



Mid-term Review

Deliverable D10.1

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FaSMEd: Improving progress for lower achievers through Formative Assessment in Science and Mathematics Education

Grant agreement no: 612337

D10.1 Mid-Term Review

Introduction

This deliverable sits within Work Package 10 – Project management and administration – which is led by Newcastle University as the co-ordinator of the project. Management activities include maintenance of the consortium agreement, the overall legal, ethical, financial, administrative management and the Mid-term review. This took place in month 21 (September 2015) of the project and was based on progress and financial reporting from months 1 – 18. This represented the timescale of 1st January 2014 until 30th June 2015.

In preparation for the review we collated (as requested) a significant amount of information and evidence including:

- A description of the work performed since the beginning of the project and the main results achieved to date;
- A description of the expected final results and their potential impacts and use (including socio-economic impact and the wider societal implications of the project to date);
- Work progress and achievements during the period by Work Package (see Appendix 1 for details submitted);
- Changes in the Consortium;
- List of project meetings, dates and venues;
- Project Communication (internal);
- Project Co-operation (external);
- Impact of possible deviations from the planned milestones and deliverables;
- Any changes to the legal status of any of the beneficiaries, in particular non-profit public bodies secondary and higher education establishments, research organisations and SMEs;
- Development of the Project website;
- Financial and person month reporting.

Mid-Term Review Recommendations

The Mid-Term Review meeting took place in Brussels in September 2015 and was attended by all WP leaders. Also in attendance were the three reviewers, our outgoing (second) Scientific Officer and our incoming (third) Scientific Officer.

At the meeting we worked through all the Work Packages in turn, reporting on progress and any issues identified for discussion. Each WP leader presented and then took questions from the reviewers.

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Following the meeting we received a report – the Technical Review Report - from the Mid-Term reviewers in November 2015 which concluded that the FaSMEd project was progressing well. The following section includes the overall recommendations made by the reviewers and our responses to these.

- *Place more emphasis on the connections between technology, formative assessment, and low achievement.*

The FaSMEd project has developed and finalised a toolkit that is being published as a website (<http://www.fasmed.eu/>) and this is a key output and resource in realising the connections between technology, FA and lower achievement. In Deliverable D3.2 Evaluation of the toolkit¹, the prototype toolkit (see deliverable D3.1 for more information) was assessed. The evaluation focused on the implementation of the prototype toolkit by the FaSMEd partners as well as on the additional tools that had been designed by the partners. It took into consideration the guidance given to the consortium in the form of deliverable D9.1: FaSMEd Project Evaluation Report Month 12 and the Technical Review Report (based on our Mid Term Review in 2015). This evaluation served as a guideline for the development of the final toolkit.

One of the main concerns of the previous toolkit evaluations was that the consortium did not take into account various technologies, especially digital resources. As stated in D3.2 Evaluation of toolkit, FaSMEd's work showed a wide range of technologies, but this was not yet visible in the prototype toolkit. The final toolkit, however, includes a number of additional tools that were not part of the prototype. The different technologies are not only emphasised by the descriptive table at the beginning of each tool page but also by the different categories and tags used to make the tools searchable.

Further, the toolkit website now contains a dedicated sub-section titled the FaSMEd Framework², which explicitly visualises the connections and interactions between agents, FA and technology.

- *Work for the remainder of the project, especially the development of the toolkit, and the analysis of the case studies, needs to be accelerated.*

Following the Mid-term review, another issue addressed in the evaluation was the structure of the toolkit. The Technical Review Report states that the consortium should clarify *what, and how, materials and outputs should be presented on the website* and that the *toolkit website should be linked to, or integrated into, the main website* (Technical Review Report, p.6). With the final toolkit's clear structure, as described in detail above, and with the link to the research website, this goal has been achieved.

¹ <https://research.ncl.ac.uk/fasmed/deliverables/>

² <https://microsites.ncl.ac.uk/fasmedtoolkit/theory-for-fa/the-fasmed-framework/>

Overall, the FaSMEd project has addressed all of the issues stated in previous reviews of the toolkit and has created a final toolkit that accomplishes the aim of emphasising connections between the use of (digital) technologies and formative assessment practices as well as to include *activities for teachers and students, together with guidance on approaches to teaching and assessment and the use of technology* (FaSMEd DOW 2013, p.8).

