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Executive Summary

This report describes the results of the first NTSE internal evaluation period (Jan 2011 to June 2012). The current status of this period and related recommendations are provided for improving the work activities, communication processes, work schedule, and outcome production and dissemination.

Overall, the partnership expressed their appreciation of the current project status and management. Only minor delay was noted in performing the work activities. Still the partnership is confident that the work plan will be completed as intended while few minor methodological changes and no changes in responsibilities are needed.

The work activities are based on effective information exchange, mainly by means of electronic communication. Again, only some structural challenges were mentioned, however, from an interpersonal perspective satisfying communication processes were reported. Also, communicating the project to target groups has started by disseminating information material and presenting the project at various events.

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1. Introduction

According to the Quality Assurance Plan (D17) "The internal project evaluation aims at monitoring the working activities performed by the coordinators and consortium members". The indicators used in the internal evaluation questionnaire are:

- Work activity (e.g. work performance, problems and obstacles).
- Co-ordination of the work (e.g. communication, information flow, use of resources)
- Implementation of the project, required modifications and dissemination (e.g. project objectives and outcomes, related methodologies, dissemination activities)".

The internal project evaluation will be undertaken in two rounds; followed by reports of the results provided by FORTH.

The report at hand describes the results of the 1st evaluation period. The answers of the partnership are provided for each question. If applicable, the number in brackets behind the statements indicates how many partners referred to that issue in the questionnaire. Also, some relevant responses are cited directly and indicated by quotation marks.

2. Work Activities

The work activities of the project consortium were monitored by three questions, focusing on the work that has been performed, the problems that occurred and possible deviations from the work plan.

Describe briefly the work your institution has undertaken/completed in the evaluation period. Please refer to the different NTSE workpackages.

Several activities have been undertaken by the partnership. In the following an overview is given about the activities per work package, showing that the partnership puts their collaborative efforts in aspects of the need analysis studies for the concept paper, development of the virtual lab and nano-tech tools, educational testing and project dissemination.

Summary of replies:

WP1 – Coordination

- Partnership protocols were prepared and signed (6)
- Website was set up (http://www.ntse-nanotech.eu/)
- Internal collaborative Space for file sharing was set up
- Organization of 1st project meeting by DOGA
- Organization of 2nd project meeting by FONTAZIONE
- Organization of 3rd project meeting by CCTA
- Organization of 4th project meeting by UVT
- Provision of input for Interim (progressive) report (Staff, Travel and Other Costs) from all partners (6)
- Progressive report

WP2 - Analysis & Concept

- Need analysis studies
  - Analysis of the national science curriculums in participating countries (5)
  - Mapping of the national science curriculums to nanotech topics (5)
  - Conduct of questionnaires for teachers, prospective teachers and students for the need analysis studies
  - National reports on Science education (5)
  - Reports on data collected from questionnaires for teachers, prospective teachers and students (5)
- Development of the technical and pedagogical features of the virtual lab
- Conduct of the Concept Paper

WP3 - Educational Guidance

- Development of Virtual Labs rooms following the requirements of the Concept Paper
- Videoconference to test the efficiency of VL rooms
- Short guidelines to teachers "How to record a video experiment". Five videos were sent by teachers and students, related to the drafts of the first experiments in the NTSE Vlab.
- Preparation of the educational tools
  - Video recording of authentic nano experiments
  - Simulations
  - Guidelines (teachers' and students')
- Five experiments uploaded in VL
- Translation of five VL Experiments in partner countries (5)
- Design of the Nanotech Database, integrated it in NTSE Virtual Laboratory.
- Interviews with female scientists (IT, BG, RO, TR) upload in VL broadcasting room

WP4 - Development of the Nano-tech Tools

- Test usage of the VLAB draft experiments on video conferences between classrooms in both, Bulgaria and Turkey.
- Input for the development of the Nano Tech Tools (5)
- Translation of VL interface and demo tour in partner countries (5)
- Design and update of the NTSE Repository room.

WP5 – Educational Testing

- Guidelines in integration of gender aspects in all project outputs.
- Template for interviews with female scientists
- Testing of VL experiments in eight schools in TR
- Four video conferences between TR-BG Schools to test the educational tools
- Interviews with female scientists (IT, BG, RO, TR) upload in VL broadcasting room
- Interviews with potential teachers, able to develop case studies during and after test-implementations

WP6 – Quality Assurance

- Quality Assurance Plan
- Data collection (internal evaluation forms)

- Feedback about monitoring / evaluation strategies, tools, instruments, applied the tools, collected data and sent the needed parts for the QA to FORTH.
- Questionnaires for teachers, prospective teachers and students aimed at evaluating and collecting information and suggestions on the content, usability and pedagogical effectiveness of the NTSE Project teaching materials were conducted.
- Data collection (questionnaires for teachers, prospective teachers and students)
- Interim evaluation report
- Setup of NTSE Blog
- Translation of NTSE Blog interface in partners' national languages (5)

WP7 – Dissemination

- Design of 1st promotional leaflet and poster in EN with inputs from partners
- Translation / printing of 1st promotional leaflet in national languages (5)
- Translation / printing of poster in TR to be used in national events
- Multilingual electronic newsletter
- Translation of website interface /content in national languages (5)
- NTSE Project dissemination to the local, national and international level in various events (workshops, conferences, seminars) in all partner countries (5)

WP8 - Exploitation

- CCTA had announced the future deliverables (nano-camp and VLAB) to its teacher seminars.

Describe the problems/ obstacles encountered in performing the work activities

With respect to this evaluation period, the current problems named by the partnership are mainly related to the late start of the project which caused delays in implementing the work activities for WP2. That resulted in a conflict with IT partner. Also difficulties in adopting new practices in Bulgaria and implementing tests of VL in Greece were reported.

Summary of replies:

DOGA: Due to late start of the project, the production of project deliverables initiated in April 2011 and the first draft of the Concept Paper was not satisfactory. In 2nd PM partners decided to define content and structure of the virtual laboratory by using the data collected in need analysis phase.

First recordings of experiments were not satisfactory regarding video / sound quality. A professional video producer subcontracted.

The place of 4th PM in May 2012 was shifted from IT to RO since the IT partner did not compensate their missing tasks in terms of submission of the report, deliverables etc.

FONTAZIONE: Some delays in fulfilling the tasks (application of questionnaires to teacher /students for the need analysis phase due to late start, resulted in a delay in the final version of concept paper)

CCTA: Nanotech requires new approaches, since it is a matter of new content to be integrated in the curriculum. Lack of flexibility in testing/experimenting with practices that will eventually slow down the process of adopting those practices.

FORTH: Delays in some tasks regarding WP2 due to the late start of the project.

Could not match Greek schools for testing videoconferences due the very strict curriculum / schedule that Greek classes have to follow.

UVT: Some delays in the fulfilling the tasks, due to the delay of starting the project.

SIRMA: No problems in implementing the work activities.

Describe deviations from the original work plan (and their justification)

In general, minor deviations from the work schedule were reported mainly due to the late start of the project which caused subsequent delays in work tasks.

Summary of replies:

DOGA: Because of the delay of the initiation of the project described above;

- The partners could apply the questionnaires in the second school term to conduct the need analysis of the project.
- The analysis of each country was ready end of June and the first draft of the Concept paper was prepared by IT partner in September.
- The first draft of the concept paper was improved and revised in the end of the November.
- The installation of the Nano-Tech experiment room was realized in February
- the call for testing the first experiment was sent to schools in partner countries in March
- The first test of VL was held between TR and BG to upload the results to the podcasting room.

The external evaluator of the project did not attend the 4th PM in RO since she was involved 3 PMs of four of them before. As a result of this the schedule of the external evaluator was rearranged.

The fourth project meeting in IT shifted to RO since IT partner did not attend the 3rd PM in BG.

P2 – FONTAZIONE

Because of the delay in providing the final version of the questionnaires form (June 2011), the need analysis was delayed till the end of 2011.

The time needed for elaborating and revising the Concept paper was also longer than it was estimated in the proposal.

Due to internal organization problem, Fondazione could not attend the third meeting in Bulgaria.

Del. 9 re. VL Broadcasting room was renamed to Podcasting room. The deliverable was remained due to mismatch between the term in the application form and the content. No changes in content or function appeared though.

P4 – FORTH

Due to the late start of the project, the questionnaires for the need analysis applied late June 2011.

P5 – UVT

Because of the delay of the start of the project with at least three months, we could apply the questionnaires for the need analysis only at the end of the second semester of the school. Due to this thing, the need analysis was delayed till the end of June 2011.

The time needed for elaborating and revising the Concept paper was also longer than it was estimated in the proposal. Due to this reason the work concerning the setting up of the Virtual Lab was delayed.

The organizing of the fourth project meeting on May, 16th-20th, 2012, in Sinaia, Romania, instead of Italy.

P6 - SIRMA

All activities were completed according to the deadlines of the project.

3. Co-ordination of the work

The co-ordination of the work was monitored by four questions, focusing on the quality of communication processes and information exchange and the performance of tasks by responsible entities.

Was your institution periodically and adequately informed of project developments?

All partners made a positive reply to these question and did not report problems in information exchange.

The following additional statements were made:

"The Turkish team has played the central role by forwarding and distributing necessary information, documents concerning the improvement of the project and project products through creating a google group with the project partners to keep them in a correspondence procedure and to use as a communication hub to sustain the communication among the partners. In April 2011, **collaborative web space** was set up as the registered area and the all the necessary documents were uploaded to this online space to share with the partners. Also **ftp area** was created to upload & download large files quickly to create the parts of VL"

"The project coordinator did best efforts to keep all partners informed and up-to-date. Reminders were timely and consistent."

"Communication was efficient through email in the beginning. Later on other communications channels used (videoconference, collaborative space)"

What is your source of information regarding a) the project as a whole b) specific project activities.

With respect to this period, electronic means of communication have a major role in the communication processes of the partnership; however, face-to-face and online meetings as well as the internal collaborative space, are also appreciated. The Technical Annex (application form of the project) is also considered as a reliable source of information.

Summary of replies:

- E- mails/ E-Mail list (6)
- Internal collaboration space (5)
- Online meetings (5)
- Face-to-face Meetings (PMs) (5)
- Application form of the project (5)
- Meeting minutes (1)
- Project website (1)
- Virtual Lab (1)

Express your views on the communication process a) from a technical perspective b) from an interpersonal perspective

From a technical perspective the communication processes are considered as efficient. However, not using the collaborative space right from the beginning causes some confusion with different versions of working documents and delays in corresponds from partners. Face to face communication helped getting things clear.

Summary of replies:

- "Some problems to understand the different versions of materials created"
- "Sometime overflow of emails and difficulty to understand what had to be done generated a sense of frustration"
- "It was easier to understand the tasks during the project meetings"
- "The communication process was efficient specially after the establishment of the online collaborative space"
- "Most of partners are much more active around the project meetings. Not all of the partners respect the deadlines."
- "The collaborative platform was not widely perceived as document exchange platform, but was of good use during the interim report phase, especially in favor of the coordinator."

From an interpersonal perspective the communication processes were "intense and productive".

Summary of replies:

- "The consortium have found a ground for academic collaboration and friendly environment from the very beginning of the project strengthened by the social events organized during the partner meetings.'
- "Experts (especially at test-implementation phase) communicated the activities and achieved video conferences virtually by themselves."

Have the undertaken tasks been addressed successfully?
a) by the coordinating institution b)by the workpackage leaders c)by the other partners

The tasks undertaken are considered to be addresses successfully by the coordinator and most workpackage leaders. Although, some delay in delivering outputs was noted. Summaries of replies:

a) By the coordinating institution - yes (4), mostly yes (1)
b) By the workpackage leaders - yes (1) mostly yes (4)
c) By the other partners – mostly yes (3), partially (2)

"Partners had clear idea who should do what. On the other hand, there are some delays (most probably) due to need for some products to be redone or updated."

"WP leaders have clear identification of their tasks in the application form. Events and accompanying tasks were undertaken correctly by WP leaders. WP leaders were responsive most of the time.

"There was good distribution of tasks in terms of competencies, expertise and capacity. The dissemination and exploitation potential of the partners varies."

