

# TOOLKIT FOR ASSESSING THE PROMOTION OF SELF- EFFICACY (O1)

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## PART 2 - STEAM4U CONCRETE TOOLS

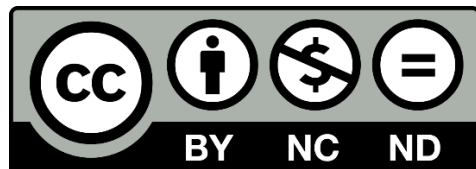
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# EXAMPLES OF TOOLS FOR OUT-OF-SCHOOL STEM ACTIVITIES

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## PRE & POST QUESTIONNAIRES FOR 10-14- YEAR-OLD TEENS PARTICIPATING IN STEM ACTIVITIES

PRE & POST QUESTIONNAIRES FOR 10-14-YEAR-  
OLD TEENS PARTICIPATING IN STEM ACTIVITIES  
DESIGNED AND USED BY FUNDACJA  
UNIwersYTET DZIECI



## PRE-QUESTIONNAIRE

### QUESTIONNAIRE GUIDELINES

Please complete the questionnaire – your answers will allow us to collect your feelings before today's workshop at the Children's University. In questions, mark your answer on the scale or mark the appropriate picture. Answers will be encoded and will not be used anywhere else. Thank you for completing the survey!





### PARTICIPANT IDENTIFICATION

Birth date: \_\_\_\_\_

Gender: ☐ Female ☐ Male

### INITIATIVE MONITORING

1. What are your expectations on workshops? Estimate the following characteristics:

	Not at all 	A little 	A good amount 	A lot 
Meet other kids				
Use materials and tools that I do not have at school or at home				
Have fun				
Create new things				
Know how things work				
Others				





### ASSESSMENT OF SELF-EFFICACY IN STEAM







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**2. Please, answer the following questions – mark the best option.**

	Not confident at all 	Fairly confident 	Confident 	Very confident 
How confident are you that you are able <b>to do tasks and carry out investigations during workshops?</b>				
How confident are you that you are able to <b>search solutions for a problem?</b>				
How confident are you that you are able to <b>cooperate with others?</b>				
How confident are you that you are able to <b>present effects of your work, results, conclusions?</b>				




**3. Think about your science, technology and mathematics subjects at school. How will you grade your capacities of each subjects now?**

	Bad 	Average 	Good 	Very good 
Biology				
Physics				
Chemistry				
Informatics				
Mathematics				
Other _____				

**4. Select your level of agreement for each statement (mark your answer)**





	Disagree 	Undecided 	Agree 
I think now that scientists can make a lot of money			
I think now that scientists have exciting jobs			
I think now that scientists are brainy			
I think that scientists spend most of their time working by themselves			

**Thank you for filling this questionnaire!** Below you can share your opinion about this questionnaire

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## POST-QUESTIONNAIRE

### QUESTIONNAIRE GUIDELINES

Please complete the questionnaire – your answers will allow us to collect your feelings after today's workshop at the Children's University. In questions, mark your answer on the scale or mark the appropriate picture. Answers will be encoded and will not be used anywhere else. Thank you for completing the survey!





### PARTICIPANT IDENTIFICATION

Birth date: \_\_\_\_\_

Gender: ☐ Female ☐ Male

### INITIATIVE MONITORING

1. Rate the extent you have found the following characteristics during workshops

	Not at all 	A little 	A good amount 	A lot 
Meet other kids				
Use materials and tools that I do not have at school or at home				
Have fun				
Create new things				
Know how things work				
Others				

## 2. How interesting were the workshops for you?



not interesting



on average



interesting



very interesting

## 3. What was the best thing for you during workshops?

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## ASSESSMENT OF SELF-EFFICACY IN STEAM

### 4. Please, answer the following questions – mark the best option.

	Not confident at all 	Fairly confident 	Confident 	Very confident 
How confident are you that you are able to <b>do tasks and carry out investigations during workshops?</b>				
How confident are you that you are able to <b>search solutions for a problem?</b>				
How confident are you that you are able to <b>cooperate with others?</b>				
How confident are you that you are able to <b>present effects of your work, results, conclusions?</b>				

**5. Think about your science, technology and mathematics subjects at school.  
How will you grade your capacities of each subjects now?**

	Bad 	Average 	Good 	Very good 
Biology				
Physics				
Chemistry				
Informatics				
Mathematics				
Other _____				

**6. Overall, and after participating in the workshop, do you feel now more capable of doing science activities?**




- Yes, I feel I am more capable of doing science activities
- Yes, I feel I am only a little more capable of doing science activities
- No, I feel I am as capable as before of doing science activities

**7. In case you have answered YES in the previous question, Is there anything that made you change your opinions about your capacities while doing science, technology and/or mathematics activities after participating in block of workshop?**

- ☐ Knowing a real scientist
- ☐ Doing science in a different way than in the school
- ☐ Knowing how science can be useful for my everyday life
- ☐ The way the scientist addressed to me made me feel I could do science
- ☐ Doing science with my friends
- ☐ The way the scientists helped me when I faced difficulties in the workshop
- ☐ Made me feel I could do science
- ☐ Having the opportunity to create new things
- ☐ Others (please, specify): \_\_\_\_\_

**8. Select your level of agreement for each statement (mark your answer)**



	Disagree 	Undecided 	Agree 
I think now that scientists can make a lot of money			
I think now that scientists have exciting jobs			
I think now that scientists are brainy			
I think that scientists spend most of their time working by themselves			

**9. Was there anything in workshops that gave you this image/idea of scientists?**

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**Thank you for filling this questionnaire!** Below you can share your opinion about this questionnaire

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## PRE & POST QUESTIONNAIRES FOR TEENS PARTICIPATING IN STEM ACTIVITIES DESIGNED AND USED BY THOMAS MORE UNIVERSITY



## PRE-QUESTIONNAIRE

### QUESTIONNAIRE "SELF-EFFICACY IN STEM-ACTIVITIES"

#### ANSWER THE FOLLOWING QUESTIONS

1. What is your name? \_\_\_\_\_
2. How old are you? \_\_\_\_\_
3. Gender? ☐ Boy ☐ Girl
4. Do your parents have a degree in science?  
☐ No ☐ Yes, 1 parent. Who? \_\_\_\_\_ ☐ Yes, both  
 If yes, do you know the degree? \_\_\_\_\_
5. Do you talk about science with your parents?  
☐ No ☐ Yes, with 1 parent. Who? \_\_\_\_\_ ☐ Yes, with both
6. What are your expectations about the WiWeTeR-sessions? Tick what fits for you.  
 (Multiple answers are possible)  

☐ Meeting other children  
☐ Creating new things  
☐ Using materials that I don't have at home

☐ Having fun  
☐ Understanding how things work  
☐ Other: \_\_\_\_\_
7. Do you agree with following statements? Cross what fits the best for you.

	Totally disagree	Disagree	Agree	Totally agree
I like doing activities about science or mathematics (e.g. making your own game, creating a kite, nature walks ...).				
I like reading books or magazines about science, technology, engineering or mathematics.				



I like visiting websites about science, technology, engineering or mathematics.				
My parents think it is important to study science.				

In the following tables you need to place a cross in the column that fits you the best.  
Here you can see an example:

	I am certain that I can't do that	I think that I can't do that	I think I can do that	I am certain that I can do that
I can make spaghetti for 20 persons	x			

This person is certain that he/she cannot make spaghetti for 20 persons.



**8. To what extent do you think you can perform/execute what is described below?**

	I am certain that I can't do that	I think that I can't do that	I think I can do that	I am certain that I can do that
How confident are you that you are able to define a problem that needs to be solved?				
How confident are you that you are able to plan and carry out investigations?				
How confident are you that you are able to program (f.e. Scratch, Arduino ...)?				
How confident are you that you will be successful carrying out an experiment or build a new thing				
How confident are you that you can apply mathematics in daily life problems or in a context different				
How confident are you that you are able to find evidence that helps you reasoning a phenomenon?				
How confident are you that you are able to build explanations about a phenomenon of design				
How confident are you that you are able to obtain, evaluate and communicate information?				

## 9. To what extent can you assess yourself?

	Totally disagree	Disagree	Agree	Totally agree
When something doesn't work, I want to find the reason it doesn't work.				
I can work in group.				
I can say what my strong and weak points are.				
I can predict that I can successfully complete a certain task.				
I can predict for which tasks I will need help from others.				
I want to learn more about why things happen.				
I want to learn more about how to invent, design or build things.				

**Thank you for filling in this questionnaire! Have fun with the following WiWeTeR-sessions!**



## POST-QUESTIONNAIRE 1

### QUESTIONNAIRE "SELF-EFFICACY IN STEM-ACTIVITIES"

#### ANSWER THE FOLLOWING QUESTIONS

1. What is your name? \_\_\_\_\_
2. Did the WiWeTeR-sessions fulfil your expectations? To which extent do you agree with the following statements? Place a cross.

	Totally disagree	Disagree	Agree	Totally agree
1. I have learned a lot during the WiWeTeR-sessions.				
2. I liked coming to the WiWeTeR -sessions.				
3. The different sessions were very interesting:				
- session 'electricity'				
- session 'CSI'				
- session 'building bridges'				
- session 'music'				
- session 'biggest bubble'				
- session 'programming with Arduino'				
4. I had enough space to design and discover.				
5. The educators had enough background information.				
6. I will look up more information about one or more sessions.				
7. I am satisfied with the organisation of the sessions.				
8. I will follow another STEM-academy, if possible.				



After the sessions... To what extent do you think you can perform/execute what is described below?

	I am certain that I can't do that	I think that I can't do that	I think I can do that	I am certain that I can do that.
How confident are you that you are able to define a problem that needs to be solved?				
How confident are you that you are able to plan and carry out investigations?				
How confident are you that you are able to program (f.e. Scratch, Arduino ...)?				
How confident are you that you will be successful carrying out an experiment or build a new thing during the sessions?				
How confident are you that you can apply mathematics in daily life problems or in a context different from the class?				
How confident are you that you are able to find evidence that helps you reasoning a phenomenon?				
How confident are you that you are able to build explanations about a phenomenon of design solutions for a problem?				
How confident are you that you are able to obtain, evaluate and communicate information?				

To what extent can you assess yourself?

	Totally disagree	Disagree	Agree	Totally agree
When something doesn't work, I want to find the reason it doesn't work.				
I can work in group.				
I can say what my strong and weak points are.				
I can predict that I can successfully complete a certain task.				
I can predict for which tasks I will need help from others.				
I want to learn more about why things happen.				
I want to learn more about how to invent, design or build things.				

The use of the STEAM-slick cards...

**1. What has changed your opinion about your capacities in doing STEM?**

- ☐ Doing science in a different way than at school
- ☐ Doing science together with my parent
- ☐ Experiencing success during the activity
- ☐ Doing science with different and new materials
- ☐ The chance to create new things
- ☐ No, my opinion did not changed
- ☐ Other: \_\_\_\_\_

**2. How often did you use the STEAM-slick cards to talk about the sessions with your parents?**

- ☐ once
- ☐ 3 times
- ☐ 5 times
- ☐ Never
- ☐





☐ twice                      ☐ 4 times                      6 times

**3. What do you think about the use of STEAM-slick cards?**

- ☐ Nice to talk about STEM with my parents
- ☐ Fascinating to learn what my parents know about the topic
- ☐ Not nice, I did it because we had to
- ☐ Boring
- ☐ Other: \_\_\_\_\_

**Thank you for filling in the questionnaire! See you next time!**



## POST-QUESTIONNAIRE 2

### QUESTIONNAIRE "SELF-EFFICACY IN STEM-ACTIVITIES"

#### ANSWER THE FOLLOWING QUESTIONS

1. What is your name? \_\_\_\_\_
2. Did the WiWeTeR-sessions fulfil your expectations? To which extent do you agree with the following statements? Place a cross.

