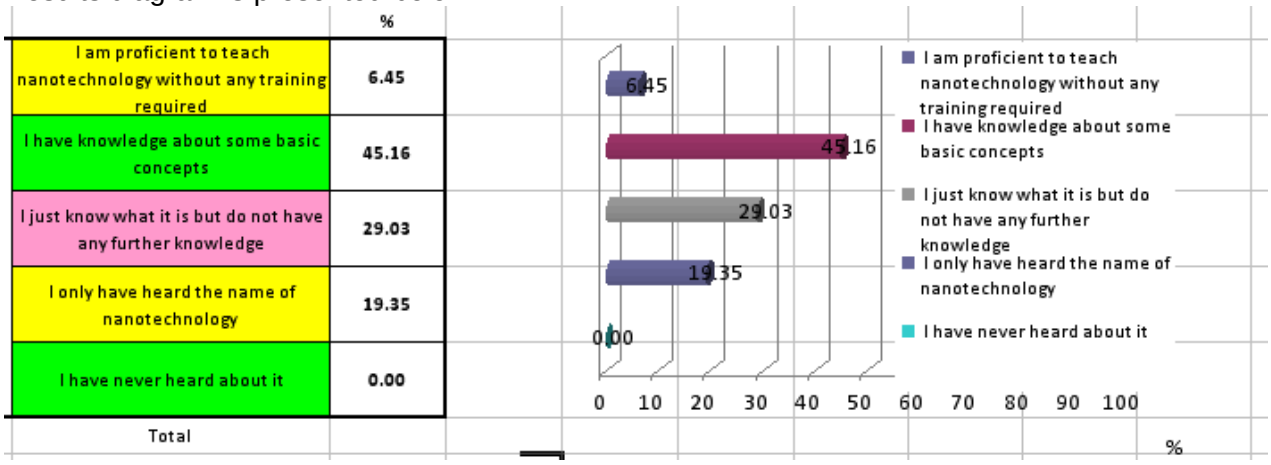
Report on the Results gathered from the Evaluation Questionnaire for Prospective Teachers (RO)

Number of questioned prospective teachers: 31 – prospective teachers with advance Sciences knowledge: Chemistry and Physics specializations (1st, 2nd and 3rd year of study) – May/June 2011.
Questionnaire data processed by: Laura Monica GORGHIU and Gabriel GORGHIU (Valahia University Targoviste, Romania) - June/July 2011.

Question no. 1:

- How would you describe your knowledge about Nanotechnology?

Results diagram is presented below:

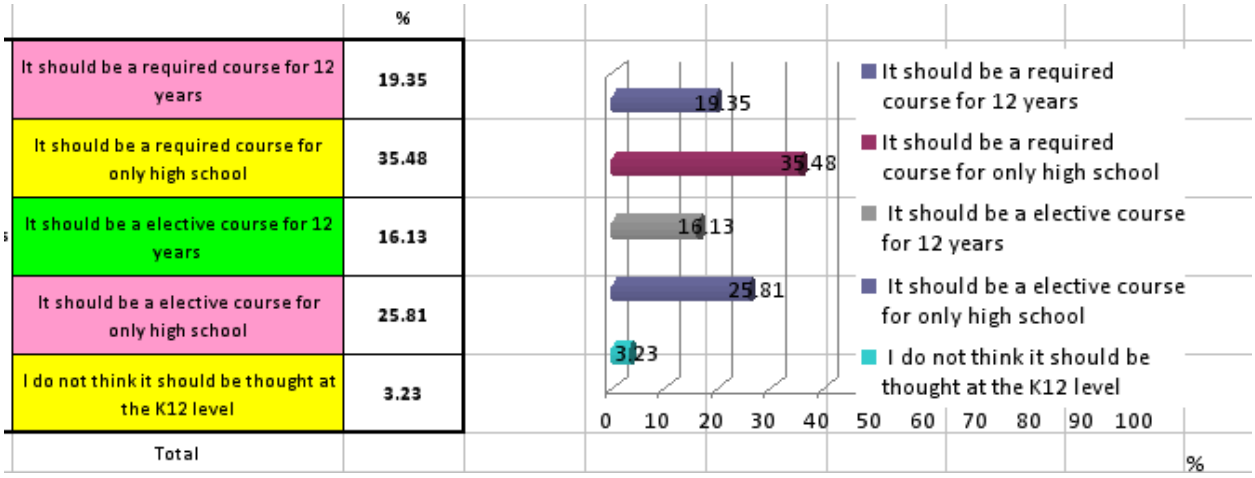


- 45.16% of prospective teachers consider that they have knowledge about some basic concepts.
- just 6.45% of prospective teachers consider that they are proficient to teach nanotechnology without any training required.

