European Coordinating Body for Maths, Science and Technology (ECB)

DELIVERABLE SUBMISSION SHEET

To: Wolfgang Bode *(Project Officer)*

EUROPEAN COMMISSION
Directorate-General for Research & Innovation
RTD/B/6
B-1049 Brussels Belgium

From:

Project acronym: ECB Project number: 266622

Project manager: Alexa Joyce (acting project manager in the absence of Rinske van den Berg)

Project coordinator Marc Durando

The following deliverable:

Deliverable title: EVALUATION STRATEGY - INSTRUMENTS AND PROTOCOLS

Deliverable number: 6.2

Deliverable date: 31.01.12

Partners responsible: Myscience

Status: ☑ Public ☐ Restricted ☐ Confidential

is now complete. ☑ It is available for your inspection.
☐ Relevant descriptive documents are attached.

The deliverable is:

☑ a document
☐ a Website (URL: .....)
☐ software (.....)
☐ an event
☐ other (.....)

Sent to Project Officer:	Sent to functional mail box:	On date:
Wolfgang.BODE@ec.europa.eu	RTD-SIS-FP7-Deliverables@ec.europa.eu	31/01/2012

"This document has been created in the context of the ECB project. The user thereof uses the information at its sole risk and liability. The document reflects solely the views of its authors. The European Commission is not liable for any use that may be made of the information contained therein."

Published in January 2012.

This deliverable is published under the terms and conditions of the Attribution-Noncommercial 3.0 Unported (http://creativecommons.org/licenses/by-nc/3.0/).

http://www.ingenious-science.eu

Coordinated by European Schoolnet

The work presented in this document is partially supported by the European Commission's FP7 programme – project ECB – European Coordination Body (Grant agreement Nº 266622). The content of this document is the sole responsibility of the consortium members and it does not represent the opinion of the European Commission and the Commission is not responsible for any use that might be made of information contained herein.

ECB - WP 6

6.2 - EVALUATION STRATEGY – INSTRUMENTS AND METHODS

CONTRACT NO	266622
DATE	31.01.2012
ABSTRACT	This document describes the evaluation methodology, instruments and protocols that will be used to evaluate the impact on pupils and teachers in pilot schools of activities of industry-education cooperation in STEM education, particularly in terms of encouraging scientific thinking, stimulating more positive views of STEM, increasing awareness and positive views of STEM careers.
AUTHOR, COMPANY	Irina Kudenko, Mary Ratcliffe. Myscience
REVIEWER, COMPANY	Jim Ayre, Mutimedia Ventures, United Kingdom Derek Bell, Campula Consulting, United Kingdom
WORKPACKAGE	WP 6
CONFIDENTIALITY LEVEL[1]	1 PU
FILING CODE	ECB_Deliverable 6.2 Evaluation Plan
RELATED ITEMS	

DOCUMENT HISTORY

Version	Date	Reason of change	Status	Distribution
V1	12/01/2012	1st draft	Draft	Reviewers
V2	24/1/2012	After reviewers' comments	Final	Consortium
V3	31/01/2012	Final	Final	EC

[1] 1 PU = Public

PP = Restricted to other programme participants (including the EC services);

RE = Restricted to a group specified by the Consortium (including the EC services);

CO = Confidential, only for members of the Consortium (including the EC services).

INN - Internal only, only the members of the consortium (excluding the EC services)

Executive summary

The overall objective of the ECB/InGenious project is 'to foster young people to STEM careers by reinforcing links between schools and industries through STEM education activities'. In order to provide evaluation of the impact from the InGenious activities that are being tested in pilot schools, the WP6 team has designed a set of evaluation criteria that together with evaluation strategy and evaluation instruments constitute the evaluation plan for the InGenious project.

This report describes the development of the evaluation methods, instruments and protocols for the evaluation of the impact of practices in pilot schools on pupils and teachers of industry-education cooperation in STEM education, particularly in terms of encouraging scientific thinking and stimulating more positive views of science.

The evaluation methods have been developed in parallel with the development of evaluation criteria (described in deliverable 6.1). The final evaluation criteria focus on four areas:

- Impact for pupils from engaging in InGenious industry-education activities – learning, motivation, awareness of careers and skills needed, views on careers.
- Impact for teachers from engaging in InGenious industry-education activities – learning of industrial practices, motivation to introduce more industry based and STEM careers material, views on careers.
- Nature of the industry-education activity – nature of learning, nature of involvement of industry and educators, characteristics of the activity.
- Transferability – Scale of implementation, adaptation to different settings, popularity of the activtity.

The evaluation criteria have been used to guide the design and refinement of evaluation tools for use by the National Co-ordinators and pilot schools. The principal means of evaluation is through on-line questionnaires for participants in the industry-education practices, namely teachers in pilot schools and their pupils. Questionnaires are designed for teachers and pupils – on their first engagement with InGenious; during and after each activity; at the end of the pilot. Protocols concerning data collection for use by National Co-ordinators and teachers address ethical issues of engagement in evaluation.

The processes for developing the evaluation tools have included:

- Evaluation Strategy –what tools and when?
- Draft of questionnaires for teachers and pupils
- Three consecutive cycles of revising and refining the questionnaires based on the feedback by industrial partners, workpackage teams and pilot teachers Review of questionnaires and evaluation plan by partners, and some pilot teachers
- Final questionnaires for online use
- Protocols for National Co-ordinators and teachers

Alongside the evaluation of all industry-education practices in all schools involved in the InGenious project, case studies of examination of particular practices will be undertaken. Case studies will focus in detail on views of teachers, pupils and industry partners on the conduct and outcomes of activities.

The full report constitutes the Evaluation Plan.

Table of Contents

Introduction 6
Reminder of the context 6
Purpose and scope of the task 6
Structure of the document 6
Impacts of the Deliverable 6
ECB project 6
Ethical Issues 8
IPR issues 8
1 Evaluation Methodology 9
1.1 Background 9
1.2 Evaluation Criteria 9
1.3 Development of the InGenious evaluation plan 10
1.4 Development of research methods and instruments 12
1.5 Development of Questionnaires 14
1.5.1 Pre-pilot questionnaires 14
1.5.2 industry-education activity questionnaires 14
1.5.3 Post-pilot questionnaires 15
1.6. Development of case studies 16
1.7. Protocols for data collection 17
1.8. Data Analysis 18
2 Conclusions 18
Appendix I: List of abbreviations 19
Appendix II: Questionnaires 20
Appendix III: Protocols for data collection 44
Appendix IV: Draft case study template 47

Introduction

Reminder of the context

The overall objective of the ECB/InGenious project is to foster young people to STEM careers by reinforcing links between schools and industries through STEM education activities. In order to provide evaluation of the impact from the InGenious activities that are being tested in pilot schools, the WP6 team has designed a set of evaluation criteria that together with evaluation strategy and evaluation instruments constitute the evaluation plan for the InGenious project.

Industry-school activities in STEM education are collected and catalogued within the InGenious project by workpackage 2. Workpackage 3 recruits national co-ordinators and schools across Europe to implement a range of industry-school activities.

In order to assess the impact of these activities on teachers and pupils in the pilot schools evaluation criteria have been developed by workpackage 6 in consultation with other workpackages and industrial partners. These evaluation criteria together with the overall evaluation strategy and evaluation instruments constitute a framework for the creation of a knowledge map of current evidence of industry-school cooperation in STEM education especially with regard to the main objective of the project regarding 'fostering young people into STEM careers'.

Workpackage 6 collaborates with the other workpackages in the development of the evaluation criteria, plans and instruments. However, WP6 maintains a distance from the development of industry-school activities, recruitment of schools and implementation of activities in schools in order to ensure the independence of the evaluation, particularly in the analysis stages.