	Totally disagree	Disagree	Agree	Totally agree
1. I have learned a lot during the WiWeTeR-sessions.				
2. I liked coming to the WiWeTeR -sessions.				
3. The different sessions were very interesting:				
- session 'Ytong'				
- session 'secret agent'				
- session 'code'				
- session 'bibberbot'				
- session 'electromagnet'				
- session 'stew'				
4. I had enough space to design and discover.				
5. The educators had enough background information.				
6. I will look up more information about one or more sessions.				
7. I am satisfied with the organisation of the sessions.				
8. I will follow another STEM-academy, if possible.				

After the sessions... To what extent do you think you can perform/execute what is described below?

	I am certain that I can't do that	I think that I can't do that	I think I can do that	I am certain that I can do that.
How confident are you that you are able to define a problem that needs to be solved?				
How confident are you that you are able to plan and carry out investigations?				
How confident are you that you are able to program (f.e. Scratch, Arduino ...)?				
How confident are you that you will be successful carrying out an experiment or build a new thing during the sessions?				
How confident are you that you can apply mathematics in daily life problems or in a context different from the class?				
How confident are you that you are able to find evidence that helps you reasoning a phenomenon?				
How confident are you that you are able to build explanations about a phenomenon of design solutions for a problem?				
How confident are you that you are able to obtain, evaluate and communicate information?				



To what extent can you assess yourself?

	Totally disagree	Disagree	Agree	Totally agree
When something doesn't work, I want to find the reason it doesn't work.				
I can work in group.				
I can say what my strong and weak points are.				
I can predict that I can successfully complete a certain task.				
I can predict for which tasks I will need help from others.				
I want to learn more about why things happen.				
I want to learn more about how to invent, design or build things.				

The use of the STEAM-slick cards...

**1. What has changed your opinion about your capacities in doing STEM?**

- ☐ Doing science in a different way than at school
- ☐ Doing science together with my parent
- ☐ Experiencing success during the activity
- ☐ Doing science with different and new materials
- ☐ The chance to create new things
- ☐ No, my opinion did not changed
- ☐ Other: \_\_\_\_\_

**2. How often did you use the STEAM-slick cards to talk about the sessions with your parents?**





- |                                |                                  |                                  |                                |
|--------------------------------|----------------------------------|----------------------------------|--------------------------------|
| <input type="checkbox"/> once  | <input type="checkbox"/> 3 times | <input type="checkbox"/> 5 times | <input type="checkbox"/> Never |
| <input type="checkbox"/> twice | <input type="checkbox"/> 4 times | <input type="checkbox"/> 6 times |                                |

**3. What do you think about the use of STEAM-slick cards?**

- ☐ Nice to talk about STEM with my parents
- ☐ Fascinating to learn what my parents know about the topic
- ☐ Not nice, I did it because we had to
- ☐ Boring
- ☐ Other: \_\_\_\_\_

**Thank you for filling in the questionnaire! See you next time!**



## POST-QUESTIONNAIRE 3

### QUESTIONNAIRE "SELF-EFFICACY IN STEM-ACTIVITIES"

#### ANSWER THE FOLLOWING QUESTIONS

1. What is your name? \_\_\_\_\_
2. Did the WiWeTeR-sessions fulfil your expectations? To which extent do you agree with the following statements? Place a cross.

	Totally disagree	Disagree	Agree	Totally agree
1. I have learned a lot during the WiWeTeR-sessions.				
2. I liked coming to the WiWeTeR -sessions.				
3. The different sessions were very interesting: - session 'relish of science'				
- session 'blockly & ozobot'				
- session '1000 bombs and grenades'				
- session 'bumblebees'				
- session 'stack on color'				
4. I had enough space to design and discover.				
5. The educators had enough background information.				
6. I will look up more information about one or more sessions.				
7. I am satisfied with the organisation of the sessions.				
8. I will follow another STEM-academy, if possible.				

After the sessions... To what extent do you think you can perform/execute what is described below?

	I am certain that I can't do that	I think that I can't do that	I think I can do that	I am certain that I can do that.
How confident are you that you are able to define a problem that needs to be solved?				
How confident are you that you are able to plan and carry out investigations?				
How confident are you that you are able to program (f.e. Scratch, Arduino ...)?				
How confident are you that you will be successful carrying out an experiment or build a new thing during the sessions?				
How confident are you that you can apply mathematics in daily life problems or in a context different from the class?				
How confident are you that you are able to find evidence that helps you reasoning a phenomenon?				
How confident are you that you are able to build explanations about a phenomenon of design solutions for a problem?				
How confident are you that you are able to obtain, evaluate and communicate information?				

To what extent can you assess yourself?

	Totally disagree	Disagree	Agree	Totally agree
When something doesn't work, I want to find the reason it doesn't work.				
I can work in group.				
I can say what my strong and weak points are.				
I can predict that I can successfully complete a certain task.				
I can predict for which tasks I will need help from others.				
I want to learn more about why things happen.				
I want to learn more about how to invent, design or build things.				

The use of the STEAM-slick cards...

**1. What has changed your opinion about your capacities in doing STEM?**

- ☐ Doing science in a different way than at school
- ☐ Doing science together with my parent
- ☐ Experiencing success during the activity
- ☐ Doing science with different and new materials
- ☐ The chance to create new things
- ☐ No, my opinion did not changed
- ☐ Other: \_\_\_\_\_

**2. How often did you use the STEAM-slick cards to talk about the sessions with your parents?**





- |                                |                                  |                                  |                                |
|--------------------------------|----------------------------------|----------------------------------|--------------------------------|
| <input type="checkbox"/> once  | <input type="checkbox"/> 3 times | <input type="checkbox"/> 5 times | <input type="checkbox"/> Never |
| <input type="checkbox"/> twice | <input type="checkbox"/> 4 times | <input type="checkbox"/> 6 times |                                |

**3. What do you think about the use of STEAM-slick cards?**

- ☐ Nice to talk about STEM with my parents
- ☐ Fascinating to learn what my parents know about the topic
- ☐ Not nice, I did it because we had to
- ☐ Boring
- ☐ Other: \_\_\_\_\_

**Thank you for filling in the questionnaire! See you next time!**



## PRE & POST QUESTIONNAIRES FOR 12-14-YEAR- OLD STUDENTS PARTICIPATING IN MATH ACTIVITIES DESIGNED AND USED BY UNIVERSITAT AUTÒNOMA DE BARCELONA (UAB)



Universitat Autònoma  
de Barcelona



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## PRE-QUESTIONNAIRE

### QUESTIONNAIRE GUIDELINES

This questionnaire was used before the implementation of the UniX workshop with teens at the Universitat Autònoma de Barcelona. We asked them to answer the questions in a sincere and personal way.

The purpose of the questionnaire is to know the opinions of the teens in order to adapt and improve the training provided in the workshops and assess the impact on their self-efficacy in Maths.

### MODULE TITLE: IDENTIFICATION OF THE PARTICIPANT

1. Which is your name?
2. What is the name of your secondary school?
3. How old are you?

### MODULE TITLE: PERCEPTION OF STANCE ON STEM

In this section, we suggest you to think about your relationship with mathematics, what do you think about this subject, how does it makes you feel?, etc.

#### 4. How would you define your relationship with mathematics?

- ☐ I do not like them at all. We do not get along, and I try to avoid them at all costs. If I use them, it's because I really do not have any other option.
- ☐ They are not one of my strong points, and maybe I prefer to avoid them. But if I have to use them, I can stand it.
- ☐ I can enjoy them when I use Maths which I dominate. However, it backtracks me when I face a problem implying an intellectual challenge.
- ☐ I like them very much. I enjoy when I use them and I am not afraid if a problem poses an intellectual challenge, on the contrary.





**5. I think I am capable of...**

	Not capable at all	A little capable	Quite capable	Very capable
Perform successfully a math activity at the institute				
Use the maths I learned in an everyday context				

**6. I think that...**

	Totally disagree	Somehow disagree	Somehow agree	Totally agree
Mathematics are essentially a way of thinking and solving problems				
Mathematics involve, above all, memorizing formulas for calculations.				
Mathematical ability is something that you are born with it or not.				
Mathematicians typically work isolated from each other.				
In mathematical problems there are several ways to find the right solution.				

**7. I feel that...**

	Totally disagree	Somehow disagree	Somehow agree	Totally agree
Mathematics classes can be exciting.				
The skills and knowledge of mathematics I have learned are useful for everyday life.				

**8. I like...**

	Totally disagree	Somehow disagree	Somehow agree	Totally agree
Do math activities outside the school (for example, build a model, play a mathematical game, make mathematical competitions ...).				

**9. In relation to my family...**

	Never	Sometimes	Frequently	Always
My family encourages me and helps me in mathematical problems				
For my family, it is important for me to go well with mathematics				

**MODULE TITLE: MY FUTURE**

In this section, we suggest you think and reflect on your future.

**10. In a future...**

	Totally disagree	Somehow disagree	Somehow agree	Totally agree
I think I would like to study more about numbers, count, measure and describe the forms of objects.				
I think that in the future I would like to have a job that uses mathematics.				

**11. When you consider your future, you would like to work on jobs related to: (choose the field in which you would like to work more)**

- ☐ Science and technology (engineer, scientist, ...)
- ☐ Mathematics (mathematician, economist, statesman, financial analyst, stock broker...)
- ☐ Sports (athlete, sports teacher...)
- ☐ Art (painter, actor / actress, cartoonist, sculptor, comedian, dancer, musician ...)
- ☐ Commerce or tourism (commercial, seller, entrepreneur, economist, public or international relations, hospitality, ...)
- ☐ Languages (writer, journalist, linguist, translator ...)

- ☐ Law and politics (lawyer, judge / judge, notary, politician, consul ...)
- ☐ Security (police, firefighter, relief, criminologist / a ...)
- ☐ Security (police, firefighter, relief, criminologist / a ...)
- ☐ Design (architect, interior designer, graphic designer, sound technician, programmer...)
- ☐ Health (doctor / nurse, nurse, veterinarian, masseur, physiotherapist, pharmacist, psychologist, ...)
- ☐ Technical / trade aspects (mechanical, constructor, electrician, carpenter, computer technician, ...)
- ☐ Social sciences (archaeologist, historian, sociologist, anthropologist, philosopher...)
- ☐ Education or social care (teacher, teacher, social educator...)
- ☐ Other

### **MODULE TITLE: THE UNIX WORKSHOP**

In this section, we suggest that you think about the workshops in which you participate

#### **12. What do you expect from these math sessions? (Choose up to 3 options)**

- ☐ Get tricks to approve
- ☐ Do Math problems
- ☐ Play a fun game
- ☐ Nothing, it does not interest me
- ☐ Learn mathematics in a different way
- ☐ Other (please, specify)

### **MODULE TITLE: TO FINISH (PERSONAL CHARACTERISATION)**

#### **13. Have you repeated any academic year...**

	No, any	Yes, 1 year	Yes, 2 years	Yes, more than 2 years
In a Pre-school education?				
In Primary education?				
In Secondary education?				

**14. Tutor 1 (choose one)**

- ☐ Father
- ☐ Mother
- ☐ Other (please, specify) \_\_\_\_\_

**15. What studies have your tutor 1 finished?**

- ☐ Primary studies not finished
- ☐ Primary education finished (eg primary)
- ☐ Compulsory studies finished (eg. ESO)
- ☐ Post-compulsory studies finished (eg vocational training ...)
- ☐ University degree finished (eg Degree, Diploma, Degree ...)
- ☐ Tertiary studies finished (eg Masters, Doctorates ...)

**16. Tutor 2 (choose one)**

- ☐ Father
- ☐ Mother
- ☐ Other (please, specify)

**17. What studies have your tutor 2 finished?**

- ☐ Primary studies not finished
- ☐ Primary education finished (eg primary)
- ☐ Compulsory studies finished (eg. ESO)
- ☐ Post-compulsory studies finished (eg vocational training ...)
- ☐ University degree finished (eg Degree, Diploma, Degree ...)
- ☐ Tertiary studies finished (eg Masters, Doctorates ...)