4. Implementation of the project, required modifications and dissemination

The project implementation, required modifications and dissemination activities were monitored by five questions. The focus was on future objectives and related methodologies, and related dissemination activities. Further, the requirements for successful project completion and expected difficulties were considered.

What do you regard as the project's main operational objective for the next period of the project?

The partnership considers several objectives as important for the next period. Especially, the Virtual Lab itself (original proposal specifications, engagement of teachers/schools) and the organizing of nano-competition and nano-camp are important objectives.

Summary of replies:

- Revise VL content according to IBL specifications and taking into account gender issues
- Implement Virtual Lab in school environments
- Organize nano poster competition
- develop a nano-camp program as consistent and relevant as possible (in the last project year)

Indicate the methodological changes that you feel need to be made in order to address the project's objectives within the next period.

The partners' responses suggest that minor methodological changes will need to be made for addressing the project's objectives within the next period especially regarding the Virtual Lab.

Summary of replies:

- "Science education should show what the students learn in classroom is related to external world and daily life, should make the students be able to perform experiments and, should enhance the personal interest of the student toward science. In addition to that, science education should include the use of information technologies (ICT), offer short reports on modern achievements in science at the micro- and Nano- level by short talks in every learning unit to raise the awareness related to the nanotechnology. **The NTSE Virtual Laboratory would be revised as the milestone to cover all these supportive educational tools**"

- "Take in consideration gender aspects and IBL approach in developed experiments / educational material."

- "Based on the feedback collected from Romanian prospective teachers involved in evaluating the materials designed for the NTSE Virtual Lab, the teaching and learning materials has to be improved in terms of pedagogical approach, by promoting more the inquiry-based learning"

What is the main result/outcome that has been generated during this period?

The project has already produced several results and outcomes. The partnership considers the Concept Paper (with the related need analysis) and the setup of the Virtual Lab (structure and working prototype) as

main outcomes so far. Also, specific documents for structuring project activities (e.g. Reports on National curriculums, questionnaires for gathering data, quality assurance Plan) are important outcomes.

Summary of replies:

- "The main result of this period was the Need analysis and the Curriculum match that grounded the Concept paper and directed the setting up of the NTSE Virtual Lab"
- "The main result of this period was the Concept Paper containing also many information derived by the Curriculum Matches and the analysis of the questionnaires"
- "VLAB structure and working prototype"

Indicate means for disseminating this result/outcome?

All partners disseminated the project on several means like presentations in international conferences, organizing workshops and presentations to teachers and distributing flyers.

Summary of replies:

P1 – DOGA SCHOOLS

- Promotional leaflet disseminated in International Congress in Antalya and at local workshops.
- Ready VL experiments disseminated to the schools and universities science and education faculties to invite test and take part in the video conference sessions.
- Multilingual promotional leaflets and e-newsletters, dissemination materials (pens, mugs & booklets)

P2 – FONTAZIONE

- 3GIORNIPERLASCUOLA 2011 - annual national convention held in Città della Scienza, Naples, and dedicated to school and education issues.

P3 – CCTA

- The initial group of responsive teachers (70+ individuals from all over Bulgaria)
- The regional inspectorates of Education – total 28
- The CCTA events related to dissemination of project outcomes (2 per year)
- The project newsletter to the associated partners' mailing lists

P4 – FORTH

- Presentation of NTSE Project to the science teachers of Experimental High School of Heraklion.
- Newsletter in the form of e-mail to Science Teachers" (including the project's leaflet in pdf format)
- Submission of the project in STENCIL Catalogue (http://www.stencil-science.eu/)
- Institutional website.

P5- UVT

Preparing and sustaining presentations in different seminars, workshops, conferences:

- 4th World Conference on Educational Sciences (WCES 2012) – Barcelona, SPAIN, February 2012 (1 presentation - GORGHIU L. M., GORGHIU G. – Teachers' perception related to the promotion of Nanotechnology concepts in Romanian Science Education)
- 11th WSEAS International Conference on Applied Computer and Applied Computational Science (ACACOS'12) – Rovaniemi, FINLAND, April 2012 (1 presentation - Gorghiu L. M., Gorghiu G - „Teachers' and Students' Feedback Concerning the Use of ICT Tools in Learning Science through Nanotechnology")
- The Yearly Scientific Seminar of the Faculty of Science and Arts, with national participation organized in the frame of „Valahia University Days" , Targoviste, ROMANIA, May 2012 (1 presentation - Gorghiu L. M., Gorghiu G., Dumitrescu C., Olteanu R. L., Bizoi M. - Considerations on the introduction of nanoscience specific topics in preuniversity and academic Romanian educational system)

P6 – SIRMA

- Project web site; Virtual lab; Partners' web sites

State any difficulties you feel might arise in the application of the project.

The partnership anticipates some problems with regard to future work activities, especially in the implementation phase (applying VL lesson plans, matching schools for videoconferences) and ensuring high quality training materials might be challenging.

Summary of replies:

- "Implementation and matching the school for video conferences; in partner countries, creating authentic experiments with simulations with inquiry based method"
- "Someway the experiments of the virtual lab are considered too hard to reply from teachers and educators"
- "Implementation of VL experiments in a school environment (time constrains)"
- "The NTSE Virtual Lab does not contain virtual experiments that appeal sufficient nano-topics and the NTSE experiments implementation is difficult to be made to the university level due to the content which addresses mainly secondary education topics"
- "Inability of the partners to generate enough and with the necessary quality and depth training materials on the subject matter of the project (nano technologies)"
- "Difficulties in using the NTSE Blog as an discussion space"

5. Other issues (regarding internal evaluation)

The final two questions provided the partners with the possibility to name issues which were not covered by the evaluation questions above, and also to point out items which they consider important for the next project meeting.

State anything else you feel should be included in the internal evaluation

Some suggestions by partners regarding organizing and responding to the work tasks were made. Respect to deadlines was mentioned by two partners

Summary of replies

- "Individuate a person from a partner organization in charge to manage information coming from all the others and making it more linear and less confused"
- "Greater respect for deadlines, stick with collaborative space as main communication channel."
- "Partners have to respond on time to the e-mail messages, respect the deadlines and focus on the deliverables realization"
- "Partners have to concentrate on their deliverables and to be more involved in the project as a whole"

Name any issues you think should be addressed in the next project meeting

Some aspects were named to be considered in the next project meeting. Especially, the case studies template and issues regarding the nano-competition and the nano-camp should be central topics to be discussed.

Summary of replies:

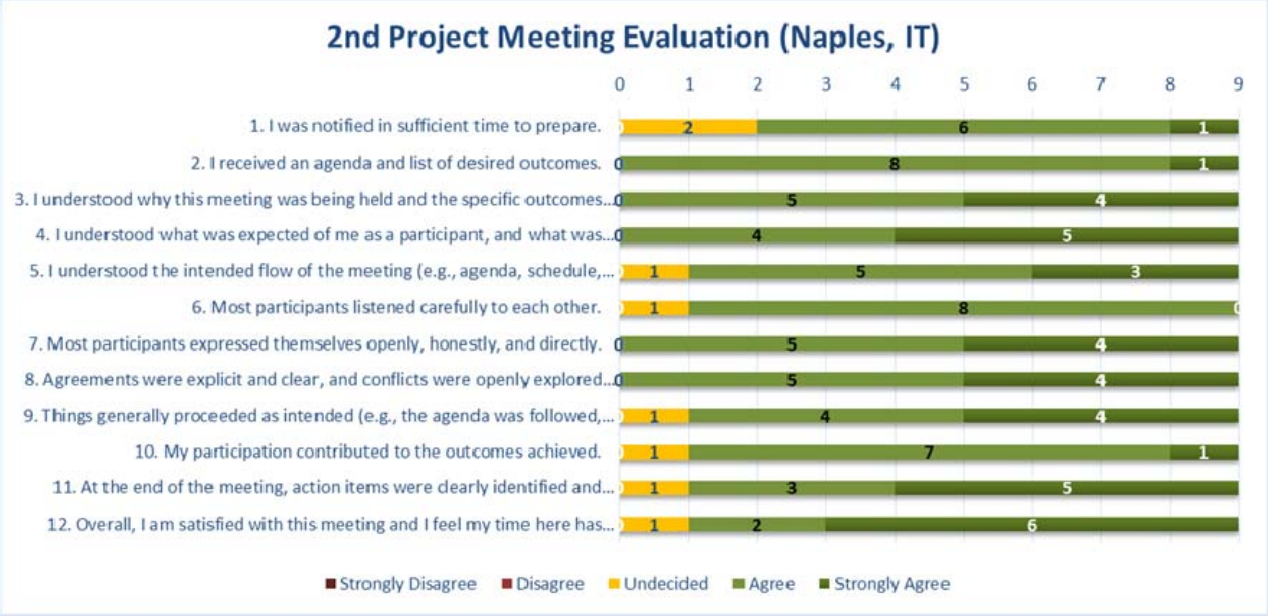
- Concept paper: IT team would revise Concept Paper (1)
- GR team would prepare paper about gender (1)
- Case Studies structure /template (2)
- Guidelines for Best Practices (1)
- The missing translations of our virtual lab (1)
- Uploading the deliverables to the collaborative space (1)
- Implementation and matching the schools (1)
- Nanotech poster competition (2)
- Nanocamp (2)
- International Nano-Tech Science Education Congress (INT-NTSE) (1)

