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Real-time Evaluation Metodology

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Contents

Real-Time Evaluation Methodology - Introduction	P. 5
Evaluation of Robodidactics Methodology during school pilots	P. 7
Evaluation of Quality of Hardware and Software of Robot Environment and of Various Elements of Didactic Material	P. 9
Detailed Evaluation of Perceived Educational Value of Robodidactics Pilots	P. 22
Brief Enquiry into Factors Favouring or Hindering the Diffusion of Robot-based Didactics at School	P. 28



Real-Time Evaluation Methodology Introduction

Project Robodidactics aims at creating a European methodology to facilitate the introduction of robotics in school didactics. As part of the process of creating such methodology, project Robodidactics organizes school pilots in a number of European countries. During these pilots the schools will evaluate the evolving methodology, providing feedback that will help to improve its content and usefulness. This methodology is called real-time because it is implemented during the course of the pilots and not post-mortem once the entire process is completed. In this way, the real-time evaluation acts as a learning factor for continuous improvement of the methodology.

This document contains the principles and the detailed questionnaires that make up the real-time evaluation approach.

First, the RoboDidactics evaluation aims at assessing the perception of quality of the full set of materials used in the Methodology, including robot hardware and software, and the set of didactic material. If the robot doesn't work well, or the didactic material is difficult this is likely to diminish the effectiveness of the methodology.

Second, the RoboDidactics evaluation aims at assessing the perception of educational value provided by the Robodidactics Methodology both as a whole and by components. This concerns the depth and breath of the educational content of the Methodological set. If the didactic material is superficial or too narrow, this is likely to limit the scope for educational impact of the methodology

Third, the RoboDidactics evaluation also looks at the factors influencing the process

of dissemination and diffusion of the methodology. This process depends not just on the quality of material, it also depends on the degree of robotic knowledge, experience and motivation of teachers and students, as well as the school's attitude or degree of motivation regarding the adoption of robotics for didactical purposes. Figure 1 shows all the areas of enquiry of the real-time evaluation of Robodidactics methodology.