**18. The gender with which I feel most identified is:**

- ☐ Female
- ☐ Male
- ☐ Other



## POST-QUESTIONNAIRE

### QUESTIONNAIRE GUIDELINES

This questionnaire was used before the implementation of the UniX workshop with teens at the Universitat Autònoma de Barcelona. We asked them to answer the questions in a sincere and personal way.

The purpose of the questionnaire is to know the opinions of the teens in order to adapt and improve the training provided in the workshops and assess the impact on their self-efficacy in Maths.

### MODULE TITLE: IDENTIFICATION OF THE PARTICIPANT

1. Which is your name?
2. What is the name of your secondary school?

### MODULE TITLE: THE UNIX WORKSHOP

3. The math workshop has met my expectations...

	Totally disagree	Somehow disagree	Somehow agree	Totally agree
The math workshop has met my expectations				

4. If you were to make an assessment of your experience at the UNIX workshop, what would you say you learned during your participation?

### MODULE TITLE: PERCEPTION OF STANCE ON STEM

5. I think I am capable of...

	Not capable at all	A little capable	Quite capable	Very capable
Perform successfully a math activity at the institute				
Use the maths I learned in an everyday context				



**6. Have the math activities you did helped you to feel you are capable of doing maths?**

	No, now I feel less capable than before of doing math activities	No, now I feel as capable as before of doing math activities	Yes, I feel a bit more capable of doing math activities	Yes, now I feel much more capable of doing math activities
Have the math activities you did helped you to feel you are capable of doing maths?				

**7. Why?**

**MODULE TITLE: MY RELATION WITH MATEMATICS**

**8. I think that...**

	Totally disagree	Somehow disagree	Somehow agree	Totally agree
Mathematics are essentially a way of thinking and solving problems				
Mathematics involve, above all, memorizing formulas for calculations.				
Mathematical ability is something that you are born with it or not.				
Mathematicians typically work isolated from each other.				
In mathematical problems there are several ways to find the right solution.				

**9. I feel that...**

	Totally disagree	Somehow disagree	Somehow agree	Totally agree
Mathematics classes can be exciting.				
The skills and knowledge of mathematics I have learned are useful for everyday life.				

**10. I like...**

	Totally disagree	Somehow disagree	Somehow agree	Totally agree
Do math activities outside the school (for example, build a model, play a mathematical game, make mathematical competitions ...).				

**11. In relation to my family...**

	Never	Sometimes	Frequently	Always
My family encourages me and helps me in mathematical problems				
For my family, it is important for me to go well with mathematics				

**MODULE TITLE: MY FUTURE**

In this section, we suggest you think and reflect on your future.

**12. In a future...**

	Totally disagree	Somehow disagree	Somehow agree	Totally agree
I think that in the future I would like to have a job that uses mathematics.				

**13. When you consider your future, you would like to work on jobs related to: (choose the field in which you would like to work more)**

- ☐ Science and technology (engineer, scientist, ...)
- ☐ Mathematics (mathematician, economist, statesman, financial analyst, stock broker...)
- ☐ Sports (athlete, sports teacher...)
- ☐ Art (painter, actor / actress, cartoonist, sculptor, comedian, dancer, musician ...)
- ☐ Commerce or tourism (commercial, seller, entrepreneur, economist, public or international relations, hospitality, ...)
- ☐ Let the kids have a good time
- ☐ Languages (writer, journalist, linguist, translator ...)
- ☐ Law and politics (lawyer, judge / judge, notary, politician, consul ...)
- ☐ Security (police, firefighter, relief, criminologist / a ...)
- ☐ Security (police, firefighter, relief, criminologist / a ...)
- ☐ Design (architect, interior designer, graphic designer, sound technician, programmer...)
- ☐ Health (doctor / nurse, nurse, veterinarian, masseur, physiotherapist, pharmacist, psychologist, ...)
- ☐ Technical / trade aspects (mechanical, constructor, electrician, carpenter, computer technician, ...)
- ☐ Social sciences (archaeologist, historian, sociologist, anthropologist, philosopher...)
- ☐ Education or social care (teacher, teacher, social educator...)



☐ Other

### **MODULE TITLE: TO FINISH (PERSONAL CHARACTERISATION)**

**14. Do you think that the activities you have done in the workshop (play TRIDIO ...) made you change your answers?**

	No affect	Minor affect	Moderate affect	Major affect
Do you think that the activities you have done in the workshop (play TRIDIO ...) made you change your answers?				

**15. If so, what made you change it? If not, why do you think they have not make you change your opinion?**



## POST-EVENT QUESTIONNAIRES FOR FAMILIES PARTICIPATING IN STEM FAIR DESIGNED AND USED BY THE FESTIVAL OF CURIOSITY

### The Festival •f Curi•sity\*



## POST-EVENT QUESTIONNAIRE 1

### QUESTIONNAIRE GUIDELINES

The questionnaire outlined below can be delivered online to attendees of informal STEAM initiatives a number of months after the interaction, e.g. three months, to identify the longer-term impact of the initiative on self-efficacy.

In tandem with a survey for attendees directly after the event, you can use this questionnaire to understand how the self-efficacy of attendees changes over time and to identify the more impactful elements of your informal STEAM initiative.

**1. Did you attend any of our events this year?**

☐ Yes ☐ No

**2. What event did you attend?** \_\_\_\_\_

**3. Please indicated the number of events you attended this year?**

	None	1-2	3-4	5+	Can't remember
NAME OF EVENT					

**4. How many other science-related events have you attended in the past 6 months?**

- ☐ None  
☐ 1-2  
☐ 3-4  
☐ 5+  
☐ Can't remember

**5. How do you rate your interest in science and technology?**

- ☐ Actively interested  
☐ Somewhat interested  
☐ Not very interested  
☐ Not at all interested  
☐ Don't know/ Not sure



**6. Please tell us how much you agree or disagree with each of the following statements about your attendance at the Festival of Curiosity.**

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	Don't know/ Unsure
Attendance has made me curious to find out more about science in general					
Attendance has helped me to be more confident when talking about science and technology with family and friends					
Attendance has made me feel that science is relevant to my life					

**7. Has the festival stimulated your curiosity or your family, friends or colleague's curiosity in science and technology in any way after the festival? If so, please share your story in a few words.**

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**8. Which of the following have you done as a result of attending events?**

	Yes	No
Discussed ideas from festival event(s) with friends or family who have not been to the festival.		
***Attended other science or technology related events or festivals		
Found out more about the topic or issue covered at this event*		
**Contacted a school, college or university about doing a science or technology course		

***\*IF FIND OUT MORE ASK:***

**9. Where did you look to find more information? (Mark all that apply)**

- ☐ Online
- ☐ Newspapers
- ☐ TV
- ☐ Radio
- ☐ Library
- ☐ College or university
- ☐ Friends, family or colleagues
- ☐ Other (Specify) \_\_\_\_\_

***\*\*IF CONTACTED EDUCATIONAL INSTITUTION:***

**10. You said you've contacted a school, college or university about doing a science or technology course, have you signed up for or started a related course?**

- ☐ YES
- ☐ NO

***\*\*\*IF ATTENDED ANOTHER SCIENCE/TECHNOLOGY EVENT OR FESTIVAL:***

**11. What kind were they?**

- ☐ Performance
- ☐ Exhibition
- ☐ Talk/debate
- ☐ Workshop
- ☐ Other (Specify) \_\_\_\_\_

**12. Did the Festival events you attended prompt you to do any science related activities either at home or elsewhere?**

**e.g. tried an experiment with your family at home or in your community.**

- ☐ YES
- ☐ NO



**13. Did you attend any Festival of Curiosity events with children (under 16)?**

- ☐ YES  
☐ NO

**14. To your knowledge, what, if any, of the following have one or more of these accompanying children done since attending Festival of Curiosity event or events?**

	Yes	No	Don't know/ Unsure
Talked about their experience at the event to people who didn't go			
Attended other science or technology related events or festivals			
Found out more about the topic or issue covered at this or other events			
Tried to conduct experiments or activities at home or with family and friends that they experienced at the event			

**15. How likely are you to attend our next event?**

- ☐ Very likely  
☐ Quite likely  
☐ Not very likely  
☐ Not at all likely  
☐ Don't know/ Not sure/ Too soon to say

**16. In a few words, what aspects of the event do you most remember?**

**17. Choose 3 words to describe your experience.**

## ***NOW JUST SOME QUESTIONS ABOUT YOU.***

### **18. Where do you live?**

City \_\_\_\_\_

Region \_\_\_\_\_

Country \_\_\_\_\_

Outside Ireland (EU) \_\_\_\_\_

Outside Ireland (Rest of the world) \_\_\_\_\_

### **19. Which age group do you belong to?**

☐ 16 or under

☐ 17-29

☐ 30-45

☐ 46-60

☐ 61+

### **20. Are you...?**

☐ Male

☐ Female

### **21. What is your highest education qualification?**

☐ Leaving Cert (or equivalent)

☐ Certificate/diploma

☐ BA/BSc

☐ Graduate diploma/ Masters

☐ PhD

☐ No education qualification

☐ Other



## POST-EVENT QUESTIONNAIRE 2

### QUESTIONNAIRE GUIDELINES

The following questionnaire can be distributed to attendees of informal STEAM education initiatives directly after the event. It can be delivered by volunteers/facilitators interviewing attendees or by asking attendees to fill in paper versions of the evaluation themselves.

Following the event, the results can be collated and insights gained on the audience and impact of the initiative on self-efficacy.

How many of our events have you attended before this one?	None	1-2	3-4	5+	Can't remember		
What type of event did you like the best?	Performance/ Shows	Exhibition	Workshop	Talk/ Debate	Other		
How many of our events do you expect to attend after this one?	None	1-2	3-4	5+	Can't remember		
Did you attend our events in 2013, 2014, 2015 or 2016? Tick the relevant years.	2013	2014	2015	2016	Don't know/unsure		
How many other science related events have you attended in the past 6 months?	None	1-2	3-4	5+	Can't remember		
How did you hear about this event? (Mark all that apply.)	Newspapers	Radio	TV	Email	Social media	Web site	Family, friends or colleagues
What made you decide to attend the event?	Passing by and thought it would be interesting or enjoyable	Read/Hear about it and thought it would be interesting or enjoyable	Read/Hear about it and thought I would learn something new	Someone I am with persuaded me to come	I'm supporting someone I know who is involved with it		
How do you rate your interest in science and technology?	Actively interested	Somewhat interested	Not much interested	Not at all interested	Don't know/unsure		
This event has made me think science is relevant to my life	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	Don't know/unsure		








This event has made me more curious about science and technology	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	Don't know/unsure		
Which of the following best describes how our event has met your expectations?	Exceeded my expectations	About what I expected	Not as good as I expected	Too soon to say	Don't know/unsure		
On a scale of 0-10 how likely are you to recommend the festival to family, friends and colleagues? 10 = Highly Recommended							
Attendance has given me confidence to further explore science and technology issues and activities.	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	Don't know/unsure		
Where do you live?	City	Region	Country	EU	Rest of World		
Which age group do you belong to?	Under 16	16-18	19-29	30-45	46-60	61-70	71+
What is your highest educational qualification?	Secondary Level	Cert/Diploma	BA/BSc	Graduate Diploma	PhD		
Is your highest level of qualification in Science, Technology, Engineering or Maths	Yes	No	Don't know/unsure				
How many in your group today?	Adults	Children under 16					
Gender	Male	Female	Other				






## PRE & POST QUESTIONNAIRES FOR TEENS PARTICIPATING IN A STEM MUSEUM DESIGNED AND USED BY XKÈ? ZEROTREDICI



DATE \_\_\_\_\_ SCHOOL \_\_\_\_\_

Indicates your preference by placing a cross in the desired box.