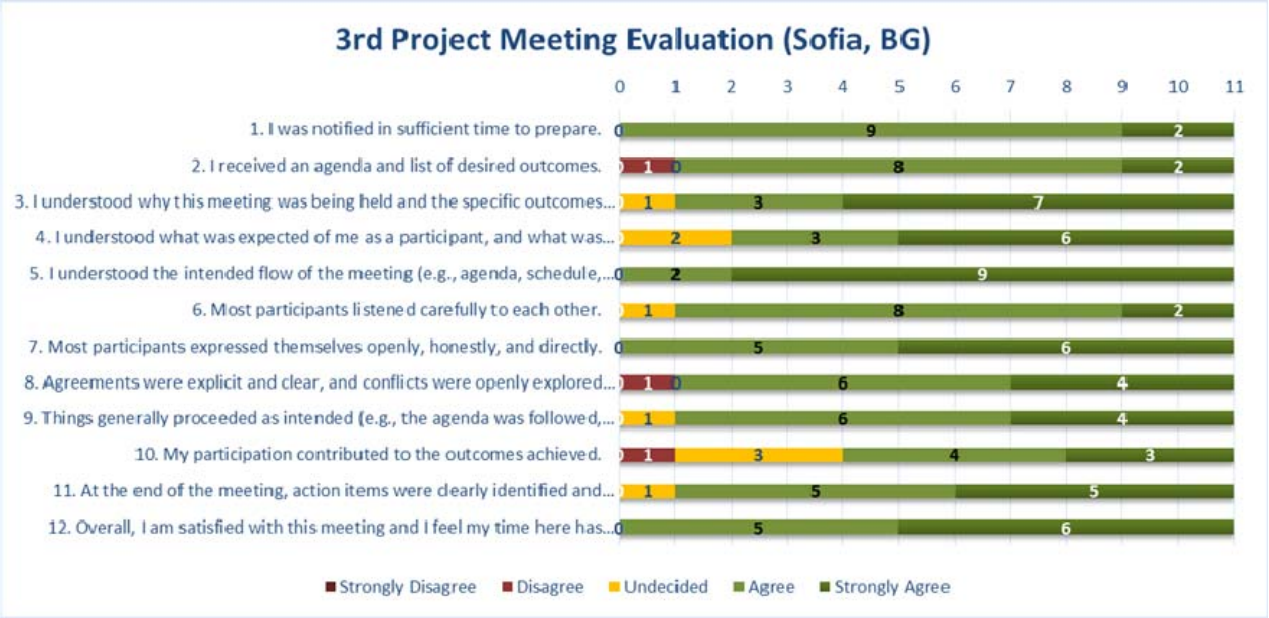
6. Project Meetings

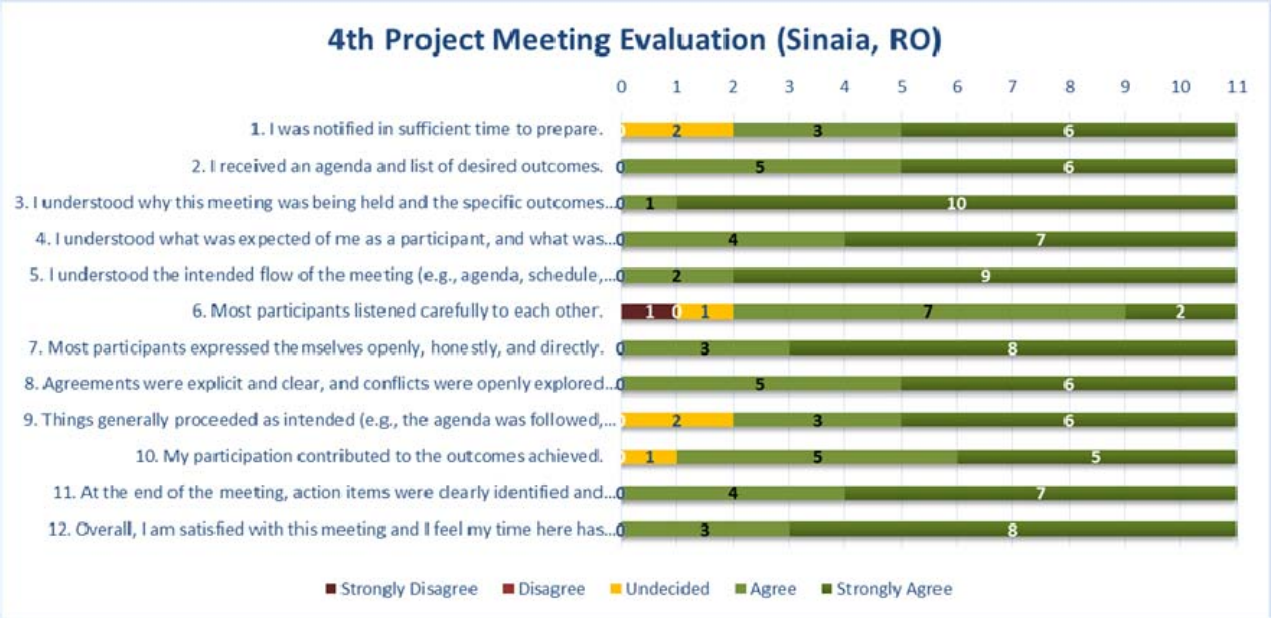
During the first period of the project, four face-to-face project meetings took place plus several online meetings using either Adobe Connect or Skype.

The bar charts below summarizes the results from the analysis of the "Project Meetings Evaluation Form" for the 2nd, 3rd and 4th face-t-face project meetings . It's worth mention that the overall satisfaction after those meeting was very positive with a minor uncertainty regarding future steps.

Shortly after the completion of every meeting the coordinator circulated the minutes including things to do and deadlines.


2nd Project Meeting Evaluation (Naples, IT)
0 1 2 3 4 5 6 7 8 9
1. I was notified in sufficient time to prepare.
2. I received an agenda and list of desired outcomes.
3. I understood why this meeting was being held and the specific outcomes...
4. I understood what was expected of me as a participant, and what was...
5. I understood the intended flow of the meeting (e.g., agenda, schedule,...
6. Most participants listened carefully to each other.
7. Most participants expressed themselves openly, honestly, and directly.
8. Agreements were explicit and clear, and conflicts were openly explored...
9. Things generally proceeded as intended (e.g., the agenda was followed,...
10. My participation contributed to the outcomes achieved.
11. At the end of the meeting, action items were clearly identified and...
12. Overall, I am satisfied with this meeting and I feel my time here has...
Strongly Disagree
Disagree
Undecided
Agree
Strongly Agree


3rd Project Meeting Evaluation (Sofia, BG)
0 1 2 3 4 5 6 7 8 9 10 11
1. I was notified in sufficient time to prepare.
2. I received an agenda and list of desired outcomes.
3. I understood why this meeting was being held and the specific outcomes...
4. I understood what was expected of me as a participant, and what was...
5. I understood the intended flow of the meeting (e.g., agenda, schedule,...
6. Most participants listened carefully to each other.
7. Most participants expressed themselves openly, honestly, and directly.
8. Agreements were explicit and clear, and conflicts were openly explored...
9. Things generally proceeded as intended (e.g., the agenda was followed,...
10. My participation contributed to the outcomes achieved.
11. At the end of the meeting, action items were clearly identified and...
12. Overall, I am satisfied with this meeting and I feel my time here has...
Strongly Disagree
Disagree
Undecided
Agree
Strongly Agree


4th Project Meeting Evaluation (Sinaia, RO)
0 1 2 3 4 5 6 7 8 9 10 11
1. I was notified in sufficient time to prepare.
2. I received an agenda and list of desired outcomes.
3. I understood why this meeting was being held and the specific outcomes...
4. I understood what was expected of me as a participant, and what was...
5. I understood the intended flow of the meeting (e.g., agenda, schedule,...
6. Most participants listened carefully to each other.
7. Most participants expressed themselves openly, honestly, and directly.
8. Agreements were explicit and clear, and conflicts were openly explored...
9. Things generally proceeded as intended (e.g., the agenda was followed,...
10. My participation contributed to the outcomes achieved.
11. At the end of the meeting, action items were clearly identified and...
12. Overall, I am satisfied with this meeting and I feel my time here has...
Strongly Disagree
Disagree
Undecided
Agree
Strongly Agree

7. Other Evaluation Instruments

Apart from the instruments developed for the internal project evaluation aiming at monitoring the working activities performed by the coordinators and consortium members, during the first period of the project two additional evaluation instruments were developed aiming at gathering information for the need analysis studies and the educational testing of virtual lab and the nano-tech tools.

The **first instrument** was a set of questionnaires addressed to teachers, prospective teachers and students. The questionnaires were translated in all partners' national languages and aimed at gathering the opinions of the virtual lab beneficiaries concerning several different aspects of their activity / preferences in order to better define the features the Virtual Lab should have: ICT, scientific contents and educational methodology.

The questionnaires have been submitted to samples of beneficiaries respectively in Turkey, Greece and Romania (students, teachers and perspective teachers), Bulgaria (teachers) and Italy (teachers and students), during spring / summer 2011.

	Teachers	Prospective Teachers	Students
Bulgaria	42	-	-
Italy	8	-	21
Greece	20	30	30
Romania	35	31	35
Turkey	111	67	256

The analysis of the collected data represents both a tool for the development of the project and also an interesting compared study about the needs and the opinions of the main stakeholders in the educational systems of different countries. The general results – available in other workpackages - gathered from these analysis oriented the educational criteria reported in the concept paper and adopted in the creation of the Virtual Lab as well as in the development of other actions carried out in the framework of the project.

The second instrument was also a set of questionnaires addressed to teachers, prospective teachers and students. Again, the questionnaires were translated in all partners' national languages and aimed at evaluating and collecting information and suggestions on the content, usability and pedagogical effectiveness of the NTSE Project teaching materials (video, interactive animation, teacher guidelines, student guidelines). The questionnaires were used in the testing / early implementation phase of the project in 8 schools across Turkey and 4 video conferences between Turkish and Bulgarian classes.

8. Summary & Recommendations

In the following, a summary of the above described internal evaluation results of the first evaluation period are provided, structured according to four main aspects which could be retrieved from the answers. Related recommendations for improvement of working processes are provided.

Status of Work Activities

During the first internal evaluation period, the partnership puts their collaborative efforts in aspects of the need analysis studies for the concept paper, development of the virtual lab and nano-tech tools, educational

testing and project dissemination. Also, specific tasks were addressed by responsible partners, e.g. website design, development of quality assurance plan, organization of project meetings.

The current problems named by the partnership are mainly related to the late start of the project which subsequently caused delays in implementing the work activities for WP2. That resulted in a conflict with IT partner. Also difficulties in adopting new practices in Bulgaria and implementing tests of VL in Greece were reported.

No major deviation from the work schedule was reported. Some delay in delivering outputs and work tasks was noted mainly due to the late start of the project.

The partnership expressed their appreciation of current project status and management. The tasks undertaken are considered to be addressed successfully by the coordinator and most workpackage leaders.

Recommendations:

- Respect of deadlines
- Partners have to concentrate on their deliverables and to be more involved in the project as a whole

Communication Processes

Regarding the information exchange In general, the partnership agreed that there were no technical problems on the one hand, and the personal communication process seemed to be excellent to the partners. Electronic means of communication have a major role in the communication processes of the partnership; however, face-to-face and online meetings as well as the internal collaborative space, are also appreciated. The Technical Annex (application form of the project) is also considered as a reliable source of information.

Recommendations:

- There seems to be no need to improve the communication from interpersonal perspective. However, following the suggestions made by partners – to use the collaborative platform to exchange working documents – should be considered for increasing structural clarity of the communication.

Future Work Schedule & Methodology

The partnership considers several objectives as important for the next period. Especially, the Virtual Lab itself (original proposal specifications, engagement of teachers/schools) and the organization of nano-competition and nano-camp are important objectives.

In general, the partners' responses suggest that some methodological changes will need to be made for addressing the project's objectives within the next period especially regarding the Virtual Lab which should be revised as the milestone to cover all the supportive educational tools. The teaching and learning materials have to be improved by promoting more the inquiry-based learning and taking in consideration gender aspects.

The partnership anticipates some problems with regard to future work activities, especially in the implementation phase (applying VL lesson plans, matching schools for videoconferences) and ensuring high quality training materials might be challenging. Also activating the discussions in NTSE blog seems to be a future challenge.

Recommendations

- The Virtual Lab experiments should be revised according to IBL methodology.
- It is necessary to think about how teachers / schools can be actively engaged in the project activities and how to provide them with tangible and interesting outcomes to be used in their working practices or educational life.
- A strategy for attracting teachers to the blog should be developed.

Project Outcomes and Dissemination

The partnership considers the Concept Paper (with the related need analysis) and the setup of the Virtual Lab (structure and working prototype) as main outcomes so far. Also, specific documents for structuring project activities (e.g. Reports on National curriculums, questionnaires for gathering data, Quality Assurance plan) are important outcomes.

All partners disseminated the project on several means like presentations in international conferences, organizing workshops and presentations to teachers and distributing flyers.

Recommendations

- With the development of project outcomes dissemination needs to be advanced to the content level, informing all target groups about the mail output (Virtual Lab) and the forthcoming major events (nano-poster competition, nano-camp).
- An exploitation plan needs to be developed at the time the project starts producing tangible outputs. It should focus on ways to support the target groups in exploiting the disseminated project results

9. Conclusion

To sum up, in the first period the project addressed evaluation from the perspectives of internal evaluation of work activities, communication process, future work schedule and methodology and dissemination of outcomes.

With regard to the status of work activities, all of them were done according to the objectives of the proposal. There were only a few little deviations of the work plan which would be seen as necessary of ensuring the high quality of the projects' outcomes (e.g. the Concept Paper and VL prototype).

The communication process could be clearly established as very good and no major problems were reported. Electronic means of communication have a major role in the communication processes of the partnership. However, it could be suggested to use more the internal collaborative space for exchanging work documents.

The main objective for the next period is a full functioning Virtual Lab according to the original proposal specifications and engagement of teachers and schools. With regard to the methodology, minor methodological changes and no changes in responsibilities will need to be made for addressing the project's objectives within the next period. Strategies for engaging teachers should be developed.

With regard to dissemination all partners used a variety of ways to disseminate the project results. An exploitation plan should be put in place though, to ensure the project's visibility for the next period and the years to come.

Annex I:

Internal Evaluation Questionnaire – Partners' responses

Evaluation Period: 01-01-2011 – 30-06-2012

Name of Institution:

1 – Work activity

Describe briefly the work your institution has undertaken/completed in the evaluation period. Please refer to the different NTSE workpackages.*

WP1

P1 - DOGA SCHOOLS

http://www.ntse-nanotech.eu/ website was set up also **NTSE Project File Sharing** for partners was established with deliverables to be uploaded by partners. Partnership protocols were prepared and signed progressive report was sent.

P2 – FONTAZIONE

Fondazione organized the 2nd Project Meeting, in Naples, Italia, during September 16th – 17th, 2011

P3 – CCTA

CCTA hosted the 3PM in Sofia, Bulgaria in December 2011. All partners took part of the meeting, by sending their representatives. The meeting agenda and minutes are available.