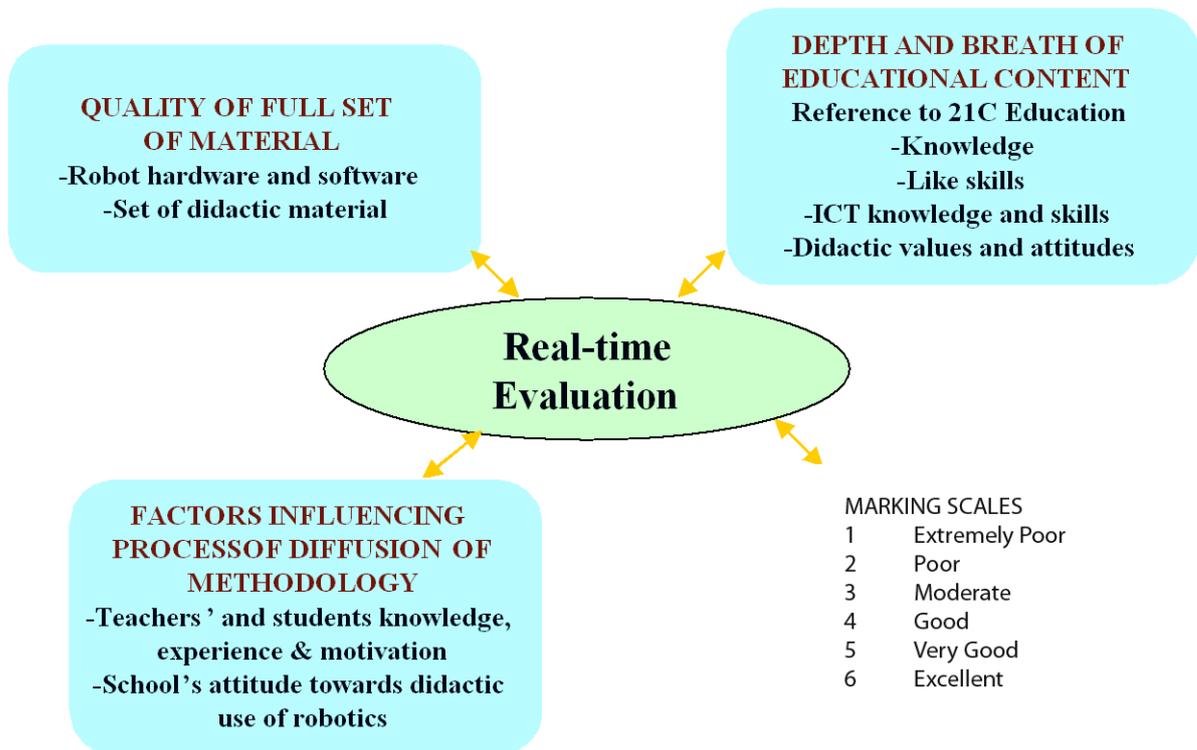


Figure 1. Areas of Enquiry of the Real-time Evaluation Methodology

In the following the document follows this structure to present the detail questionnaires for each one of the areas. The format of the questionnaires is primarily that of closed questions to facilitate the task of the teachers responding to it.



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Evaluation of Robodidactics Methodology during school pilots

This questionnaire evaluates teachers' perceived value of the didactic methodology and supporting robot environment used in the first school pilots of CEC Project Robodidactics. Your feedback will provide valuable information on the usefulness of the results of the project for educational stakeholders and will enable further development of the didactic methodology and supporting robot environment. All information is treated confidentially and names of individuals and schools will NOT be associated with any information and comments provided in this survey.



(For reference only)

Participant Name.....

Occupation.....

School.....

Country.....

I. Evaluation of Quality of Hardware and Software of Robot Environment and of Various Elements of Didactic Material

Figure 2 illustrates the dimension of evaluation dealt with in this section. This is followed by the questionnaires to be filled in by the teachers participating in the Robodidactics pilots.