The evaluation criteria and the principles of effective evaluation have formed a basis for the subsequent development of evaluation instruments.

Purpose and scope of the task

The purpose of the task addressed in this deliverable is to develop instruments, based on the evaluation criteria, whose use will enable the evaluation of the impact that the activities carried out within the InGenious project produce on participating teachers pupils and schools.

Structure of the document

As in the contents page

Impacts of the Deliverable

The evaluation plan will enable effective data collection using protocols for national co-ordinators to ensure that teachers and their pupils complete the relevant questionnaires at appropriate stages of their involvement in the piloting of industry-education activities. The plan will also allow for collection of case studies

Completed questionnaires and case studies will be analysed by WP6, using the evaluation criteria (deliverable 6.1) as a basis for analysis and reporting.

ECB project

Review 'milestones' and 'degree or level of achievements'

The process of the development of the evaluation plan, instruments and protocols: - milestones

1) Developing a first draft of evaluation plan and questionnaire tools for pilot
    a. Month 3-4 Reviewing existing approaches to evaluation of projects in science education, including relevant experience of Myscience, projects of pan-European scale (e.g. project ROSE) and previous projects run by EUN (e.g. InSpire, Stella, PENCIL)
    b. M4-5 Adapting relevant experience and materials to the InGenious evaluation framework, including the outline of alternative evaluation strategies to be included in the evaluation plan
    c. M5 Presenting alternative scenarios for the evaluation plan to the steering committee and partners (Barcelona meeting)
    d. M6-7 review of literature including previous Science in Society projects, adoption of existing tools and creation of new tools for the evaluation of impact from use of InGenious activities
    e. M7 First draft of evaluation protocol and questionnaires completed
2) Review of evaluation plan and evaluation questionnaires by partners, other workpackages and pilot teachers
    a. M5 Receiving partners' feedback (Barcelona) and finalising the evaluation plan
    b. M7 Presenting the revised evaluation framework and the first draft of protocol and questionnaires to partners for review via the InGenious virtual platform
    c. M7 Presenting the first draft of protocol and questionnaires to some of the pilot teachers via workpackage 3 (Prague meeting of the InGenious national coordinators)
    d. M8 Revision of the evaluation tools to address partners' and teachers' comments and concerns
    a. M9 Presenting the evaluation plan and 2nd draft of questionnaires to the steering committee (Brussels)
3) Refining evaluation questionnaires
    a. M7-10 iterative feedback from other workpackage teams and partners
    b. M9-10 Alterations to the evaluation criteria and instruments to accommodate the completed knowledge map of good practices developed by WP2 (M9) and changes in the design and implementation of the Pilot by WP3.
    c. M10 presenting to General Assembly and discussing evaluation framework and questionnaires
4) M11 Final version of the evaluation questionnaires produced and developed as online versions by WP4.
5) M11 Refinement of guidance and protocols for the National Co-ordinators and teachers participating in the pilot
6) M11-12 Refinement of online version of questionnaires

7) M12 Start of development of case study methodology
8) M12 Evaluation plan report

Review 'Risk Analysis'

The milestones for development of the main evaluation instruments – online questionnaires - have been met, despite the very slow start to the overall project and the very limited number of exemplar industry-education practices which have been forthcoming.

Alongside the evaluation of all industry-education practices in all pilot schools, case studies of examination of particular practices will be undertaken. At this stage, plans for choice of case studies, interview schedules for those involved and guidelines for National Co-ordinators to conduct case studies are in outline only. This delay in developing the detail of the case study methodology is due to the delay in identifying the industry-education activities that schools can choose from initially for the pilot starting in January 2012. Activities were finalised in late December 2011. It had originally been expected that pilot practices might start in September 2011. The case study procedures are best developed from examination of pilot activities and developing protocols from that experience, rather than imposing procedures on a yet unknown situation. Because of the delay in starting industry-education practices in pilot schools, therefore, it has not been possible to develop the detail of the case study protocols in the original timeframe.

It is expected that some industry-education practices will be undertaken early in 2012, allowing piloting of case study interviews and other instruments. This will then allow protocols and instruments that are fit for purpose to be widely and quickly disseminated.

Ethical Issues

Issues of informed consent and preserving confidentiality of data are important in implementing the evaluation plan. These are dealt with in section 1.6.

IPR issues

No IPR issues.

1 EVALUATION METHODOLOGY

1.1 Background

The evaluation methodology for InGenious has been developed in parallel with the evaluation criteria. The development of the evaluation criteria and the overarching principles of effective evaluation have been described in deliverable 6.1 – evaluation criteria. This report does not duplicate deliverable 6.1, so no details are reiterated apart from the evaluation criteria. This report extends the evaluation principles outlined in deliverable 6.1 to describe the details of the methodology, and the processes of development, for the evaluation of the impact of InGenious industry-education activities on teachers and their pupils.

1.2 Evaluation criteria

As described in deliverable 6.1 the evaluation criteria are:

Key criteria	***Description of criteria***
1. Impacts for students	Learning of STEM subjects Learning of STEM industrial practice Motivation to study STEM subjects Motivation to pursue STEM careers Improved knowledge of STEM jobs available Awareness of jobs in STEM and skills, needed for these jobs Views on the role of industry, science and technology in society and views on jobs in this sector
2. Impacts for teachers	Learning of STEM industrial practice Motivation to introduce more industry based material in lessons / school activities Motivation to include more STEM careers materials in lessons / school activities Views on the role of industry, science and technology in society and views on jobs in this sector
3. Nature of the activity	Nature of learning for pupils, teachers, industry Nature of involvement for pupils, teachers, industry (leader / facilitator / observer / active learner) Activity characteristics: type, scope, target group, etc
4. Transferability	Geography (scales) of activity implementation Difficulties in adapting and using activities in a different setting

	Flexibility– ability to 'customise' activities to fit various school settings Popularity' of the activities (frequency of use by pilot and network schools)

1.3. Development of the InGenious evaluation plan

The development of the evaluation plan has been based on the principles of effective evaluation (Rossi et al 2004) and followed the guidelines for building a successful evaluation design (Cullen et al 2007:47) Detailed descriptions of effective evaluation and evaluation design have been outlined in Deliverable 6.1 and are not repeated in this document. To summarise, the best evaluation plan defines a sequence of research methods that provides a vigorous and efficient way of measuring the extent to which project aims have been achieved. The stages of the evaluation plan need to be coordinated with the timeline of the project while the choice of methods and instruments is based on the assessment of availability and value of data (Ibid:48).

The evaluation plan of the InGenious has been drafted in close consultation with other workpackages and partners. The process started with reviewing existing approaches to evaluation in science education, including relevant experience of Myscience and other multi-country-projects (e.g. project ROSE). We also drew upon the experience of previous European projects run by the EUN (e.g. InSpire, Stella, PENCIL), which had many similarities with the InGenious project and thus provided the most valuable information about data, logistics and procedures required for the evaluation.

In M5, after careful examination of the relevant materials and the specifications of the InGenious project, the first draft of the evaluation approach was created. It consisted of evaluation background, aims and criteria of evaluation. It also presented two alternative scenarios for the evaluation plan. At this stage of the project, the information about the timeline of the pilot and the availability of data at the starting point of the pilot was incomplete. To deal with these contingencies the evaluators designed two possible scenarios for carrying out the evaluation. One was based on a pre- and post-pilot data collection and comparison, while the second option, in case pre-pilot data collection was not feasible, suggested using control groups of pupils and/or teachers.

Both options were presented for discussion to workpackage teams and partners at Barcelona meeting (see Figures 1-2). Following this consultation, the first option of the evaluation plan (with pre- and post-pilot questionnaires) was selected, refined and subsequently used for the development of instruments and protocols of evaluation (see Figure 3).