Question no. 2:

- What do you think about teaching the emerging Sciences (i.e Nanotechnology) to K12 students?

Results diagram is presented below:

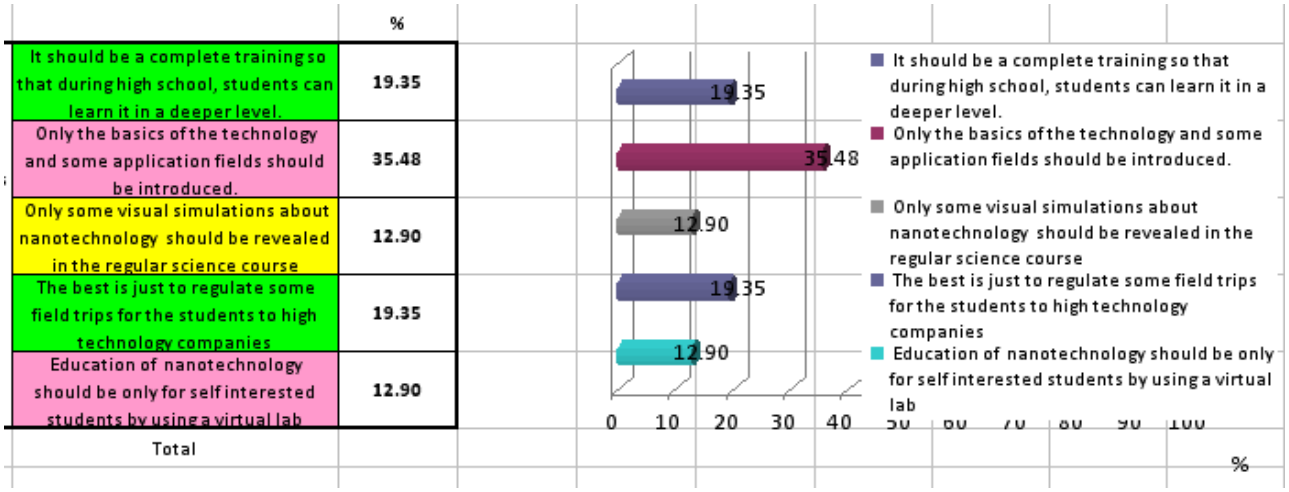


- 35.48% of prospective teachers consider that emerging Sciences (like Nanotechnology) should be a required course for high school students.
- just 3.23% of prospective teachers consider that emerging Sciences (like Nanotechnology) should not be taught at K12 level.

Question no. 3:

- If Nanotechnology is taught, what should be the level for elementary school students?

Results diagram is presented below:

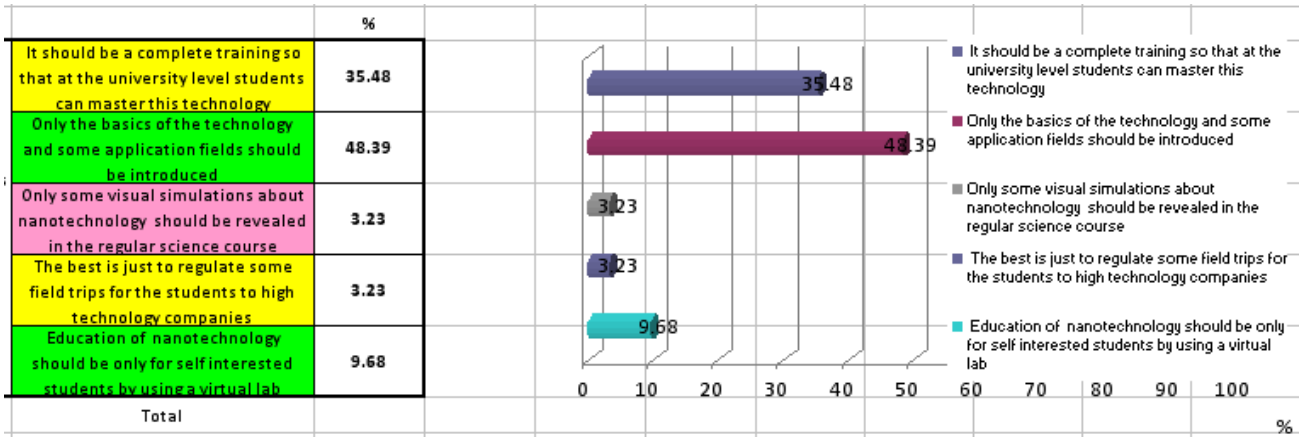


- 35.48% of prospective teachers consider that only the basics of the Technology and some application fields should be introduced for elementary school students.
- 12.90% of prospective teachers consider that only some visual simulations about Nanotechnology should be revealed in the regular science course for elementary school students, and also education of Nanotechnology should be only for self-interested elementary school students by using a Virtual Lab.

Question no. 4:

- If Nanotechnology is taught, what should be the level for high school students?

Results diagram is presented below:



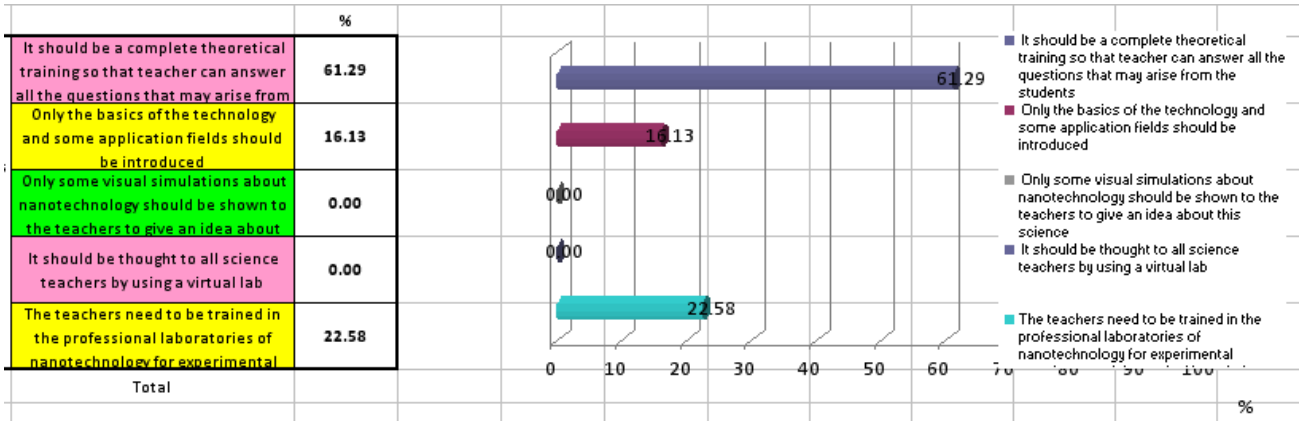
- 48.39% of prospective teachers consider that only the basics of the Technology and some application fields should be introduced for high school students.

- 3.23% of prospective teachers consider that only some visual simulations about Nanotechnology should be revealed in the regular science course for high school students, and also they admit as a suitable channel to organise (on a regular basis) some field trips (for high school students) to high-tech companies.

Question no. 5:

- If Nanotechnology is taught to the science teachers, what would be the level?

Results diagram is presented below:



- 61.29% of prospective teachers consider that it should be a complete theoretical training, so that teacher can answer all the questions that may arise from the students.

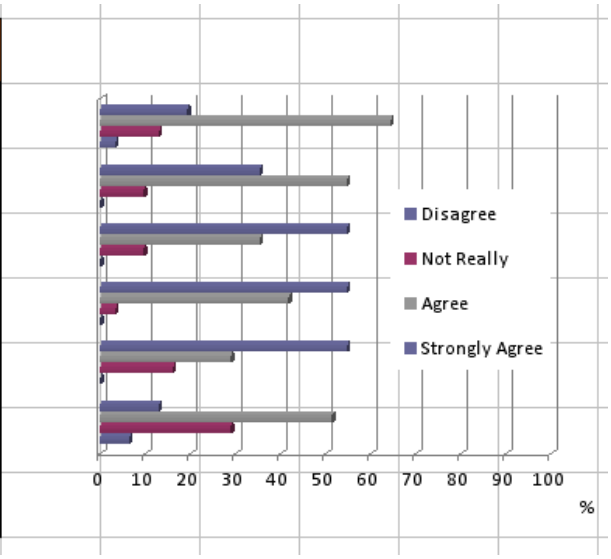
- No one of prospective teachers consider that only some visual simulations about Nanotechnology should be shown to the teachers to give an idea about it, and also no one of prospective teachers consider that it should be taught to all Science teachers just by using a Virtual Lab.