BEFORE the LABS	Yes, very much 	Yes 	So-so 	No 	Not at all 
Are you able to do what are you going to do?					
How curious you are on science?					
How science is closer to you?					
Some thinks that science is necessary for their daily life. Do you agree?					
Are you considering to become a scientist?					

AFTER the LABS	Yes, very much 	Yes 	So-so 	No 	Not at all 
Were you able to do what was expected?					
After this experience, do you think you'll have more questions (Xkè?)?					
After this experience, how curious are you about science?					
Some thinks that science is necessary for their daily life. Do you agree?					
Are you considering to become a scientist?					
How science is after this experience closer to you?					

## PRE & POST TEST QUESTIONNAIRES FOR EDUCATORS AND EXPERTS PARTICIPATING IN STEM ACTIVITIES

PRE & POST QUESTIONNAIRES FOR EDUCATORS  
& EXPERTS PARTICIPATING IN STEM ACTIVITIES  
DESIGNED AND USED BY FUNDACJA  
UNIwersYTET DZIECI



## PRE-QUESTIONNAIRE

### QUESTIONNAIRE GUIDELINES

Please, complete the questionnaire. In questions, mark your answer by choosing appropriate option. Thank you for completing the survey.

### PARTICIPANT IDENTIFICATION

Gender: ☐ Female ☐ Male

Have you ever conduct workshops at Children's University? ☐ Yes ☐ No

### OPINIONS ABOUT TEACHING'S STRATEGIES

1. Please, mark to which extend are these strategies important to you when you carry out a workshop?

	not at all	a little	a good amount	very
Promoting cooperative activities instead of competitive activities to promote peer learning				
Using student's mistakes as an opportunity to learn from, decriminalizing the errors				
Reviewing verbal and non-verbal judgments of students to emphasize positive messages				
Helping students to develop more efficient strategies to carry out a task (e.g. Help them make a problem resolution scheme, help them discriminate between relevant and secondary information...)				
Customizing the activity at the various learning rhythms				
Other _____				

**2. Rate from 1 to 5 to which extent particular parts of the workshop are important to you?**

- a. Awaking children curiosity 1- 2- 3 - 4 - 5
- b. Introducing scientific thinking to the workshop's activities 1- 2- 3 - 4 - 5
- c. Working on a scheme idea-plan-run-summary during workshop 1- 2- 3 - 4 - 5
- d. Giving lecture during workshops to explain children difficult parts of the topic  
1- 2- 3 - 4 - 5
- e. Children's activities which lead them to finding solutions (Experiment/action)  
1- 2- 3 - 4 - 5
- f. Conclusions 1- 2- 3 - 4 - 5
- g. Summary 1- 2- 3 - 4 - 5

**Thank you for filling this questionnaire!**



## POST-QUESTIONNAIRE

### QUESTIONNAIRE GUIDELINES

Please, complete the questionnaire – your answers will allow us to collect your opinion about material provided by Children's University. In questions, mark your answer by choosing appropriate option. Thank you for completing the survey.

### PARTICIPANT IDENTIFICATION

Gender: ☐ Female ☐ Male

### OPINION ABOUT TEACHING'S STRATEGIES AND THE ARTEFACT

1. After reading the guidelines and leading workshops for children, rate from 1 to 5 to which extent particular parts of the workshop are important to you?

	1	2	3	4	5
Awaking children curiosity					
Introducing scientific thinking to the workshop's activities					
Working on a scheme idea-plan-run-summary during workshop					
Giving lecture during workshops to explain children difficult parts of the topic					
Children's activities which lead them to finding solutions / gaining knowledge					
Conclusions					
Summary					

- 1a. Please, explain why those parts are the most important to you?

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**2. After reading the guidelines and carrying out workshops for children, please, mark to which extend are these strategies important to you when you carry out a workshop?**

	not at all	a little	a good amount	very
Promoting cooperative activities instead of competitive activities to promote peer learning				
Using student's mistakes as an opportunity to learn from, decriminalizing the errors				
Reviewing verbal and non-verbal judgments of students to emphasize positive messages				
Helping students to develop more efficient strategies to carry out a task (e.g. Help them make a problem resolution scheme, help them discriminate between relevant and secondary information...)				

**3. Please, answer the following questions.**

	not at all	partially	a good amount	fully
Did the material made you feel more aware of your role as a workshop leader?				
Did the material made you feel more aware of how you can motivate children/ give feedback during workshop?				
Did the material provide you information about possible ways of how to strengthen children's self-efficacy during workshop?				

**3a. Is there anything that you would change in provided material? Please write down your suggestions.**

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**Thank you for filling this questionnaire!**





## PRE & POST QUESTIONNAIRES FOR VOLUNTEERS PARTICIPATING IN MATHS ACTIVITIES DESIGNED AND USED BY UNIVERSITAT AUTÒNOMA DE BARCELONA (UAB)



Universitat Autònoma  
de Barcelona



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## PRE-QUESTIONNAIRE

### QUESTIONNAIRE GUIDELINES

This questionnaire was used before the training of the volunteers participating in the STEAM4U project at the Universitat Autònoma de Barcelona. We asked them to answer the questions in a sincere and personal way before coming to the first training session.

The purpose of the questionnaire is to know the opinions of the volunteers in order to adapt and improve the training provided in the workshops.

### MODULE TITLE: IDENTIFICATION OF THE VOLUNTEER

1. Which is your name?
2. Which is your date of birth?
3. Please, provide your gender (mark one answer)
  - ☐ Male
  - ☐ Female
  - ☐ Other
4. What degree(s) are you currently studying?

### MODULE TITLE: PERCEPTION OF STANCE ON STEM

5. How would you define your relationship with mathematics?
  - ☐ I do not like them at all. We do not get along, and I try to avoid them at all costs. If I use them, it's because I really do not have any other option.
  - ☐ They are not one of my strong points, and maybe I prefer to avoid them. But if I have to use them, I can stand it.
  - ☐ I can enjoy them when I use Maths which I dominate. However, it backtracks me when I face a problem implying an intellectual challenge.
  - ☐ I like them very much. I enjoy when I use them and I am not afraid if a problem poses an intellectual challenge, on the contrary.



**MODULE TITLE: THE UNIX PROGRAM**

**6. What do you think is the main benefit for young people participating in the UNIX program? (tick a single answer).**

- ☐ Develop a good level of mathematics
- ☐ Increase confidence in themselves
- ☐ Achieve basic skills/competences
- ☐ Do homework properly
- ☐ Learn study habits
- ☐ Let the kids have a good time
- ☐ Learn mathematics in a different way
- ☐ Other benefits (please, specify) \_\_\_\_\_

**7. What is the most important thing to be a good UNIX volunteer? (mark a MAXIMUM of 3 replies).**

- ☐ Have a good level of knowledge of mathematics
- ☐ Be nice / nice with teens
- ☐ Have patience
- ☐ Promote the confidence of teens in their abilities
- ☐ Have control of the classroom
- ☐ To have many resources so that the teens do not get bored
- ☐ Have a close attitude with young people
- ☐ Other things (please, specify) \_\_\_\_\_



**8. What do you think teens need to develop a good mathematical competence?  
(mark an answer for each one of the rows)**

	Unimportant	Of little importance	Considerably important	Very important
Set up an activity that has a motivating context				
Let them feel that they are capable of doing the proposed activity successfully				
Have a teacher that engage the students				
Have a study habits				
Have innate abilities to solve the problem				
Make teens feel that they are useful for everyday life				
Teens' family valuing the importance of mathematical knowledge				
Teens' wanting to study something related to math				
Teen's not feeling different if they are interested in mathematics				

**9. Why did you give this score to "Do you feel that you are capable of doing it" in the previous question?**

## MODULE TITLE: METHODOLOGICAL STRATEGIES

In this section, we suggest that you reflect on your ability to make and think activities for UNIX's teens, and the strategies you have for them to feel they are capable of doing Mathematics.

### 10. Select the level with which you agree or disagree with the following statements

	Strongly disagree	Somehow disagree	Somehow agree	Totally agree
I feel less able to teach maths to teens who speak Catalan/Spanish as a second language than those who speak Catalan/Spanish as their first language				
I feel less able to teach maths to teens of low socio-economic level than those of mid/high socio-economic level				
I feel less able to teach math to girls than boys				

### 11. How capable do you feel about doing a UNIX activity in which teens gain confidence in their mathematical abilities? (marks a response from the 1-4 scale)

Not capable at all 1	2	3	Totally capable 4
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### 12. How capable do you feel to design a Unix activity so that young people can feel they have the capabilities to do maths? (marks a response from the 1-4 scale)

Not capable at all 1	2	3	Totally capable 4
-------------------------	---	---	----------------------

### 13. Tell us what your strategies are for make teens feel they have the capabilities to do maths.



## **MODULE TITLE: EXPECTATIONS ABOUT THE WORKSHOP**

Now we suggest you reflect on your own expectations regarding the training you will receive.

### **14. What do you think the training can help you with? (mark a unique answer)**

- ☐ To better know what do I have to do at UNIX workshops
- ☐ Give me strategies to help students learn math
- ☐ Give me strategies to help students in the acquisition of habits and study strategies
- ☐ Give me strategies to manage the class especially in moments of tension
- ☐ Give me strategies to encourage students to be able to do maths
- ☐ I do not know
- ☐ Other (please, specify)

### **15. Other comments that we want to send before training**



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## POST-QUESTIONNAIRE

### **QUESTIONNAIRE GUIDELINES**

This questionnaire was used before the training of the volunteers participating in the STEAM4U project at the Universitat Autònoma de Barcelona. We asked them to answer the questions in a sincere and personal way before coming to the first training session.

The purpose of the questionnaire is to know the opinions of the volunteers in order to adapt and improve the training provided in the workshops.

### **MODULE TITLE: IDENTIFICATION OF THE VOLUNTEER**

1. Which is your name?
2. Which is your date of birth?

### **MODULE TITLE: PERCEPTION OF STANCE ON STEM**

3. How would you define your relationship with mathematics?

- ☐ I do not like them at all. We do not get along, and I try to avoid them at all costs. If I use them, it's because I really do not have any other option.
- ☐ They are not one of my strong points, and maybe I prefer to avoid them. But if I have to use them, I can stand it.
- ☐ I can enjoy them when I use Maths which I dominate. However, it backtracks me when I face a problem implying an intellectual challenge.
- ☐ I like them very much. I enjoy when I use them and I am not afraid if a problem poses an intellectual challenge, on the contrary.

## MODULE TITLE: THE UNIX PROGRAM

After having participated in the training of volunteers and having implemented the workshop with teens, think again and reflect on the benefits for young people who participate in the program, their needs and about your role as a monitor / volunteer.

### 4. What do you think has been main benefit for young people participating in the UNIX program? (tick a single answer).

- ☐ Develop a good level of mathematics
- ☐ Increase confidence in themselves
- ☐ Achieve basic skills/competences
- ☐ Do homework properly
- ☐ Learn study habits
- ☐ Let the kids have a good time
- ☐ Learn mathematics in a different way
- ☐ Other benefits (please, specify) \_\_\_\_\_

### 5. What do you think teens need to develop a good mathematical competence? (mark an answer for each one of the rows)

	Unimportant	Of little importance	Considerably important	Very important
Set up an activity that has a motivating context				
Let them feel that they are capable of doing the proposed activity successfully				
Have a teacher that engage the students				
Have a study habits				
Have innate abilities to solve the problem				



Make teens feel that they are useful for everyday life				
Teens' family valuing the importance of mathematical knowledge				
Teens' wanting to study something related to math				
Teen's not feeling different if they are interested in mathematics				

6. Why did you give this score to "Do you feel that you are capable of doing it" in the previous question?

7. What is the most important thing to be a good UNIX volunteer? (mark a MAXIMUM of 3 replies).

- ☐ Have a good level of knowledge of mathematics
- ☐ Be nice / nice with teens
- ☐ Have patience
- ☐ Promote the confidence of teens in their abilities
- ☐ Have control of the classroom
- ☐ To have many resources so that the teens do not get bored
- ☐ Have a close attitude with young people
- ☐ Other things (please, specify) \_\_\_\_\_

## MODULE TITLE: METHODOLOGICAL STRATEGIES

In this section, we suggest that you reflect again on your ability to do and think activities for UNIX youth and the strategies you have for them to feel they are capable of doing math. Have they changed after this period? Are they kept the same?