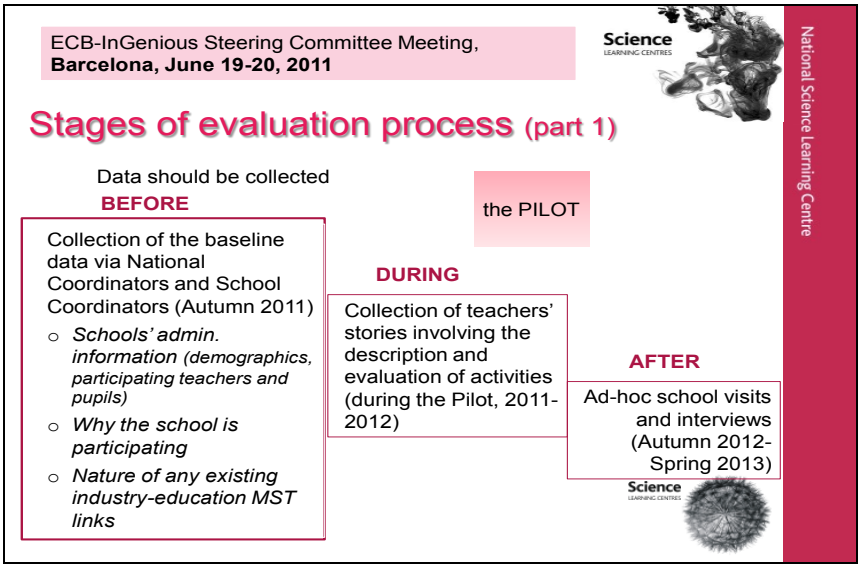

Figure 1 - Stages of evaluation process - part 1

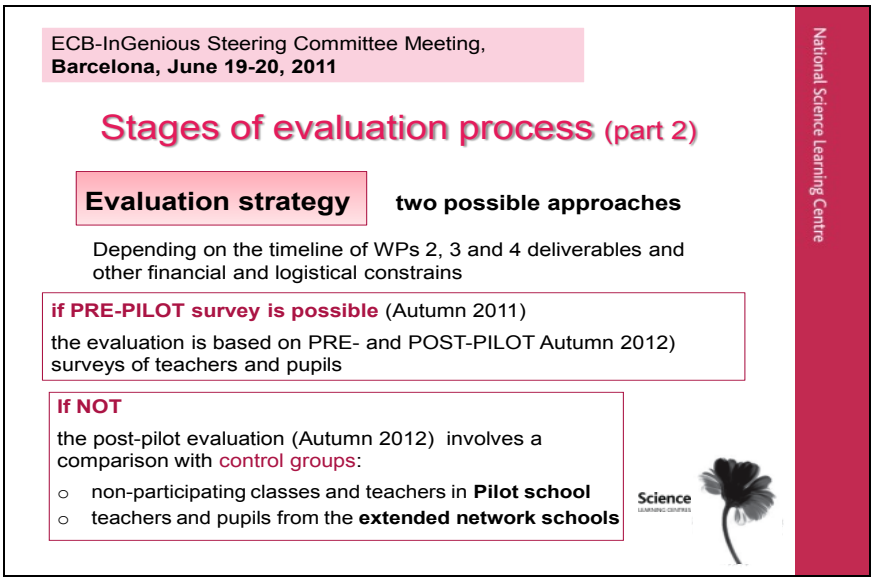

Figure 2 - Stages of evaluation process – part 2

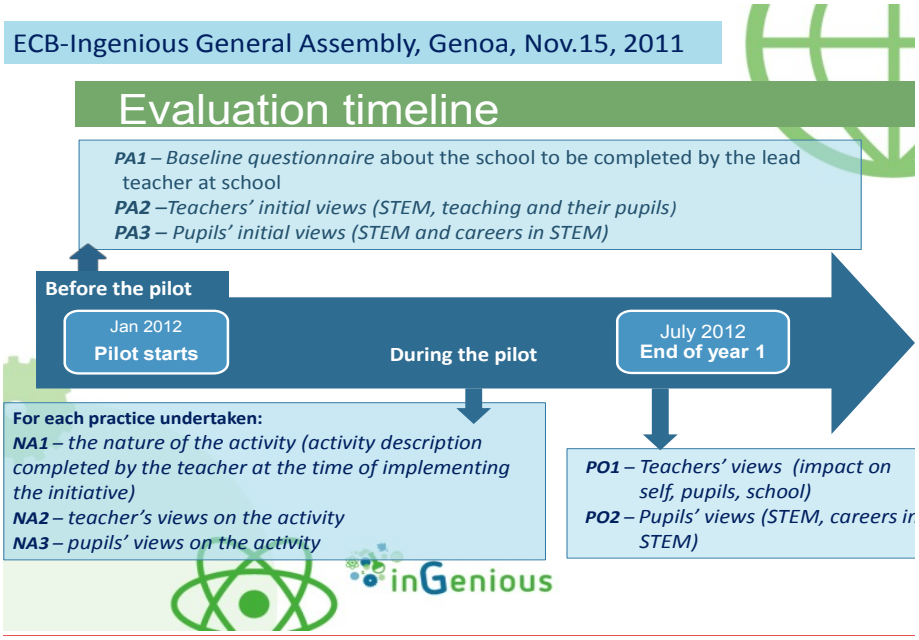

Figure 3 – evaluation timeline

1.4 Development of research methods and instruments

The principles of effective evaluation (outlined in deliverable 6.1) also apply to the development of the research methods and instruments.

Evaluation methods have to follow the development of a project as it rolls out. A project's original intentions may be modified by logistic and time constraints. The evaluation has to be true to the original intentions at the same time as working with changes to plans as they might happen. The InGenious project has had changes to its timescale and some details of its operation as might be expected in such a multi-country project with many partners.

The evaluators in workpackage 6 made a number of logistical assumptions at the outset, in discussion with leaders of other workpackages:

- InGenious industry-education activities would be piloted in 150 schools in 15 different countries during the first full year of operation. This year of operation is now January – July 2012.

- There would be many different InGenious activities for schools to try, based on existing activities and new ones developed as a result of collaboration by partners and emerging outcomes of workpackage 2.

- The schools involved would be primary and secondary schools – possibly covering pupils from the age range of 5 -18.

It should be noted that there is considerable diversity in type of school and type of activity in the InGenious project. The evaluation thus has to take these factors into account in developing

instruments that can be used across types of activities and in different school settings. Additionally these instruments should be sufficiently robust that any modifications made after the first year of operation are as minimal as possible.

The evaluators have made a number of methodological decisions, in discussion with other workpackages and partners during the development phase:

- The evaluation should attempt to explore *changes* in learning and views on behalf of pupils and teachers through their involvement in InGenious activities. To explore changes a pre- / post- method of exploration is most effective. This does bring further logistical challenges to the project but is the approach the evaluation has been encouraged to adopt.

- The instruments, that explore the nature of activities undertaken and the changes perceived, need to be accessible and user-friendly to teachers and their pupils, yet capable of yielding meaningful outcomes on analysis.
- The instruments, that will be translated into multiple languages, need to consist of closed or semi-closed pre-structured questions that offer participants fixed alternative responses. In the context of a multi-country, multi-language study closed-questions help to increase the validity, reliability and credibility of data by reducing the problems of translating and coding open responses collected in different cultural settings. This methodology is also easier to administer, code and analyse.
- Ethical principles of informed consent, confidentiality in data collection and anonymity in reporting need to be upheld.