- *The European added value of the project needs to be highlighted, through better synthesis of the collected data at consortium level.*

The evaluation report advised that FaSMEd should *highlight the value added by this project, particularly in relation to the role of technology* wherever FaSMEd adapted resources from other projects (D9.1, p.4). What is more, the Technical Review Report states that the focus should be on *digital technologies in relation to formative assessment* (Technical Review Report, p.4). This focus of FaSMEd is highlighted in various ways in the final toolkit: the integrated FaSMEd framework provides the readers with a conceptual model that can be used to categorise and describe technology enhanced FA processes with a focus on the agents, used strategies and functionalities of technology and the connections between the three dimensions.

A coordinated strategy has been developed to communicate with European wide and international audiences (for example joint presentations at the European Educational Research Conference (ECER 2015), Commission internationale pour l'étude et l'amélioration de l'enseignement des mathématiques (CIEAEM) conference and a workshop on Assessment in Science and Mathematics at secondary level, Dublin). In order to facilitate these activities, briefing documents (D7.3), posters and booklets (D7.5) were produced by the end of month 12 of the project. In response to recommendations these are now presented in the partner languages. Partners have further developed posters and dissemination materials³ more suited to their own specific contexts where appropriate.

In addition, a strategic effort has been made to identify other EU projects in the Science in Society theme and to communicate with them regarding possible areas for collaboration. The FaSMEd project is registered on the Scientix website and at present relationships have been formed with ASSIST-me, Sis-Catalyst, INSTEM, S-TEAM and SAILS, where we have discussed joint interests, shared appropriate materials and presented together at conferences (for example FaSMEd, SAILS and ASSIST-me presented together at the 2nd Scientix Conference, Brussels, as well as sharing an exhibition booth and distributing briefing papers; ASSIST-ME, SAILS and INSTEM presented at a workshop on assessment in science and mathematics at secondary level at Dublin City University, February 2015; and FaSMEd and SAILS will be presenting in a joint symposium at the European Science Education Research

³ <https://research.ncl.ac.uk/fasmed/disseminationactivity/>

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Association (ESERA) conference in September 2015). Further, members of SAILS have directly contributed to the FaSMEd project through participation in our Strategic Advisory Committee and at our Final Meeting and International Conference.

- *Use of remaining resources should be very efficient, given the demands of the next phase and the current budgetary constraints.*

The team took notice of this with immediate effect. Subsequent Strategic Advisory Committee, Evaluation, and Ethics Evaluation meetings all took place virtually by either Skype or using Webex.

- *Gender issues, and socio-economic factors, should be explored more in the research design and data analysis*

The FaSMEd project is aware of the importance of addressing gender and socio-economic factors within STEM generally. Our concern has been the avoidance of explicitly labelling students within a deficit model. Our approach, therefore, has been to work with whole classes of students, within which there are naturally occurring differences. Within different partner countries, this was necessarily context-specific, for example, in the UK mathematics classes are ability set and so we were able to work with lower achieving students both male and female. In contrast, many European countries have mixed ability classes. It was also the project design that all case study schools should be mixed gender. We ensured that in our research design, data collection and analysis the views of both male and female mathematics and science students were equally represented.

- *The professional development programme [sic] needs to be structured more clearly. Within project documentation, there should be materials to describe connections between formative assessment, classroom practices and technology for professional development purposes.*

One section of the toolkit website hosts FaSMEd's final Professional Development (PD) package. It is aimed at people organising professional development for teachers of mathematics and science but can also be used by teachers, either individually or working in groups. It includes a theoretical section on principles for effective PD, describes different approaches to PD, shows practical examples of PD courses carried out by FaSMEd partners and includes six PD modules designed to help teachers use FA more effectively in their classrooms (see deliverable D3.6 Final Professional Development Package for a detailed description).

The PD modules, especially module six, give advice on how to support teachers in their use of technology for FA. Moreover, each tool's teacher guide includes sections describing the used aspects of FA as well as the technology. Therefore the guidance of D9.1 stating that *a paragraph highlighting [the role of technology] in relation to each activity* (D9.1, p.4) should be integrated in the website and of the Technical Review Report requiring that the final tools should report on *which technology and formative assessment strategies are used and how* (p.6) has been followed.

The Reviewers also recommended that some Deliverables were rejected and these should be re-worked in line with suggestions made. Here we present the recommendations made and our actions to respond to these:

