

Digital Improvement by Game In Teaching

DIGITgame Project

Final International Virtual Conference & Game Award Ceremony 10 of December 2020







36 MONTHS PROJCET DURATION From 30-12-2017 to 29-12-2020 (including extension)



Intellectual Output 1
Pedagogical material

Intellectual Output 2
STEMgame Video Game platform

Intellectual Output 3
Toolkit for Players

Intellectual Output 4
Methodology for Exchange innovative experiences

5 PROJECT PARTNERS
3 COUNTRIES









vakıfk12

TAGES

PROJECT FINANCED BY ERASMUS+ PROGRAMME



Key action:

KA2 –

Cooperation for Innovation and the Exchange of Good Practices

Action:

KA201 -

Strategic Partnerships for school education





Computers and technology have influenced the nature of the "digital native citizens" life and the most recent generation of students have grown up with these technologies. (Wang S. et al. 2014)

DIGITgame project intends to attract young people to STEM subjects by supplying an alternative way to use and apply basic and advanced scientific concepts in a technological tool very familiar and appealing as a videogame.



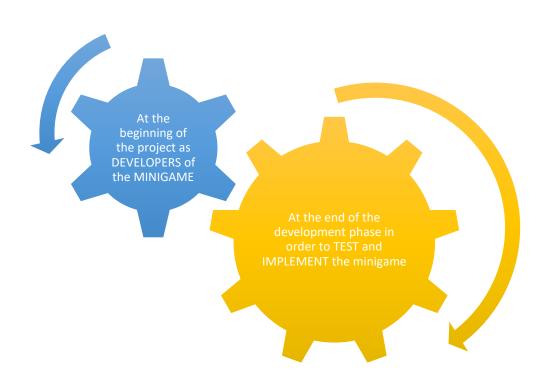
The project proposes a new approach to communicate and teach traditional topics of environmental sciences using the new thematic of Smart Cities and taking advantage introducing the videogame solution.





DIGITgame project involved students from 14 to 16 ages in Italy and Turkey.

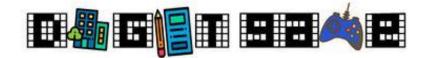
Different students are involved in two different pilot activities:



DEVELOPERS SENSALE K12

Students' activities:

- ✓ Administration of questionnaires
- ✓ Traditional lessons on STEM subject
- ✓ Creation of minigame
- ✓ Technological and IT support
- ✓ Direct contact with other students



Didactic strategy designing

The innovative didactic idea is to involve students in build and tuning the videogames logic by making use of the scientific knowledge acquired in relation to the variables and assets identifies.



Variables are the game software structure that will be developed by the virtual world software Company. It is the general framework where students will develop the **Assets**.

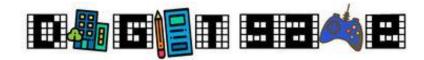
VARIABLES

- Climate: Dry and windy; Hot and humid; Humid and cold (no seasons yearly average)
- Industrialization: Low; Medium; High
- Level of Green: Low; Medium; High
- Green Transport

ASSETS

- Recycle Stations
- Trees (10 from Italy 10 from Turkey)— related to VOC
- Weather Stations: One basic and one more advance (students will answer questions to modify their station from basic to advance)
- Questions about green transport and cars to increase money or score
- Solar Panels (the energy that is produced increases the score. The solar panels have to be buy)
- Smart Building (elements to build the house to increase the score and happiness)





Didactic strategy designing

The aim of the mini-game is to combine and create a *file rouge* between entertainment education and use of entertainments features for education. The didactic strategy of the project is focused on the students' participative approach. After the identification of assets and variables the first group of students participated to the traditional lessons to deepen STEM subjects. In the same period, the software company involved in the project identified the platform that support the mini-game and developed the variables.



They have set three kind of places: small village, medium town and large city.



MINI

SMALL VILLAGE



MIDI

MEDIUM TOWN



MAXI

LARGE CITY





Results of the questionnaires administrated to developer and implementer schools in Italy and Turkey

The aim of this double survey administration was to detect if the awareness and knowledge of STEM has increased as a result of the activities developed during the project.

	Male Female	First questi administ N=21	Second questionnaire administrated N=187		
		n. of responses	%	n. of responses	%
Canadan	Male	130	60.5	115	61.5
Gender	Female	85	39.5	72	38.5
	12-13	9	4.2	6	3.2
Age Group	14-15	96	44.6	81	43.3
	16-17	110	51.2	100	53.5
Country	Italy	113	52.6	103	55.1
Country	Turkey	102	47.4	84	44.9

The total sample interviewed was made up of 60.9% of male and 39.1% of female. Most of respondents have an age comprised between 16-17 (52.2%), followed by 44% from the 14-15 age group. Italian (53.7%) and Turkey (46.3%%) students was interviewed





Science			· a				b.								
ntine games (quizzes) could make me love more Science	3.05 (1.06)	14.42%	9.77%	33.49%	41.40%	0.93%	Online-games (quizzes) could make me love more Science	3.58 (1.04)	5.35%	9.09%	24.06%	44.92%	16.58%		
My parents would like it if I choose a science career	3.37 (0.80)	4.65%	4.19%	43.26%	45.58%	2.33%	My parents would like it if I choose a science carear	3.34 (1.07)	3.74%	18.72%	33.69%	27.81%	16.04%		
If I do well in science classes, it will help me in my future career	3.65 (0.79)	3.72%	3.72%	21.40%	66.05%	5.12%	If I do well in science classes, it will help me in my future conser	3.77 (1.08)	4.28%	5.88%	28.88%	30.48%	30.48%		
I would feel comfortable talking to people who have a career in science	3.44 (0.86)	6.05%	5.12%	28.84%	59.07%	0.93%	I would feel comfortable talking to people who have a career in science	3.25 (1.16)	6.95%	19.79%	31.55%	24.60%	17.11%		
I will work hard in my science classes	4.00 (0.80)	1.40%	0.93%	20.93%	49.77%	26.98%	I will work hard in my science classes	3.80 (1.05)	3.74%	8.02%	19.79%	41.18%	27.27%		
se mobile devices / pcto deepen Science topics treated al school	3.21 (1.04)	13.02%	6.05%	28.84%	51.16%	0.93%	Luse mobile devices / poto-deepen Science topics treated at school	3.66 (0.92)	2.14%	5.88%	34.76%	38.50%	18.72%		
I use mobile devices / pc to study Science	3.42 (0.91)	6.98%	7.44%	22.79%	62.33%	0.47%	I use mobile devices / pc to study Science	3.59 (1.09)	6.42%	4.28%	36.36%	29.41%	23.53%		
I plan to use science in my future career	3.54 (1.16)	7.91%	6.05%	35.35%	25.58%	25.12%	I plan to use science in my future censer	3.33 (1.17)	6.42%	16.04%	37.43%	18.18%	21.93%		
Tike online games (quizzes) with Science questions	2.96 (1.05)	13.49%	16.28%	31.63%	38.14%	0.47%	I like online games (quizzes) with Science questions	3.42 (1.06)	8.56%	7.49%	28.34%	44,92%	10.70%		
I like my science class	3.54 (0.84)	5.58%	5.12%	20.00%	68.37%	0.93%	Tilke my science class	3.90 (0.95)	3,74%	3.21%	18.18%	48.66%	26.20%		
now someone in my family who uses science in their career	2.81 (1.23)	23.26%	16.28%	16.74%	43.26%	0.47%	I know someone in my family who uses science in their career	3.07 (1.32)	10.22%	30.65%	22.58%	15.05%	21.51%		
I have a role model in a science career	2.50 (1.18)	30.23%	16.28%	26.51%	26.98%	0.00%	I have a role model in a science career	2.70 (1.17)	11.83%	39.78%	26.88%	9.14%	12.37%		
I am interested in careers that use science	3.36 (0.99)	8.37%	6.98%	29.77%	49.77%	5.12%	I am interested in careers that use science	3.32 (1.14)	7.49%	13.90%	34.76%	26.74%	17.11%		
m able to get a good grade in my science class	3.95 (0.82)	2.33%	1.40%	17.67%	56.28%	22.33%	I am able to get a good grade in my science class	3.87 (0.85)	3.21%	2.14%	17.65%	58.29%	18.72%		
I am able to complete my science homework	3.84 (0.92)	3.72%	2.33%	21.86%	50.23%	21.86%	I am able to complete my science homework.	3.97 (0.78)	0.53%	4.28%	15.51%	57.22%	22.46%		
	Mean (SD)	1	2	3	- 6	- 6		Mean (SD)	1	2	3	4.			

Technolo (gy		ć	1.).						
line games (quizzes) could make me lave more Technology	2.91 (1.08)	14.88%	16.74%	31.63%	35.81%	0.93%	Online games (quizzes) could make me love more Technology	2.95 (1.3)	14.4%	22.5%	34.2%	11.2%	17.6%	
My parents would like it if I choose a technology career	3.18 (0.92)	8.84%	7.44%	41,40%	41.40%	0.93%	My parents would like it if I choose a technology career	3.17 (1.1)	7.5%	20.9%	33.7%	23.5%	14.4%	
If I learn a lot about technology, I will be able to do lots of different types of careers	3.53 (0.88)	6.98%	4.19%	19.07%	68.37%	1.40%	If I learn a lot about technology, I will be able to do lots of different types of caneers	3.55 (1.2)	5.4%	14.5%	29.0%	21.5%	29.6%	
i would feel comfortable talking to people who work in technology careers	3.20 (0.95)	9.30%	8.37%	35.81%	45.58%	0.93%	I would feel comfortable falking to people who work in fachtology careers	3.18 (1.1)	7.5%	19.4%	32.3%	29.0%	11.8%	
I will work hard in my technology classes	3.35 (0.95)	9.30%	5.12%	27.91%	56.74%	0.93%	I will work hard in my technology classes	3.44 (1.2)	5.3%	16.6%	31.0%	22.5%	24.6%	
I use mobile devices / pc to study Technology	3.37 (1.00)	8.84%	9.30%	20.00%	59.53%	2.33%	I use mobile devices / pc to study Technology	3.43 (1.3)	7.5%	17.6%	24.6%	24.6%	25.7%	
use mobile devices / pc to deepen Technology topics treated at school	3.22 (1.02)	9.77%	12.56%	24.65%	51.63%	1.40%	I use mobile devices / pc to despen Technology topics treated at achosi	3.28 (1.2)	8.6%	18.7%	29.9%	21.9%	20.9%	
I plan to use technology in my future career	3.37 (0.95)	9.30%	4.19%	27.91%	57.21%	1.40%	I plan to use technology in my future career	3.42 (1.2)	5.3%	19.8%	28.9%	19.8%	26.2%	
I like online games (quizzes) with Technology questions	2.98 (1.03)	12.09%	16.74%	32.56%	38.14%	0.47%	I like online games (quizzes) with Technology questions	3.01 (1.3)	14.4%	19.8%	34.2%	13.4%	18.2%	
I like my technology class	3.22 (0.94)	8.37%	9.77%	34.42%	46.51%	0.93%	I like my technology class	3.25 (1.2)	7.5%	19.3%	35.3%	17.1%	20.9%	
ow someone in my family who uses technology in their career	3.09 (1.17)	16.28%	13.49%	16.28%	52.56%	1.40%	t know someone in my tamily who uses technology in their career	3.01 (1.3)	13.9%	23.5%	28.3%	16.6%	17.6%	
tuve a role model who uses technology in their career	2.76 (1.11)	19.63%	16.82%	32.71%	29.91%	0.93%	I have a role model who uses technology in their career	2.77 (1.1)	12.8%	29.9%	33.7%	14.4%	9.1%	
I am interested in careers that use technology	3.16 (1.01)	11.16%	8.84%	34.88%	43.26%	1.86%	Lies interested in careers that use technology	3.10 (1.2)	9.1%	21.9%	35.3%	17.1%	16.6%	
I am able to do well in activities that involve technology	3.54 (0.85)	6.05%	3.72%	21.86%	66.98%	1.40%	I am able to do well in activities that involve technology	3.57 (1.2)	7.0%	9.1%	29.9%	28.3%	25.7%	
I am able to complete activities that involve technology	3.53 (0.82)	5.58%	3.72%	23.26%	66.51%	0.93%	I am able to complete activities that involve technology	3.61 (1.1)	5.3%	9.1%	28.9%	32.1%	24.6%	

The comparison results highlight an interesting aspect related to the **increasing of knowledge** about the online quizzes and use of technologies in each STEM subjects. This result is in line with the aim of the project and activities carried out to students in Italy and Turkey. In particular, it is in line with the output IO2 which proposed a new approach to enhance the students' ability to learn scientific and ecological skills through the development of a mini-game.





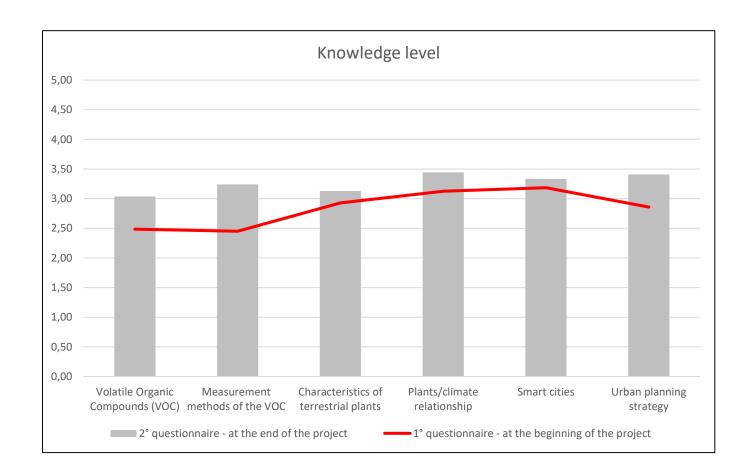
Enginee	ring		а						10 To	Ł).			
Online games (quizzes) could make me love more engineering	2.80 (1.13)	17.67%	21.40%	26.05%	33.49%	1.40%	Orane games (guizzes) could make me love more engineering	2.81 (1.3)	18.7%	20.3%	35.3%	12.8%	12.8%	
My parents would like it if I choose an engineering career	3.23 (0.92)	7.91%	7.91%	39.07%	43.26%	1.86%	My parents would like it if I choose an engineering canser	3.04 (1.2)	10.8%	22.2%	31.4%	23.8%	11.9%	
If I learn a lot about engineering, I will be able to do lots of different types of careers	3.20 (1.06)	11.63%	10.23%	26.98%	48.84%	2.33%	If I learn a lot about engineering, I will be able to do lots of different types of useers.	2.90 (1.3)	12.8%	26.2%	26.7%	17.6%	16.6%	
I would feet comfortable taking to people who are engineers	3.07 (1.02)	11.16%	13.95%	31.63%	42.79%	0.47%	I would find confortable falling to people who are engineers	2.86 (1.2)	14.4%	24.1%	32.6%	19.3%	9.6%	
I will work hard on activities at school that involve engineering	3.08 (1.04)	13.49%	9.30%	33.02%	43.72%	0.47%	I will work hard on activities at achool that stroote engineering	3.02 (1.2)	9.6%	26.7%	29.4%	20.3%	13.9%	
I use mobile devices/pc to study engineering for engineering activities	2.84 (1.09)	17.21%	16.28%	32.56%	33.49%	0.47%	I use mobile devices jot to study engineering for engineering activities.	2.78 (1.2)	16.0%	25,1%	33.2%	16.6%	9.1%	
I use mobile devices to to deepen engineering topics treated at school	2.77 (1.09)	18.14%	18.60%	31.63%	31.16%	0.47%	I use mobile devices by to deepen engineering, topics treated at school	2.75 (1.2)	18.2%	26.2%	28.9%	15.5%	11.2%	Per
I plan to use engineering in my future career	2.95 (1.13)	16.74%	12.56%	33.02%	34.42%	3.26%	I plan to use engineering in my future career	2.64 (1.3)	25.7%	20.3%	28.9%	14.4%	10.7%	П
I like on/off line quizzes with engineering questions/solivities	2.70 (1.11)	19.07%	22.79%	28.37%	28.84%	0.93%	I like untoff line quizzes with engineering questions activities	2.71 (1.2)	20.3%	23.0%	33.7%	11.8%	11.2%	
I like activities that involve engineering	3.13 (0.99)	11.16%	9.77%	34.42%	44.65%	0.00%	1 like activities that involve engineering	2.99 (1.2)	11.3%	25.8%	28.5%	21.0%	13.4%	
know someone in my family who is an engineer	2.94 (1.18)	18.60%	15.81%	20.00%	44.19%	1.40%	I know someone in my family who is an engineer	2.93 (1.3)	14.4%	31.0%	18.2%	20.9%	16.0%	
I have a role model in an engineering career	2.53 (1.12)	24.19%	23.26%	28.37%	23.26%	0.93%	I have a rule model in an engineering career	2.48 (1.2)	21.9%	36.9%	19.8%	14.4%	7.0%	
I am interested in careers that involve engineering	2.97 (1.10)	15.35%	13.49%	32.09%	37.21%	1.86%	I am interested in coreen that move engineering	2.72 (1.2)	15.6%	30.1%	31.2%	12.9%	10.2%	
I am able to do well in activities that involve engineering	3.19 (1.01)	10.70%	9.30%	32.09%	46.05%	1.86%	I am able to do well in activities that involve engineering	3.06 (1.2)	11.2%	18.7%	34.8%	23.5%	11.8%	
I am able to complete activities that involve engineering	3.11 (1.03)	12.09%	10.23%	33.02%	43.72%	0.93%	I am able to complete activities that involve originaring	3.04 (1.1)	8.6%	20.3%	39.6%	21.4%	10.2%	
	Mean (SD)	1	2	3	4	5		Mean (SD)	1	2			6	

Mathema	tics		ā	ì.						k).			
Online games (quizzes) could make me love more Mathematics	3.01 (1.05)	11.63%	18.14%	28.84%	40.00%	1.40%	Online garres (quizzes) could make me love more Mathematics	3.32 (1.19)	12.30%	9.09%	26.74%	38.50%	13,37%	
My parents would like it if I choose a mathematics career	3.20 (0.88)	7.44%	6.51%	46.05%	38.60%	1.40%	My parents would like it if I choose a mathematics carear	3.25 (1.07)	6.95%	14.97%	36.36%	29.95%	11.76%	
If I do well in mathematics classes, it will help the in my future career	3.68 (0.72)	2.33%	3.72%	21.86%	67.91%	4.19%	If I do well in enatherrotics classes, it will help not in my future career	3.65 (1.08)	5.35%	6.42%	31.02%	32.62%	24.60%	
I would feel comfortable talking to people who work in mathematics careers	3.27 (0.92)	7.91%	7.91%	34.88%	48.37%	0.93%	I would feel conflotable falking to people who auck in mathematics careers.	3.27 (1.16)	9.63%	11.76%	36.90%	25.67%	16.04%	
I will work hard in my mathematics classes	3.75 (0.53)	0.47%	2.79%	18.60%	77.67%	0.47%	I will work hard in my mathematics classes	3.97 (0.94)	4.30%	0.54%	17.74%	48.92%	28,49%	
I use mobile devices/pc to study Mathematics	3.29 (1.04)	11.16%	9.30%	19.53%	59.07%	0.93%	I use mobile devicembs to study Mathematics	3.49 (1.06)	5.88%	11.23%	25.13%	43.32%	14,44%	
I use mobile devices/pc to deepen Mathematics topics treated at school	3.14 (1.06)	12.09%	13.02%	24.65%	49.30%	0.93%	I use mobile devicesips to deepen Mathematics topics treated at school	3.40 (1.11)	6.42%	14.97%	26.20%	37.43%	14.97%	
I plan to use mathematics in my future career	3.31 (0.86)	5.12%	9.30%	36.74%	47,44%	1.40%	I plan to use wethernation in my future career	3.34 (1.14)	8.02%	11.76%	35.83%	27.27%	17.11%	ш
I like online games (quizzes) with Mathematics questions	3.13 (1.06)	10.70%	16.28%	23.26%	48.37%	1.40%	like onine garres (quizzes) with Mathematics questions	3.42 (1.13)	9.63%	8.56%	25.67%	42.78%	13.37%	
I like my mathematics class	3.43 (0.92)	6.98%	8.84%	19.07%	64.65%	0.47%	like my mathematos class	3.79 (1.05)	5.35%	6.95%	14.44%	49.73%	23.53%	
w comeone in my family who uses mathematics in their career	3.19 (1.11)	13.95%	10.70%	19.07%	54.88%	1.40%	I know someone in my family who uses mathematics in their career	3.35 (1.27)	9.09%	18.72%	22.46%	27.27%	22.46%	
I have a role model in a mathematics career	2.69 (1.12)	20.93%	20.00%	28.84%	29.77%	0.47%	I have a rate model in a mathematics career	2.78 (1.14)	13.37%	29.41%	31.55%	17.11%	8.56%	
I am interested in careers that use mathematics	3,16 (1,04)	12.09%	8.84%	32.09%	45.12%	1.86%	Lant interested in careers that use mathematics	3.25 (1.11)	8.56%	12.30%	39.04%	25.67%	14,44%	
am able to get a good grade in my mathematics class	3.67 (0.70)	2.79%	3.26%	19.53%	73.02%	1.40%	I am able to get a good grade in my mathematics closs	3.83 (1.06)	5.88%	4.28%	17.65%	44.92%	27.27%	
am able to complete my mathematics homework.	3.60 (0.80)	4.19%	6.05%	17.21%	71.16%	1.40%	I am able to complete my mathematics homework.	3.91 (0.99)	2.67%	6.42%	18.72%	41.71%	30.48%	
	Mean (SD)	1	2	3	4	5		Mean (SD)	1	2				