CCTA sent reports to DOGA regarding the project progress until month 18, also necessary financial documentation, timesheets and proofs of activities.

P4 – FORTH

Financial and contractual matters

Administrative tasks and responsibilities at National Level

Participation in Kick off Meeting, 2nd, 3rd and 4th Project Meetings, Online meetings

P5 - UVT

UVT organized the 4th Project Meeting, in Sinaia, Romania, during May 16th – 20th, 2012

UVT provided Interim reports (Staff, Travel and Other Costs) and the necessary information for the progress report

WP2

P1 – DOGA SCHOOLS

Setting up Nanotech Exp. Room: Since the project was initiated in the 1st PM in 24-25 March, 2011, the need analysis studies were conducted in the second school term for 3 different target groups. Before the end of second school term, all the partners sent the results to DOGA testing office and TR did whole analysis of the questionnaires of all partners to accelerate the period for the preparation of the Concept Paper and Nano topics were matched with the topics of the science lessons at secondary school aged 13-18 to be able to integrate the students & teachers' guidelines with the science lessons.

P2 – FONTAZIONE

Fondazione was leader of this workpackage. It took part in the development of the need analysis by collecting data in order to make the Concept paper for the Virtual Lab – WP2/D. 5. Organized 2 workshops based on the educational contents. It was exploited some opportunities for online cooperation.

1. Took part to the survey on National Science school curricula aimed at the introduction of the Nano-topics in science lessons and was responsible of the summary of the common topics in all the school curricula of the partners' countries.

2. Questionnaires were submitted to teachers and students. Reports were prepared on the results coming from this survey. A synthesis of the results coming from all the partners' Countries was prepared and inserted into the Concept Paper.

Outputs: Concept Paper

4. Fondazione took part in the development of the pedagogical features of the virtual lab by discussing with SIRMA.

P3 – CCTA

CCTA did curriculum matching of the Bulgarian educational system, also sent a questionnaire to teachers in most of the regions in Bulgaria. Total 70+ questionnaires are collected and available. Later the database with teachers will be involved in dissemination and exploitation activities.

CCTA took part in the NTSE Virtual lab development, by taking initiative to gather content for the Podcasting room of the Virtual lab.

P4 - FORTH

Contribution in suggested nanotech topics for VL

Analysis of the Greek curriculum in physics, chemistry and biology for secondary education for identifying suitable nanotech topics.

Mapping of all partner countries curriculums in accordance to nanotech topics.

Conduct of questionnaires for teachers, prospective teachers and students for the need analysis studies

Report on Science education in Greece

Reports on data collected from questionnaires for teachers, prospective teachers and students

P5 – UVT

1. UVT took part in the development of the need analysis by collecting data in order to make the Concept paper for the Virtual Lab – WP2/D. 5. The studies had to emphasize the pedagogical features required for ICT-based Science teaching on nanotech (contributing to the questionnaire applied to the following target groups: teachers, prospective teachers, students) – Outputs:
Report_NTSE_Valahia_RO_Prospective_Teachers_July_2011,
Report_NTSE_Valahia_RO_Students_July_2011, Report_NTSE_Valahia_RO_Teachers_July_2011

2. UVT proceeded to identify the suitable topics from Science (Chemistry, Physics, Biology) curricula for introducing the nano-topics in Science lessons - Curriculum matched in Romania (Matched Biology Curriculum_Romania; Matched Chemistry Curriculum Romania; Matched Physics Curriculum Romania; Matched Secondary School Science Curriculum)

3. UVT took part in the development of the features of the virtual lab by discussing with SIRMA technical aspects about setting up the Virtual Lab and giving its expertise concerning the use of ICT in learning and collaborating process.

P6 - SIRMA

Collecting data with Questionnaires from Science teachers in order to make analyze of the Concept for the Virtual Lab

WP3

P1 – DOGA SCHOOLS

The creation of the rooms of the virtual lab was initiated right after the 2nd PM in IT since the virtual lab would strictly follow the requirements of the Concept Paper to create the educational tools in it as it was stated in our proposal. TR initiated the process of the preparation of the educational tools in December 2011 through holding the videoconference session with one of the existent Nano experiments “LEDs” between BG & TR. Later the sequence of the experiments graded from easiest to difficult ones and for the first experiment “the Nano Scale” the existent video from the Nano web sites was used. Accordingly the student and teacher guidelines were uploaded and tested with the teachers and students in January 2012. According to feedback from the users, the partners decided not to use ready/ existent videos in experiment rooms. The authentic experiments were chosen and shot in Yakacık Nano-bio lab and Gebze High Tech Nano laboratory with the Nano tech academicians. The videos edited and subtitles were added. The project expert teachers and Nano academicians designed the guidelines and tested 2nd Nano experiment “Nano Crystal Fabrication”. Most of the users (mostly students, teachers and prospective teachers) found it challenging since the results of the Nano experiments are invisible for the target groups. Therefore, extra simulations or drawings were planned for some of the experiments if they are required. The preparation of the simulations and translations of each student and teacher guidelines took more time than expected. Till the end of school term 3 Nano- experiments (Understanding Nanoscale, Making Origami Buckyball, Nanocrystal Fabrication) were tested in 8 different schools through sending calls to schools to test and also 3 different schools took part in video-conferences and held between BG and TR. In addition to this, till the mid-June 5 nano experiments were uploaded to the virtual lab but because of the school exams, two of them could not be tested in the beginning of June. Since all these experiments were under the improvement process, the

virtual laboratory was tested in a limited number of teachers and students to improve the content of the educational tools to make them more applicable for the users and it would be open and tested in mid-September.

14 May 2012 Video conference between Acarkent Doğa High School and John Atanasov Electronic High School was conducted.

P2 – FONTAZIONE

1. Fondazione participated to the development of the virtual lab providing support with its expertise. Took part to the videoconference organized by P6 to test the efficiency of the rooms of the virtual lab. Fondazione realized and uploaded a video interview with a female scientist.

Fondazione started the translation of the NTSE Virtual Laboratory interface in Italian –

Outputs: NTSE_Virtual_Lab_IT version, translation of Short demo tour subtitles in IT, translation of description of the items from NTSE repository in IT.

P3 – CCTA

Besides the WP description, CCTA had developed short guidelines to teachers “How to record a video experiment”, and distributed inside the partnership and to teachers in Bulgaria. 5 videos were sent by teachers and students, related to the drafts of the first experiments in the NTSE Vlab.

CCTA also translated all the content of the website and the virtual lab in Bulgarian language.

P4 - FORTH

Contribution in the development of the VL

Translation of the VL interface in Greek

Translation of the first 5 experiments, demo tour and repository items in Greek.

P5 – UVT

1. UVT designed of the Nanotech Database, integrated it in NTSE Virtual Laboratory, in order to be used by the virtual lab users as extra reading and reference about the nano tech readings. UVT uploaded different resources (e.g. articles, posters, videos, methodological articles, books, chapters of books etc.) inside of the Nanotech Database. Output: Nanotech Database – NTSE Repository.

2. Start of translation of the NTSE Virtual Laboratory interface in RO – Outputs: NTSE_Virtual_Lab_RO version (all rooms), translation of Short demo tour subtitles in RO, translation of description of the items from NTSE repository in RO.

3. UVT prepared the interview with with Professor Rodica Ion (PhD coordinator in the Doctoral School of Materials Engineering of UVT) in EN according to the template provided by CCTA to publish in the podcasting room for the integration of gender aspect into the project deliverables. In addition, the UVT experts edited and produced the videoclip with Professor Rodica Ion. – Output: Ion_video_audio.avi

P6 – SIRMA

Short demo of the Virtual Lab

Setting up the podcasting room

WP4

P1 – DOGA SCHOOLS

Providing input for the development of the Nano Tech tools and giving constant feedback through testing in classes with the science teachers. Translating the main tools of the VL and blog.

P2 – FONTAZIONE

Fondazione provided inputs during the development of the draft of the virtual lab as required.

P3 – CCTA

CCTA organized test usage of the VLAB draft experiments on video conferences between classrooms in both, Bulgaria and Turkey. The VC was held with the technical assistance of project experts. The meetings were recorded and later will be uploaded in the respective VLAB room. Testing was reported via feedback forms by students and teachers.
Video interviews with scientists, future teachers and female scientists, to foster the project's accent – gender balance in nature sciences and supporting girls to pursue science careers.

P4 – FORTH

Input for the development of VL as required. Translation into Greek.

P5 – UVT

UVT supported P3 with the development of the educational guidance and implement technical solutions on the lab by contributing to the following outputs: a) RO Translation of Virtual Lab rooms and b) designing and updating of the NTSE Repository room.

WP5

P1 – DOGA SCHOOLS

Doga prepared the interview with the famous female journalist in TR according to the template provided by CCTA to publish in the pod casting room for the integration of gender aspect into the project deliverables.

P4 – FORTH

FORTH provided guidelines in integration of gender aspects in all project outputs.

WP6

P1 – DOGA SCHOOLS

Doga Schools participated in, supported and monitored the development of all tools. It got feedback from the WP leader IACM-forth to create the assessment grids and tools for testing the efficiency of the

educational tools. Doga Schools ensured that the results of WP 6 are integrated in an appropriate way into the entire project WPs.

P2 – FONTAZIONE

Fondazione filled and submitted the questionnaire designed by the partnership for evaluation of the interim period of the report.

Fondazione took part to the quality assurance workpackage with feedbacks concerning the evaluation strategies and tools. The data collected were sent to FORTH.

P3 - CCTA

Questionnaires filled out as described in the application form.

P4 – FORTH

FORTH conducted the Quality assurance plan and the interim evaluation report

FORTH conducted the questionnaires for teachers, prospective teachers and students aimed at evaluating and collecting information and suggestions on the content, usability and pedagogical effectiveness of the NTSE Project teaching materials (video, interactive animation, teacher guidelines, student guidelines).

Setup of NTSE Blog, a portal with multilingual interface, dedicated to the generation, promotion, discussion and reflection upon new ideas and practices promoting the incorporation of nanotechnology into secondary education.

P5 – UVT

UVT experts provided to FORTH the gathered data related to the quality and the efficiency of Virtual Lab on learning and teaching skills.

UVT fulfilled the questionnaire designed by the partnership for evaluation of the interim period of the report.

UVT participated in the quality assurance WP providing feedback about monitoring / evaluation strategies, tools, instruments, applied the tools, collected data and sent the needed parts for the QA to FORTH.

WP7

P1 – DOGA SCHOOLS

The first promotional leaflet of the project was designed EN and printed by TR partner to disseminate in International Conferences and Seminars. The first promotional leaflet and poster were prepared in EN to disseminate in the Advances in Applied Physics & Materials Science Congress in Antalya right after the 1st PM in April 2011. TR uploaded the printable format to the collaborative space to share with the partners. Later the coordinator designed TR versions to disseminate during the local workshops to involve more and more implementer teachers to test the VL.

The electronic newsletter was prepared in multilingual in March 2012 before the test of the Nano experiments and disseminated to the partners to send the implementer and potential implementer schools through explaining the project process briefly and announcing the experiments in the virtual laboratory.

12.05.2011 DOGA-TR APMAS - International Advances in Applied Physics and Material Science Congress

17.03.2011 DOGA-TR Local workshop to students

06.09.2011 DOGA-TR Local workshop to the science teachers

26.04.2012 DOGA-TR APMAS - International Advances in Applied Physics and Material Science Congress

P2 – FONTAZIONE

Fondazione was involved in NTSE Project dissemination to the local, national and international level by the following activities:

a) Printing and handing out some NTSE project materials.

b) Translating in Italian the interface of the NTSE website.

c) Took part to some events in local schools presenting general features of the NTSE project

P3 – CCTA

CCTA disseminated the NTSE project under the annual Nanotechnology conference in Sofia, Bulgaria. Report paper is available and published with ISBN#.

Newsletters are translated in Bulgarian and spread out to the target group.

P4 – FORTH

Forth provided feedback in the creation of the project website and internal space. The content was translated to Greek.