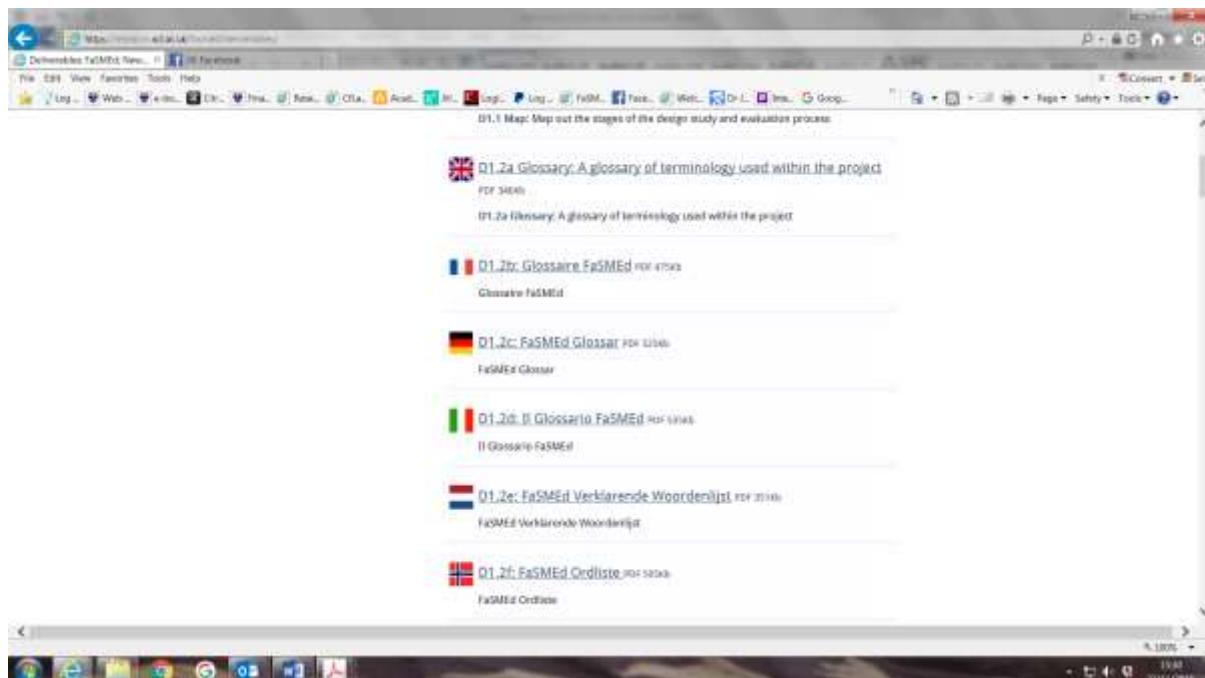
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D1.2 Glossary. The Glossary should be a) expanded to include all terms relevant to the goals of the project and 2) should be translated into all partner languages.

Action taken: At our Phase 3 launch meeting in Cape Town we expanded on our Glossary to include additional terms. The Glossary now includes the additional terms alongside their explanations and related referenced work:

- Connected Classroom technology;
- Computer-aided assessment;
- Feedback.

Secondly, the extended Glossary has now been translated into partner languages and all versions are available to download from our website:



D1.3 Protocols. The deliverables should also include the list of research protocols for data collection.

Action taken: We have expanded our protocols document and this now contains full details of our protocols for data collection:

Data to be collected

HEI partners worked with school teachers to collect data on the design process of the activities. All partner countries collected basic data listed below and in addition worked with teachers in ways most appropriate to the setting.

- Contextual information for each participating school:

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School Context	
School Roll (number of pupils)	
Staff Roll (number of teaching staff)	
Geographical location (urban/rural, etc.)	
Relationship to other schools (e.g. cluster/Feeder/Part of a group of schools)	
Age range	
Single or mixed gender	
Ethnicity	
Mixed ability or selected (could include Special Educational Needs)	
Socio-economic intake (with local contextual indicators, e.g. UK Free School Meals)	
How the school is judged to be performing in local context	
Past experience of using formative assessment	
Past experience of using technologies/tools	
Previous experience of working within other research projects	

- Teacher demographic information

Teacher demographic	
Subject area (science or mathematics)	
Role (e.g. Head of Department/Teacher, etc.)	
Gender	
Age range (under 20; 21-30; 31-40; 41-50; 51-60; over 60)	
How long has he/she been teaching	
How long has/she been working at this school	
Past experience of using formative assessment within lessons	
Past experience of using technologies/tools within lessons	
Past experience of working in a research project	

- Student demographic information

Class demographic	
Age range	
Number of students in the class	
Gender split within class (male/female)	
Ethnicity	
Mixed ability or ability set	
Any relevant contextual information (do the class work well together or are there any particular difficulties/are they taught in this class for other subjects or only for this	

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subject/do students have any additional needs (special educational need or are they being taught in an additional language/is there high mobility of students etc)	

- Teacher report of what happened in each lesson (e.g. length of lesson, day and time, attendance, objectives, any significant event, etc.)