### 8. Select the level with which you agree or disagree with the following statements

	Strongly disagree	Somehow disagree	Somehow agree	Totally agree
I feel less able to teach maths to teens who speak Catalan/Spanish as a second language than those who speak Catalan/Spanish as their first language				
I feel less able to teach maths to teens of low socio-economic level than those of mid/high socio-economic level				
I feel less able to teach math to girls than boys				

### 9. If so, explain what has changed your opinion regarding your strategies for specific collectives, compared to what you believed before participating in the program.

### 10. How capable do you feel about doing a UNIX activity in which teens gain confidence in their mathematical abilities? (marks a response from the 1-4 scale)

Not capable at all 1	2	3	Totally capable 4
-------------------------	---	---	----------------------

### 11. How capable do you feel to design a Unix activity so that young people can feel they have the capabilities to do maths? (marks a response from the 1-4 scale)

Not capable at all 1	2	3	Totally capable 4
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### 12. Tell us what your strategies are for make teens feel they have the capabilities to do maths.



## **MODULE TITLE: EXPECTATIONS ABOUT THE WORKSHOP**

Now we suggest you reflect on your own expectations regarding the training you will receive

### **13. What do you think the training can help you with? (mark a unique answer)**

- ☐ To better know what do I have to do at UNIX workshops
- ☐ Give me strategies to help students learn math
- ☐ Give me strategies to help students in the acquisition of habits and study strategies
- ☐ Give me strategies to manage the class especially in moments of tension
- ☐ Give me strategies to encourage students to be able to do maths
- ☐ I do not know
- ☐ Other (please, specify)

### **14. In general, has the training fulfilled your initial aims?**

Not at all 1	2	3	Totally 4
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### **15. Explain your previous answer. What should we keep? What should we improve?**

### **16. Other comments that we want to send before training.**



## INTERVIEWS FOR TEENS

### PRE & POST INTERVIEWS FOR TEENS PARTICIPATING IN MATH ACTIVITIES DESIGNED AND USED BY UNIVERSITAT AUTÒNOMA DE BARCELONA



Universitat Autònoma  
de Barcelona



Co-funded by the  
Erasmus+ Programme  
of the European Union

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## INTERVIEW GUIDELINES

These questions are guidelines for the interviews. If teens do not provide a clear answer, we will pose another similar question to deepen in the answer. Moreover, if the answer hinders some information that could be relevant for knowing more about their self-efficacy or other related aspects, we will make more questions, as well.

---

### PRE-EVENT INTERVIEW

1. Introduce yourself

#### EXPECTATIONS

2. What do you think we will do in the UNIX sessions?
3. What would you like us to do in these sessions?
4. How would you like us to do them?
5. Do you want to do math? Why?

#### SELF-EFFICACY

6. Do you think you are good or bad at math? Why?
7. Why do you think you are bad/good at math?
8. Who told you that you are good/bad at math? Explain it to me
9. Do you think you are capable of solving mathematical problems? Why?
10. In relation to other subjects, in which of them do you feel more capable of being successful? Why?

#### INTEREST/STEM VISION

11. Do you see utility in mathematics? For what?
  - a. Could you give us an example?

#### ASPIRATIONS IN MATH

12. What would you like to study?
  - a. Do you think there are mathematics here? In which sense?
13. Would you like to study mathematics? And work on something related to maths? Why?
14. Could you make a slogan to define your relationship with mathematics?



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## POST-EVENT INTERVIEW

### **EXPECTATIONS**

1. What have you done in these past sessions?
2. Do you think you have been doing math?
  - a. When/Which maths?
3. How have you felt when doing... (show photos of things that have been done in the workshop)
4. How did the challenges went?
5. Which part did you like the most/the less? Why?

### **SELF-EFFICACY**

6. What was your star moment of the activity? Why?
7. Do you think you are now more/less capable of doing mathematical problems than before? Why?
8. What has helped you more to feel that you are able to achieve mathematical challenges?

### **INTEREST/STEM VISION**

9. What usefulness have you seen in what you did / learned?

### **ASPIRATIONS IN MATH**

10. After participating, would you like to study mathematics? And work on something that need mathematics? Why?

### **PROMOTION OF STEM**

11. What would you say to other children who say they do not feel able to do math activities? Do you think they could change your mind? Why?



## INTERVIEWS FOR EDUCATORS

### PRE & POST INTERVIEWS FOR VOLUNTEERS PARTICIPATING IN MATH ACTIVITIES DESIGNED AND USED BY UNIVERSITAT AUTÒNOMA DE BARCELONA



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de Barcelona



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## INTERVIEW GUIDELINES

These questions are guidelines for the interviews. If volunteers do not provide a clear answer, we will pose another similar question to deepen in the answer. Moreover, if the answer hinders some information that could be relevant for knowing more about their self-efficacy or other related aspects, we will make more questions, as well.

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## PRE-EVENT INTERVIEW

### **VOLUNTEER'S IDENTIFICATION**

1. Name, age
2. What is the degree or degrees you are studying?
3. Is this the first time you participate in the Unix program?
  - Why did you sign up in the Unix program? Why are you repeating?
4. How would you define your relationship with mathematics?

### **EXPECTATIONS WITH THE UNIX PROGRAM**

5. Which do you think is the main benefit of the Unix program for the participating teens? Why?
  - *If equity issues appear, ask to deep in the answer.*
  - *If the volunteer is participating in the Unix program for a second time, ask about their experience of the previous year.*

*The Unix program is based on two pillars: developing the mathematical competence of children and developing cross-curricular skills, such as learning to learn, study techniques...*





6. If we focus on the development of mathematical competence, what do you think teen needs to be able to develop it?
- *We suggest to print the answers, and ask them to arrange them according to their importance. This would help us to ask then why they put the answer in this position "that you feel you are capable of doing it."*

Set up an activity that has a motivating context	Let them feel that they are capable of doing the proposed activity successfully	Have a teacher that engage the students
Have a study habits	Have innate abilities to solve the problem	Make teens feel that they are useful for everyday life
Teens' family valuing the importance of mathematical knowledge	Teen's not feeling different if they are interested in mathematics	Teens' wanting to study something related to math

7. Think of all your student years, from elementary school, going to secondary school. Was there any moment when you felt that you were not able to do an activity that implied the use of mathematics? (problem, exercise, examination...). Explain us one of those moments.
- Do you think you could overcome that moment? Do you feel different now, regarding that moment?
  - What helped you most at that moment, to make you feel that you were able to successfully overcome that situation?

### **METHODOLOGICAL STRATEGIES IN RELATION TO ATTENTION TO DIVERSITY**

8. How do you think you could transfer this experience to the Unix workshop? That is, to make teens feel the same thing that helped you to feel you were capable of doing mathematics?
9. What other strategies do you have to make teens feel they have the capabilities to do mathematics?

10. In general, how can you be able to do a Unix activity in which young people gain confidence in their mathematical abilities?

- And to design it?
- Why?
- What do you think you would miss?

11. In the questionnaire we have asked you to select the level of agreement or disagreement with the following statements:

- I feel less able to teach math to teens who speak Catalan / Spanish as a second language than those who speak Catalan / Spanish
- I feel less able to teach maths to teens from low socio-economic level, than teens from mid/high socio-economic level
- I feel less able to teach math to girls than boys

\* Could you explain why you feel more / less able to teach math to these collectives?

### **EXPECTATIONS ABOUT THE TRAINING WORKSHOP**

12. What do you think the training workshop can help you with?

### **ADDITIONAL INFORMATION**

13. Would you like to add anything else?



## POST-EVENT INTERVIEW

### VOLUNTEER'S IDENTIFICATION

1. Name, age
2. How would you define your relationship with mathematics?

### OPINION ABOUT THE UNIX PROGRAM

3. Now you have some experience as a UniX volunteer. What do you think is the main benefit of the UniX program for teens? Why?
  - *If equity issues appear, ask to deep in the answer.*
  - *If the volunteer is participating in the UniX program for a second time, ask if they have identified differences from different years.*
  - *It is important to remember the answers given in the previous interview.*  
What has made you change your opinion? Tell us a little more.

*The Unix program is based on two pillars: developing the mathematical competence of children and developing cross-curricular skills, such as learning to learn, study techniques...*

4. If we focus on the development of mathematical competence, what do you think a teen needs to be able to develop it?
  - *We suggest to print the answers, and ask them to arrange them according to their importance. This would help us to ask then why they put the answer in this position "that you feel you are capable of doing it."*

Set up an activity that has a motivating context	Let them feel that they are capable of doing the proposed activity successfully	Have a teacher that engage the students
Have a study habits	Have innate abilities to solve the problem	Make teens feel that they are useful for everyday life
Teens' family valuing the importance of mathematical knowledge	Teen's not feeling different if they are interested in mathematics	Teens' wanting to study something related to math

- *It is important to remember the answers given in the previous interview.*  
What has made you change your opinion? Tell us a little more.

## **OPINION ABOUT THE TRAINING**

5. How did you feel in the training? Why?
6. What do you think the training has served you? Why?
  - Would you change something? Would you add something?
  - What would you not change by no means?
7. Have you been able to implement the STEAM4U workshop? (Game Tridio etc.) How did you feel teaching mathematics this way?
  - What do you think were the strengths of the workshop?
  - What do you think should be changed?
  - Do you think that the STEAM4U workshop you have carried out has had an impact on teens? Which one?
  - In particular, do you think these kind of workshops can boost the confidence of young people in their abilities? Why?
8. Do you feel capable of carrying out more similar workshops/activities than the STEAM4U one? What would you miss?

## **METHODOLOGICAL STRATEGIES IN RELATION TO ATTENTION TO DIVERSITY**

9. After your experience, to which extend do you feel capable of carrying out a Unix activity which make teens feel gain confidence in their mathematical abilities?
  - And designing it?
  - Why?
  - What would you miss
  - Is there anything that has made you change your opinion from your previous answers?
    - *If they mention the training, ask more about it*
10. What strategies do you think you have to make teens feel they have the capabilities to do math?
  - Of all these strategies, which one do you think is the most effective?
  - Could you provide an example of what you have experienced in these weeks?
11. Do you think that your teaching strategies have changed in the time you take your volunteer to Unix?
  - What made you change them? What has reinforced your strategies?



12. In the questionnaire we asked again to select the level of agreement or disagreement of the following statements:

- I feel less able to teach math to teens who speak Catalan / Spanish as a second language than those who speak Catalan / Spanish
- I feel less able to teach maths to teens from low socio-economic level, than teens from mid/high socio-economic level
- I feel less able to teach math to girls than boys
- Does the participation in this volunteer program has made you change your perception regarding your ability to teach mathematics? How has it changed?

### **ADDITIONAL INFORMATION**

13. Would you like to add something more?



## DIARY FOR EDUCATORS

POST DIARY FOR VOLUNTEERS DESIGNED AND  
USED BY THE FESTIVAL OF CURIOSITY

**The Festival  
•f Curi•sity\***



Co-funded by the  
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## DIARY GUIDELINES

The diary questions outlined below can be used to help volunteers at STEAM initiatives identify instances where they observed the self-efficacy of children and families positively impacted. Once identified, writing about these practices in a diary helps reinforce the good practice in the volunteer's interactions with attendees and also helps you understand what aspects of your initiative are having the biggest impact on self-efficacy.

