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Annexes

Annex 1.

Questionnaire on Self-Regulation of Learning in Problem-Solving Contexts (English Version)

No.	Statement
1	I stop reading a problem as soon as the problem statement is more than 5 lines long.
2	If the statement is difficult to understand, I read it several times and try to understand it.
3	If the statement is long (more than 5 lines), I relate it to others I have made or seen before.
4	Even if a problem statement makes me unsure, I try to solve the problem.
5	When I try to understand a problem, even if I have doubts, I don't give it up because I take responsibility for solving it.
6	After reading a problem statement I highlight or represent the essential conditions or information of the problem.
7	After reading about the problem, I'm going to do the first thing that comes to my mind
8	If I don't understand the statement I talk to myself to try to understand it.
9	If I feel insecure when I read a statement, I have resources to feel more confident.
10	As I'm reading, I encourage myself by reminding myself that understanding the statement depends on what I try and how I try.
11	If I have failed to understand a statement, I try to look for the causes so that the same thing does not happen to me the next time.
12	Even if a problem seems useless or uninteresting to me, before I start to solve it, I try to motivate myself by reminding myself how important it is to learn it in order to pass the exam and the subject, and thus finish the course, the degree,...
13	If I have understood the statement of a problem, I look at what worked for me in order to repeat or improve it in the next problem.
14	I tend to keep in the habit of taking time to understand the issues.
15	If I don't understand a statement I am able to ask for help to understand it.
16	If I have a fixed idea of how to solve the problem I am not capable to change it.
17	After understanding the statement I think of different strategies to deal with it (try examples, start with simpler cases, change the statement, look for similar problems, look for regularities, etc.).
18	After a while of weighing up plans, I'm not usually clear about which one I'm going to choose.
19	Before writing a tentative conclusion about the solution (conjecture) I think about whether it makes sense.
20	I am able to express my tentative conclusions about the solution (guesses), even if I don't know if they are right.
21	I am able to express my tentative conclusions about the solution (conjectures) even though I am embarrassed to express them.
22	At all times I know what I am doing on a problem, what I am doing it for and how what I am doing is useful for the solution.
23	If, after overcoming a difficulty, another difficulty arises in the problem, I look for ways to overcome it myself.
24	I persist in pursuing my plan or idea, even if I am not sure if it is right.
25	I check my tentative conclusions (conjectures) or results to see if they are consistent or if the conditions of the statement are met.
26	I am able to control my emotions while solving a problem.

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No.	Statement
27	If, when I check a solution, I realise that it is wrong, I am not able to take advantage of what is right to look for another way.
28	If, after thinking about the problem for a long time, I am not able to solve it, I am able to ask for help from one of my classmates, teachers or people close to me.
29	I am able to be critical of myself, questioning the steps of my solution.
30	I am able to sequence, describe and correct the steps taken to reach the solution.
31	I am able to see the possibilities of my solution to extend it to other problems.
32	I am able to take an interest in other solutions and see the advantages or disadvantages with my own solution.
33	I prefer challenging tasks (therefore a bit more difficult and adventurous) to exercises where I know what I have to do.
34	I don't engage in challenges that cause me fear, or stress or frustration or any negative emotions.
35	I find it important when solving problems to do it myself.
36	If I don't know how to do it myself, I find it important to learn from my peers.
37	I am not primarily responsible for the resolution of the problem.
38	The main person responsible for the problem is the teacher.
39	I am capable of thinking, even for a week, about a problem that has not come up.
40	When I can't solve a problem, I feel bad.
41	When I'm solving problems, I'm so focused that it's as if time stands still.
42	I believe that being responsible and putting all interest in solving problems is not only beneficial for me, but also for parents, teachers and classmates.
43	I think it is important that a problem is difficult in order to improve my education and to grow as a person.
44	If the problem is difficult, I am not able to generate positive emotions for its resolution.

Total Element Statistics

Total Item-total correlation	Cronbach's alpha if Item removed

Note: derived from research.

Annex 2

Total Element Statistics

	Total Item-total correlation	Cronbach's alpha if Item removed		Total Item-total correlation	Cronbach's alpha if Item removed
Item1	,273	,883	**Item14**	,537	,879
Item2	,383	,881	**Item15**	,205	,883
Item4	,468	,880	**Item16**	,192	,884
Item5	,645	,877	**Item17**	,526	,879
Item6	,266	,883	**Item18**	,210	,884
Item8	,405	,880	**Item19**	,475	,880
Item9	,525	,878	**Item20**	,426	,880
Item10	,339	,882	**Item21**	,357	,881
Item11	,347	,882	**Item22**	,572	,877
Item12	,368	,881	**Item23**	,606	,878
Item13	,325	,882	**Item24**	,348	,882

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	Total Item-total correlation	Cronbach's alpha if Item removed
Item25	,540	,879
Item26	,375	,881
Item27	,277	,883
Item28	,306	,882
Item29	,437	,880
Item30	,633	,878
Item31	,370	,881
Item32	,602	,877
Item33	,464	,879
Item34	,179	,885

	Total Item-total correlation	Cronbach's alpha if Item removed
Item35	,489	,879
Item36	,205	,883
Item37	,120	,886
Item38	,105	,885
Item39	,225	,885
Item41	,447	,880
Item42	,395	,881
Item43	,513	,879
Item44	,255	,883

Note: derived from research.