It is recognised that attitudinal measures in a multi-lingual context, with mainly closed questions have limitations in addressing the nuances of impact from InGenious activities The methodological and logistical assumptions and the accepted earlier evaluation plan thus led to the development of *two* parallel data collection methods:

- **Online Questionnaires** for completion by teachers and their pupils who will be involved in InGenious activities - at the beginning of the pilot; at the time of any InGenious activity; at the end of the pilot. The pilot runs from January – July 2012.
  The questionnaires form the collection method for surveying all schools involved in the InGenious project and all InGenious activities during the first year of operation. Thereafter activities will be sampled. The extent and nature of sampling will be determined from analysis of the first year and in discussion with other workpackages.

- **Case studies** of some activities as they are implemented. To examine the outcomes of InGenious industry-education activities in some detail there will be case studies of particular activities in particular schools. The development of the case study instruments is embryonic as the InGenious activities for the pilot were only finalised in late December. As there has been no implementation of InGenious activities in pilot schools to date, there has not been the opportunity to pilot case study data collection methods.

1.5 Development of questionnaires

The questionnaires have been developed in three phases:

1. First draft of all questionnaires in line with the development of the evaluation plan and criteria (Month 7)
   Consultation with all partners, workpackages and national co-ordinators on the draft questionnaires (M7-8)
2. Second draft of all questionnaires (M9)
   Further round of consultation, including feedback from the steering committee and general assembly participants (M9-10)
3. Final questionnaires prepared (M11)
4. In collaboration with workpackage 3 the process of putting questionnaires online and of their translation into languages of countries participating in the pilot.

The consultations showed that partners and workpackage leaders were content with the evaluation design and its main elements. Useful suggestions were made regarding the development of criteria (see deliverable 6.1) which resulted in some necessary revisions to the questionnaires. Other suggestions proposed minor changes – mostly to the wording of particular questions to aid clarity. These suggestions were taken on board in the subsequent rounds of drafting of the questionnaires.

In accordance with the evaluation timeline (see Figure 3) three sets of questionnaires have been developed:

1. Pre-pilot year questionnaires
2. Activity questionnaires
3. Post-pilot year questionnaires

The questionnaires are currently in the process of being made available online – they are shown in appendix II in their drafted format.

1.5.1 Pre-pilot year questionnaires

In order to explore any changes in teachers' and pupils' learning and views as a result of the year in which InGenious activities take place, all lead teachers in the pilot schools are asked to complete three questionnaires (full questionnaires are in appendix II). Some taxonomy questions, i.e. those containing typologies of schools, positions and subject areas of teachers, categories of target groups and catalogues of activities, have been developed to reflect the typologies adapted in workpackages 2 and 3 to maintain the consistency of categories used throughout the project. Each questionnaire was built on the basis of the relevant evaluation criteria identified in 6.1, so that together they create a consistent and coherent picture of impact evaluation. The three questionnaires are:

- Form PA1 - baseline information about the school to be completed by the lead teacher in the school. This questionnaire seeks information about current and expected experience in STEM industry-education activities.

- Form PA2 – teachers' views about STEM and their pupils before the activities at the beginning of the year. This questionnaire seeks teachers' views about STEM subjects, STEM industries and STEM in society. It also asks teachers to indicate what they consider that their pupils think about STEM subjects and STEM careers.

- Form PA3 – pupils' views about Science, Technology, Engineering and Math (further on STEM) before the activities. This should be a *minimum* of one class, preferably two, of pupils who will engage in school-industry activities during the year. This asks pupils to indicate their views of STEM subjects, their school experience of learning STEM, STEM careers and industries. Wherever possible, similar questions to those in PA2 were used.

1.5.2 Industry-education activity questionnaires

Each time that a teacher in a pilot school undertakes an InGenious industry-education activity they are expected to complete questionnaires about the activity. (full questionnaires are in appendix II).

- Form NA1 - the nature of the activity undertaken, completed by lead teacher, ***before*** the activity is done. This questionnaire seeks information on the type of activity, its duration and focus.

- Form NA2 – teachers' views on the nature of the activity immediately ***after*** the activity. This seeks views as to whether the activity achieved its objectives and teachers' perceptions of what pupils gained from the activity. It also asks about benefits, difficulties and challenges in adapting the activity to their schools. To address the auxiliary aim of evaluation (help to build up the repository of good practices) the evaluators inserted a question about the evidence collected to support their claims. This could be used later for building up an online library of good practices (one of the aims of the project InGenious).

- Form NA3 - pupils' views (wherever possible) after the activity. Pupils are encouraged to give their views on what they learnt from the activity through a set of closed questions

For form NA3, the teacher should try to ensure that pupils from a minimum of one class who engaged in the activity complete the form.

1.5.3 Post-pilot year questionnaires

At the end of the first year, teachers are expected to complete questionnaires relating to the year's activities as a whole. (full questionnaires are in appendix II).

- Form PO1 – teachers' views on the changes from undertaking the year's activity. This questionnaire seeks information on the extent to which involvement in InGenious activities has affected teachers' use of industry-education activities and their general classroom practice as well as their perceptions of pupils' learning and views.

- Form PO2 – pupils' views about STEM subjects at the end of the year – this should be the same classes of pupils who completed form PA3 at the beginning of the year. Form PO2 is identical to form PA3 and seeks to identify any changes in disposition towards STEM subjects and STEM careers during the year.

1.6 Development of case studies

It had been expected that some piloting of InGenious activities would have taken place during 2011, allowing the questionnaires to be tested, and, in particular, to develop the data collection methods for case studies of particular activities. However, InGenious pilot activities were not finalised until late December 2011.

Thus at this stage we outline the methods for data collection of case studies rather than give the full detail of the instruments. The actual instruments will be developed by the end of March 2012, following trial in a few pilot schools, if possible, and discussion with partners and other workpackages. An outline of a draft case-study template is given in appendix IV.

Selection of case studies: the particular practices for the case studies will be identified by national co-ordinators working with WP3 and WP6 workpackage leaders. National co-ordinators will be guided to identify particular InGenious activities in their schools which appear to have good potential for pupils' learning and motivation. They will seek permission from the school to use the practice as a case study.

Data collection methods will include:

Interview by national co-ordinator with the lead teacher in the school at the time of the activity (interview schedule to be provided by the evaluation team WP6). This schedule will include questions concerning: the purpose of the activity; why the teacher chose to use it; how the activity was planned and carried out; what the outcomes of using the activity were; the strengths and weaknesses of the activity; any adaptations if the activity were used again. The interview schedule may be used face-to-face, by telephone or by email. Outcomes of the interview will be conveyed in English to the evaluation team based on notes of the interviewer or email transcript. The interview notes / transcript will be confidential to the national co-ordinator and the evaluation team.

Examples of pupils' work from the activity. The exact nature of the work will depend on the activity, the language in which it is conducted or outcomes are expressed. It is possible that some of the outcomes could be disseminated through video. If this is the case, appropriate permission will be needed from pupils' guardians for use of the material if it is in video format. Anonymity of pupils' work will be preserved apart from the country in which the activity took place.

1.7 Protocols for data collection

The main data collection methods are focused on completion of instruments by teachers and pupils. It is important that ethical principles of informed consent, confidentiality in responses and anonymity in reporting are maintained throughout. The main agent of ensuring data collection in each country is the national co-ordinator.

The protocol for the national co-ordinator is given as appendix III. It outlines the timescale for completion of the questionnaires along with the ethical protocols, the evaluation criteria and the questionnaires.

Here we outline the ethical protocol which explains to the national co-ordinator how the ethical principles will be fulfilled:

Ethical protocols for national co-ordinators and InGenious teachers – for distribution to all teachers.

The teachers involved in the InGenious project in your country have agreed to undertake industry-education activities. As part of this project, you and the teachers have agreed to be involved in the evaluation of the InGenious activities.