### DIARY QUESTIONS

1. **Write down a positive memory from your time at the event today.**
2. **Write about any instances where you saw someone's confidence/self-efficacy positively impacted.**
3. **Why do you think it increased their confidence/self-efficacy?**
4. **From your perspective what do you think worked when you interacted with families?**



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# EXAMPLES OF TOOLS FOR SCHOOL STEM ACTIVITIES

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## QUESTIONNAIRES FOR TEENS

### PRE & POST QUESTIONNAIRES FOR TEENS PARTICIPATING IN STEM ACTIVITIES DESIGNED AND USED BY FLORIDA SECUNDÀRIA & SINS CARDENER



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## PRE-QUESTIONNAIRE

### QUESTIONNAIRE GUIDELINES

This questionnaire was used before the implementation of the project of the scientific conference at Florida secundària and SINS Cardener secondary schools. We asked students to answer the questions in a sincere and personal way.

The purpose of the questionnaire is to know the opinions of the teens in order to adapt and improve the training provided in the workshops and assess the impact on their self-efficacy in STEM.

### IDENTIFICATION OF THE PARTICIPANT

1. Which is your name?
2. How old are you?
3. What is the genre with which you feel identified?
  - ☐ Male
  - ☐ Female
  - ☐ Other
4. Which is the name of your school?

### EXPECTATIONS OF THE PARTICIPANT

5. What do you expect from the scientific conference?
  - ☐ To have fun
  - ☐ Think a lot
  - ☐ Use materials I do not have at home
  - ☐ Know real people working in STEM
  - ☐ Research how things made by humans work
  - ☐ Research about phenomena or other things that are interesting to me



## HOW DO YOU FEEL?

In this section, we suggest you to think about your relationship with the scientific and technological world.

### 6. Please, provide an answer by marking it on each row

	Not at all	Very little	A little	Some-how	Considerably	A lot
Do you like the scientific activities in which you participate regularly?						
Would you like to study in the future studies related to science, technology engineering or mates?						
In your free time, do you like to do things related to science? (to do excursions to nature, visit a science museum, watch a video about science ...)						
In general, do you feel that you have achieved the scientific challenges that have been raised on other occasions?						

## 7. To which extent do you feel capable of...

	Not capable at all	A little capable	Quite capable	Very capable	Totally capable	Totally capable and I could help my colleagues
Designing experiences to collect data. (e.g. designing an experiment to observe a phenomenon)						
Formulating hypotheses or predictions about an experiment. (for example, what do I think will happen?)						
Identifying what factors or conditions (variables) can affect an experiment. (eg the amount of light can cause a plant to grow more or less)						
Collecting data and represent them graphically.						
Providing a scientific explanation of phenomena or experiences. (eg how it happened)						

or why it happened ...)						
Obtaining conclusions based on collected data. (e.g. justify something from the data or experiment performed)						
Arguing publicly the results of an investigation (eg defend, expose a job)						

**8. In general, and after having answered all the previous questions, how can you be able to carry out scientific research / research?**

- ☐ Not capable at all
- ☐ A little capable
- ☐ Quite capable
- ☐ Very capable
- ☐ Totally capable
- ☐ Totally capable and I could help my colleagues

**9. Which of your potentialities (what is good for you, what you are good / good) do you think is useful for carrying out scientific research?**



## WHICH THINGS HELP ME TO LEARN SCIENCE?

10. Please, provide an answer by marking it in each row

	It does not help me at all	It helps me very little	It helps me a little	It helps me some- how	It helps me conside- rably	It definiti- vely helps me a lot
The teacher helps me to see what my ability to do science and believe in it						
That the expert of the initial talk (happening) appear to be a close person and makes me feel that I can also do a scientific research						
That the teacher helps me to be aware of what I do right and wrong throughout an entire activity (eg knowing where I am from the activity in relation to the final objective, knowing how my work is evaluated...)						
That the teacher uses words that I can understand and not too many technical in the classroom						
Build together, with the teacher, the final structure that my work, TIT, video or scientific poster should have						

That teacher help me to learn how to manage my emotions (e.g., help overcome the tension of having to expose in public)						
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### 11. In relation to your experiences when doing science...

	Not at all	Very little	A little	Some-how	Considerably	A lot
Do you feel involved in science classes?						
Your interest in science has declined in recent years?						
Would you like to train in health, biology, medicine ...?						
Would you like to train in communication technologies, physics, engineering ...?						
Think of a person who is dedicated to science, technology, engineering or mathematics. Do you see doing the same thing that person does?						

When you find yourself having difficulty doing science it's easy for you to get back and overcome it?						
Do you positively value your academic results?						

## TO FINISH (PERSONAL CHARACTERISATION)

12. In which country were you born?

13. Where were your parents born?

14. Which level of studies have your parents?

	Primary studies not finished	Primary education finished (eg primary)	Compulsory studies finished (eg. ESO)	Post-compulsory studies finished (eg vocational training ...)	University degree finished (eg Degree, Diploma, Degree ...)	Tertiary studies finished (eg Masters, Doctorates ...)
Father, Mother or tutor						
Father, Mother, or Tutor						



**15. Have you ever repeated a course?**

	No	Yes, one course	Yes, two courses	Yes, more than two courses
Pre-Primary education				
Primary education				
Secondary education				

**Thank you for your answers!**

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## POST-QUESTIONNAIRE

### QUESTIONNAIRE GUIDELINES

This questionnaire was used before the implementation of the project of the scientific conference at Florida secundària and SINS Cardener secondary schools. We asked students to answer the questions in a sincere and personal way.

The purpose of the questionnaire is to know the opinions of the teens in order to adapt and improve the training provided in the workshops and assess the impact on their self-efficacy in STEM.

### IDENTIFICATION OF THE PARTICIPANT

1. Which is your name?
2. How old are you?
3. What is the genre with which you feel identified?
  - ☐ Male
  - ☐ Female
  - ☐ Other
4. Which is the name of your school?

### EXPECTATIONS OF THE PARTICIPANT

5. After participating in the project of the scientific conference, from the following list mark the items about you would like to know more.
  - ☐ Use materials I do not have at home
  - ☐ Know real people working in STEM
  - ☐ Research about natural phenomena
  - ☐ Research how things made by humans work
  - ☐ Research about other things I like



## HOW DO YOU FEEL?

In this section, we suggest you to think about your relationship with the scientific and technological world.

### 6. Please, provide an answer by marking it on each row

	Not at all	Very little	A little	Somehow	Considerably	A lot
Do you like the scientific activities in which you participate regularly?						
Would you like to study in the future studies related to science, technology engineering or mates?						
In your free time, do you like to do things related to science? (to do excursions to nature, visit a science museum, watch a video about science ...)						

### 7. Do you feel that your interest about scientific topics has grown after your participation in the scientific conference?

- ☐ No, I am less interested in scientific topics than before
- ☐ No, I am as interested in scientific topics than before
- ☐ Yes, I am a bit more interested in scientific topics than before
- ☐ Yes, I am much more interested in scientific topics than before

## 8. To which extent do you feel capable of...

	Not capable at all	A little capable	Quite capable	Very capable	Totally capable	Totally capable and I could help my colleagues
Designing experiences to collect data. (e.g. designing an experiment to observe a phenomenon)						
Formulating hypotheses or predictions about an experiment. (for example, what do I think will happen?)						
Identifying what factors or conditions (variables) can affect an experiment. (eg the amount of light can cause a plant to grow more or less)						
Collecting data and represent them graphically.						
Providing a scientific explanation of phenomena or experiences. (eg how it happened or why it happened ...)						

Obtaining conclusions based on collected data. (e.g. justify something from the data or experiment performed)						
Arguing publicly the results of an investigation (eg defend, expose a job)						

**9. Do you feel much more capable of doing a scientific research after your participation in the scientific conference?**

- ☐ No, I feel less capable than before
- ☐ No, I feel as capable as before
- ☐ Yes, I feel a bit more capable than before
- ☐ Yes, I feel much more capable than before

**10. Do you think that you have achieved the goals of the scientific conference?**

- ☐ Yes
- ☐ No

**11. During the the conference, what has made your feel that you were capable of doing a scientific research? (you can explain us an example or situation where you have felt you were capable).**

**12. Which of your potentialities (what is good for you, what you are good / good) do you think is useful for carrying out scientific research?**



## WHICH THINGS HELP ME TO LEARN SCIENCE?

13. Please, provide an answer by marking it in each row

	It does not help me at all	It helps me very little	It helps me a little	It helps me some- how	It helps me conside- rably	It definiti- vely helps me a lot
The teacher helps me to see what my ability to do science and believe in it						
That the expert of the initial talk (happening) appear to be a close person and makes me feel that I can also do a scientific research						
That the teacher helps me to be aware of what I do right and wrong throughout an entire activity (eg knowing where I am from the activity in relation to the final objective, knowing how my work is evaluated...)						
That the teacher uses words that I can understand and not too many technical in the classroom						
Build together, with the teacher, the final structure that my work, TIT, video or scientific poster should have						

That teacher help me to learn how to manage my emotions (e.g., help overcome the tension of having to expose in public)						
---	--	--	--	--	--	--

**14. After participating in the scientific conference, please answer the following questions:**

	Not at all	Very little	A little	Some-how	Considerably	A lot
Do you feel involved in science classes?						
Your interest in science has declined in recent years?						
Would you like to train in health, biology, medicine ...?						
Would you like to train in communication technologies, physics, engineering ...?						
Think of a person who is dedicated to science, technology, engineering or mathematics. Do you see doing the same thing that person does?						

When you find yourself having difficulty doing science it's easy for you to get back and overcome it?						
Do you positively value your academic results?						

**15. Has your vision of science changed after participating in the scientific conference?**

☐ Yes

☐ No

**16. In what sense it has changed?**

**17. What has made it change?**

## ***TO FINISH (PERSONAL CHARACTERISATION)***

**18. In which country were you born?**

**19. Where were your parents born?**





## 20. Which level of studies have your parents?

	Primary studies not finished	Primary education finished (eg primary)	Compulsory studies finished (eg. ESO)	Post-compulsory studies finished (eg vocational training ...)	University degree finished (eg Degree, Diploma, Degree ...)	Tertiary studies finished (eg Masters, Doctorates ...)
Father, Mother or tutor						
Father, Mother, or Tutor						

## 21. How many books do you have at home?

- ☐ Few books, not even a complete shelf
- ☐ One complete shelf
- ☐ Approximately a bookstore (a piece of furniture with several shelves full of books)
- ☐ Approximately two bookstores (two furniture with several shelves full of books)
- ☐ Three or more bookstores (three or more furniture with several shelves full of books)

**Thank you for your answers!**



## QUESTIONNAIRES FOR TEACHERS

### PRE & POST QUESTIONNAIRES FOR TEACHERS PARTICIPATING IN STEM ACTIVITIES DESIGNED AND USED BY FLORIDA SECUNDÀRIA & SINS CARDENER



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## PRE-QUESTIONNAIRE

### QUESTIONNAIRE GUIDELINES

This questionnaire was used before the implementation of the project of the scientific conference at Florida secundària and SINS Cardener secondary schools. We asked teachers participating in the scientific conference to answer the questions in a sincere and personal way.

The purpose of the questionnaire is to know the opinions of the teachers in order to adapt and improve the training provided in the workshops and assess the impact on their self-efficacy in STEM and knowledge of strategies to raise self-efficacy in teens.

### IDENTIFICATION OF THE PARTICIPANT

1. Mail address
2. Full name
3. What do you think it means taking into account equity in STEM education? What does it mean? (give examples)

### WHAT IMPACT DO I THINK I HAVE AS A TEACHER STE(A)M?

We speak of the students' STEM stance to talk about the way in which students feel and think about the topics, contents, professions and all kinds of activities related to STEM, as well as the way in which they publicly express their opinions and / or feelings. It has been detected that there are 5 key elements that influence this positioning of students:

- Your interest in STEM
- Your professional aspirations
- Your identity in STEM
- Your STEM capacity
- Your self-efficacy in STEM

In this section we ask that you reflect on your teaching style and look at identifying what influence you think you have in each of these elements.