Question no. 6:

- The most effective way to teach a scientific topic in general is...

Results diagram is presented below:

	Disagree	Not Really	Agree	Strongly Agree
Formal lessons	3.23	12.90	64.52	19.35
Reading textbooks	0.00	9.68	54.84	35.48
Watching clips and documentaries	0.00	9.68	35.48	54.84
Interactive computer based tools	0.00	3.23	41.94	54.84
Experiments	0.00	16.13	29.03	54.84
Less structured experiments	6.45	29.03	51.61	12.90
Total	1.61	13.44	46.24	38.71



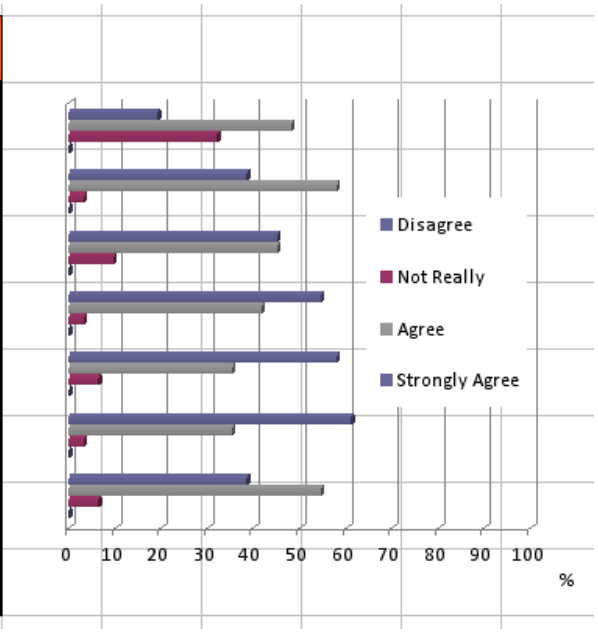
- 54.84% of prospective teachers strongly agree to watch video-clips and documentaries, to use interactive computer based tools and to use experiments in the teaching process.

Question no. 7:

- Do you think the following tools are important for an on-line Virtual Lab?

Results diagram is presented below:

	Disagree	Not Really	Agree	Strongly Agree
Texts	0.00	32.26	48.39	19.35
Images	0.00	3.23	58.06	38.71
Video	0.00	9.68	45.16	45.16
Simulations	0.00	3.23	41.94	54.84
Interactive simulations	0.00	6.45	35.48	58.06
Procedures to carry out experiments with the students	0.00	3.23	35.48	61.29
Resource library	0.00	6.45	54.84	38.71
Total	0.00	9.22	45.62	45.16



- 61.29% of prospective teachers strongly agree that clear procedures to carry out experiments with students are important for an on-line Virtual Lab.

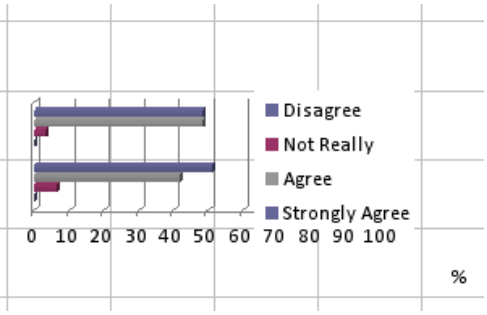
- also 58.06% and 54.84% of prospective teachers strongly agree that interactive simulations and simulations are important for an on-line Virtual Lab

Question no. 8:

- Which type of Lab approach do you think is better?