Dissemination activities:
- Presentation of NTSE Project to the science teachers of Experimental High School of Heraklion.
- Newsletter in the form of e-mail to Science Teachers" (including the project's leaflet in pdf format)
- Submission of the project in STENCIL Catalogue (http://www.stencil-science.eu/)

Translation of project's leaflet in Greek and printing / dissemination

P5 – UVT

UVT was involved in NTSE Project dissemination to the local, national and international level by the following activities:

a) Printing and disseminating the NTSE project materials (leaflets, bookmarks, posters, pens, block notes, etc).

b) Translating in RO the interface of the NTSE website.

c) Preparing and sustaining presentations about the results of the NTSE project in different seminars, workshops, conferences:

4th World Conference on Educational Sciences (WCES 2012) – Barcelona, SPAIN, February 2012 (1 presentation - GORGHIU L. M., GORGHIU G. – *Teachers' perception related to the promotion of Nanotechnology concepts in Romanian Science Education*)

11th WSEAS International Conference on Applied Computer and Applied Computational Science (ACACOS'12) – Rovaniemi, FINLAND, April 2012 (1 presentation - Gorghiu L. M., Gorghiu G - *„Teachers' and Students' Feedback Concerning the Use of ICT Tools in Learning Science through Nanotechnology"*)

The Yearly Scientific Seminar of the Faculty of Science and Arts, with national participation organized in the frame of „Valahia University Days" , Targoviste, ROMANIA, May 2012 (1 presentation - Gorghiu L. M., Gorghiu G., Dumitrescu C., Olteanu R. L., Bizoi M. - *Considerations on the introduction of nanoscience specific topics in preuniversity and academic Romanian educational system*)

WP8

P3 - CCTA

CCTA had announced the future deliverables (nano-camp and VLAB) to its teacher seminars.

Describe the problems/ obstacles encountered in performing the work activities

P1 – DOGA SCHOOLS

According to our proposal, the start of our project was expected to start in October 2010. However, the agreement was signed on 01 January 2011 with the Commission. Therefore, the dates of the project deliverables and the project meetings were extended with 3 months delay. Therefore, we planned our project meetings and the activities (applying questionnaires, shooting the experiments and preparation of the guidelines etc.) as it was stated in our grant agreement (01.01.2011). Moreover the project partners waited for the first transfer of their budget to finance their travel expenses for the 1st PM in Istanbul. After long correspondences and face to face meeting with our officer, we could achieve to get our first transfer in the end of March. Therefore, the first PM in Istanbul was realized end of March 2011. The contractual procedure with the partners also delayed and the production of the project deliverables were actually initiated in April after the decision taken in the kick off meeting 23-25 March 2011 in TR. The coordinator proposed the partners to choose the reasonable dates for the 1st PM in TR and requested to finance their expenses temporarily from their institutions. When the coordinator got the transfer from the Commission, their first tranches were sent after signing the partnership contracts with the partners. However, some delays happened for the transfer of the 1st and 2nd tranche as indicated in the budget since for the partners' institutions the legal procedures to open their account took more time than expected and also the partners asked an extension for submitting their interim reports.

The first draft of the Concept Paper was not satisfying, all the partners decided to define content and structure of the virtual laboratory through using the analysis of the results to initiate the preparation of the educational tools. The task allocation was done during the 2nd PM among the partners and the deadlines were put by the project partners and Doga took responsibility to shoot the videos and prepare the guidelines.

Since expenses for the video shooting & editing were not shown in the budget, Nano-tech video experiments were prepared by Doga by the TR project experts but the quality and sound system was not satisfying for the partners. Since Nano experiments were very challenging and long lasting, project coordinator preferred to subcontract a professional video producer.

The place of 4th PM in May 2012 was shifted from IT to RO since any staff from IT did not participate the 3rd PM in Sofia, BG without partners' consents. Since IT partner did not follow the tasks and obligations of the project during this time, the partners agreed on shifting the meeting place from IT to RO. The IT partner was informed via mail and coordinator conducted a Skype meeting with the IT partner and gave warnings for nonattendance to the PM. Since IT did not compensate their missing tasks in terms of submission of the report, deliverables etc. The project coordinator deduced the staff days and travel cost of IT. The responsibilities of IT partner were reminded and the agreement in principle on the shared responsibilities was done between Fondazione (P2) and the coordinator to sustain the project consortium.

Uploading the deliverables to the collaborative space could not be a habit by the partners

P2 – FONTAZIONE

There were some delays in the fulfilling the tasks. The reports about the results of the questionnaires in Italy have been provided with some delay, this because the definitive forms were ready in the summer 2011 when it was quite difficult to find school classes and teachers who fill them.

Also the definitive version of the Concept Paper has been provided in delay because the first version provided in time has been considered not completed by the partners and it had to be finished in the following months. Moreover the synthesis of the report about the result of the questionnaires was an essential part of the Concept Paper and the delay described above produced this further delay in its writing.

P3 – CCTA

Completely new topic – Nanotech requires new approaches, since it is a matter of new content to be integrated in the curriculum. Those who implement had reserves where and when to insert the specific content – towards which lesson plan, etc. While on the other hand – students were eager to get to know more and better about Nano. There is certain lack of flexibility in testing/experimenting with practices that will eventually slow down the process of adopting those practices.

P4 – FORTH

Delays in some tasks regarding WP2 due to the late start of the project.
Could not match Greek schools for testing videoconferences due the very strict curriculum / schedule that Greek classes have to follow.

P5 – UVT

In general we didn`t have any problems in implementation of the work activities, there were only some delays in the fulfilling the tasks, due to the delay of starting the project.

P6 – SIRMA

In general we didn`t have any problems in implementation of the work activities.

Describe deviations from the original work plan (and their justification)

P1 – DOGA SCHOOLS

Because of the delay of the initiation of the project described above; the partners could apply the questionnaires in the second school term to conduct the need analysis of the project. The analysis of each country was ready end of June and the first draft of the Concept paper was prepared by IT partner to define the structure and content of the virtual laboratory in September and proposed to the partners for necessary changes. The first draft of the concept paper was improved and revised in the end of the November. Accordingly, the installation of the Nano-Tech experiment room was realized in February within a month following the preparation of the first Nano-Tech experiments with all supportive materials and documents (video, guidelines & simulation). When the first experiment was ready, the call for testing the experiment was sent to schools in partner countries in March and the first test was held between TR and BG to upload the results to the podcasting room.

The external evaluator of the project did not attend the 4th PM in RO since she was involved 3 PMs of four of them before. As a result of this the schedule of the external evaluator was rearranged.

As a last deviation from the initial plan, the fourth project meeting in IT shifted to RO since IT partner did not attend the 3rd PM in BG.

P2 – FONTAZIONE

Because of the delay in providing the final version of the questionnaires form (June 2011), we could apply them only at the beginning of the school year 2011-2012. Due to this thing, the need analysis was delayed till the end of 2011. The time needed for elaborating and revising the Concept paper was also longer than it was estimated in the proposal.

Due to internal organization problem, Fondazione could not attend the third meeting in Bulgaria.

P3 – CCTA

Del. 9 In the VLAB the Broadcasting room was renamed to podcasting room. The deliverable was remained due to mismatch between the term in the application form and the content. No changes in content or function appeared though.

P4 – FORTH

Due to the late start of the project, the questionnaires for the need analysis applied late June 2011.

P5 – UVT

Because of the delay of the start of the project with at least three months, we could apply the questionnaires for the need analysis only at the end of the second semester of the school. Due to this thing, the need analysis was delayed till the end of June 2011. The time needed for elaborating and revising the Concept paper was also longer than it was estimated in the proposal. Due to this reason the work concerning the setting up of the Virtual Lab was delayed.

Another deviation from the initial plan was the organizing of the fourth project meeting on May, 16th-20th, 2012, in Sinaia, Romania, instead of Italy.

P6 - SIRMA

All activities were completed according to the deadlines of the project.

2 – Co-ordination of the work

Was your institution periodically and adequately informed of project developments?

P1 – DOGA SCHOOLS

Since the NTSE project is one of the complicated and demanding project, the communication among the partners via flash meetings and the mailing system to update the tasks of the partners and process of the project. In the e-mailing system, the Turkish team has played the central role by forwarding and distributing necessary information, documents concerning the improvement of the project and project products through creating a google group with the project partners to keep them in a correspondence procedure and to use as a communication hub to sustain the communication among the partners. In April 2011, collaborative web space was set up as the registered area and the all the necessary documents were uploaded to this online space to share with the partners. Also ftp area was created to upload & download large files quickly to create the parts of VL.

P2 – FONTAZIONE

Yes

P3 – CCTA

Yes. The project coordinator did best efforts to keep all partners informed and up-to-date.
Reminders were timely and consistent.

P4 – FORTH

Yes, communication was efficient through email in the beginning. Later on other communications channels used (videoconference, collaborative space)

P5 – UVT

Yes

P6 – SIRMA

Yes

What is your source of information regarding a) the project as a whole b) specific project activities

P1 – DOGA SCHOOLS

a) e-mailing system, PMs, online flash meetings

b) skype

P2 – FONTAZIONE

Application form of the project, e-mail correspondence, Project Meetings, on-line flash meetings, Skype discussions

P3 – CCTA

The application form; meeting minutes, peer-to-peer communication with partners, the NTSE google-group, the Virtual lab, the collaboration platform, the project website.

P4 – FORTH

Application form of the project, e-mail correspondence, Project Meetings, on-line meetings, collaborative space.

P5 – UVT

Application form of the project, e-mail correspondence, Project Meetings, on-line flash meetings, Skype discussions.

P6 – SIRMA

Application form of the project, project meetings and e-mail correspondence.

Express your views on the communication process a) from a technical perspective b) from an interpersonal perspective

P1 – DOGA SCHOOLS

a) e-maling, skype & adobe conference http://conf.dogakoleji.com/euprojects/ worked well

b) The consortium have found a ground for academic collaboration and friendly environment from the very beginning of the project strengthened by the social events organized during the partner meetings. It has become a tradition among the partners to organize dinners, excursions and visits to prominent local places of cultural and historical significance creating opportunities of cultural visits.

P2 – FONTAZIONE

We had some problems to understand the different versions of materials created, so probably having a common folder where the updates could be visible in real time could have helped. It was difficult to have prompt reply to all the requests. Sometime overflow of emails and difficulty to understand what had to be done generated a sense of frustration. It was easier to understand the tasks during the project meetings with communication face to face. Not all of the partners respect the deadlines.

P3 – CCTA

The collaborative platform was not widely perceived as document exchange platform, but was of good use during the interim report phase, especially in favor of the coordinator. Partners could follow their individual progress and checklists of deliverables were relatively easy to be generated.
At interpersonal level communication processes were intense and productive. Partners discussed in pairs outside the project

P4 – FORTH

From a technical perspective, the communication process was efficient specially after the establishment of the online collaborative space.

From an interpersonal perspective, the collaboration between the partners was excellent.

P5 – UVT

From a technical perspective our communication, it should be designed a collaborative space for all the documents between partners from the beginning of the project. Correspondence by e-mail with different versions of the documents created confusion. In addition, not all the partners responded on time to the requests. Most of them are much more active around the project meetings. Not all of the partners respect the deadlines.

P6 - SIRMA

From a technical perspective our communication with the partners was clear. But most of the partners don`t follow all e-mail communication and often they don`t respond on time. Partners are very active mostly around the project meetings. Not all of the partners respect the deadlines.

Have the undertaken tasks been addressed successfully?

a) by the coordinating institution b)by the workpackage leaders c)by the other partners

P1 – DOGA SCHOOLS

WP1 Coordination DOGA SCHOOLS

WP2 Analysis & Concept FONDAZIONE as described above their tasks could not be completed well in the first period of the project but it would be compensated very well in the second period of the project.

WP3 Educational Guidance CCTA implementations, matching schools as video conference could not be realized enough.

WP4 Development of the Nano-tech Tools SIRMA MEDIA

WP5 Educational Testing DOGA SCHOOLS

WP6 Quality Assurance FORTH implementations, matching schools as video conference could not be realized.

WP7 Dissemination DOGA SCHOOLS

WP8 Exploitation Results UVT implementations, matching schools as video conference could not be realized enough.