**4. In what aspects of STEM stance of students do you think that your teaching style (activities you do, promoted values, etc.) influences more?**

	What I do in the classroom has no influence	What I do in the classroom has little influence	What I do in the classroom influences moderately	What I do in the classroom influences moderately	What I do in the classroom has a lot of influence, but I do not consider it when it comes to planning my activities	What I do in the classroom has a lot of influence and I take it into account when planning my activities
Interest in STE(A)M (e.g. I am not interested in the activity...)						
Aspirations in STE(A)M (p.e. I decide not to choose the elective of sciences in 4th of ESO)						
Identity in STE(A)M (i.e. I am a STE(A)M person because I like to disassemble appliances)						
Capacity in STE(A)M (i.e. I was able to carry out a search)						

Self-efficacy in STE(A)M, which corresponds to the belief of the students in their own abilities to carry out a successful task in a successful way (i.e. I think I am not able to solve this problem)						
--	--	--	--	--	--	--

5. Give us an example of how you work in the classroom the aspects of the STEM stance of students in which you think you have more influence as a STE(A)M teacher.

### **STRATEGIES TO PROMOTE SELF-EFFICACY STEM - TEACHING EXPERIENCE**

Self-efficacy (the belief in own capacities to carry out a task in a successful way) is one of the most important elements of the STEM stance of the students, which are often given little attention. In this section we would like to focus on this element and, in particular, on the strategies that exist for working in the classroom. To structure the look, we have grouped these strategies into four types:

- Strategies related to the promotion of self-regulation of students before, during and after the activity
- Strategies related to actions to promote success in learning
- Strategies related to the generation of a positive classroom environment
- Strategies related to the influence of other agents in the educational community

**6. To what degree have you used any of the following strategies related to the promotion of self-regulation of students before, during and after the activity?**

	I have never used this strategy in the class-room	I rarely use this strategy in the class-room	I sometimes use this strategy in the class-room	I often use this strategy in the class-room	I use this strategy very frequently in the classroom, but I do not take it into account when planning my activities	I use this strategy very frequently in the classroom and I take it into account when planning my activities
Promote students to be aware of their progress throughout the activity (eg helping them to find themselves, know where they are in relation to the objective of the activity ...)						
Promote that students develop more efficient strategies to carry out a task (eg help them to make a problem resolution scheme, help them to discriminate the relevant information of the secondary ...)						
Promote emotional education (eg help them overcome anxiety before an exam).						

## 7. Strategies related to actions to promote success in learning...

	I have never used this strategy in the class-room	I rarely use this strategy in the class-room	I sometimes use this strategy in the class-room	I often use this strategy in the class-room	I use this strategy very frequently in the class-room, but I do not take it into account when planning my activities	I use this strategy very frequently in the class-room and I take it into account when planning my activities
Classify and sequence the learning objectives and / or the key ideas that want to work in an activity in increasing order of difficulty, establishing an initial level suitable for all students						
Customize the activity at the various learning rhythms (e.g., propose different ways in which the same activity can be carried out)						

## 8. Strategies related to the generation of a positive classroom environment

	I have never used this strategy in the class-room	I rarely use this strategy in the class-room	I sometimes use this strategy in the class-room	I often use this strategy in the class-room	I use this strategy very frequently in the class-room, but I do not take it into account when planning my activities	I use this strategy very frequently in the class-room and I take it into account when planning my activities
Promote cooperative activities instead of competitive activities to promote peer learning						
Review verbal and non-verbal judgments to emphasize positive messages (e.g., promote optimism)						
Change the roles of students in the classroom (eg review how roles are shared in a project to break down negative associations between students and roles)						
Promote exchanges between peers (eg carry out tutorials of equal to equal)						



## 9. Strategies related to the positive influence of other agents in the educational community

	I have never used this strategy in the classroom	I rarely use this strategy in the classroom	I sometimes use this strategy in the classroom	I often use this strategy in the classroom	I use this strategy very frequently in the classroom, but I do not take it into account when planning my activities	I use this strategy very frequently in the classroom and I take it into account when planning my activities
Engage students in exchanges or experiences with ste(A)M people who show confidence and ability to adapt to failure						
Develop confidence in one's own capacity as a teacher, or the ability of and teaching partners, to influence students						
Involve families in STE(A)M activities so that their children can show their successes to the family and feel they are valued positively						

**10. After seeing the different types of strategies with which self-efficacy in STEM can be promoted in the classroom, what do you think would require more teaching training?**

- ☐ Strategies related to self-regulation of students.
- ☐ Strategies related to didactic actions to promote good learning in STE(A)M.
- ☐ Strategies related to the classroom environment.
- ☐ Strategies related to other educational agents.

**STRATEGIES TO PROMOTE SELF-EFFICACY STEM - TEACHING SELF-EFFICACY**

**11. How capable do you feel of using these strategies in the classroom, and generate impact on students, regardless of your experience?**

	Not capable at all	Not capable at all, but I could try it	A little capable	Quite capable	Very capable	Totally capable
Promote students to be aware of their progress throughout the activity (eg helping them to find themselves, know where they are in relation to the objective of the activity ...)						
Promote that students develop more efficient strategies to carry out a task (eg help them to make a problem resolution scheme, help them to discriminate the relevant information of the secondary ...)						
Promote emotional education (e.g. help them overcome anxiety).						
Promote emotional education (e.g. help them overcome anxiety).						

Classify and sequence the learning objectives and / or the key ideas that want to work in an activity in increasing order of difficulty, establishing an initial level suitable for all students						
Customize the activity at the various learning rhythms (e.g., propose different ways in which the same activity can be carried out)						
Promote cooperative activities instead of competitive activities						
Review verbal and non-verbal judgments to emphasize positive messages (e.g., promote optimism)						
Change the roles of students in the classroom (eg review how roles are shared in a project to break down negative associations between students and roles)						
Promote exchanges between peers (eg carry out tutorials of equal to equal)						
Engage students and students in exchanges or experiences with STEM / STEAM people who show confidence and ability to adapt to failure						
Develop confidence in one's own capacity as a teacher, or the ability of and teaching partners, to influence students						

Involve families in STEM / STEAM activities so that their children can show their successes to the family and feel they are valued positively						
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## GENDER IN STEM

In the field of the promotion of equity and a suitable STEM position, several issues associated with gender have been identified. Here are some possible options and we ask you to check the box that you think appropriate, depending on the degree of knowledge / experience you have before these problems.

### 12. To what extent do you know (did you get information, did you see it in your classroom, ...)?

	Not at all	Very slightly	A little	Pretty much	A lot	Very much
The girls feel less involved in science classes than boys.						
Interest in STEM is decreasing throughout the school, especially pronounced in girls.						
In post-compulsory studies, girls are focused on health, biology and medicine, and boys on communication technologies, physics, engineering ...						
Girls see that their female identities are incompatible with the dominant stereotype of scientist as a man.						
Given a difficulty, the girls are discouraged from the STE(A)M more than boys.						
Given a same academic outcome, girls appreciate their performance worse than boys.						

The perception of self-efficacy (beliefs about one's own abilities) is lower than their real ability, especially in girls.						
The girls are more modest and the boys are getting more up to themselves in the academic field with similar achievements.						

**13. Choose the issue or issues of gender in which you think that you address more in your day to day as a STE(A)M teacher and explain how you work or do it.**

### **PERSONAL AND PROFESSIONAL DATA**

Remember that we will always maintain the confidentiality of the data.

**14. Provide your gender**

- ☐ Male  
☐ Female  
☐ Other

**15. What are your initial studies?**

- ☐ Scientific field (Biology, Environmental Sciences, Geology, Physics, Chemistry)  
☐ Mathematical field (Mathematics, Statistics)  
☐ Technology area (Computer engineering, Industrial engineering, Communications engineering ... etc.)  
☐ Social sciences (Geography, History, Economics, Psychology, Anthropology, Communication Sciences, Pedagogy ...)  
☐ Linguistic scope (Philology ...)  
☐ Artistic field (Music, Fine Arts ...)  
☐ Physical education (INEF, CAFE ...)  
☐ Area of culture and values (Religious Sciences, Philosophy)  
☐ Other

**16. What is your experience as a teacher?**

- ☐ Between 1 and 5 years
- ☐ Between 5 and 10 years
- ☐ Between 10 and 15 years
- ☐ More than 15 years

**17. What is your teaching experience with STE (A) M projects?**

- ☐ Less than one year (it is the first year)
- ☐ Between 1 and 2 years
- ☐ Between 3 and 5 years
- ☐ Between 6 and 10 years
- ☐ More than 10 years

**Thank you for your answers!**



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## POST-QUESTIONNAIRE

### QUESTIONNAIRE GUIDELINES

This questionnaire was used after the implementation of the project of the scientific conference at Florida secundària and SINS Cardener secondary schools. We asked teachers participating in the scientific conference to answer the questions in a sincere and personal way.

The purpose of the questionnaire is to know the opinions of the teachers in order to adapt and improve the training provided in the workshops and assess the impact on their self-efficacy in STEM and knowledge of strategies to raise self-efficacy in teens.

### IDENTIFICATION OF THE PARTICIPANT

In the context of the STEAM4U project, we want to know how different teaching strategies are developed when they carry out specific actions to promote equity. In this questionnaire, you will find a series of questions related to some issues that affect the STE(A)M field in education and possible strategies to deal with them. We ask that you respond with the utmost sincerity.

1. **Mail address**
2. **Full name**
3. **After your experience at the Hackathon and at the scientific congress, what do you think it means taking into account equity in STEM education? What does it mean? (give examples)**

### WHAT IMPACT DO I THINK I HAVE AS A TEACHER STE(A)M?

We speak of the students' STEM stance to talk about the way in which students feel and think about the topics, contents, professions and all kinds of activities related to STEM, as well as the way in which they publicly express their opinions and / or feelings. It has been detected that there are 5 key elements that influence this positioning of students:

- Your interest in STEM
- Your professional aspirations
- Your identity in STEM
- Your STEM capacity
- Your self-efficacy in STEM



In this section we ask that you reflect on your teaching style and look at identifying what influence you think you have in each of these elements.

**4. In what aspects of STEM stance of students do you think that your teaching style (activities you do, promoted values, etc.) influences more?**

	What I do in the classroom has no influence	What I do in the classroom has little influence	What I do in the classroom influences moderately	What I do in the classroom influences moderately	What I do in the classroom has a lot of influence, but I do not consider it when it comes to planning my activities	What I do in the classroom has a lot of influence and I take it into account when planning my activities
Interest in STE(A)M (e.g. I am not interested in the activity...)						
Aspirations in STE(A)M (p.e. I decide not to choose the elective of sciences in 4th of ESO)						
Identity in STE(A)M (i.e. I am a STE(A)M person because I like to disassemble appliances)						
Capacity in STE(A)M (i.e. I was able to carry out a search)						



Self-efficacy in STE(A)M, which corresponds to the belief of the students in their own abilities to carry out a successful task in a successful way (i.e. I think I am not able to solve this problem)						
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**5. Give us an example of how you work in the classroom the aspects of the STEM stance of students in which you think you have more influence as a STE(A)M teacher.**

**6. Compare your teaching style before and after the scientific conference. In which aspects do you think your teaching style has changed more?**

	What I did in the scientific conference had less influence than before	What I did in the scientific conference had the same influence than before	What I did in the scientific conference had a bit more influence than before	What I did in the scientific conference had a much more influence than before
Interest in STE(A)M (e.g. I am not interested in the activity...)				
Aspirations in STE(A)M (p.e. I decide not to choose the elective of sciences in 4th of ESO)				
Identity in STE(A)M (i.e. I am a STE(A)M person because I like to disassemble appliances)				

Capacity in STE(A)M (i.e. I was able to carry out a search)				
Self-efficacy in STE(A)M, which corresponds to the belief of the students in their own abilities to carry out a successful task in a successful way (i.e. I think I am not able to solve this problem)				

**7. What has allowed you to increase the influence on the aspects of STEM's stance of the students during the scientific congress?**

## **STRATEGIES TO PROMOTE SELF-EFFICACY STEM - TEACHING EXPERIENCE**

Self-efficacy (the belief in own capacities to carry out a task in a successful way) is one of the most important elements of the STEM stance of the students, which are often given little attention. In this section we would like to focus on this element and, in particular, on the strategies that exist for working in the classroom. To structure the look, we have grouped these strategies into four types:

- Strategies related to the promotion of self-regulation of students before, during and after the activity
- Strategies related to actions to promote success in learning
- Strategies related to the generation of a positive classroom environment
- Strategies related to the influence of other agents in the educational community

**8. To what degree have you used any of the following strategies related to the promotion of self-regulation of students before, during and after the activity?**

	I have not used this strategy in the project	I rarely used this strategy in the project	I sometimes used this strategy in the project	I often used this strategy in the project	I used this strategy very frequently in the project, but I did not take it into account when planning my activities	I used this strategy very frequently in the project and I took it into account when planning my activities
Promote students to be aware of their progress throughout the activity (eg helping them to find themselves, know where they are in relation to the objective of the activity ...)						
Promote that students develop more efficient strategies to carry out a task (eg help them to make a problem resolution scheme, help them to discriminate the relevant information of the secondary ...)						
Promote emotional education (eg help them overcome anxiety before an exam).						