The evaluation is designed to examine the thinking of teachers and pupils about Science, Technology, Engineering and Mathematics – particularly how these subjects are used in industries and career paths.

The evaluation questionnaires are designed to be as easy to complete as the evaluation team can manage. They are all available for completion online.

Confidential responses

The only people who will see the completed questionnaires are the independent researchers who are undertaking the evaluation analysis.

Teachers' responses will be anonymised in any reading by the national co-ordinators or by anyone managing the InGenious programme.

Pupils' responses will be anonymous if they are read by their teacher, national co-ordinator or by anyone managing the InGenious programme.

In this way we hope respondents can be reassured that they can respond honestly and openly.

Anonymity in reporting

Reports will be written based on the analysis of questionnaires. In undertaking the analysis, researchers will preserve anonymity of individual schools, teachers are pupils. They will indicate trends in particular countries if there are any.

Case studies

In addition to the questionnaires completed by all InGenious participants, there will be case studies of some industry-education practices. These will be subject to the same ethical procedures of informed consent, confidentiality in data collection and anonymity in reporting. In the case studies, however, it will normally be the national co-ordinator who collects the data rather than data being direct to the evaluation team.

1.8 Data Analysis

The evaluation team will undertake analysis of all data collected. Data analysis will be quantitative and qualitative using the evaluation criteria as a guide for data collation and reporting.

All completed questionnaires will be reviewed and analysed on a regular basis. The questionnaires lend themselves to quantitative analysis which will examine trends in planning, learning and motivation according to the nature of the activity, the age range of the pupils and the country in which the activity is conducted.

It is anticipated that the analysis will follow the following timeline for 2012, with a review of instruments and outcomes towards the end of 2012 for further implementation in 2013.

January – March 2012 Analysis of pre-activity questionnaires from all pilot schools; reporting of school types and intentions for InGenious activities.

Development and trial, if possible, of case study instruments.

March – August 2012 Regular review of activity questionnaires; draft reporting of emerging outcomes from InGenious activities

Case study instruments implemented. Case studies collected. Qualitative analysis of case studies against evaluation criteria.

August – October 2012 Analysis of end of year questionnaires.
Review of data collection instruments - start of implementation of year 2 evaluation.
Reporting of outcomes from all questionnaire analysis and case studies.

October 2012 – June 2013 Year 2 evaluation – questionnaires and case studies.

2 CONCLUSIONS

This report has outlined the evaluation instruments and data collection methods for the first full year of InGenious activities, base on the principles of effective evaluation as adapted for the InGenious project as described in deliverable 6.1 – evaluation criteria.

The evaluation plan is sufficiently robust and flexible to be able to accommodate minor changes to instruments for the second year of InGenious activities.

APPENDIX I: LIST OF ABBREVIATIONS

ACRONYM	MEANING
STEM	Science Technology Engineering and Mathematics

Appendix II Questionnaires (in draft preparation for putting online)

inGenious PA1 –

Administrative information about the school and the teachers involved

Dear participants,

If you are an inGenious school coordinator, we'd like you to provide some background information on your school and teachers that you plan to involve in the project.

Please fill PA1 section.

Thank you for spending the time to complete this questionnaire.

Note: STEM* is the abbreviation for Science, Technology, Engineering and Math. This category includes general as well as any of the specialist subjects within these fields of knowledge (e.g. biology, astronomy, chemistry, health studies, ICT, informatics, algebra, etc.)

1. Country

2. School

3. School type and characteristics of the school

- ☐ Pre-school education (3- 6 yrs)
- ☐ Primary Education (6-12 yrs)
- ☐ Secondary school
- ☐ College of Further Education
- ☐ Vocational/Professional Training
- ☐ Special Needs Education (SEN)
- ☐ Mixed school
- ☐ All girls school
- ☐ All boys school

4. Address of the school

Street + N°:

Town:

Country:

Postcode:

5. Contact details

Tel.:

E-mail:

Fax:

Website:

6. InGenious contact person details

First and family name:

Position:

Teaching subjects:

E-mail:

7. Enter your personal code:

8. Please indicate who else at your school will be involved in the INGENIOUS project

(tick all appropriate boxes)

- ☐ None, just me
- ☐ A few teachers of STEM* subjects
- ☐ Almost all/all STEM* teachers at school
- ☐ A few non-STEM* teachers
- ☐ School career councillors
- ☐ School Leadership
- ☐ Parents
- ☐ Other (please specify)

9. What do you hope to achieve for your school through participating in the INGENIOUS project?

- ☐ Improve pupils' knowledge of STEM* subjects and/or careers
- ☐ Improve pupils' interest in STEM* subjects and/or careers
- ☐ Improve teachers' knowledge and skills in teaching STEM*

☐ Improve teachers' interest in teaching STEM*

☐ Obtain new teaching resources, activity kits for teaching STEM* subjects

☐ Raise the profile (popularity) of STEM* subjects in school

☐ Other (please specify)

10. School previous experience with Industry-Education links in STEM* education

From the following list of industry-school collaboration activities, please indicate which activities your school has participated in during the last 3 years, and identify the frequency of these occurrences

	Never	1-2 times	3-5 times	More than 5 times
Visit to industry	○	○	○	○
Visiting speaker from industry	○	○	○	○
Hands-on activity with teacher using industry-provided resources	○	○	○	○
Hands-on activity with industry representative	○	○	○	○
Resources from industry used in normal classroom activity (e.g. for demonstrations)	○	○	○	○
Running competition in STEM* subjects	○	○	○	○
Running/supporting/engaging in STEM* club	○	○	○	○
Professional development of teaching staff	○	○	◉	○
Other (please specify)	○	○	○	○

11. Intended experience with Industry-Education links in STEM* education

Please indicate which of the following activities your school would like to undertake as part of the INGENIOUS project (tick all relevant boxes)

- ☐ Visit to industry
- ☐ Visiting speaker from industry
- ☐ Hands-on activity with teacher using resources supplied by industry
- ☐ Hands-on activity with industry representative
- ☐ Resources from industry used in normal classroom activity (e.g. for demonstrations)
- ☐ Running competition in STEM* subjects
- ☐ Running/supporting/engaging in STEM* club
- ☐ Professional development of teaching staff

Other (please specify)

INGENIOUS PA2-VIEWS OF TEACHERS INVOLVED PRIOR TO INGENIOUS

Dear participants,

If you are an inGenious school coordinator or a teacher involved in inGenious, please fill PA2 section.

This form is designed to provide valuable background information, focusing on various aspects of STEM learning and teaching in your school, i.e. your own teaching experience of STEM subjects, your pupils' attitude and motivation to STEM. It also asks for your views on modern industry and jobs in the STEM sector.

Thank you

Note: **STEM*** is the abbreviation for Science, Technology, Engineering and Math. This category includes general as well as any of the specialist subjects within these fields of knowledge (e.g. biology, astronomy, chemistry, health studies, ICT, informatics, algebra, etc.)

1. School

2. Your personal code

Reminder of the rules for building you personal code.

The code is composed of:

Your country code - eg: UK for United Kingdom
The first 3 letters of the first name of your father - eg: PAU for Paul
The first 3 letters of the first name of your mother – eg: SAR for Sarah

The 2 last number of your year of birth - eg: 70 for 1970

Example of code in this case: UKPAUSAR70

3. STEM* subjects

- ☐ Physical sciences (e.g. Physics, Chemistry, Astronomy etc.)
- ☐ Life Sciences (e.g. Biology, health studies etc.)
- ☐ Computer Sciences (e.g. IT and Informatics)
- ☐ Technology
- ☐ Engineering
- ☐ Mathematics
- ☐

Other (please specify)

4. Age of classes you teach

- ☐ Pre-school education (3- 6 yrs)
- ☐ Secondary school
- ☐ Primary Education (6-12 yrs)
- ☐ .