P2 – FONTAZIONE

a) by the coordinating institution - yes

b) by the workpackage leaders - mostly yes

c) by the other partners – mostly yes

P3 – CCTA

a) Partners had clear idea who should do what. On the other hand, there are some delays (most probably) due to need for some products to be redone or updated.
b) again, WP leaders have clear identification of their tasks in the application form. Events and accompanying tasks were undertaken correctly by WP leaders. WP leaders were responsive most of the time.
c) there was good distribution of tasks in terms of competencies, expertise and capacity. The dissemination and exploitation potential of the partners varies.

P4 – FORTH

a) by the coordinating institution - yes

b) by the workpackage leaders - mostly yes

c) by the other partners – mostly yes

P5 - UVT

a) by the coordinating institution - mostly yes

b) by the workpackage leaders - mostly yes

c) by the other partners – partially

P6 – SIRMA

a) by the coordinating institution - yes entirely

b) by the workpackage leaders - mostly agree

c) by the other partners – agree – mostly disagree

3 – Implementation of the project, required modifications and dissemination

What do you regard as the project's main operational objective for the next period of the project?

P1 – DOGA SCHOOLS

In 2012-2013 29 implementations were made; 18 teachers implemented Nanotech topics in 15 different schools of Doğa Schools and 3 state schools as an outside body in their classrooms.

Implementation and matching the school: Doğa sent the implementation list to the partners in order to choose their schools.

VL according to the original proposal specifications.

P2 – FONTAZIONE

Implementing Virtual Lab in school environments

P3 – CCTA

CCTA will definitely try to develop as consistent and relevant nano-camp program as possible (in the last project year) and also working links between the VLAB activities and the national curriculum in high schools.

CCTA aims at exploiting the VLAB and nano-camp and the Nano-tech competition far beyond the project lifetime (del. 12, 13 and 14). By practically hosting science-camps on annual basis and also to host teacher trainings how to use the VLAB in the classrooms.

P4 – FORTH

Engage teachers and schools in the implementation phase, organize nano poster competition and nanocamp.

Revision of the VL

P5 – UVT

Promote IBL through the VL

P6 – SIRMA

Organizing Nano poster competition and nanocamp

Indicate the methodological changes that you feel need to be made in order to address the project's objectives within the next period.

P1 – DOGA SCHOOLS

In the original Proposal the experiments are foreseen to be prepared according to the inquiry-based approach. However, after the implementation, according to the feedback, the first 5 experiments revised again. The pedagogical approach while creating the educational tools is to promote the inquiry-based approach, case studies encouraging the learners to wonder about phenomena through posing the questions connected with the real life, to find solutions and exchanging information through video conferences from partner countries. Mostly it is believed that science education should show what the students learn in classroom is related to external world and daily life, should make the students be able to perform experiments and, should enhance the personal interest of the student toward science. In addition to that, science education should include the use of information technologies (ICT), offer short reports on modern achievements in science at the micro- and Nano- level by short talks in every learning unit to raise the awareness related to the nanotechnology. The NTSE Virtual Laboratory would be revised as the milestone to cover all these supportive educational tools mentioned above.

P2 – FONTAZIONE

n/a

P3 – CCTA

n/a

P4 – FORTH

VL: take in consideration gender aspects and IBL approach in developed experiments / educational material.

P5 - UVT

Based on the feedback collected from Romanian prospective teachers involved in evaluating the materials designed for the NTSE Virtual Lab, the teaching and learning materials has to be improved in terms of pedagogical approach, by promoting more the inquiry-based learning.

P6 – SIRMA

n/a

What is the main result/outcome that has been generated during this period?

P1 – DOGA SCHOOLS

Analysis of the questionnaires, curriculum match and Concept Paper of the Project

Setting up the Virtual Laboratory

Creating LPs

P2 – FONTAZIONE

The main result of this period was the *Concept Paper* containing also many information derived by the Curriculum Matches and the analysis of the questionnaires.

P3 – CCTA

- VLAB structure and working prototype
- Video interviews
- Better perception what the final project outcomes would be and how it would look like
- Direct involvement of teachers and pupils in the field of Nanotechnology
- Involvement of associated partners (in BG)

P4 – FORTH

The *Concept Paper and the setting up of the VL*

National reports, analysis of questionnaires.

The QA plan

P5 – UVT

The main result of this period was the *Need analysis and the Curriculum match* that grounded the Concept paper and directed the setting up of the NTSE Virtual Lab.

P6 – SIRMA

The questionnaires which were filled and collected from teachers in all partner counties in order to match their opinion for building the concept of the virtual lab.

Indicate means for disseminating this result/outcome?

P1 – DOGA SCHOOLS

The first promotional leaflet was designed in EN by TR partner to disseminate in International Congress in Antalya. Later TR & IT versions were designed by TR to disseminate at local workshops.

Second test implementation period would be initiated mid- September and ready experiments and other rooms of the virtual laboratory will be disseminated to the schools and universities science and education faculties to invite test and take part in the video conference sessions.

Multilingual promotional leaflets and e-newsletters, dissemination materials (pens, mugs & booklets) would be disseminated to disseminate the project outcomes.

P2 – FONTAZIONE

3GIORNIPERLASCUOLA 2011 - annual national convention held in Città della Scienza, Naples, and dedicated to school and education issues. (first presentation of the project and collecting of nominatives of teachers interested to attend the future initiatives of the project)

P3 – CCTA

- The initial group of responsive teachers (70+ individuals from all over Bulgaria)

- The regional inspectorates of Education – total 28

- The CCTA events related to dissemination of project outcomes (2 per year)

- The project newsletter to the associated partners' mailing lists

P4 – FORTH

Presentation of NTSE Project to the science teachers of Experimental High School of Heraklion.

Newsletter in the form of e-mail to Science Teachers" (including the project's leaflet in pdf format)

Submission of the project in STENCIL Catalogue (http://www.stencil-science.eu/)

Institutional website.

P5- UVT

Preparing and sustaining presentations in different seminars, workshops, conferences:

4th World Conference on Educational Sciences (WCES 2012) – Barcelona, SPAIN, February 2012 (1 presentation - GORGHIU L. M., GORGHIU G. – *Teachers' perception related to the promotion of Nanotechnology concepts in Romanian Science Education*)

11th WSEAS International Conference on Applied Computer and Applied Computational Science (ACACOS'12) – Rovaniemi, FINLAND, April 2012 (1 presentation - Gorghiu L. M., Gorghiu G - *„Teachers' and Students' Feedback Concerning the Use of ICT Tools in Learning Science through Nanotechnology"*)

The Yearly Scientific Seminar of the Faculty of Science and Arts, with national participation organized in the frame of „Valahia University Days" , Targoviste, ROMANIA, May 2012 (1 presentation - Gorghiu L. M., Gorghiu G., Dumitrescu C., Olteanu R. L., Bizoi M. - *Considerations on the introduction of nanoscience specific topics in preuniversity and academic Romanian educational system*)

P6 – SIRMA

Project web site; Virtual lab; Partners' web sites

State any difficulties you feel might arise in the application of the project.

P1 – DOGA SCHOOLS

Implementation and matching the school for video conferences; in partner countries, creating authentic experiments with simulations with inquiry based method.

P2 – FONTAZIONE

Someway the experiments of the virtual lab are considered too hard to reply from teachers and educators. Plus teachers from Italy were not at their ease in dealing with a topic they hardly know about.

P3 – CCTA

Just the new field of work – nanotechnologies

P4 – FORTH

Implementation of VL experiments in a school environment (time constrains)

Creating interactive virtual experiments.

Difficulties in using the NTSE Blog as an discussion space

P5- UVT

The NTSE Virtual Lab does not contain virtual experiments that appeal sufficient nano-topics and the NTSE experiments implementation is difficult to be made to the university level due to the content which addresses mainly secondary education topics.

P6 – SIRMA

Inability of the partners to generate enough and with the necessary quality and depth training materials on the subject matter of the project (nano technologies).

4 – Other issues

State anything else you feel should be included in the internal evaluation.

P2 – FONTAZIONE

A suggestion could be to individuate a person from a partner organization in charge to manage information coming from all the others and making it more linear and less confused.

P3 – CCTA

n/a

P4 – FORTH

Greater respect for deadlines, stick with collaborative space as main communication channel.

P5 – UVT

Partners have to respond on time to the e-mail messages, respect the deadlines and focus on the deliverables realization.

P6 – SIRMA

Partners have to concentrate on their deliverables and to be more involved in the project as a whole.

Name any issues you think should be addressed in the next project meeting.

P1 – DOGA SCHOOLS

Concept paper: IT team would revise Concept Paper

GR team would prepare paper about gender

Case Studies template

The missing translations of our virtual lab

Uploading the deliverables to the collaborative space

Implementation and matching the school

During the lifetime of the project, the Nano-Tech competition, the interested groups and implementer schools will be included and through online voting system of the competition, more and more potential users will be engaged to the project to define the successful projects. In pursuit of Nano competition, the Nano Science Camp would be made in Bulgaria addressing the teachers and their students. Partners' universities and general & vocational schools and the entrepreneur learners in the Nano-tech project competitions (at least 5 teachers 10 students from each country) would be invited to the Nano Science Camp which includes hands-on demonstrations, weeding animations, and a demonstration of Nano material. During the summer camp promotional dissemination materials such as mugs, pens, bags and booklets with activities from VL will be dispatched to the participants.

An international Nano Tech Conference called 'International Nano-Tech Science Education Congress (INT-NTSE)'would be held in Istanbul, TR and will address to at least 200 participants targeting educational stakeholders including the Ministry of Education and the academicians on science and the sessions on the last technological improvements and the effects on humankind. The outcomes of the project will be introduced in the workshops and distributed to the targets groups for the sake of project dissemination.

P2 – FONTAZIONE

Exploitation and guidelines

P3 - CCTA

Dissemination and exploitation processes. Discussion about creating a nano-tech kits with practical materials.

P4 – FORTH

Case studies structure / template

Organizing the nano-competition (setting up, rules, deadlines, dissemination)

P5 - UVT

Discussing and deciding the structure of the Guideline for Best Practices.

P6 – SIRMA

Partners' activity level – the goal is to achieve constant involvement of the partners in the project activities.

Annex II – Questionnaire Sets

Here are the EN version* of the two sets of questionnaires developed during the 1st period of the project.

Set 1: These questionnaires aimed at gathering the opinions of the virtual lab beneficiaries concerning several different aspects of their activity / preferences in order to better define the features the Virtual Lab should have in terms of ICT, scientific contents and educational methodology.

Set 2: These questionnaires aimed at evaluating and collecting information and suggestions on the content, usability and pedagogical effectiveness of the NTSE Project teaching materials (video, interactive animation, teacher guidelines, student guidelines).

* *Versions in BG, GR, IT, TR and RO are available in NTSE collaborative space.*

Questionnaire for Teachers

This questionnaire is aimed at gathering the opinions of the virtual lab beneficiaries concerning several different aspects of their activity / preferences in order to better define the features the Virtual Lab should have in terms of ICT, scientific contents and educational methodology.

I. Personal data

1. Name: _____

2. Country: _____

3. Gender: Male Female

4. Years of teaching experience: _____

5. Subject(s) taught: _____

6. Type of current school: upper secondary lower secondary

7. Experience in using on-line resources for teaching and learning:

not at all little average much very much

II. Content & Pedagogic Approach & Tools

1. Which kind of topics in science education would you consider to be more appealing for students? (e.g. traditional or basic subjects, problems of global importance or scale, topics oriented towards high technologies and innovation, subjects of special importance for human life or improvement of the human condition, topics significant for business applications or future development, other, etc.)

……

……

……

2. Which of the extracurricular topics should be integrated with science topics?

What kind of extracurricular subjects would you consider to be important and/or innovative? (e.g. relevant to the connections between science and business applications, such as electronics, energy sources/fuels, modern anti-corrosive coatings, biotechnological instruments etc. ?). How would you improve the balance between the different topics in science teaching?

		Strongly Agree	**Agree**	**Disagree**
a.	Optical instruments and how they work			
b.	The use of lasers			

c.	How CDs and DVDs store and play sound and image			
d.	Organic and ecological farming without use of pesticides and artificial fertilizers			
e.	How radios and TVs work			
f.	How mobile phones can send and receive messages			
g.	Life and death and human soul			
h.	Why we can see the rainbow			
i.	The ozone layer and how it may be affected by humans			
j.	How technology helps us to handle waste, garbage and sewage			
k.	How energy can be saved or used in a more effective way			
l.	How gene technology prevent diseases /базисни/			
m.	Very recent inventions and discoveries in science and technology			
n.	Nanotechnology and its uses			
Other :…….				

