please specify):

1.17. How do you think STEM education can be made more inclusive for underrepresented groups?

- a) Providing mentorship programs
- b) Offering scholarships and financial support
- c) Creating inclusive and diverse learning environments
- d) Addressing stereotypes and biases in STEM fields
- e) Other (please specify):

1.18. What impact do you think emerging technologies will have on STEM education?

- a) Enabling personalized learning experiences
- b) Facilitating remote learning opportunities
- c) Enhancing collaboration among students and educators
- d) Introducing new STEM career opportunities
- e) Other (please specify):

1.19. How do you think project-based learning can promote STEM literacy among students?

- a) By engaging students in authentic, real-world challenges
- b) By encouraging inquiry and investigation
- c) By fostering collaboration and communication skills
- d) By integrating multiple STEM disciplines into projects
- e) Other (please specify):

1.20. How do you think STEM education can be integrated with other subjects?

- a) Through interdisciplinary projects
- b) By highlighting real-world connections
- c) By incorporating STEM elements into arts and humanities subjects
- d) By emphasizing the importance of STEM in various fields
- e) Other (please specify):



1.21. What role do you think extracurricular STEM programs play in students' education?

- a) Providing additional opportunities for exploration and learning
- b) Reinforcing concepts taught in the classroom
- c) Fostering a passion for STEM subjects
- d) Building teamwork and leadership skills
- e) Other (please specify):

1.22. How do you think the perception of failure impacts STEM education?

- a) It can discourage students from taking risks and exploring new ideas
- b) It can promote resilience and problem-solving skills
- c) It can create a fear of failure that hinders learning
- d) It can foster a growth mindset and a willingness to learn from mistakes
- e) Other (please specify):

1.23. How do you think STEM education can better prepare students for careers in emerging fields?

- a) By emphasizing adaptability and lifelong learning
- b) By providing exposure to cutting-edge technologies
- c) By teaching skills relevant to future job market demands
- d) By promoting creativity and innovation
- e) Other (please specify):

1.24. How do you think informal STEM learning experiences (e.g., museums, and science centers) contribute to education?

- a) They provide hands-on learning opportunities outside the classroom
- b) They inspire curiosity and a love for STEM subjects
- c) They offer access to experts and professionals in STEM fields
- d) They encourage exploration and experimentation
- e) Other (please specify):

1.25. How do you think collaboration with industry professionals can enhance STEM education?

- a) By providing real-world insights and experiences
- b) By offering mentorship and career guidance
- c) By creating opportunities for internships and apprenticeships
- d) By fostering connections between education and industry needs
- e) Other (please specify):

1.26. How do you think the accessibility of STEM education can be improved for students with disabilities?

- a) By providing assistive technologies and accommodations
- b) By training educators to support diverse learning needs



- c) By promoting inclusive curriculum design
- d) By collaborating with disability advocacy organizations
- e) Other (please specify):

1.27. How do you think the portrayal of STEM professionals in media and popular culture affects students' interest in STEM?

- a) Positive portrayals can inspire and motivate students to pursue STEM careers
- b) Negative stereotypes can discourage students, especially those from underrepresented groups
- c) It has little impact on students' perceptions of STEM fields
- d) It can perpetuate misconceptions about STEM careers and fields
- e) Other (please specify):

1.28. How do you think the affordability of STEM resources and materials affects access to STEM education?

- a) It can be a barrier for students from low-income backgrounds
- b) It can limit opportunities for hands-on learning experiences
- c) It can widen the opportunity gap in STEM education
- d) It can hinder schools' ability to provide quality STEM education
- e) Other (please specify):

1.29. How do you think the integration of ethics into STEM education can benefit students?

- a) By fostering ethical decision-making skills
- b) By promoting social responsibility in STEM fields
- c) By addressing the ethical implications of technological advancements
- d) By encouraging critical thinking about the ethical implications of scientific research
- e) Other (please specify):

1.30. How do you think the representation of diverse role models in STEM fields can impact students' aspirations?

- a) It can inspire students from underrepresented groups to pursue STEM careers
- b) It can challenge stereotypes and biases about who can succeed in STEM fields
- c) It can provide relatable examples of success in STEM for all students
- d) It can increase confidence and self-efficacy in STEM subjects
- e) Other (please specify):

1.31. How do you think informal mentorship opportunities can support STEM education?

- a) By providing guidance and support from experienced professionals
- b) By offering insights into career pathways and opportunities in STEM fields
- c) By fostering relationships between students and industry professionals
- d) By promoting networking and collaboration in STEM communities
- e) Other (please specify):