## 9. Strategies related to actions to promote success in learning...

	I have not used this strategy in the project	I rarely used this strategy in the project	I sometimes used this strategy in the project	I often used this strategy in the project	I used this strategy very frequently in the project, but I did not take it into account when planning my activities	I used this strategy very frequently in the project and I took it into account when planning my activities
Classify and sequence the learning objectives and / or the key ideas that want to work in an activity in increasing order of difficulty, establishing an initial level suitable for all students						
Customize the activity at the various learning rhythms (e.g., propose different ways in which the same activity can be carried out)						

## 10. Strategies related to the generation of a positive classroom environment

	I have not used this strategy in the project	I rarely used this strategy in the project	I sometimes used this strategy in the project	I often used this strategy in the project	I used this strategy very frequently in the project, but I did not take it into account when planning my activities	I used this strategy very frequently in the project and I took it into account when planning my activities
Promote cooperative activities instead of competitive activities to promote peer learning						
Review verbal and non-verbal judgments to emphasize positive messages (e.g., promote optimism)						
Promote exchanges between peers (eg carry out tutorials of equal to equal)						
Change the roles of students in the classroom (eg review how roles are shared in a project to break down negative associations between students and roles)						

## 11. Strategies related to the positive influence of other agents in the educational community

	I have not used this strategy in the project	I rarely used this strategy in the project	I sometimes used this strategy in the project	I often used this strategy in the project	I used this strategy very frequently in the project, but I did not take it into account when planning my activities	I used this strategy very frequently in the project and I took it into account when planning my activities
Engage students in exchanges or experiences with ste(A)M people who show confidence and ability to adapt to failure						
Develop confidence in one's own capacity as a teacher, or the ability of and teaching partners, to influence students						
Involve families in STE(A)M activities so that their children can show their successes to the family and feel they are valued positively						

**12. To which extent do you feel you have used more or less the strategies to promote self-efficacy in STEM during the project?**

	I have not used less these strategies in the project than before	I have used these strategies similarly than before	I have used these strategies a bit more during the project than before	I have used these strategies much more during the project than before
Strategies related to self-regulation of students.				
Strategies related to didactic actions to promote good learning in STE(A)M.				
Strategies related to the classroom environment.				
Strategies related to other educational agents.				

**13. What has made you use a bit or much more these strategies selected?**

## STRATEGIES TO PROMOTE SELF-EFFICACY STEM - TEACHING SELF-EFFICACY

14. After participating in the scientific conference, how capable do you feel of using these strategies in the classroom, and generate impact on students, regardless of your experience?

	Not capable at all	Not capable at all, but I could try it	A little capable	Quite capable	Very capable	Totally capable
Promote students to be aware of their progress throughout the activity (eg helping them to find themselves, know where they are in relation to the objective of the activity ...)						
Promote that students develop more efficient strategies to carry out a task (eg help them to make a problem resolution scheme, help them to discriminate the relevant information of the secondary ...)						
Promote emotional education (e.g. help them overcome anxiety).						
Promote emotional education (e.g. help them overcome anxiety).						
Classify and sequence the learning objectives and / or the key ideas that want to work in an activity in increasing order of difficulty, establishing an initial level suitable for all students						



Customize the activity at the various learning rhythms (e.g., propose different ways in which the same activity can be carried out)						
Promote cooperative activities instead of competitive activities						
Review verbal and non-verbal judgments to emphasize positive messages (e.g., promote optimism)						
Change the roles of students in the classroom (eg review how roles are shared in a project to break down negative associations between students and roles)						
Promote exchanges between peers (eg carry out tutorials of equal to equal)						
Engage students and students in exchanges or experiences with STEM / STEAM people who show confidence and ability to adapt to failure						
Develop confidence in one's own capacity as a teacher, or the ability of and teaching partners, to influence students						
Involve families in STEM / STEAM activities so that their children can show their successes to the family and feel they are valued positively						

## 15. What has made you feel much more capable of carrying out these activities?

### GENDER IN STEM

In the field of the promotion of equity and a suitable STEM position, several issues associated with gender have been identified. Here are some possible options and we ask you to check the box that you think appropriate, depending on the degree of knowledge / experience you have before these problems.

## 16. To what extent do you observe some evidences that...

	Not at all	Very slightly	A little	Pretty much	A lot	Very much
The girls feel less involved in science classes than boys.						
Interest in STEM is decreasing throughout the school, especially pronounced in girls.						
In post-compulsory studies, girls are focused on health, biology and medicine, and boys on communication technologies, physics, engineering ...						
Girls see that their female identities are incompatible with the dominant stereotype of scientist as a man.						
Given a difficulty, the girls are discouraged from the STE(A)M more than boys.						
Given a same academic outcome, girls appreciate their performance worse than boys.						
The perception of self-efficacy (beliefs about one's own abilities) is lower than their real ability, especially in girls.						

The girls are more modest and the boys are getting more up to themselves in the academic field with similar achievements.						
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**17. Choose the issue or issues of gender in which you think that you have observed more and explain how you have worked on it.**

**18. Did you feel more aware of these inequalities than before?**

- ☐ I think I have observed less inequalities than before.
- ☐ I think I have observed the same inequalities than before.
- ☐ I think I have observed a bit more inequalities than before.
- ☐ I think I have observed much more inequalities than before.

**19. In case you have observed a bit or much more inequalities than before, what helped you to be more aware of them?**

**Thank you for your answers!**

## INTERVIEWS FOR TEENS

### PRE & POST FOCUS GROUP INTERVIEWS FOR TEENS PARTICIPATING IN STEM ACTIVITIES DESIGNED AND USED BY FLORIDA SECUNDÀRIA & SINS CARDENER



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## PRE-INTERVIEW

### INTERVIEW GUIDELINES

The following questions are guidelines to conduct an initial focus group with 12-14-year-old students to have an insight of their self-efficacy in STEM and factors affecting it. The guidelines are supposed to provide an structured, but they do not have to be followed in an strict order, but within the flow of the conversation.

### EXPECTATIONS OF THE SCIENTIFIC CONFERENCE

1. What do you expect from the scientific conference?
2. What does science mean to you?

### CHARACTERISATION OF STANCE ON STEM

3. How do you rate your experience when doing science?
  - a. Do you like doing science? What do you like from science?
  - b. Would you like to continue studying science in a future? Why?
4. What do you think when you hear someone talking about scientific topics?
5. What does know/do science mean to you?
6. Do you like to do things related with science in your free time? (for example, activities, studying, watching a documental, going to a science museum...)
7. When you do science, do you feel like a scientist? Why?
  - a. And when you do not do science?
8. Do you feel capable of doing science? Why?
  - a. In which fields do you feel more capable?
  - b. In which scientific activities? (designing experiences, collecting data...)
9. When you face a difficulty in a scientific activity, how do you act in front of it?
  - a. What do you think science professionals do in a similar situation?



10. Which personal characteristics do you think a science professional has to have?
11. Which characteristics of your own personality do you think are good for doing science? Why?

### **STRATEGIES TO RAISE SELF-EFFICACY**

12. What helps you to do science?
13. To which extent the following strategies help you to learn science (rate them from 1 to 5)
  - That the teacher helps me to see my capacities in science
  - That the expert doing the initial talk appear to be close to me
  - Help me to know if I am doing right or wrong at any time
  - Use easy vocabulary (not too technical)
  - Create with my teacher the final structure that the product of the project has to follow
  - That the teacher helps me to manage my feelings
14. Of all the previous items, which is the one that helps you the most when learning science?
15. Is there any other strategy/action that helps you to learn science?

### **GENDER IN STEM**

16. Do you think are any differences between boys and girls when you do science?
  - a. And in the participation in the classroom and the relation with the teacher?
  - b. And regarding the interest in STEM?
  - c. And regarding the aspirations in STEM?
  - d. And regarding the marks?
  - e. And regarding the success or failure in STEM subjects? And the attitude towards them?

## **CONCLUSION OF THE FOCUS**

Thank all the participants.

17. Is there anything else you would like to add regarding the topics we have talked about?
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## POST-INTERVIEW

### INTERVIEW GUIDELINES

The following questions are guidelines to conduct a final focus group with 12-14-year-old students to have an insight of their self-efficacy in STEM and factors affecting it. The guidelines are supposed to provide an structured, but they do not have to be followed in an strict order, but within the flow of the conversation.

### EXPECTATIONS OF THE SCIENTIFIC CONFERENCE

1. Have your initial expectations regarding the scientific conference been fulfilled?
2. What does science mean to you, after participating in the scientific conference?

### CHARACTERISATION OF STANCE ON STEM

3. How do you rate your experience when doing science, after participating in the scientific conference?
  - a. Did you like it? What did you like the most?
  - b. Would you like to continue studying science in a future? Why?
  - c. Has your participation in the project made you change your interests about science topics? Why?
  - d. And about your willingness to continue studying science? Why?
4. Did you do things related with science in your free time? (for example, activities, studying, watching a documental, going to a science museum...)
5. Throughout the scientific conference, did you feel like a scientist? Why?
  - a. And when you were not doing the project?
6. Do you feel capable of doing science now? Why?
  - a. In which fields do you feel more capable?
  - b. In which scientific activities have you felt more capable in the scientific conference? (designing experiences, collecting data...)
7. When you have faced a difficulty in the scientific conference, how did you act?
  - a. What do you think science professionals do in a similar situation?





8. Which personal characteristics do you think a science professional has to have?
9. Which characteristics of your own personality do you think are good for doing science? Why?

### **STRATEGIES TO RAISE SELF-EFFICACY**

10. What helps you to do science?
11. To which extent have the following strategies helped you to learn science? (rate them from 1 to 5)
  - That the teacher helps me to see my capacities in science
  - That the expert doing the initial talk appear to be close to me
  - Help me to know if I am doing right or wrong at any time
  - Use easy vocabulary (not too technical)
  - Create with my teacher the final structure that the product of the project has to follow
  - That the teacher helps me to manage my feelings
12. Of all the previous items, which is the one that helps you the most when learning science?
13. Is there any other strategy/action that helps you to learn science?

### **GENDER IN STEM**

14. Do you think are any differences between boys and girls when you do science?
  - a. And in the participation in the classroom and the relation with the teacher?
  - b. And regarding the interest in STEM?
  - c. And regarding the aspirations in STEM?
  - d. And regarding the marks?
  - e. And regarding the success or failure in STEM subjects? And the attitude towards them?



## **CONCLUSION OF THE FOCUS**

Thank all the participants.

15. Is there anything else you would like to add regarding the topics we have talked about?