3. Do you have any knowledge about nanotechnology? YES NO

If yes, which of the curriculum topics are related with nanotechnology?		**YES**	**NO**	**NOT SURE**
a.	Chemicals, their properties and how they react			
b.	Parts of human body and how the systems work			
c.	Structure of DNA, genetic studies, heredity and how genes influence how we develop reproduction in humans			
d.	How plants and animals grow and reproduce			
e.	How people, animals, plants and the environment depend on each other			
f.	Atom, molecules and chemical bonding			
g.	Light and its nature			
h.	Radioactivity and its effects			
i.	The nature of sound and its properties			
j.	Velocity and the relationship between velocity, time and road			
k.	The structure of cell, mitosis and meiosis			
l.	Simple machines and how they ease our lives			
m.	Electricity and its properties			
n.	Optics and how they are used in our daily lives			

o.	Structure of Earth and how earthquakes happen			
p.	Clouds, rain and the weather			
r.	Sustainable energy and its sources			
s.	heat and temperature			
t.	Technology and its interaction with science			
Other: ……..				

4. Which science topics do you think that should be supported with experiments for a meaningful and permanent learning?

……

……

……

5. Science education should involve the following;

		Strongly Agree	**Agree**	**Disagree**
a.	Make pupils aware of the unlimited aspects of science			
b.	Be able to use scientific equipment skillfully			
c.	Be able to demonstrate experiments			
d.	Use information technology			
e.	Expect pupils to use the proper terminology correctly			
f.	Link new science learning to everyday experiences			
g.	Help pupils to understand the importance of science in modern business applications			
h.	Encourage pupils to try out their own ideas in experiments			
i.	Teach pupils to understand science concepts			
j.	Frequently revise previous learning			
k.	Show how classroom learning relates to phenomena in outside world and everyday life			
l.	Explain to pupils how to use the scientific knowledge and why their science activity is important,			
m.	Help pupils become aware of the benefits and misuses of science			
n.	Relate each new idea (concept) to ones the pupils have already learnt			
o.	Use visits to industry to support science learning			
p.	Use field trips to support science learning			

r.	Develop a personal interest in science (e.g. find new and exciting scientific topics to enrich their understanding of new horizons)			
s.	Enable the pupils to integrate with everyday lives and problems of global importance, scientific/technological achievements			
t.	Raise awareness related to the nanotechnology by introducing short talks at the last 10 minutes of learning unit			
u.	Offer short reports on modern achievements in science at the micro- and nano-level to be added to every learning unit			
Other :…….				

6. The most effective ways to teach a particular scientific topic in a modern way generally would be:

	1 Disagree	2 Doubtful about it	3 Agree	4 Strongly agree
Formal lessons				
Reading textbooks				
Watching clips and documentaries				
Interactive computer based tools				
Direct experiments using measuring equipment				
Pre-recorded or filmed experiments with explanations				
Less structured experiments				
Other (please specify)				

7. Please, rate the importance of the following tools for an online virtual lab:

	1 Disagree	2 Doubtful about it	3 Agree	4 Strongly agree
Texts				
Images				

Video				
Simulations				
Interactive simulations				
Procedures to carry out experiments with the students				
Resource library				
Other (please specify)				

8. What type of lab approach you prefer?

	1 Disagree	2 Doubtful about it	3 Agree	4 Strongly agree
Cook-book type laboratory activities (step-by step instructions) to verify scientific facts.				
Inquiry-based laboratory activities (students decide how to conduct the activity, and have to explore in order to figure out how the world works).				

9. What do you think that the appropriate activities in a laboratory would be;

	1 Disagree	2 Doubtful about it	3 Agree	4 Strongly agree
Students should get involved with scientifically oriented questions.				
Students should have (be provided with) the ability to determine what data allows them to develop and evaluate scientific explanations.				
Students should have (be provided with) the ability to formulate their own explanations from the evidence they have obtained.				
Students should have (be provided with) the ability to expand upon their findings and relate those findings to similar situations.				
Students should have (be provided with) the ability to communicate their experimental findings to others in class via written laboratory reports.				
Students should be able to have access to experiments on-line which cannot be done in a laboratory				

10. If you were to create your own laboratory, the students should be able to:

	1 Disagree	2 Doubtful about it	3 Agree	4 Strongly agree
Make observations.				
Pose questions.				
Have access to an e-Library (other sources of information).				
Plan investigations.				
Reviewing what is already known in light of experimental evidence.				
Use (virtual) tools to gather, analyze and interpret data.				
Propose answers, explanations, and predictions.				
Communicate the results.				
Identify assumptions.				
Use critical and logical thinking.				
Consider alternative explanations.				

11. How well are you able to manage with using ICT tools for teaching Science topics?

❍ poor ❍ average ❍ good ❍ excellent

12. To what extent do you implement ready-made ICT tools for teaching Science topics?

❍ never ❍ sometimes ❍ often ❍ always

13. What is the purpose of using Nano-Tech experiments in your classroom by the use of ICT?

❒ To let students understand the core aspects of the nano-technology
❒ To provide students with nano-tech examples
❒ To verify hypothesis, theories or models from nano-technology area
❒ To raise the students' motivation for learning nano-technology

14. What kind(s) of ICT tools do you use for presenting Science/Nano-Tech experiments in your lessons?

❒ PowerPoint Presentations ❒ Digital Images ❒ Video clips ❒ Virtual Experiments

Other, please specify…

15. Evaluate (on a scale from 1 to 4) how important are ICT tools to you for the purpose of promoting an inquiry based/creative learning environment in Science teaching?

a) as a method to explain the "Inquiry Based Science Education" concept	1	2	3	4
b) as a way for better planning of an experiment	1	2	3	4
c) as a channel for guiding students to explain scientific aspects and propose hypothesis for investigation	1	2	3	4
d) as a method to enhance creativity in teaching and learning process	1	2	3	4

(Scale: 1 – not at all; 2 – very little; 3 – to some extent; 4 – to great extent)

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

a) as a method to increase students' motivation	1	2	3	4
b) as a method to make learning content more attractive (by using virtual environments and multimedia tools)	1	2	3	4
c) as a way to make students more emotional ??? (by connecting them)	1	2	3	4
d) as a method to promote creativity based on collaborative work	1	2	3	4

(Scale: 1 – not at all; 2 – very little; 3 – to some extent; 4 – to great extent)

17. Where do you find good examples of Science experiments, appropriate to be presented in the classroom?

- ❒ From real life
- ❒ From Internet (WWW Space), please specify some sources:
- ❒ From educational CDs/DVDs, please name some titles:
- ❒ They are produced by myself, please provide further details:

Questionnaire for future teachers

This questionnaire is aimed at gathering the opinions of the virtual lab beneficiaries concerning several different aspects of their activity / preferences in order to better define the features the Virtual Lab should have in terms of ICT, scientific contents and educational methodology.

A. QUESTIONS FOR THE CONTENT OF THE SCIENCE TEACHING

1. How would you describe your knowledge about nanotechnology?
   a) I am proficient to teach nanotechnology without any training required.
   b) I have knowledge about some basic concepts
   c) I just know what it is but do not have any further knowledge
   d) I only have heard the name of nanotechnology
   e) I have never heard about it

2. What do you think about teaching the emerging sciences (i.e nanotechnology) to K12 students?
   a) It should be a required course for 12 years
   b) It should be a required course for only high school
   c) It should be a elective course for 12 years
   d) It should be a elective course for only high school
   e) I do not think it should be thought at the K12 level

3. If nanotechnology is thought what should be the level for elementary school students?
   a) It should be a complete training so that during high school, students can learn it in a deeper level.
   b) Only the basics of the technology and some application fields should be introduced.
   c) Only some visual simulations about nanotechnology should be revealed in the regular science course
   d) The best is just to regulate some field trips for the students to high technology companies
   e) Education of nanotechnology should be only for self interested students by using a virtual lab

4. If nanotechnology is taught what should be the level for high school students?

   a) It should be a complete training so that at the university level students can master this technology
   b) Only the basics of the technology and some application fields should be introduced
   c) Only some visual simulations about nanotechnology should be revealed in the regular science course
   d) The best is just to regulate some field trips for the students to high technology companies
   e) Education of nanotechnology should be only for self interested students by using a virtual lab

5. If nanotechnology is taught to the science teachers what would be the level?

   a) It should be a complete theoretical training so that teacher can answer all the questions that may arise from the students
   b) Only the basics of the technology and some application fields should be introduced
   c) Only some visual simulations about nanotechnology should be shown to the teachers to give an idea about this science
   d) It should be thought to all science teachers by using a virtual lab
   e) The teachers need to be trained in the professional laboratories of nanotechnology for experimental experience and theoretical knowledge.

B. QUESTIONS FOR THE METHODOLOGY OF THE SCIENCE TEACHING

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

	1 Disagree	2 Not really	3 Agree	4 Strongly agree
Formal lessons				
Reading textbooks				
Watching clips and documentaries				
Interactive computer based tools				
Experiments				
Less structured experiments				
Other (please specify)				

7. Please, rate the importance of the following tools for an online virtual lab:

	1 Disagree	2 Not really	3 Agree	4 Strongly agree
Texts				
Images				
Video				
Simulations				
Interactive simulations				
Procedures to carry out experiments with the students				
Resource library				
Other (please specify)				

8. What type of lab approach you prefer?

	1 Disagree	2 Not really	3 Agree	4 Strongly agree
Cook-book type laboratory activities (step-by step instructions) to verify scientific facts.				
Inquiry-based laboratory activities (students decide how to conduct the activity, and have to explore in order to figure out how the world works).				

9. What do you think that the regarding activities in a laboratory would be;

	1 Disagree	2 Not really	3 Agree	4 Strongly agree
Students should be engaged by scientifically oriented questions.				
Students should have (be provided) the ability to determine what data allows them to develop and evaluate scientific explanations.				
Students should have (be provided) the ability to formulate their own explanations from the evidence they have obtained.				
Students should have (be provided) the ability to expand upon their findings and relate those findings to similar situations.				
Students should have (be provided) the ability to communicate their experimental findings to others in class via written laboratory reports.				
Students should be able to access to the experiments on-line that cannot be done in a laboratory				

10. If you were to create your own laboratory, the students should be able to:

	1 Disagree	2 Not really	3 Agree	4 Strongly agree
Make observations.				
Pose questions.				
Have access to an e-Library (other sources of information).				
Plan investigations.				
Reviewing what is already known in light of experimental evidence.				
Use (virtual) tools to gather, analyze and interpret data.				
Propose answers, explanations, and predictions.				
Communicate the results.				
Identify assumptions.				
Use critical and logical thinking.				
Consider alternative explanations.				