1.32. How do you think the inclusion of culturally relevant content can improve STEM education for diverse learners?

- a) By making STEM subjects more relatable and engaging
- b) By addressing cultural biases and stereotypes in STEM fields
- c) By promoting inclusivity and equity in STEM learning environments
- d) By recognizing the contributions of diverse cultures to STEM fields
- e) Other (please specify):

1.33. How do you think the digital divide impacts access to STEM education?

- a) It creates disparities in access to technology and internet connectivity
- b) It limits opportunities for digital literacy and online learning
- c) It exacerbates inequalities in STEM education outcomes
- d) It hinders students' ability to participate in virtual STEM activities
- e) Other (please specify):

1.34. How do you think extracurricular STEM programs can address equity gaps in STEM education?

- a) By providing access to resources and opportunities outside the school curriculum
- b) By offering mentorship and support for underrepresented students
- c) By fostering a sense of belonging and community among participants
- d) By empowering students to explore STEM subjects at their own pace
- e) Other (please specify):

1.35. (Statistical question) Please indicate your gender:

- a) Male
- b) Female
- c) Other/I prefer not to answer

Conclusion:

Thank you for completing our survey. Your input is invaluable in advancing our understanding of the challenges and opportunities in STEM education, particularly for female students. The information collected will be used to inform strategies and initiatives aimed at fostering a more inclusive and supportive STEM learning environment.

If you have any additional comments or suggestions, please feel free to share them below:

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STEM for Inclusive Schools (ERASMUS+)

No. 2023-1-DE03-KA220-SCH-000151162

Questionnaire

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Please note that the questionnaire is divided into blocks: Block 1 for teachers, and Block 2 for students. Depending on whether you are a teacher or a student, complete the appropriate block. You can add your own answer to some questions - please write in capital letters.

Completing the survey will take approximately 30 minutes.

BLOCK 2 – TO BE FILLED IN BY STUDENTS

2.1. What school do you study at?

- a) Primary school
- b) Secondary school (lower secondary)
- c) Upper secondary school (high school, vocational school)

2.2. In which country is your school located?

- a) Germany
- b) Poland
- c) Portugal
- d) Romania
- e) Türkiye

2.3. Which STEM subjects are you most interested in? (Select all that apply):

- a) Science
- b) Technology



- c) Engineering
- d) Mathematics

2.4. How often do you engage in STEM-related activities outside of school?

- a) Daily
- b) Weekly
- c) Monthly
- d) Rarely
- e) Never

2.5. How do you rate your interest in STEM subjects?

- a) Very interested
- b) Interested
- c) Neutral
- d) Not very interested
- e) Not interested at all

2.6. Have you ever participated in any STEM competitions or challenges?

- a) Yes
- b) No
- c) Don't remember

2.7. What type of STEM activities do you enjoy the most? (Select all that apply)

- a) Experiments
- b) Coding
- c) Robotics
- d) Building projects
- e) Math puzzles
- f) Other (please specify):

2.8. How important do you think STEM education is for future career opportunities?

- a) Very important
- b) Important
- c) Neutral
- d) Not very important
- e) Not important at all

2.9. What challenges do you face in learning STEM subjects? (Select all that apply)

- a) Lack of resources
- b) Lack of interest
- c) Difficulty in understanding concepts
- d) Limited access to technology



- e) Insufficient teacher support
- f) Other (please specify):

2.10. How often do you use technology in your STEM learning?

- a) Daily
- b) Weekly
- c) Monthly
- d) Rarely
- e) Never

2.11. How do you prefer to learn STEM subjects? (Select all that apply)

- a) Hands-on activities
- b) Lectures
- c) Group projects
- d) Online tutorials
- e) Reading textbooks

2.12. Do you think STEM education adequately prepares students for real-world challenges?

- a) Yes
- b) No
- c) Don't know

2.13. What improvements would you suggest for enhancing STEM education? (Select all that apply)

- a) More practical applications
- b) Better teacher training
- c) Increased funding for resources
- d) Integration of arts (STEAM)
- e) More field trips and guest speakers
- f) Other (please specify):

2.14. Do you perceive the gender gap in STEM fields?

- a) It exists and needs to be addressed
- b) It exists but is not a significant issue
- c) It does not exist