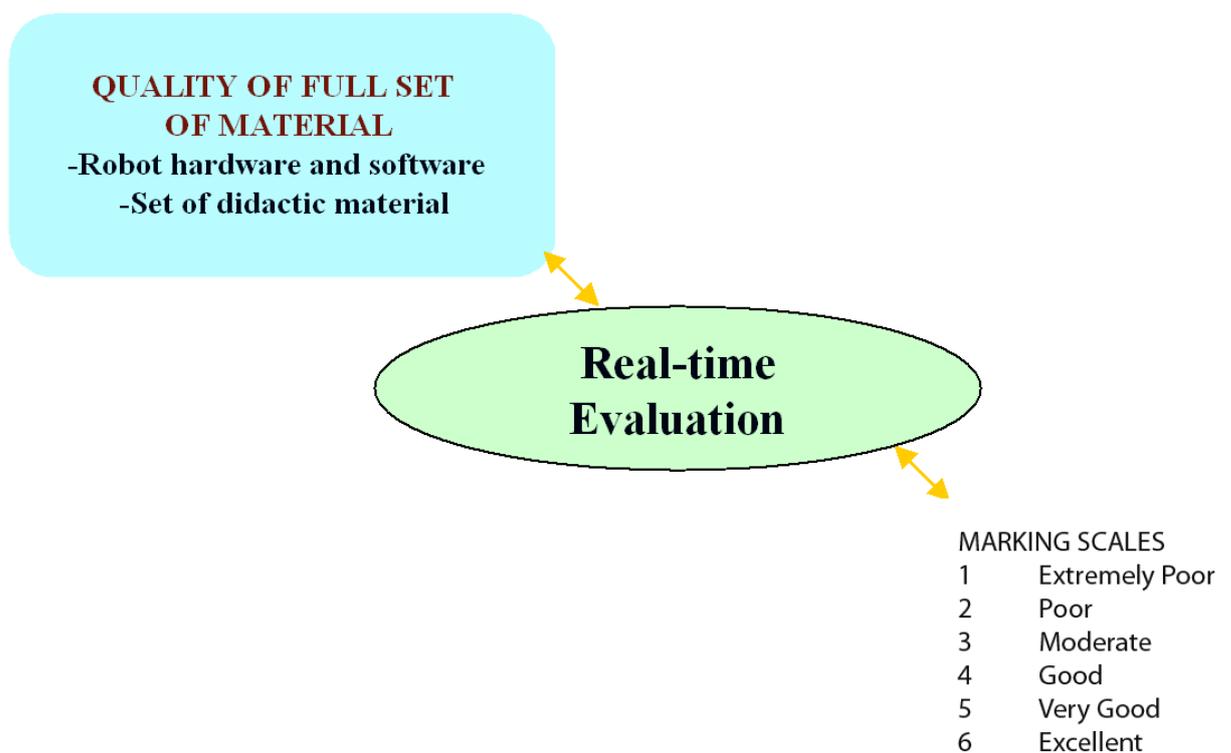


Figure 2. Evaluation of Quality of Full set of Technology and Didactic Material



(Ia) Robotic Environment – Hardware ad Software

HARDWARE						
Please rate the quality of the <u>robot kit hardware</u> in terms of:						
	1	2	3	4	5	6
Ease of assembling						
Ease of use						
Reliability						
Ruggedness (sturdy)						
Attractiveness						
Versatility (can do many tasks)						
Performance (movement, vision)						
Ease of maintenance						
Ease of repair						
Others (please specify)						
Suggestions for Improvements:						
Additional Comments:						



1 (extremely poor), 2 (poor), 3 (moderate), 4 (good), 5 (very good), 6 (excellent)

SOFTWARE						
Please rate the quality of the <u>robot kit software</u> in terms of:						
	1	2	3	4	5	6
Easy to understand & learn						
Easy to implement existing sets of instructions						
Easy to create new sets of instructions						
Reliability (no bugs)						
Versatility (multiple tasks)						
Performance						
Ease of maintenance						
Instruction Manual Content						
Instruction Manual Presentation						
Others (please specify)						
Suggestions for Improvements:						
Additional Comments:						

1 (extremely poor), 2 (poor), 3 (moderate), 4 (good), 5 (very good), 6 (excellent)

(1b) Robodidactics' didactic methodology

So far, the Didactic Methodology Set is made up of the following booklets (a) Robodidactics Manual, (b) Robodidactics Basic Course and (c) Robodidactics Teachers Guides. The first table concerns the perceived quality of the entire Didactic Methodology Set. In contrast, the tables that follow after the first seek to evaluate each one of the elements (booklets) of the full set.

ROBODIDACTICS' DIDACTIC METHODOLOGY SET						
Please rate the quality of the <u>full</u> "Didactic Methodology Set" in terms of:						
	1	2	3	4	5	6
Educational value of overall didactic methodology (full set)						
Educational effectiveness of fundamental didactic concept of methodology						
Comprehensiveness of content of full didactic methodology						
Clarity of structure and language						
Ease of understanding & learning						
Fun to use (degree of educational entertainment)						
Quality (Usefulness) of exercises						
Quantity of exercises						
Good coverage of exercise extensions to scientific subjects						



Effectiveness of exercise extensions to scientific subjects						
Good coverage of exercise extensions to non-scientific subjects						
Effectiveness of exercise extensions to non-scientific subjects						
Reliability (no mistakes)						
Versatility (allows for multiple didactic tasks or alternatives)						
Quality of presentation (layout and graphics)						
Others (please specify)						
Suggestions for Improvements:						
Additional Comments:						

1 (extremely poor), 2 (poor), 3 (moderate), 4 (good), 5 (very good), 6 (excellent)



BOOKLET “ROBODIDACTICS MANUAL”						
Please rate the quality of this booklet in terms of:						
	1	2	3	4	5	6
Educational value of booklet						
Educational effectiveness of fundamental didactic concepts						
Comprehensiveness of content						
Clarity of structure and language						
Ease of understanding & learning						
Fun to use (degree of educational entertainment)						
Reliability (no mistakes)						
Versatility (allows for multiple didactic tasks or alternatives)						
Quality of presentation (layout and graphics)						
Others (please specify)						
Suggestions for Improvements:						
Additional Comments:						



1 (extremely poor), 2 (poor), 3 (moderate), 4 (good), 5 (very good), 6 (excellent)

BOOKLET “ROBODIDACTICS BASIC COURSE”

Please rate the quality of this booklet in terms of:

	1	2	3	4	5	6
Educational value of booklet						
Educational effectiveness of the concept adopted for the Basic Course						
Comprehensiveness of content						
Clarity of structure and language						
Ease of understanding & learning						
Fun to use (degree of educational entertainment)						
Quality (Usefulness) of exercises						
Quantity of exercises						
Good coverage of exercise extensions to scientific subjects						
Effectiveness of exercise extensions to scientific subjects						
Good coverage of exercise extensions to non-scientific subjects						
Effectiveness of exercise extensions to non-scientific subjects						
Reliability (no mistakes)						
Versatility (allows for multiple didactic tasks or alternatives)						