C. QUESTIONS FOR THE USE OF THE ICT INSTRUMENTS IN SCIENCE TEACHING

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

❍ poor ❍ average ❍ good ❍ excellent

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

❒ PowerPoint Presentations ❒ Images ❒ Video clips ❒ Virtual Experiments

Other, please specify…

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?

a) as a source of inspiration for you as a future teacher	1	2	3	4
b) as an effective learning environment	1	2	3	4
c) as a method to improve students' learning skills	1	2	3	4
d) as a way for improving students' understanding	1	2	3	4

(Scale: 1 – not at all; 2 – very little; 3 – to some extent; 4 – to great extent)

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?

a) as a method to explain the "Inquiry Based Science Education" concept	1	2	3	4
b) as a way for better planning of an experiment	1	2	3	4
c) as a channel for guiding students to explain scientific aspects and propose hypothesis for investigation	1	2	3	4
d) as a method to enhance creativity in teaching and learning process	1	2	3	4

(Scale: 1 – not at all; 2 – very little; 3 – to some extent; 4 – to great extent)

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

a) as a method to increase students' motivation	1	2	3	4
b) as a method to make learning content more attractive (by using virtual environments and multimedia tools)	1	2	3	4
c) as a way to make students more emotional (by connecting them)	1	2	3	4
d) as a method to promote creativity based on collaborative work	1	2	3	4

(Scale: 1 – not at all; 2 – very little; 3 – to some extent; 4 – to great extent)

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

❒ From real life

❒ From Internet (WWW Space), please specify some sources:

❒ From educational CDs/DVDs, please name some titles:

❒ They are produced by myself, please provide further details:

Questionnaire for students

1. How interested are you in learning about the following in science lessons?

		Very interested	Interested	Not interested
a.	Chemicals, their properties and how they react			
b.	Parts of human body and how the systems work			
c.	Structure of DNA, genetic studies, heredity and how genes influence how we develop			
d.	How plants and animals/humans grow and reproduce			
e.	How living and not living environment are connected on Earth			
f.	Atom, molecules and chemical bonding			
g.	Light and its nature			
h.	The nature of sound and its properties			
i.	The structure of cell, cell division			
j.	Robots and automated machines and their use in life			
k.	Electricity and its properties			
l.	Optics and how they are used in our daily lives			
m.	Structure of Earth			
n.	Weather and climate changes			
o.	Renewable energy and new energy sources.			
p.	The use of lasers			
q.	How radios and TVs work			
r.	Life and death and human soul			
s.	Why we can see the rainbow			
t.	The ozone layer and how it may be affected by humans			
u.	How technology helps us to handle waste, garbage and sewage			
v.	Organic and ecological farming without use of pesticides and artificial fertilizers			
w.	How energy can be saved or used in a more effective way			
x.	Technology in healthcare and medicine			
y.	Latest inventions and discoveries in science			
z.	Nanotechnology and its' use in life			

2. **What do you think about science education in school?**

		Yes	May be	No
a.	School science is a difficult subject			
b.	School science has opened my eyes to new careers and new events around me			
c.	I like school science more than most other subjects			
d.	The things that I learn in science at school will be helpful in my everyday life			
e.	School science has increased my curiosity about things we cannot yet explain			
f.	School science has increased my appreciation of nature			
g.	School science is my way to technology and science knowledge			

3. **I think that a good way to learn more about science and technology is:**
   (please check if you think it is good)

Having lessons in the classroom	
Reading textbooks	
Watching clips and documentaries	
Simulated labs and simulated experiments	
Real experiments	
A guided walk in nature	
Other (please specify)	

4. **Do you prefer to use of computers and internet to discover and learn aspects related to Science topics?**

❍ Yes ❍ No

If the answer is "YES",

Indicate what kind of specific tools you would like to use:

❒ PowerPoint Presentations ❒ Images ❒ Video clips ❒ Virtual Experiments

Other, please specify…

5. **Choose which kind of specific environments do you like to use for this purpose:**

❒ Platform made just for this ❒ Social Network like facebook with included science materials ❒ Forum/Group discussion with included science materials

Other, please specify…

QUESTIONNAIRE FOR TEACHERS

This questionnaire is aimed at evaluating and collecting information and suggestions on the content, usability and pedagogical effectiveness of the NTSE Project teaching materials (video, interactive animation, teacher guidelines, student guidelines).

Personal data

1. **Name:**

   _____

2. **Country:**

   _____

3. **Gender:** Male Female

4. **Years of teaching experience:**

   _____

5. **Subject(s) taught:**

   _____

6. **Type of current school:** upper secondary lower secondary

7. **Experience in using on-line resources for teaching and learning:**

   not at all little average much very much

Pedagogical approach

A. Please, evaluate the teaching materials according to the general pedagogical criteria below. Circle the appropriate number.

General pedagogical criteria	1 very poor	2 poor	3 average	4 good	5 very good
1. Clarity of the stated educational aims and learning outcomes.	1	2	3	4	5
2. The teaching materials fulfill the stated educational purpose.	1	2	3	4	5
3. Learning objectives are clearly stated.	1	2	3	4	5
4. Assignments are clearly written.	1	2	3	4	5
5. The activities are well-matched to the target audience.	1	2	3	4	5

B. Please, circle a number to indicate the extent to which the teaching materials enables the student to:

Student-focused pedagogical requirements	1 not at all	2 little	3 average	4 much	5 very much
1. Set his/her own learning objectives	1	2	3	4	5
2. Choose among different alternatives of studying and using the resource	1	2	3	4	5
3. Search for and explore information	1	2	3	4	5
4. Collect and extract information	1	2	3	4	5
5. Study material by him/herself	1	2	3	4	5
6. Experiment and play with material	1	2	3	4	5
7. Exchange and share information with peers (other students)	1	2	3	4	5
8. Collaborate with peers in a common workspace	1	2	3	4	5
9. Ask for and receive support from subject area experts	1	2	3	4	5
10. Take tests in order to assess him/herself	1	2	3	4	5

C. Please, circle a number to indicate the extent to which which the teaching materials enables the teacher to:

Teacher-focused pedagogical requirements	1 not at all	2 little	3 average	4 much	5 very much
1. Set his/her own learning objectives	1	2	3	4	5
2. Search for and explore information	1	2	3	4	5
3. Collect and extract information	1	2	3	4	5
4. Communicate with students	1	2	3	4	5
5. Ask for and receive professional support from nanotechnology experts	1	2	3	4	5

Content Efficiency

D. Please, evaluate the teaching materials according to the criteria below. Circle the appropriate number.

Criteria	1 not at all	2 little	3 average	4 much	5 very much
Information					
1. The information included is detailed and extensive.	1	2	3	4	5
2. The information included is relevant to the stated educational objectives.	1	2	3	4	5
3. The information included is appropriate for the identified target audience.	1	2	3	4	5
4. The information included enriches school curriculum.	1	2	3	4	5
5. The information included is linked with other relevant on-line resources.	1	2	3	4	5
6. The information included is free of political, cultural, social, gender and racial bias, demeaning labels or stereotypes.	1	2	3	4	5
7. The information included is up to date with current nanotechnology topics.	1	2	3	4	5
8. The sources of the information included are clearly stated.	1	2	3	4	5
Structure					
9. The information included is well-structured and organized.	1	2	3	4	5
10. The texts included are well-structured.	1	2	3	4	5
11. The labeling of sections is representative of the information included in them.	1	2	3	4	5
12. The on-line resources linked with the information are relevant.	1	2	3	4	5

Presentation / design					
13. The pictorial and sound information included is accompanied by relevant labels.	1	2	3	4	5
14. The texts included are legible, in terms of colour, size and type of lettering, arrangement and visual effects.	1	2	3	4	5
15. The graphics, images, video and virtual reality included are well-presented, in terms of resolution, colour and size.	1	2	3	4	5
16. The sound information included is well-presented, in terms of technical quality.	1	2	3	4	5
17. Graphics, images, sound, video and virtual reality used are appropriate for the purpose of the resource.	1	2	3	4	5
18. The use of graphics, images, sound, video and virtual reality facilitates understanding.	1	2	3	4	5
Accuracy					
19. The links included in the resource are valid and up to date.	1	2	3	4	5
20. The language used is grammatically and syntactically accurate.	1	2	3	4	5

Improvements

E. In the process of implementation, did you deviate from the lesson plan? YES NO

F. If YES - how, why? To what extent may this affect future lesson plans with this class?

_____
_____
_____
_____
_____
_____

G. Was there a missing stage in either instructions or preparation?

_____
_____
_____
_____
_____

H. Did any part of your teaching go particularly well? Can you think of a reason for this? Will this affect future planning?

_____
_____
_____
_____
_____
_____

I. Did any part of your lesson go particularly badly? Can you think of a reason for this? Will this affect future planning?

_____
_____
_____
_____
_____
_____

J. Did the whole procedure take longer or shorter than predicted? YES NO

K. Which aspects could be improved? How?

_____
_____
_____
_____
_____
_____

QUESTIONNAIRE FOR PROSPECTIVE TEACHERS

This questionnaire is aimed at evaluating and collecting information and suggestions on the content, usability and pedagogical effectiveness of the NTSE Project teaching materials (video, interactive animation, teacher guidelines, student guidelines).

Personal data

1. **Name:** ……..
2. **Country: ……**
3. **Gender:** Male Female
4. **Experience in using on-line resources for teaching and learning:**

Not at all little average much very much

Pedagogical approach

A. Please, evaluate the teaching materials according to the general pedagogical criteria below. Circle the appropriate number.

General pedagogical criteria	1 very poor	2 poor	3 average	4 good	5 very good
1. Clarity of the stated educational aims and learning outcomes.	1	2	3	4	5
2. The teaching materials fulfill the stated educational purpose.	1	2	3	4	5
3. Learning objectives are clearly stated.	1	2	3	4	5
4. Assignments are clearly written.	1	2	3	4	5
5. The activities are well-matched to the target audience.	1	2	3	4	5

B. Please, circle a number to indicate the extent to which which the teaching materials enables the teacher to:

Teacher-focused pedagogical requirements	1 not at all	2 little	3 average	4 much	5 very much
1. Set his/her own learning objectives	1	2	3	4	5
2. Search for and explore information	1	2	3	4	5
3. Collect and extract information	1	2	3	4	5
4. Communicate with students	1	2	3	4	5
5. Ask for and receive professional support from nanotechnology experts	1	2	3	4	5

Content Efficiency

C. Please, evaluate the teaching materials according to the criteria below. Circle the appropriate number.

Criteria	1 not at all	2 little	3 average	4 much	5 very much
Information					
1. The information included is detailed and extensive.	1	2	3	4	5
2. The information included is relevant to the stated educational objectives.	1	2	3	4	5
3. The information included is appropriate for the identified target audience.	1	2	3	4	5
4. The information included enriches school curriculum.	1	2	3	4	5
5. The information included is linked with other relevant on-line resources.	1	2	3	4	5
6. The information included is free of political, cultural, social, gender and racial bias, demeaning labels or stereotypes.	1	2	3	4	5
7. The information included is up to date with current nanotechnology topics.	1	2	3	4	5
8. The sources of the information included are clearly stated.	1	2	3	4	5
Structure					
9. The information included is well-structured and organized.	1	2	3	4	5
10. The texts included are well-structured.	1	2	3	4	5
11. The labeling of sections is representative of the information included in them.	1	2	3	4	5
12. The on-line resources linked with the information are relevant.	1	2	3	4	5

Presentation / design					
13. The pictorial and sound information included is accompanied by relevant labels.	1	2	3	4	5
14. The texts included are legible, in terms of colour, size and type of lettering, arrangement and visual effects.	1	2	3	4	5
15. The graphics, images, video and virtual reality included are well-presented, in terms of resolution, colour and size.	1	2	3	4	5
16. Graphics, images, sound, video and virtual reality used are appropriate for the purpose of the resource.	1	2	3	4	5
17. The use of graphics, images, sound, video and virtual reality facilitates understanding.	1	2	3	4	5
Accuracy					
18. The links included in the resource are valid and up to date.	1	2	3	4	5
19. The language used is grammatically and syntactically accurate.	1	2	3	4	5
20. Was there a missing stage in either instructions or preparation?	1	2	3	4	5

Further improvement

D. Which aspects could be improved? How?

QUESTIONNAIRE FOR STUDENTS

This questionnaire is aimed at evaluating and collecting information and suggestions on the content, usability and pedagogical effectiveness of the NTSE Project teaching materials (video, interactive animation, student guidelines).

1. **Country: _____** **2. Gender:** Boy Girl

3. Age: _____ 4. **School:** upper secondary lower secondary **5. Class:**____

Please, evaluate the lesson / experiment. Circle the appropriate number.

	1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
1. The "Reading before experiment" part was difficult to understand.	1	2	3	4	5
2. The "Reading before experiment" part was very useful.	1	2	3	4	5
3. For me, it was difficult to follow the video experiment.	1	2	3	4	5
4. The interactive animation was very useful and helped me understand the experiment.	1	2	3	4	5
5. After watching the video and doing the suggested activities, I had a better understanding of the subject matter.	1	2	3	4	5
6. Assignments helped me better understand the subject matter.	1	2	3	4	5
7. Tests and tasks reflected the lesson content.	1	2	3	4	5
8. The tests and tasks in this lesson/lab were difficult.	1	2	3	4	5
9. I learned a lot of new things in this lesson/lab.	1	2	3	4	5
10. I enjoyed doing this lesson/lab.	1	2	3	4	5

Would you like to add something else?