2.15. Have you ever considered pursuing a career in a STEM field?

- a) Yes
- b) No
- c) I haven't thought about it yet

2.16. Which STEM careers do you find most appealing? (Select all that apply)

- a) Scientist



- b) Computer Programmer
- c) Mathematician
- d) Medical Professional
- e) Other (please specify):

2.17. How do you think STEM education could be made more engaging for students? (Select all that apply)

- a) Incorporating more hands-on experiments
- b) Introducing real-world problem-solving activities
- c) Using interactive technology tools
- d) Providing opportunities for creativity within STEM subjects
- e) Other (please specify):

2.18. How do you rate your confidence level in STEM subjects?

- a) Very confident
- b) Confident
- c) Neutral
- d) Not very confident
- e) Not confident at all

2.19. How do you think STEM education can help address global challenges? (Select all that apply)

- a) By fostering innovation
- b) By developing sustainable solutions
- c) By promoting critical thinking and problem-solving skills
- d) By encouraging collaboration across disciplines
- e) Other (please specify):

2.20. How do you think the perception of failure impacts STEM education?

- a) It can discourage students from taking risks and exploring new ideas
- b) It can promote resilience and problem-solving skills
- c) It can create a fear of failure that hinders learning
- d) It can foster a growth mindset and a willingness to learn from mistakes
- e) Other (please specify):

2.21. How do you think informal STEM learning experiences (e.g., museums, and science centers) contribute to education?

- a) They provide hands-on learning opportunities outside the classroom
- b) They inspire curiosity and a love for STEM subjects
- c) They offer access to experts and professionals in STEM fields



- d) They encourage exploration and experimentation
- e) Other (please specify):

2.22. How do you think collaboration with industry professionals can enhance STEM education?

- a) By providing real-world insights and experiences
- b) By offering mentorship and career guidance
- c) By creating opportunities for internships and apprenticeships
- d) By fostering connections between education and industry needs
- e) Other (please specify):

2.23. How do you think STEM education can address environmental challenges?

- a) By promoting sustainable practices and innovations
- b) By educating students about the impact of human activities on the environment
- c) By encouraging the development of green technologies
- d) By fostering a sense of responsibility and stewardship towards the environment
- e) Other (please specify):

2.24. How do you think project-based learning can enhance STEM education?

- a) By promoting inquiry-based learning and problem-solving skills
- b) By fostering collaboration and teamwork
- c) By providing real-world context and relevance to learning
- d) By encouraging creativity and innovation
- e) Other (please specify):

2.25. How do you think cultural diversity contributes to STEM education?

- a) By bringing different perspectives and approaches to problem-solving
- b) By reflecting the diversity of the global workforce in STEM fields
- c) By promoting understanding and collaboration across cultures
- d) By challenging stereotypes and biases in STEM fields
- e) Other (please specify):

2.26. How do you think informal mentorship opportunities can support STEM education?

- a) By providing guidance and support from experienced professionals
- b) By offering insights into career pathways and opportunities in STEM fields
- c) By fostering relationships between students and industry professionals
- d) By promoting networking and collaboration in STEM communities
- e) Other (please specify):

2.27. How do you think gamification can enhance STEM learning experiences?

- a) By increasing engagement and motivation
- b) By providing immediate feedback and rewards
- c) By making learning more interactive and fun



- d) By fostering competition and teamwork
- e) Other (please specify):

2.28. How do you think the alignment of STEM education with workforce needs can benefit students?

- a) By increasing students' employability and career readiness
- b) By ensuring that students acquire relevant skills for future job opportunities
- c) By strengthening connections between education and industry
- d) By reducing the skills gap in STEM fields
- e) Other (please specify):

2.29. How do you think collaborative problem-solving activities can enhance STEM education?

- a) By promoting teamwork and communication skills
- b) By encouraging diverse perspectives and approaches to problem-solving
- c) By simulating real-world challenges and scenarios
- d) By fostering creativity and innovation
- e) Other (please specify):

2.30. How do you think peer mentoring programs can support STEM education?

- a) By providing academic support and guidance from peers
- b) By fostering collaborative learning and teamwork
- c) By promoting leadership and communication skills
- d) By creating a supportive community for STEM learners
- e) Other (please specify):

2.31. How do you think the integration of career exploration activities can enhance STEM education?

- a) By helping students understand the relevance of STEM subjects to future careers
- b) By providing exposure to diverse career pathways in STEM fields
- c) By connecting classroom learning to real-world job opportunities
- d) By fostering goal-setting and planning skills
- e) Other (please specify):