Quality of presentation (layout and graphics)						
Others (please specify)						
Approximately, how long does it take children to gain the basic understanding to work with the first basic lessons?						
Is this different for various age groups?						
Is it gender dependent?			Yes, in favour of women			
			Yes, in favour of men			
Once students have learnt the basic lessons, how quickly do they get bored and wish to move on to the next level?						
After students have made the first approach to the course material, how well did they use it and did it serve its purpose?						
Suggestions for Improvements (Please specify aspects that need change)						
Additional Comments:						



1 (extremely poor), 2 (poor), 3 (moderate), 4 (good), 5 (very good), 6 (excellent)

BOOKLET “ROBODIDACTICS RESCUE COURSE”

Please rate the quality of this booklet in terms of:

	1	2	3	4	5	6
Educational value of booklet						
Educational effectiveness of the concept adopted for the Basic Course						
Comprehensiveness of content						
Clarity of structure and language						
Ease of understanding & learning						
Fun to use (degree of educational entertainment)						
Quality (Usefulness) of exercises						
Quantity of exercises						
Good coverage of exercise extensions to scientific subjects						
Effectiveness of exercise extensions to scientific subjects						
Good coverage of exercise extensions to non-scientific subjects						
Effectiveness of exercise extensions to non-scientific subjects						



Reliability (no mistakes)						
Versatility (allows for multiple didactic tasks or alternatives)						
Quality of presentation (layout and graphics)						
Others (please specify)						
Approximately, how long does it take children to gain the basic understanding to work with the first basic lessons?						
Is this different for various age groups?						
Is it gender dependent?			Yes, in favour of women			
			Yes, in favour of men			
Once students have learnt the basic lessons, how quickly do they get bored and wish to move on to the next level?						
After students have made the first approach to the course material, how well did they use it and did it serve its purpose?						
Suggestions for Improvements (Please specify aspects that need change)						
Additional Comments:						



1 (extremely poor), 2 (poor), 3 (moderate), 4 (good), 5 (very good), 6 (excellent)

BOOKLET “ROBODIDACTICS TEACHERS GUIDE”

Please rate the quality of this booklet in terms of:

	1	2	3	4	5	6
Educational value of booklet						
Educational effectiveness of the concept adopted for the Teachers' Guide						
Comprehensiveness of content (full set of items)						
Clarity of structure and language						
Ease of understanding & applying						
Fun to use (degree of educational entertainment)						
Quality (Usefulness) of exercises						
Quantity of exercises						
Good coverage of exercise extensions to scientific subjects						
Effectiveness of exercise extensions to scientific subjects						
Good coverage of exercise extensions to non-scientific subjects						



Effectiveness of exercise extensions to non-scientific subjects						
Reliability (no mistakes)						
Versatility (allows for multiple didactic tasks or alternatives)						
Quality of presentation (layout and graphics)						
Others (please specify)						
Suggestions for Improvements:						
Additional Comments:						

1 (extremely poor), 2 (poor), 3 (moderate), 4 (good), 5 (very good), 6 (excellent)

BOOKLET “ROBODIDACTICS TEACHER’S GUIDE – STRUCTURED LESSONS PHYSICAL LEVEL”

Please rate the quality of this booklet in terms of:

	1	2	3	4	5	6
Educational value of booklet						
Educational effectiveness of the concept adopted for the Teachers’ Guide						
Comprehensiveness of content (full set of items)						
Clarity of structure and language						
Ease of understanding & applying						
Fun to use (degree of educational entertainment)						
Quality (Usefulness) of exercises						
Quantity of exercises						
Good coverage of exercise extensions to scientific subjects						
Effectiveness of exercise extensions to scientific subjects						
Good coverage of exercise extensions to non-scientific subjects						
Effectiveness of exercise extensions to non-scientific subjects						



Reliability (no mistakes)						
Versatility (allows for multiple didactic tasks or alternatives)						
Quality of presentation (layout and graphics)						
Others (please specify)						
Suggestions for Improvements:						
Additional Comments:						



1 (extremely poor), 2 (poor), 3 (moderate), 4 (good), 5 (very good), 6 (excellent)

II. Detailed Evaluation of Perceived Educational Value of Robodidactics Pilots

This section evaluates the perceived value of the Robodidactics Methodology from the point of view of various dimensions of importance for 21st century education, including (a) knowledge of various subjects, (b) life skills, (c) ICTs skills and knowledge, and (d) didactic attitudes and values. These dimension are illustrated in Figure 3 and the corresponding questionnaires follow.