Other (please specify)

5. Gender

- ○ Male
- ○ Female

6. Your reflections on teaching STEM subjects (Tick one box for each statement)

	1 **Fully Disagree**	2 **Rather Disagree**	3 Rather Agree	4 **Fully Agree**	Do not know /N/A
a. I have a strong personal interest in science and technology					
b. I believe it is important to teach STEM subjects in a real-life context					
c. It is easy for me to teach STEM subjects in the context of modern life					
d. I enjoy teaching about practical applications of modern scientific discoveries and technological inventions					
e. I often use resources from modern industries in my teaching					
f. Teaching STEM subjects I find it hard to provide real-life illustrations and present-day industry examples					
g. I would like to know more about recent scientific and technological discoveries and/ or their industrial applications					

7. Value of learning STEM and STEM in your school	1 Fully Disagree	2 Rather disagree	3 Rather Agree	4 Fully Agree	Do not know /N/A
a. Learning STEM subjects helps pupils to understand the work of scientists and researchers					
b. Science, mathematics and technology are important for pupils' future success in life regardless of their career choices					
c. School helps to open pupils' eyes to new and exciting jobs in science, technology and information					
d. The school curricula in STEM* subjects that I teach are interesting					
e. Science and science-related disciplines are difficult subjects to study					
f. The things that pupils learn in STEM subjects at school are not useful in their everyday life					

8. Pupils in your school	1 Fully Disagree	2 Rather disagree	3 Rather Agree	4 Fully Agree	Do not know /N/A
a. Pupils in our school are very enthusiastic about studying mathematics					
b. Pupils like lessons in science and technology more than most other subjects at school					
c. Boys and girls in my classes show equal interest in learning science and technology					
d. Pupils have good understanding of a variety of careers in STEM*					
e. Pupils are aware that different types of jobs in STEM* require different personal qualities and skills					
f. Pupils understand the relevance of their STEM lessons to real life					
g. Most pupils find it hard to study mathematics					
h. Most pupils find it hard to study science and technology					
i. Pupils know little of job opportunities in					

today's industry, science and technology

j. Pupils are unable to connect school lessons in STEM subjects with their everyday lives

9. From the list provided below, please select 5 words that you think are best suited to describe present day industry and manufacturing sector. If you wish, you may also add your own words

important	environmentally friendly	high-tech	innovative	responsible	safe
not-important	polluting	low-tech	old-fashioned	irresponsible	Dangerous
Other		Other			

10. From the list provided below, please select 5 words that you think are best suited to describe JOBS in present-day industry and technology. If you wish, you may also add your own words

attractive	exciting	clean	well-paid	rewarding	innovative
unattractive	boring	dirty	low-paid	disappointing	traditional
high-tech	popular	safe	secure	for men and women	for men
low-tech	unpopular	dangerous	insecure	for women	
Other			Other		

THANK YOU!

inGenious PA3-Pupils' views on STEM* subjects/ careers/ industries

Dear teacher participants,

This form has to be filled in before the pilot year starts by the pupils of any ONE class of target pupils who are going to participate in InGenious activities.

Note that the same pupils should fill in another pupils' questionnaire at the end of the pilot year.

Thank you

Dear Pupil,

The form below is part of the InGenious project that aims to enrich school teaching of science, technology and maths with contemporary industrial practices and expertise

The questions in this form ask about your views on the value of science, technology and maths in your life and in the life of the society. We are also interested in your school experience of these subjects and your opinion about industry and technology.

1. Your country:			
2. Name of your school:			
3. Your age:		**4. Your class:**	
5. Your are	☐ **female**	☐ **male**	

6a. The statements below express different views on personal value of science, technology and maths. Please indicate your agreement-disagreement with each of them by ticking one box for each statement.

6a. Science, technology and math in your life	1 Fully Disagree	2 Rather Disagree	3 Rather Agree	4 Fully Agree
I am very interested in topics related to science and technology	☐	☐	☐	☐
Lessons in science and technology are among my most favourite subjects at school	☐	☐	☐	☐
I like mathematics more than most other subjects at school	☐	☐	☐	☐
Doing well in mathematics, science and technology is important for my further education and career	☐	☐	☐	☐
I like learning about jobs in industry, science and technology	☐	☐	☐	☐
I would like to get a job related to science or technology	☐	☐	☐	☐
I learn a lot about science and technology matters outside my school lessons (by reading	☐	☐	☐	☐

or watching a programme on the topic, attending science club, etc.)				
I do not have personal qualities and skills necessary for a career in industry, science or technology	☐	☐	☐	☐
In my future career I have no need for good knowledge in mathematics, science or technology	☐	☐	☐	☐

6b. The statements below are about the experience of science, technology and maths at school. Please indicate your agreement-disagreement with each of them by ticking one box for each statement.

6b. Science, technology and math at your school	1 Fully Disagree	2 Rather Disagree	3 Rather Agree	4 Fully Agree
It is easy for me to understand and learn school science	☐	☐	☐	☐
I find school lessons in science and technology interesting	☐	☐	☐	☐
School science and technology will help me with everyday practical problems	☐	☐	☐	☐
School mathematics is rather easy for me to learn	☐	☐	☐	☐
I think school mathematics will have practical use in my daily life	☐	☐	☐	☐
Learning science, technology and mathematics at school make it easy for me to understand the work of scientists and researchers	☐	☐	☐	☐
School science, technology and mathematics help me discuss topical scientific issues with fellow pupils	☐	☐	☐	☐
At school I learn about different career choices available in industry, science and technology	☐	☐	☐	☐

Mathematics, science and technology are difficult subjects to learn	☐	☐	☐	☐
School mathematics is too theoretical and do not help to solve practical problems in my life	☐	☐	☐	☐
At our science and technology lessons we never discuss how this knowledge is used in practice	☐	☐	☐	☐

6c. The statements below express different views on the value of science, technology and maths in the society. Please indicate your agreement-disagreement with each of them by ticking one box for each statement.

The value of science, technology and industry in society	1 Fully Disagree	2 Rather Disagree	3 Rather Agree	4 Fully Agree
Today all people, regardless of their career choices, need to learn science, mathematics and technology	☐	☐	☐	☐
In the near future, our society will need more engineers, technicians and scientists	☐	☐	☐	☐
Jobs in industry, science and technology can be very different and they need people with very different personal qualities and skills	☐	☐	☐	☐

6. From the list provided below, please select 5 words that you think are best suited to describe present day industry and manufacturing sector. If you wish, you may also add your own words

important	environmentally friendly	high-tech	innovative	responsible	safe
not-important	polluting	low-tech	old-fashioned	irresponsible	Dangerous
Other		Other			

7. From the list provided below, please select 5 words that you think are best suited to describe JOBS in present-day industry and technology. If you wish, you may also add your own words

8.

attractive	exciting	clean	well-paid	rewarding	innovative
unattractive	boring	dirty	low-paid	disappointing	traditional
high-tech	popular	safe	secure	for men and women	for men
low-tech	unpopular	dangerous	insecure	for women	
Other			Other		

Thank you!

InGenious Form NA1

Dear participants,

If you are an InGenious school coordinator, please fill in NA1 section at the time of each activity.