2.32. How do you think project-based learning can promote STEM literacy among students?

- a) By engaging students in authentic, real-world challenges
- b) By encouraging inquiry and investigation
- c) By fostering collaboration and communication skills
- d) By integrating multiple STEM disciplines into projects
- e) Other (please specify):

2.33. How do you think integrating cultural perspectives into the STEM curriculum can promote diversity in STEM fields?



- a) By recognizing and valuing diverse ways of knowing and problem-solving
- b) By highlighting the contributions of diverse cultures to scientific knowledge
- c) By fostering inclusivity and representation in STEM learning materials
- d) By challenging Eurocentric narratives in STEM education
- e) Other (please specify):

2.34. How do you think the representation of diverse role models in STEM fields can impact students' aspirations?

- a) It can inspire students from underrepresented groups to pursue STEM careers
- b) It can challenge stereotypes and biases about who can succeed in STEM fields
- c) It can provide relatable examples of success in STEM for all students
- d) It can increase confidence and self-efficacy in STEM subjects
- e) Other (please specify):

2.35. (Statistical question) Please indicate your gender:

- a) Male
- b) Female
- c) Other/I prefer not to answer

Conclusion:

Thank you for completing our survey. Your input is invaluable in advancing our understanding of the challenges and opportunities in STEM education, particularly for female students. The information collected will be used to inform strategies and initiatives aimed at fostering a more inclusive and supportive STEM learning environment.

If you have any additional comments or suggestions, please feel free to share them below:

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Appendix 2

STEM for Inclusive Schools (ERASMUS+)

No. 2023-1-DE03-KA220-SCH-000151162

Focus Group Interview Scenario

Remember that each interview must take place in an atmosphere of complete trust:

- 1) Greet participants in a warm and friendly manner to build a sense of comfort and trust.
- 2) Demonstrate understanding and empathy towards participants, listen to them carefully, and show interest in their experiences and opinions.
- 3) Emphasize that all opinions are valuable and will not be judged, will encourage open sharing of views.
- 4) Introduce the purpose of the interview and provide participants with clarity about its importance.

You can use the text below as an example:

Dear Participants,

Thank you for taking part in this focus group interview focused on STEM (Science, Technology, Engineering, and Mathematics) teaching and learning. This interview aims to gather your perspectives, experiences, and suggestions regarding STEM subjects. Your responses will contribute to our efforts to enhance educational practices, promote inclusivity, and foster a passion for STEM among students. Your participation is entirely voluntary. You have been randomly selected to participate in this interview. It will constitute an in-depth follow-up to the previously conducted surveys, and the discussions in which you will participate will help us, the partners of the STEM for Inclusive Schools project, best understand the needs of the end recipients of the materials created as part of the project. You are making a huge contribution to the development of European school education, as the project results will be widely promoted and used throughout the European Union and in associated countries.

Thank you very much for your time and we wish you a successful discussion!

- 5) Conduct the interview. Ask open questions (listed below) that encourage participants to freely share their experiences, opinions, and reflections. Encourage dialogue and exchange of views between participants, which will lead to a more open and dynamic atmosphere. **Remember to keep notes for each question in Appendix 3.** These notes are to contain the most important conclusions from the respondents' answers. To help you keep notes, you can use the following tips:



- **Direct note-taking:** Use traditional note-taking methods such as handwriting on paper or a whiteboard. Write down the main points and key information to maintain coherence.
- **Audio recording:** You can use an audio recording device to keep an accurate record of the conversation. This allows you to focus on interacting with participants without worrying about missing any details while writing.
- **Use visual techniques:** If possible, use visual techniques like mind maps or diagrams to organize and visualize information. This can help in understanding complex concepts and the relationships between them.
- **Team note-taking:** If interviewing as part of a team, divide note-taking responsibilities. You can use different colors to differentiate participants' voices.
- **Summary after the session:** After concluding the session, provide a summary highlighting the main points and key information. This will help you organize the collected data.
- **Utilize technology:** If you're tech-savvy, you can use note-taking apps or online tools for sharing notes. This can facilitate data organization and sharing with other team members.
- **Ask clarifying questions:** While taking notes, don't hesitate to ask additional questions or request clarification if something is unclear. This will help you better understand responses and supplement your notes.

6) At the end summarize the main points discussed during the interview and ask participants for any additional comments or questions. Note them carefully in the proper part of Appendix 3.

7) Complete the report. Fill out Annex 3 and send it to the Activity leader (P4).

The interview should take not less than 45 minutes.