Annex 3

Factor Weights for Exploratory Factor Analysis with Varimax Rotation of the Self-Regulation Scale in Mathematical Problem-Solving Contexts

Nº	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Factor 1												
item30	.666	.243		.178			.117	.109	.155			-.108
item33	.600		-.105	.249		.192	-.190	-.114		.327		.184
item31	.570		.167									
item9	.548	.112	.240			.206				.120		
item22	.527	.186	.109	.177	.189	.116			-.101		.154	
item32	.496	.133	.127	.279	.310	.164			.151			
item23	.470	.437		.133	.228							.145
item26	.453					.209						.118
item17	.444	.228	.161	.232		.116	.218				-.161	
item35	.397	.259		.218			.138		.304	.187	.111	
item29	.287	.265		.154	.273	-.125	.142	.148				
Factor 2												
item2		.659					.117					
item4	.275	.569						.157				.257
item25	.167	.504			.333	.145	.102	.111	.142			-.102
item8	.164	.470	.143	.321				-.135	-.140		-.176	-.209
item6		.454	.187					-.179				
item14	.176	.440	.296		.272	.153		-.113		.143	.193	.150
item5	.409	.435	.156		.178	.104	.150	.220		.232		
i1REC		.325				.276		.156			.104	
Factor 3												
item13		.210	.600	.159	.141			-.147				
item11	.258		.589		.231					.122		-.146
item12	.110	.120	.561	.173		.118						.159
item10	.264	.135	.517	.142							-.321	
Factor 4												
item41	.269	.203	.100	.608								
item42	.167		.191	.582			.152		.143			
item43	.389			.453	.164			.220	.109	.121		

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Nº	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Factor 5												
item20	.190		.109	.148	.672		.102			-.108		
item19		.313	.184		.551	.231				.140		
item21	.291				.503		.120	.101	-.104			.248
Factor 6												
item44	.173					.613						
item34						.494		.112	-.118			
item27	.173					.428			.111	-.363		
item16	.211			-.139		.390	.149		.115			
item38	-.103	.102	-.172	.172		.318	-.131	.157	.128	-.142		
Factor 7												
item15		.138					.758					
item28		.223		.132	.177		.598		.210			
Factor 8												
item37					.104	.156		.596				
Factor 9												
item36		.181				.129	.185		.624	-.152		
Factor 10												
item39		.113		.374					-.192	.494		
Factor 11												
item18	.231		-.224			.375		.215		-.145	.614	-.100
Factor 12												
item24	.225	.263		.274		-.110	.115					.456

Note: Factor weightings >10.

Note: derived from research.

Annex 4

Distribution of Items According to the Level of Self-Regulation

	Level of self-regulation			
Factors	Observation	Emulation	Self-control	Self-regulation
Factor 1			23, 26, 30	22, 31, 32, 33
Factor 2		1, 24	2, 4, 5, 14,	
Factor 3			39, 41	35, 42, 43
Factor 4			6, 8, 17	9, 10, 11, 12, 13
Factor 5	16, 34, 37, 38		18, 44	27
Factor 6		19, 20, 25, 29	21	
Factor 7				15, 28, 36

Note: derived from research.

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Annex 5

Distribution of Items According to Zimmerman's Dimensions

Factors	Zimermann					Boekarts
	Method	Motives	Behavior	Time	Social environment	Ethic
Factor 1		30, 32, 33	22, 23, 26, 31			
Factor 2	2		4, 5, 24	1, 14		5
Factor 3		35, 39, 41, 42, 43				
Factor 4	6, 8, 17	6, 12	9, 10, 11, 13			
Factor 5		27, 34, 44	16, 27, 18	18		34, 37, 38, 44
Factor 6	19, 20, 21, 29	25				
Factor 7					15, 28, 36	

Note: derived from research.

Annex 6

Distribution of Items in Problem-Solving Phases

	Mathematical problem solving phases				Do not belong to any phase
Factors	Understand the problem	Make a plan	Execute the plan	Look back and reflect	
Factor 1			22, 23, 26	30, 31, 32	33
Factor 2	1, 2, 5, 14		4, 24		
Factor 3					35, 39, 41, 42, 43
Factor 4	6, 8, 9, 10, 11, 12, 13	17			
Factor 5		16, 18	27		34, 37, 38, 44
Factor 6		19, 20, 21	25	29	
Factor 7		15	28		36

Note: derived from research.

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