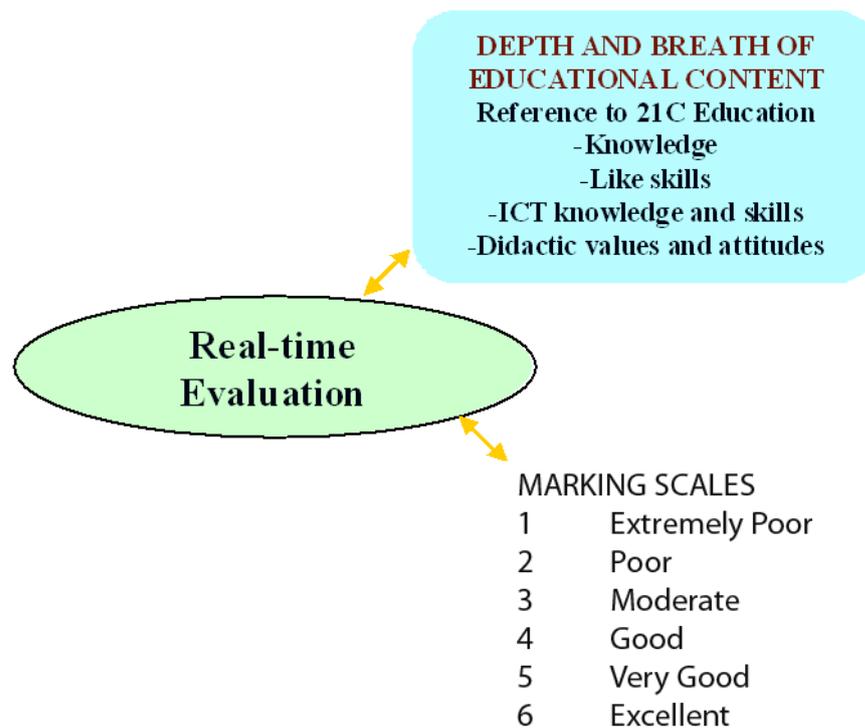


Figure 3. Evaluation of Perceived Educational Value of Robodidactics Pilots



KNOWLEDGE OF VARIOUS SCHOOL SUBJECTS

Please rate the degree to which the use of the Robodidactics Methodology in the pilots has involved the following subjects:

	1	2	3	4	5	6
Mathematics						
Science						
Physics						
Chemistry						
Biology						
Electronics and Mechanics (Mechatronic Engineering)						
Computing and Telecommunications						
Literature						
Philosophy						
English						
Other Languages						
History & Geography						
Economics						
Civic Education						
Arts and Design						
Physical Education						



Others (please specify)						
Suggestions for Improvements:						
Additional Comments:						

1 (nothing), 2 (very little), 3 (little), 4 (fair amount), 5 (high), 6 (very high)

LIFE SKILLS						
Please rate the degree to which the use of Robodidactics Methodology in the pilots has nurtured the following life skills:						
	1	2	3	4	5	6
Leadership and decision-making						
Creativity and innovation						
Communication						
Critical and systemic thinking						
Concentration (focus) and problem solving						
Mnemonics (memory)						
Research (including use of Internet)						
Ludic skills (learning with fun))						
Self-awareness and personal development						



Team and relationship building						
Collaborative work						
Community involvement						
Cultural empathy (with e.g., the elderly, the disable, other nationalities)						
Health, stress and emotional management						
Others (please specify)						
Suggestions for Improvements:						
Additional Comments:						



1 (nothing), 2 (very little), 3 (little), 4 (fair amount), 5 (high), 6 (very high)

DIDACTIC ATTITUDES AND VALUES

Please rate the degree to which the use of the Robodidactics Methodology in the pilots has nurtured the following didactic attitudes and values:

	1	2	3	4	5	6
Curiosity, fun & joy to learn						
Participation & discipline in tasks						
Shared learning						
Scientific honesty, integrity						
Motivation to achieve and fair competition						
Personal responsibility, flexibility & adaptability						
Social and environmental responsibility						
Values for inclusive human development (e.g., freedom, justice, peace, equality of opportunities, solidarity, fraternity, generosity, trustworthiness)						
Others (please specify)						
Suggestions for Improvements:						
Additional Comments:						