highlight a **lower** Results knowledge in Engineering and Technology compared to Mathematics and Science. This aspect could be related to the fact that in the Italian and Turkish schools the subject of engineering and technology are included in the scholastic curriculum, but at the same time they are not specify as subject in the schools' hours. Probably, students don't perceive these two subjects, despite being treated during schools' lessons, compared to mathematics and science which are subjects itemise in the daily schools' hours.



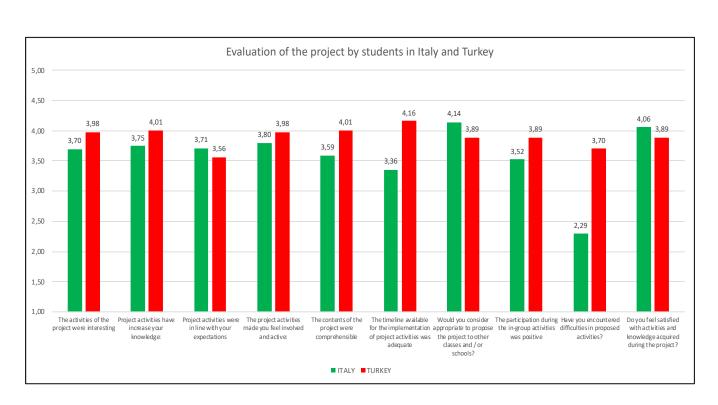




The figure shows a greater knowledge at the end of the project of the topics treated in comparison to the level of knowledge expressed during the first administration of the questionnaire at the beginning of the project. For all topics addressed an increase in knowledge was recorded. In particular the higher percentage of increase was emerged related to the measurement methods of the VOC (+0.79%), Volatile Organic Compound (+0.55%) and *urban planning strategy* (+0.55%).



Final evaluation fo the project. Results of the questionnaires administrated in Italy and Turkey

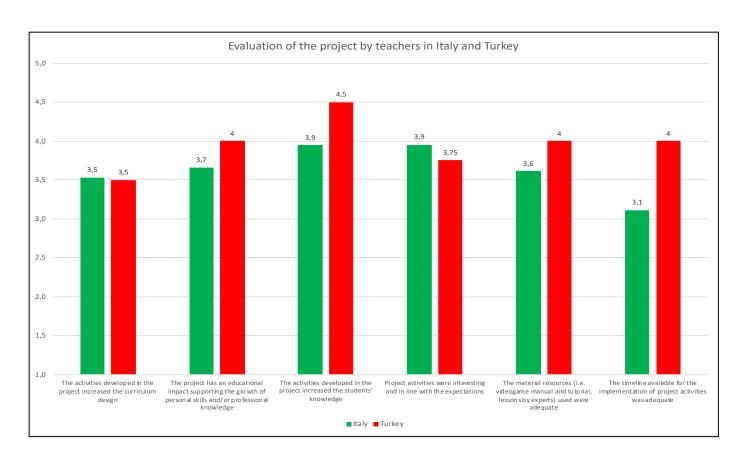


STUDENTS EVALUATION

- Good level of satisfaction related to all questions both for students involved in Italy both in Turkey.
- The mean of all the questions is over 3.8.
- All students declared that the activities carried out have increased their knowledge. Moreover, all of them felt involved in the activities carried out and suggest to propose the project to other classes and schools.







TEACHERS EVALUATION

- Good level of satisfaction for all questions.
- It's interesting to note that also professors argue that the project's activities increased students' knowledge (mean 3.9) and that material resources (such as videogame, tutorial, lessons by experts, etc.) used to carried out the project activities were adequate.



THANKS FOR YOUR ATTENTION AND PARTICIPATION