Thank you

*1. Date of activity:

*2. Activity Title:

*3. Target group(s) (please indicate which of the following are target groups of this activity)

(at least one checked box)

- ☐ All pupils in the classes to which the activity is addressed
- ☐ Parents/Families
- ☐ Girls
- ☐ Particular categories of pupils (e.g. gifted and talented, special needs, minority background)
- ☐ Teaching Personnel at school
- ☐ Boys

Other (please specify)

4. Age groups

- ☐ Pre-primary school pupils (1-4 years old)
- ☐ Low primary school pupils (5-8 years old)
- ☐ Upper primary school pupils (8-11 years old)
- ☐ Lower secondary pupils (11-14 years old)
- ☐ Upper secondary pupils (14-16 years old)
- ☐ Students aged 17 and above

5. Teaching personal Involved

- ☐ STEM* Teachers
- ☐ Teaching Assistants

☐ Non-STEM* teachers ☐ Technicians

☐ School/ Departments Heads

Other (please specify)

6.

Does the activity involve any of the following?	Yes	No
Industry representatives	○	○
Other third party (consultants, agencies, local authorities, etc.)	○	○

7. Timeline and scope of the Initiative

○ One off event

○ One off event repeated with different groups of pupils

◉ A sequence of events with the same pupils

Other (please specify)

8. Number of people directly concerned by the initiative

○ Less than 20 people

○ Between 20 and 100

○ More than 100

9. Type of Activity

(all appropriate boxes)

- ☐ Visit to industry or to other resource centres
- ☐ Visiting speaker from industry
- ☐ Practical activity with teacher using resources provided by industry
- ☐ Practical activity with industry representative
- ☐ Resources from industry used in normal classroom activity (e.g. demonstrating)
- ☐ Organising competition in STEM* subjects
- ☐ Managing/supporting/engaging in STEM* club
- ☑ Professional development of teaching personnel
- ☐ E-learning (incl. e-resources)

Other (please specify)

*

10. STEM* curricular subjects addressed by the activity

- ○ Physical sciences (e.g. Physics, Chemistry, Astronomy etc.)
- ○ Life Sciences (e.g. Biology, health studies etc.)
- ○ Computer Sciences (e.g. IT and Informatics)
- ○ Technology
- ○ Engineering
- ○ Mathematics

Other (please specify)

11. Location of Activity

- ○ In School (On school premises)
- ○ In industry
- ○ Virtual (e-learning)
- ○ Both – in school and industry
- ◉ Out of school (Outside school premises)

Other (please specify)

12. Duration of Activity

(only one checked box)

- ○ One hour
- ○ Between one hour and half a day
- ○ A whole day
- ○ Several days but less than a week
- ○ One week
- ○ More than a week

Other (please specify)

13. Focus of Activity

(all appropriate boxes)

- ☐ Improve pupils' knowledge in STEM* subjects
- ☐ Improve pupils' interest in STEM* subjects
- ☐ Improve pupils' knowledge of STEM* careers
- ☐ Improve pupils' positive perception of STEM* in society
- ☐ Improve pupils' positive perception of industry
- ☐
- ☑ Improve teachers' interest in teaching STEM*
- ☐ Improve teachers' knowledge and skills in teaching STEM*
- ☐ Improve teachers' knowledge of industry
- ☐ Improve teachers' awareness of STEM* careers
- ☐ Raise the profile of STEM* subjects in school
- ☐ Building up the depository of school resources in STEM subjects

Other (please specify)

14. The activity is used	**Yes**	**No**
within the Subject curriculum	○	○
outside the Subject Curriculum	○	○
both within and outside the curriculum	○	○

NA2 – Nature of Activity – immediate feedback

Dear participants,

If you are an InGenious school coordinator and other teacher/industry participants, please fill in NA2 section immediately after each activity is completed.

Thank you

1. Your personal code:

2. Your school:

2. Activity Title:

3. Date of activity:

4. Please indicate your role in the school

- STEM* Teacher
- Non-STEM* teacher
- School/ Departments Head
- Teaching Assistant
- Technician
- Scientist / technologist / researcher
- Industry representative
- Consultant

Other (please specify)

5. Your views of the activity

(tick one box for each statement)

	1 Fully Disagree	2 Rather Disagree	3 Rather Agree	4 Fully Agree	Do not know/N/A
a. The activity fully achieved its expected learning outcomes					
b. Pupils enjoyed the activity					
c. Pupils showed that they improved their understanding of mathematics / science / technology from the activity					
d. Pupils showed that they learnt about the career opportunities in industry					
e. Pupils showed interest in the career opportunities in industry and technology					
f. Pupils learnt about industrial processes					
g. Pupils learned how STEM subjects relate to everyday life					
h. I enjoyed the activity					
i. I learnt more on how to link school mathematics / science / technology with industrial practices					
j. I learnt more on how to teach mathematics / science / technology in the context of real life					
k. I would recommend this activity to colleagues in my school or other schools					
l. I would like to do more of this type of activity					

6. Please give a brief description of the activity /events within one activity

7. Please describe major positive outcomes of the activity

For pupils:

For teachers:

For schools and wider community

For industry (if applicable)

8. Please describe any difficulties you faced while using this activity

9. Please indicate ways in which the activity can be improved

10. Please indicate what evidence of this activity impact on pupils, teachers and school you have collected/plan to collect

- ☐ Video/audio recording of the activity
- ☐ Pupils' work
- ☐ Pupils' feedback
- ☐ Change in teaching plan, modifications in schemes of work
- ☐ Formal dissemination to school teaching staff
- ☐ Informal dissemination
- ☐ Spin-off activities are planned
- ☐ Other

Other (please specify)

inGenious PO1-Impact assessment by teachers involved after 1 year of InGenious

Dear participants,

If you are an InGenious teacher or teacher involved with the ingenious activity we would like to know your opinion regarding the impact of the Ingenious activities.

Please fill in PO1 section at the end of the pilot year.

Thank you

1. Your personal code

2. Your School

3. Number of InGenious activities you have participated in

Drop box
1
2
3
4 and more

4. Participating pupils:

4a: number of classes engaged in the InGenious activities in the past academic year

(Drop box)
1 class
2-3 classes
4-5 classes
More than 5 classes

4b. Ages of pupils engaged in the InGenious activities

(tick all relevant boxes)

- ☐ Pre-primary school pupils (1-4 years old)
- ☐ Low primary school pupils (5-8 years old)
- ☐ Upper primary school pupils (8-11 years old)
- ☐ Lower secondary pupils (11-14 years old)
- ☐ Upper secondary pupils (14-16 years old)
- ☑ Students aged 17 and above

5. Other people engaged in the InGenious project	yes	No
Parents		
Career councillors		
Other teachers/technicians in your school		
Teachers/technicians from other schools		
Other, specify		

6. InGenious Impact Assessment: On the scale from 1 (no impact) to 4 (large impact) please, evaluate the impact of the InGenious project on					
6a. YOURSELF (tick one answer per row)	**1 None**	**2 Little impact**	**3 Medium impact**	**4 Large impact**	**NA / cannot tell**
Your teaching practices and skills					
Your knowledge of industrial processes and practices					
Your ability to teach STEM subjects in the context of real life applications					
Your desire to introduce more industry-based materials in lessons or school activities					

Your views on the role of science and technology in a contemporary world					
Your ability to use more resources from industries in your teaching					
Other Impact or Any Comment:					
6b. Your PUPILS	**1 None**	**2 Little impact**	**3 Medium impact**	**4 Large impact**	**NA / cannot tell**
Pupils' motivation to study STEM* subjects					
Pupils' knowledge and understanding of STEM concepts					
Pupils' understanding of the work of scientists and researchers					
Pupils' understanding of the relevance of STEM lessons to real life					
Pupils' knowledge of different jobs in STEM					
Pupils' awareness of a variety of personal skills needed in different STEM careers					
Pupils' views on the role of science and technology in a contemporary world					
Reducing Gender differences in pupils' interest in and motivation for STEM					
Other Impact on Pupils or Any Comment:					
6C. WIDER IMPACT ON	**1 None**	**2 Little impact**	**3 Medium impact**	**4 Large impact**	**NA / cannot tell**
other pupils in your school (e.g. further					

dissemination)					
other teachers in your school					
Pupils or teachers outside your school					
Parents					
Career councillors					
Other Wider Impact or any Comment:					
6C. OVERALL IMPACT	**1 None**	**2 Little impact**	**3 Medium impact**	**4 Large impact**	**NA / cannot tell**
your participation in the project on the whole					

7. Would you like to continue participating in the project?

☐ Yes ☐ No ☐ have not yet decided

Questionnaire PO2 has the same questions as PA2

APPENDIX III: PROTOCOLS FOR DATA COLLECTION.