Results diagram is presented below:

	Disagree	Not Really	Agree	Strongly Agree
Cook-book type laboratory activities (step-by step instructions) to verify scientific facts.	0.00	3.23	48.39	48.39
Inquiry-based laboratory activities (students decide how to conduct the activity, and have to explore in order	0.00	6.45	41.94	51.61
Total	0.00	4.84	45.16	50.00



- 51.61% of prospective teachers strongly agree that inquiry-based laboratory activities (where students decide how to conduct the activity, and have to explore in order to figure out how the world works) are the best approach for an on-line Virtual Lab.

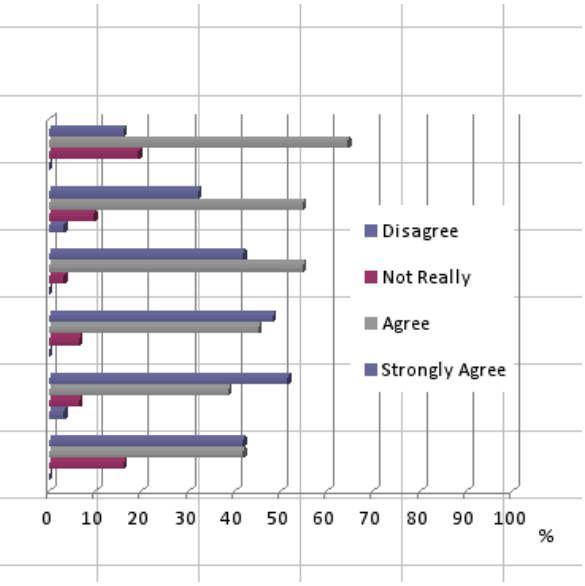
- also 48.39% of prospective teachers strongly agree that cook-book type laboratory activities (step-by step instructions - to verify scientific facts) represent a proper option for an on-line Virtual Lab.

Question no. 9:

- What do you think that the regarding activities in a laboratory would be?

Results diagram is presented below:

	Disagree	Not Really	Agree	Strongly Agree
Students should be engaged by scientifically oriented questions.	0.00	19.35	64.52	16.13
Students should have (be provided) the ability to determine what data allows them to develop and	3.23	9.68	54.84	32.26
Students should have (be provided) the ability to formulate their own explanations from the evidence they	0.00	3.23	54.84	41.94
Students should have (be provided) the ability to expand upon their findings and relate those findings to	0.00	6.45	45.16	48.39
Students should be able to access to the experiments on-line that cannot be done in a laboratory	3.23	6.45	38.71	51.61
Students should have (be provided) the ability to communicate their experimental findings to others in	0.00	16.13	41.94	41.94
Total	1.08	10.22	50.00	38.71



- 51.61% of prospective teachers strongly agree that students should be able to access the on-line experiments that cannot be done in a laboratory.

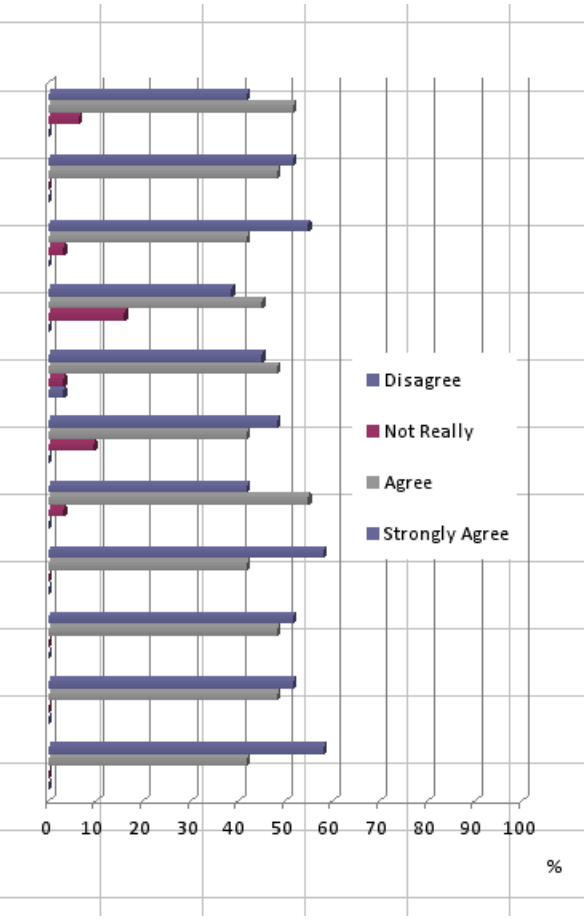
- also 48.39% of prospective teachers strongly agree that students should have (be provided) the ability to expand upon their findings and relate those findings to similar situations.