Questions for Moderated Interview

1. Do you believe the current STEM curriculum is inclusive and representative of diverse perspectives, including those of women and underrepresented groups? If not, what actions do you think should be taken to make STEM education more inclusive?
2. What activities using digital tools would interest you in STEM lessons?
3. Which digital tools or platforms do you find most effective in engaging students in STEM subjects? Do you have any specific examples of their use?
4. Are there specific resources or teaching materials that you find effective in promoting interest in STEM subjects among students?
5. What recommendations do you have for improving the teaching and learning of STEM subjects with a focus on increasing interest among underrepresented female students?



Appendix 3

STEM for Inclusive Schools (ERASMUS+)

No. 2023-1-DE03-KA220-SCH-000151162

Focus Group Interview Report

Date and place:	
Number of teachers:	
Number of students:	
<i>Write down the most important conclusions from the discussion:</i>	
1. Do you believe the current STEM curriculum is inclusive and representative of diverse perspectives, including those of women and underrepresented groups? If not, what actions do you think should be taken to make STEM education more inclusive?	
2. What activities using digital tools would interest you in STEM lessons?	



3. Which digital tools or platforms do you find most effective in engaging students in STEM subjects? Do you have any specific examples of their use?

4. Are there specific resources or teaching materials that you find effective in promoting interest in STEM subjects among students?

5. What recommendations do you have for improving the teaching and learning of STEM subjects with a focus on increasing interest among underrepresented female students?



Any additional comments or questions?



Appendix 4

STEM for Inclusive Schools (ERASMUS+)

No. 2023-1-DE03-KA220-SCH-000151162

Dear Participant,

Welcome to the STEMInSCH project, which stands for "STEM for Inclusive Schools". It is an Erasmus+ project that brings together Universities, Research Institutes, schools, and businesses from Germany, Poland, Türkiye, Portugal, and Romania. The main objective of the STEMInSCH project is to empower STEM professionals in the use of digital technology to provide new ways to learn and teach STEM subjects as an effective initiative to address the challenges of participating in STEM. The project aims to foster STEM professionals and the school community to develop inclusive ways to increase interest and participation in the STEM field and to increase their capacity by offering new ways to use digital resources in STEM to provide quality responses to different learning.

The first phase of the project involves research (surveys and focus group interviews) which are designed to gather information about the perspectives, experiences, and suggestions regarding STEM subjects. The results will be used for the development of the Open Educational Resource that will allow teachers to customize their STEM teaching, Toolset, and digital tool for measurement and evaluation, as well as a Guidebook focused on increasing participation in STEM.

Those eligible to participate include teachers and students at every stage of education (primary and secondary schools, secondary schools, vocational schools, technical schools, etc.).

If you are eligible and willing to participate in our research, could you kindly spare some time to take part in it? This would take approximately 30 to 45 minutes.

You will not be asked to divulge any sensitive information. Your identity will only be revealed if you explicitly give us your consent to do so (mainly for attributable quotations; please see the 'Declaration of Consent' section on the next page). If you would not like your identity to be disclosed, your research data will be pseudonymised by replacing your personal details with a code, and no data that can identify you will be included in the research outputs.

There are no risks involved in participating in this interview. The data that will be collected during the study will be processed exclusively by the STEMInSCH project team. You would not benefit directly, but your participation would contribute to the development of this project's envisaged outputs, which will benefit teachers and students of STEM subjects. These results will contribute to developing outcomes that take into account inclusion in STEM teaching/learning, as well as increasing the representation of female students in STEM, which is a major challenge in today's world.

Participation in this interview is voluntary and you may refuse to answer any of the questions asked. You may discontinue participation by ending the interview at any point, and any data collected from you will be deleted. According to the General Data Protection Regulation (GDPR) and implementing national legislation, you have the right to access, rectify, and, where applicable, erase your data.

With thanks and best wishes,

STEMInSCH Project Team



STEMinSCH Project – Declaration of Consent in taking part in the research

I have read and understood the information provided above about the STEMinSCH project and the research.

I hereby confirm that I am participating in this research voluntarily and with full informed consent, on the conditions listed above and marked below.

- ☐ I consent to being identified as a respondent and for attributable quotations to be used in the research outputs
- ☐ I DO NOT consent to being identified as a respondent and for attributable quotations to be used in the research outputs.

Name of Respondent:

Signature of Respondent:

Date:

STEMinSCH Researcher's Contact Details:

Name:
Organisation:
Address:
Email:
Telephone: