

Evaluation instruments
Version 2

mathematics and science for life



mascil aims to promote a widespread implementation of inquiry-based teaching (IBL) in math and science in primary and secondary schools. It connects IBL in schools with the world of work making math and science more meaningful for young European students and motivating their interest in careers in science and technology.



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mathematics and science for life

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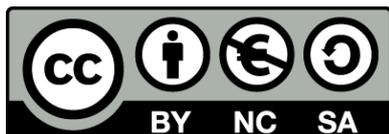
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Evaluation instruments – Version 2

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Introduction

The mascil project has planned to incorporate a baseline study. The aim of the study is to gain insight into teaching and learning with a focus on inquiry based learning (IBL) and the implementation of the “world of work” (WoW) situation in the thirteen countries involved in the project. This information will be useful when designing and adapting the continuous professional development programs and will help to identify country-specific needs.

We want to answer the following research questions:

- What is the effect of the country /cultural background on beliefs, IBL practice and WoW?
- What is the effect of the subject referred to on beliefs and IBL practice and WoW?
- What is the influence of the problems anticipated when implementing IBL and WoW on the actual use of IBL and WoW? What kind of problems have the strongest effect?

For the purpose of this baseline study a teacher questionnaire has been designed. On the basis of the PISA study four-point Likert-type items were used whenever suitable. These items do not allow subjects to opt for a neutral response. Based on the PISA study, the applied categories of the four-point scales reflect frequencies or agreement (never or hardly ever, in some lessons, in most lessons, in almost all lessons and strongly disagree, disagree, agree, strongly agree). Due to time management, complexity and possible translation problems, the questionnaire includes no open questions.

We intend to reach between 50 and 100 teachers in each of the thirteen participating countries.

In the first section of the questionnaire background information about the individual teacher is collected. Probably the most important variable in the context of the European project mascil is the country. Being seen as relevant and easy to access, data were collected on the teachers' gender and age, their professional teaching experiences and also their experiences with the world of work, the discipline and the age group taught. These individual characteristic personal data are used as independent variables.

In the next section we collect information about teachers' beliefs and practice in relation to implementing inquiry based learning and making connections to the world of work. Teachers are asked about difficulties they have when implementing IBL and when making connections to the world of work. Furthermore, teachers are asked if students benefit from implementing IBL and from making connections to the WoW. Finally, teachers are asked about their actual use of IBL and WOW as well as their orientation towards both.

In the concluding section teachers are asked to describe their current teaching practice in relation to IBL and WOW with a focus on a specific subject and a specific age group.

In the following you find the questionnaire.



Dear teacher,

We would like to invite you to participate in this survey as part of the European project mascil. Please fill out the questionnaire anonymously.

Mascil (mathematics and science for life) is funded by the European Commission involving 18 partners from 13 countries. The project partners aim to effect a change across Europe in the teaching and learning of mathematics and science by supporting teachers to develop inquiry-based learning (IBL) pedagogies. In addition, we plan to connect mathematics and science education to the world of work. Our intention is that inquiry-based science and math teaching connected to the world of work will make mathematics and science more meaningful and attractive to students.

The aim of this survey is to find out about the European situation regarding inquiry based learning and teaching and regarding connections to the world of work across different countries and disciplines.

Your answers will be completely anonymous. Your responses are voluntary and will be confidential. Responses will not be identified by individual. All responses will be compiled together and analyzed as a group.

Please use a #2 pencil or blue or black pen to complete this questionnaire. Most of the questions instruct you to choose one answer. Darken ovals completely, but do not stray into adjacent ovals:



Thank you very much in advance for your help and collaboration.

Your mascil Team

[It would be nice if you put your names here]

1. Please enter today's date

day	month	year
		20

2. What year were you born in?

year
19

3. Are you male or female?

Male	Female

4. In which county are you working as a teacher?

Austria		Greece		Spain	
Bulgaria		Lithuania		Turkey	
Cyprus		Netherlands		UK	
Czech Republic		Norway			
Germany		Romania			

5. How long have you been working as a teacher?

Where possible exclude extended periods of absence (e.g. career breaks).

This is my first year	1-2 years	3-5 years	6-10 years	11-15 years	16-20 years	More than 20 years

6. For what level of education are you trained? (you may choose more than one if appropriate)

primary level	lower secondary level	upper secondary level	vocational education

7. For which subjects were you trained to teach? Which subjects do you currently teach?

		trained for	teaching
a.	Maths		
b.	Physics		
c.	Biology		
d.	Chemistry		
e.	Engineering		
f.	Natural science		
g.	Geography		
h.	Technology		
i.	Information technology		

8. Did you work in any other capacity before being a teacher?

no	yes

**If yes:
How long?**

less 1 year	1-5years	more than 5 years

What kind of work? Please specify:

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9. As a teacher do you have a contact/exchange with (choose one answer)

		not at all (never)	seldom (once or twice a year)	regularly (once or twice a month)	very regularly (more than once a week)
a.	Industry?				
b.	Museum?				
c.	Science Center?				
d.	Other, please specify:				

For the remainder of the questionnaire please refer to the subject and the age group you teach most frequently. (If you regularly teach two or more subjects or age groups equally choose the group you prefer.) Please choose one subject and one age group!!

10. Which subject do you teach most frequently? Choose one subject!

a.	Maths	
b.	Physics	
c.	Biology	
d.	Chemistry	
e.	Engineering	
f.	Natural science	
g.	Geography	
h.	Technology	
i.	Information technology	

11. Which age group do you teach most frequently? Choose one group!

a.	primary	
b.	lower secondary	
c.	upper secondary	
d.	vocational education	

Inquiry based learning (IBL) and world of work (WoW)

Inquiry-based learning aims to develop the inquiring minds and attitudes that are required to cope with an uncertain future. Fundamentally, IBL is based on students adopting an active, questioning approach. Students inquire and pose questions, explore and evaluate, and the problems they address are relevant to them. Learning is driven by open questions and multiple solution strategies. Teachers are proactive, supporting struggling students and extending those that are succeeding through the use of carefully chosen strategic questions. They value students' contributions, including their mistakes, and scaffold learning using students' reasoning and experience. In the classroom there is a shared sense of purpose and ownership.

Education prepares students for becoming critical thinkers, responsible and active citizens as well as for taking well thought out future decisions with respect to the pursue of professional and other careers. Resources for teaching and learning can refer to the **world of work** by using a specific workplace context or by giving students a task or role that reflects a workplace practice. The level of including the world of work can vary from an activity in a workplace to solving a textbook problem in school.

Please have the subject and the age group from questions 10 and 11 in mind when answering the questions.

12. To what extent do you agree with the following statements? (please choose one answer)

		Strongly disagree	Disagree	Agree	Strongly agree
a.	Policy making prioritises IBL approaches in my country.				
b.	National curricula prioritize IBL approaches, in general and in specific in science and mathematics subjects in my country.				
c.	There are curriculum support materials and certain topics in science and mathematics education that supports IBL approaches.				
d.	My school implements policy priorities in relation to IBL approaches.				
e.	Assessment of students draws on and is based on notions of IBL (i.e. IBL skills/ competences are assessed).				

13. To what extent do you agree with the following statements?
 (please choose one answer)

	I have difficulties in implementing IBL, because...	Strongly disagree	Disagree	Agree	Strongly agree
a.	...the curriculum does not encourage IBL				
b.	...I worry about student discipline being more disruptive in IBL lessons.				
c.	...I don't have enough/adequate teaching materials.				
d.	...students don't like IBL.				
e.	...there is not enough time in the curriculum.				
f.	...I don't feel confident with IBL.				
g.	...IBL is not included in the textbooks I use.				
h.	...Students are not able to do inquiry.				
i.	...my students have to take assessments that don't reward IBL.				
j.	...I worry about my students getting lost and frustrated in their learning in IBL lessons.				
k.	...too little time is available to plan and prepare lessons.				
l.	...IBL is too difficult for many students.				
m.	...the school system does not encourage changes.				
n.	...I think that group work is difficult to manage.				
o.	...the quality of available instructional materials.				

14. To what extent do you agree with the following statements?
 (please choose one answer)

	I have difficulties in making connections with the WoW in my teaching, because...	Strongly disagree	Disagree	Agree	Strongly agree
a.	...the curriculum does not encourage making connections with the WoW.				
b.	...I don't have enough/adequate teaching materials.				
c.	...I do not feel able to transform contexts from the WoW to activities for my students.				
d.	...there is not enough time in the curriculum.				
e.	...the WoW is not included referred to in the textbooks I use.				
f.	.. I don' t believe that making connections to the WoW is valuable.				
g.	...my students have to take assessments that don't reward making connections to the WoW				
h.	...the time available to plan and prepare lessons.				
i.	...I do not know how to approach companies in the neighbourhood of my school to establish connections.				
j.	...the quality of available instructional materials.				

15. To what extent you agree with the following statements?
 (please choose one answer)

		Strongly disagree	Disagree	Agree	Strongly agree
a.	I regularly do projects using IBL with my students				
b.	I regularly do projects that have connections to the WoW with my students				
c.	I would like to implement more IBL practices in my lessons.				
d.	IBL is well suited to overcome problems with students' motivation.				
e.	I would like to implement more real-world problems in my lessons.				
f.	I would like to make more connections to the world of work.				
g.	Connections to the World of Work are well suited to overcome problems with students' motivation.				
h.	Effective/good teachers demonstrate the correct way to solve a problem.				
i.	IBL is part of my daily teaching.				
j.	Making connections to the WoW is part of my daily teaching.				
k.	I would like to do more IBL to enrich my teaching practice.				
l.	IBL is well suited to motivate students.				
m.	A quiet classroom is generally needed for effective learning.				

		Strongly disagree	Disagree	Agree	Strongly agree
n.	I would like to use students' personal experiences as a context for applying knowledge more often to enrich my teaching practice.				
o.	I would like to use more tasks that resemble the tasks of real workers.				
p.	Connections with the World of Work are well suited to motivate students.				
q.	Instruction should be built around problems with clear, correct answers and around ideas that most students can grasp quickly				
r.	I already use IBL a great deal.				
s.	How much students learn depends on how much background knowledge they have – that is why teaching facts is so necessary.				
t.	I already use the WoW a great deal.				
u.	I think my teaching will improve by implementing IBL.				
v.	Students benefit from IBL.				
w.	It is important to explain the relevance of maths/science concepts to everyday life.				
x.	Connecting to the world of work makes lessons more interesting.				
y.	Students will benefit from making connections to the world of work.				

Teaching

Please bear in mind the subject and the age group from questions 10 and 11!

16. How often do the following activities take place in your lessons? (please choose one answer)

	My students ...	never or hardly ever	some lessons	most lessons (about half the lessons)	almost every lesson
a.	... do practical activities.				
b.	... work together to explain ideas/solutions to each other.				
c.	...design their own experiments/investigations.				
d.	...are given opportunities to explain their ideas.				
e.	... do experiments/simulations/modelling by following my instructions.				
f.	...do experiments/investigations to test out their own ideas.				
g.	...have discussions about the topic.				
h.	...share ideas or solve problems with each other in small groups.				
i.	... draw conclusions from experiments/simulations/modeling they have conducted.				
j.	...have the chance to choose their own experiments/investigations.				
k.	...have the possibility to try out their own ideas.				
l.	...are involved in class debate or discussion.				
m.	...choose which questions to do or which ideas to discuss.				
n.	...work on models or simulations.				

17. How often do the following activities take place in your lessons? (please choose one answer)

		never or hardly ever	some lessons	most lessons (about half the lessons)	almost every lesson
a.	I use this subject to help the students understand the world outside school.				
b.	I make connections to the world of work.				
c.	I demonstrate the correct way to solve a problem.				
d.	I show the students how this subject is relevant to society.				
e.	I use tasks that resemble the tasks of real workers.				
f.	I explain the relevance of this subject to our daily lives.				
g.	I make connections to the possible future work of the students.				
h.	I develop my teaching around problems with clear, correct answers and around ideas that most students can grasp quickly.				

THANK YOU!!!