Question no. 10:

- If you were to create your own laboratory, the students should be able to?

Results diagram is presented below:

	Disagree	Not Really	Agree	Strongly Agree
Make observations.	0.00	6.45	51.61	41.94
Pose questions.	0.00	0.00	48.39	51.61
Have access to an e-Library (other sources of information).	0.00	3.23	41.94	54.84
Plan investigations.	0.00	16.13	45.16	38.71
Reviewing what is already known in light of experimental evidence.	3.23	3.23	48.39	45.16
Use (virtual) tools to gather, analyze and interpret data.	0.00	9.68	41.94	48.39
Propose answers, explanations, and predictions.	0.00	3.23	54.84	41.94
Communicate the results.	0.00	0.00	41.94	58.06
Identify assumptions.	0.00	0.00	48.39	51.61
Use critical and logical thinking.	0.00	0.00	48.39	51.61
Consider alternative explanations.	0.00	0.00	41.94	58.06
Total	0.29	3.81	46.63	49.27



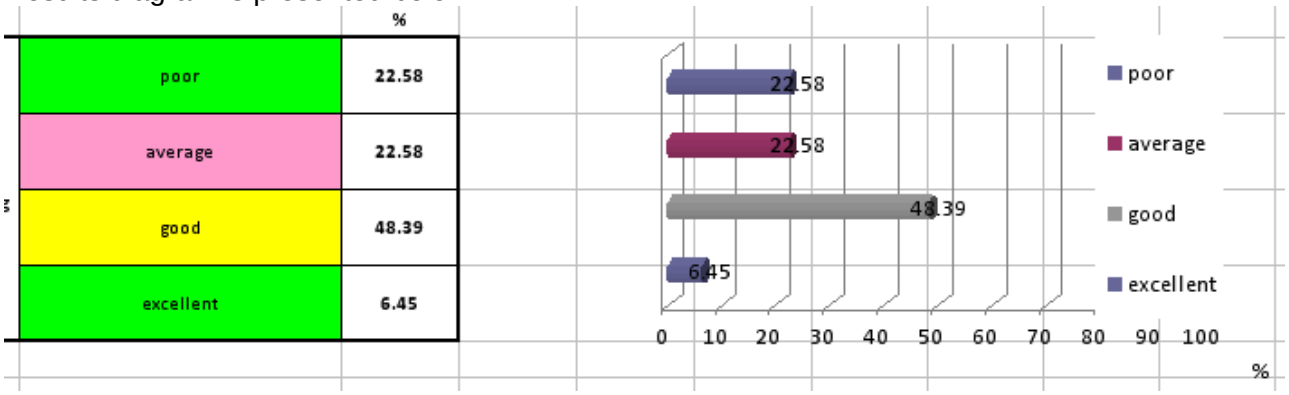
- 58.06% of prospective teachers strongly agree that students should be able to communicate the experimental results and to consider alternative explanations.
- also 54.84% of prospective teachers strongly agree that students should be able to have access to an e-library and to consult other sources of information.

Question no. 11:

- To what extent do you know to use ICT tools for teaching Science/Nano-Tech topics?

Results diagram is presented below:

	%
poor	22.58
average	22.58
good	48.39
excellent	6.45



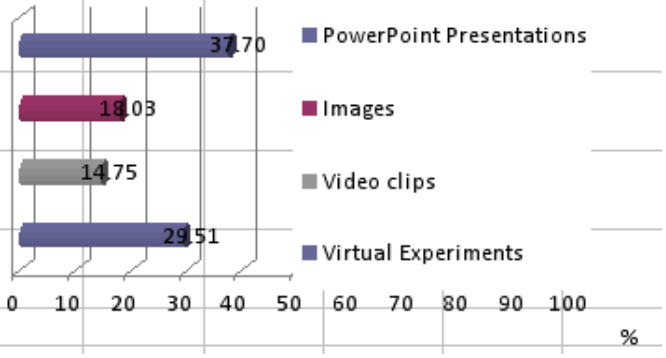
- 48.39% of prospective teachers declare as good their skills and abilities on using ICT tools for teaching Science/Nano-Tech topics.