1 (nothing), 2 (very little), 3 (little), 4 (fair amount), 5 (high), 6 (very high)



ICT SKILLS AND KNOWLEDGE						
Please rate the degree to which the Pilot has nurtured the following ICT skills and knowledge:						
	1	2	3	4	5	6
General use of ICT equipment (e.g., computers, robots)						
Specific conceptual knowledge of ICT equipment (e.g., computers, robots)						
Learning the principles of designing and building working ICT objects (e.g., robots)						
Learning-by-doing or making ICT equipment (e.g., robot building and simple programming)						
Learning-by-playing with ICT equipment (e.g., robots)						
Learning-to-learn using Internet and other research resources						
Participating in collaborative e-learning environment and practices						
Preparing, processing, presenting, and communicating knowledge and work						
Others (please specify)						
Suggestions for Improvements:						
Additional Comments:						



1 (nothing), 2 (very little), 3 (little), 4 (fair amount), 5 (high), 6 (very high)

III. Brief Enquiry into Factors Favouring or Hindering the Diffusion of Robot-based Didactics at School

This section enquires about a number of factors of importance for the adoption and diffusion of robot-based didactics at school and, more generally, the involvement of students with technology and science. It distinguishes two interrelated aspects: (i) motivation of students and (ii) motivation of school. These factors are illustrated in Figure 4 and the questionnaires follow.

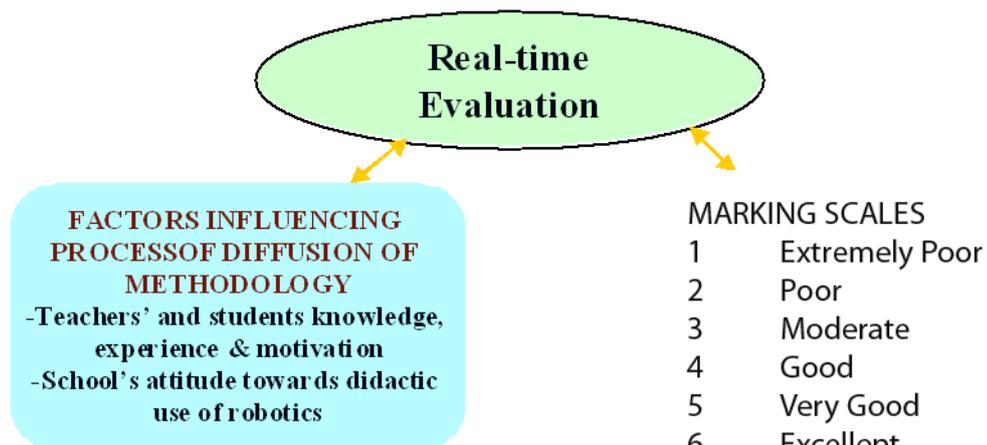


Figure 4. Evaluation of Factors Favouring or Hindering the Diffusion of Robot-based Didactics at School



MOTIVATION OF STUDENTS

What motivates children to get involved with technology or to decide not to get involved with it?

Can a playful approach improve the involvement of students with technology?

Is the Robodidactics methodology addressing the right issues? To what extent is the approach likely to work?

Is the RoboDidactics approach likely to be successful in stimulating children in selecting a scientific or engineering education?

A major drawback of learning by exploration is that students may form wrong habits or enter a lengthy path that deviates from the goals. How do we detect this is happening and how do we solve this situation? Is a guide with set goals a good approach and how are we then going to enforce this?

Can we develop metrics that reveal the degree of learning generated by robot-based didactics? How would these metrics look like?

MOTIVATION OF SCHOOL

What is the motivation of your school for participating in the Robodidactics Pilot?

How strong is this motivation? Please circle

Very Poor Poor Moderate Good Very Good Excellent

How do you rate the alignment of the Robodidactics Pilot with the educational strategy, governance, and reward system of your school? Please circle

Very Poor Poor Moderate Good Very Good Excellent

Is there some kind of institutional reward for the teachers promoting robot-based education?

Can the institutional rewards be improved? How?

What aspects of your school play a favourable role in the implementation of the Robotic Pilot and, more generally, robot-based education?

What aspects of your school play an unfavourable role in the implementation of the Robotic Pilot and, more generally, robot-based education?

Suggestions for removing them?

Please make any comment you wish regarding the value of the Robodidactics Pilot to you and your school and any other comments that you feel are relevant

THANK YOU!