INGENIOUS

EVALUATION OF SCHOOL-INDUSTRY LINKS IN PRACTICE.

PROTOCOLS FOR NATIONAL CO-ORDINATORS

This set of documents is the evaluation package for national co-ordinators to use with their schools.

The documents included are:

1. Ethical protocols for national co-ordinators – to explain the conduct of the evaluation

2. Evaluation criteria. These are the criteria which have been used in designing the data collection instruments, and which will be used as key categories in the analysis.

3. Pre-activity questionnaires for pilot schools for completion in January 2012. These forms are all online.

4. Questionnaires for completion each time a school undertakes a school-industry activity (expecting several per school per year). These are all online.

5. End of year questionnaires for pilot schools for completion in June 2012. These are all online.

Timeline:
January 2012 ..... Ingenious activities undertaken .....June 2012

PA questionnaires completed	NA questionnaires completed for each activity	PO questionnaires completed

1. **Ethical protocols for national co-ordinators and InGenious teachers – for distribution to all teachers.**

The teachers involved in the InGenious project in your country have agreed to undertake industry-education activities. As part of this project you and the teachers have agreed to be involved in the evaluation of the InGenious activities.

The evaluation is designed to examine the thinking of teachers and pupils about Science, Technology, Engineering and Mathematics – particularly how these subjects are used in industries and career paths.

The evaluation questionnaires are designed to be as easy to complete as the evaluation team can manage. They are all available for completion online.

Confidential responses

The only people who will see the completed questionnaires are the independent researchers who are undertaking the evaluation analysis.

Teachers' responses will be anonymised in any reading by the national co-ordinators or by anyone managing the InGenious programme.

Pupils' responses will be anonymous if they are read by their teacher, national co-ordinator or by anyone managing the InGenious programme.

In this way we hope respondents can be reassured that they can respond honestly and openly.

Anonymity in reporting

Reports will be written based on the analysis of questionnaires. In undertaking the analysis, researchers will preserve anonymity of individual schools, teachers are pupils. They will indicate trends in particular countries if there are any.

Case studies

In addition to the questionnaires completed by all InGenious participants, there will be case studies of some industry-education practices. These will be subject to the same ethical procedures of informed consent, confidentiality in data collection and anonymity in

reporting. In the case studies, however, it will normally be the national co-ordinator who collects the data rather than data being direct to the evaluation team.

If you have any concerns about the evaluation you should contact Agueda Gras-Velazquez [agueda.gras@eun.org] or Irina Kudenko [I.Kudenko@slcs.ac.uk].

Item 2 is included on page 9 of this report; Items 3,4 & 5 are included in appendix II

APPENDIX IV DRAFT CASE STUDY TEMPLATE

Draft Case Study Outline: To be conducted in the form of semi-structured interview.

InGenious Case Studies. Interview Schedule for Teacher Participants (INTERVIEWEES' VERSION)

Thank you very much for agreeing to talk to me about your experience in using the InGenious industry-school practices in your school. I have been asked by the team of evaluators for this project to conduct case studies of the impact of different industry-school practices offered within the InGenious project on pupils and teachers in a variety of school contexts.

The discussion, as part of such a case study, will be confidential and the reporting will be anonymous, so I hope you can be as frank as possible. The interview questions are detailed below.

1. **The context:** *[to avoid some duplications this section is to be cross-referenced with the information collected via the teacher's application to the pilot form]*

I would like you to talk briefly about your background in the school

1.1 How long have you been teaching and how long at this school?
1.2 What are your specific responsibilities in the area of science teaching? (Subjects, number and age of pupils)
1.3 Can you briefly summarise your wider role(s) within your school, e.g., pastoral, year head etc?
1.4 What is your personal experience in collaborating with industries and businesses in the area of STEM education (e.g. use of activities devised by or in collaboration with business partners, arrangement of pupils' meetings with industry representatives, arrangement of pupils' work placement in STEM industries, etc.)?
1.5 What do you know about your school previous experience in collaboration with industries and businesses?

2. **Expectations of participation in the InGenious and the choice of activities**

2.1 What were your reasons for participating in the InGenious?
2.2 What did you hope to achieve for
a) yourself b) your pupils c) your school d) other target groups
2.3 What activities did you choose to implement and why? (relevance to school needs, availability of support, correspondence with the curriculum, etc.)
2.4 What difficulties, if any, have you anticipated at this stage?

Questions in sections 3 and 4 are to be repeated for each implemented activity

3. **Adapting the activity to your school**

3.1 Could you briefly describe what happened after you have chosen the InGenious practices to use in your school and to the moment of their actual implementation?
3.1.1 What were the difficulties?
3.1.2 Did you communicate with the InGenious coordinators and with industry representatives?

3.1.3 What, if any, changes to your teaching plans did you have to do?
3.1.4 What, if any, changes to the original design of the practice did you do (outcomes, scope, target group, etc.)? Why was this modification necessary?
3.2 How helpful were your line managers and colleagues in this project?
3.3 What are three characteristics of your school that were most relevant in helping you to use the industry-school practices?
3.4 What members of industry have been involved with you in the activity? What do you think their views of the activity are?

4. Activity implementation and outcomes

4.1 Could you briefly describe what happened during the activity implementation?
4.1.1 What did you do?
4.1.2 What did the pupils do? (check the number of pupils and the number of time the activity was used)
4.1.3 Were other members of the staff involved? What did they do?
4.2 Did it go according to the plan? what were the difficulties in using the activity?
4.3 How would you describe the attitude of pupils to the activity?
4.4 Did you collect any evidence/use any protocols to record the process of activity implementation? If yes, describe what evidence was collected?
4.5 Have the activity achieved its expected learning outcome?
4.6 What did you or other staff members learn?
4.7 Were there any other unexpected outcomes? Positive and negative?
4.8 In your opinion, how helpful was the activity in promoting the overall aim of the InGenious project (improving the knowledge and attitudes of pupils to STEM industries and careers)?

5. Overall outcomes and impacts of the InGenious project

I would like you to talk about the overall outcomes and impacts of the InGenious project on yourself, your pupils and your school:

5.1 How would you describe your overall experience with the project so far? (positive and negative impacts)
5.2 Have your expectations been met?
5.3 What, if anything, has changed in relation to your teaching practice (your skills, real life context, knowledge of industrial practices and careers, confidence in teaching, etc.)
5.4 What have changed for the pupils (knowledge, motivations, interests)
5.5 What, if anything, has changed in relation to your school (colleagues, parents, resources, attitudes, etc)

6. Further plans

I would like you to talk about the influence the InGenious has had on any of your further plans. Can you tell me:

6.1 Do you plan to stay in the project? Why? if yes, what do you plan to achieve?
6.2 Would you recommend other teachers in your school/ your country/ other countries to participate?

6.3 Any other comment you wish to make?

Thank you very much for taking the time to talk with me

InGenious Case Studies. Interview Schedule for Industry Participants (INTERVIEWEES' VERSION)

A similar schedule will be developed for industrial partners in the activities, following discussions with partners. That schedule will focus on the outcomes for the industrialist from their involvement in the activity – i.e. it will mirror question 4, principally, in the teachers' schedule.