Question no. 12:

- Which kind(s) of ICT tools do you intend to use for leading Nano-tech experiments in your future lessons?

Results diagram is presented below:

	%
PowerPoint Presentations	37.70
Images	18.03
Video clips	14.75
Virtual Experiments	29.51



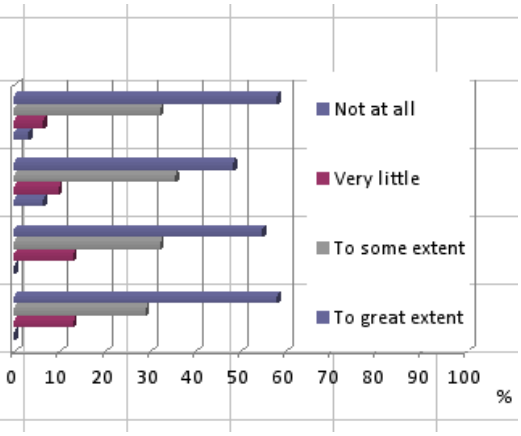
- 37.70% of prospective teachers intend to use PowerPoint presentation for leading Nano-tech experiments in their future lessons.
- also 29.51% of prospective teachers intend to use Virtual Experiments for leading Nano-tech experiments in their future lessons.

Question no. 13:

- Evaluate (on a scale from 1 to 4) how important are ICT tools for you when considering their usefulness for teaching Science/Nano-Tech topics

Results diagram is presented below:

	Not at all	Very little	To some extent	To great extent
as a source of inspiration for you as a future teacher	3.23	6.45	32.26	58.06
as an effective learning environment	6.45	9.68	35.48	48.39
as a method to improve students' learning skills	0.00	12.90	32.26	54.84
as a way for improving students' understanding	0.00	12.90	29.03	58.06
Total	2.42	10.48	32.26	54.84



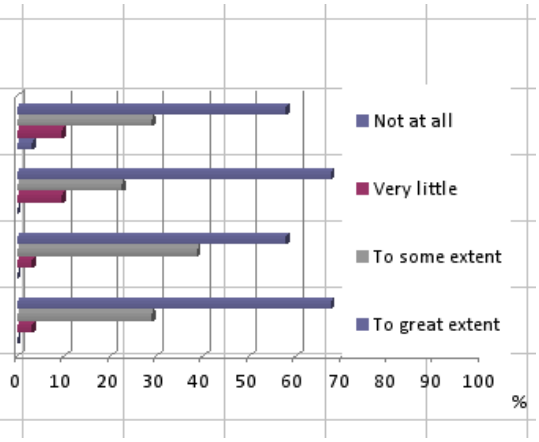
- 58.06% of prospective teachers appreciate (in a great extent) that ICT tools represent a source of inspiration for them as a future teacher and also a way for improving students' understanding, considering the relation between ICT tools and their usefulness for teaching Science/Nano-Tech topics.
- however, 54.84% of prospective teachers appreciate (in a great extent) that ICT tools represent a method for improving students' learning skills, considering the relation between ICT tools and their usefulness for teaching Science/Nano-Tech topics.

Question no. 14:

- Evaluate (on a scale from 1 to 4) how important are ICT tools for you related to the promoting of inquiry based/creative learning about Science/Nano-Tech topics

Results diagram is presented below:

	Not at all	Very little	To some extent	To great extent
as a method to explain the "Inquiry Based Science Education" concept	3.23	9.68	29.03	58.06
as a way for better planning of an experiment	0.00	9.68	22.58	67.74
as a channel for guiding students to explain scientific aspects and propose hypothesis for	0.00	3.23	38.71	58.06
as a method to enhance creativity in teaching and learning process	0.00	3.23	29.03	67.74
Total	0.81	6.45	29.84	62.90



- 67.74% of prospective teachers appreciate (in a great extent) that ICT tools represent a way for better planning of an experiment and also a method to enhance creativity in teaching and learning process, considering the importance of ICT tools to the promoting of inquiry based/creative learning about Science/Nano-Tech topics.

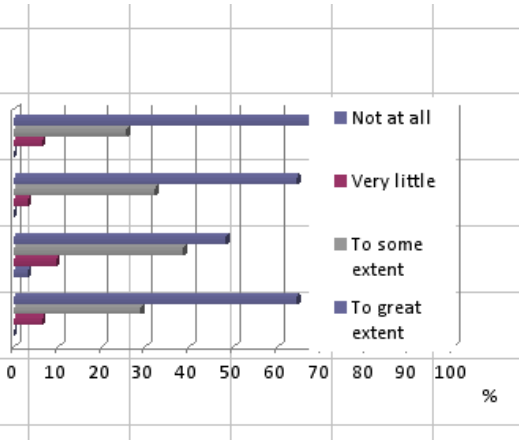
- however, 58.06% of prospective teachers appreciate (in a great extent) that ICT tools represent a method to explain the "Inquiry Based Science Education" concept and also a channel for guiding students to explain scientific aspects and propose hypothesis for investigation, considering the importance of ICT tools to the promoting of inquiry based/creative learning about Science/Nano-Tech topics.

Question no. 15:

- Evaluate (on a scale from 1 to 4) how do you consider collaboration using ICT for teaching Science/Nano-Tech topics

Results diagram is presented below:

	Not at all	Very little	To some extent	To great extent
as a method to increase students' motivation	0.00	6.45	25.81	67.74
as a method to make learning content more attractive (by using virtual environments and	0.00	3.23	32.26	64.52
as a way to make students more emotional (by connecting them)	3.23	9.68	38.71	48.39
as a method to promote creativity based on collaborative work	0.00	6.45	29.03	64.52
Total	0.81	6.45	31.45	61.29



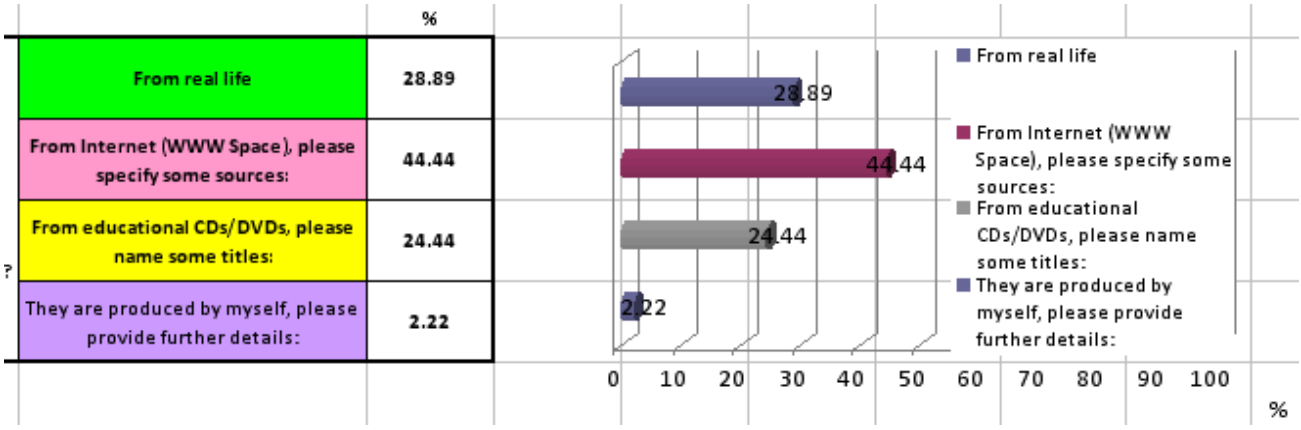
- 67.74% of prospective teachers appreciate (in a great extent) that ICT tools represent a method to increase students' motivation, considering the role of ICT tools for teaching Science/Nano-Tech topics.

- however, 64.52% of prospective teachers appreciate (in a great extent) that ICT tools represent a method to make learning content more attractive (by using virtual environments and multimedia tools) and also a method to promote creativity based on collaborative work, considering the role of ICT tools for teaching Science/Nano-Tech topics.

Question no. 16:

- From where do you find examples for the Nano-Tech experiments for your preparation?

Results diagram is presented below:



- 44.44% of prospective teachers use examples for the Nano-Tech experiments (needed to be presented in the classroom) collected / downloaded from Internet (WWW space) – the main accessed website is: http://nanoyou.eu/ (http://nanoyou.eu/en/virtual-lab.html).

- just 2.22% of prospective teachers use examples for the Nano-Tech experiments (needed to be presented in the classroom) produced by themselves.