Intervention Data	
Teacher report of what happened in each case study lesson (e.g. length of lesson, day and time, attendance, objectives, any significant event, etc.)	
Teacher report of what happened pre and post each case study lesson (e.g. planning, reviewing, interaction with other school staff and professionals outside of school, etc.)	
Teacher reflective diaries or blogs (where possible)	
HEI partner observations	
Video of extracts of lessons (where permission is granted to be used for research purposes)	
Video of lessons and/or interviews to be used for dissemination and professional development. (where possible)	
Interviews with case study teachers	
Interviews with participant students – to include focus group interviews (based on Q sorting) on their perceptions of how FA and technology/tool helped them in their learning.	
Student questionnaire	
Students as researchers - At Newcastle, UK, a group of students reflected on the FaSMEd experience and expressed their ideas through the design, drawing and production of a FaSMEd Comic.	
Parent forum (where possible)	
Attainment data was collected in line with individual schools usual attainment data collection (where available). Where possible, pre- and post- design study data was collected. For comparison, data from an equivalent class/year was also be collected.	

In addition we have also included full details of:

- Teachers' data collection
- Interview schedule for case study teacher
- FaSMEd Case Study teacher – Interview 2

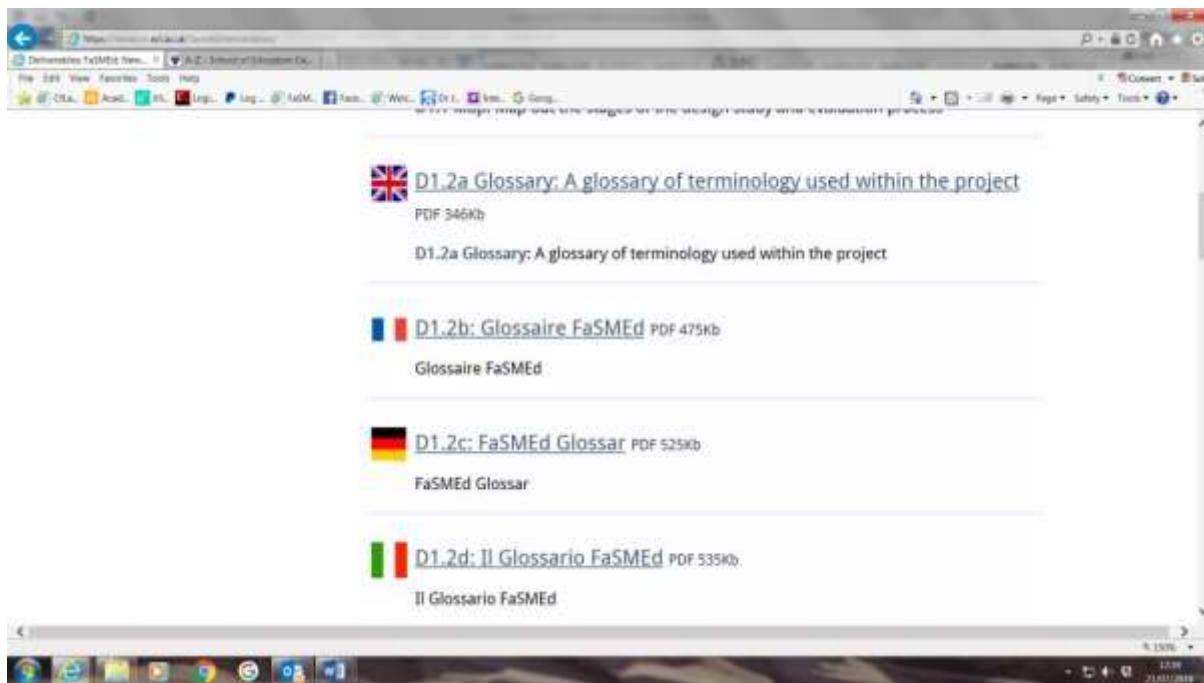
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- Student Q Sort statements
- Student Interview schedule
- FaSMEd Project Student Questionnaire.

The full revised Deliverable can be downloaded from our website⁴.

Deliverable D7.1 Website. The deliverable consists of only a few sentences; it should be enriched to include information about the process of design and how the website addresses the goals of the project. The addition of screenshots would help make this a stand-alone document.

Action taken: We have expanded this deliverable document, outlining how the website structure has developed in line with the recommendations made by our reviewers. Our Deliverables page (<https://research.ncl.ac.uk/fasmed/deliverables/>) is a new page which is constantly updated as we progress through the project. Recent additions – based on the recommendations of our Mid-Term Review Panel – were to add the translated versions of our documents such as the Glossary and posters/leaflets. These are easily identifiable by the addition of country flags to help identify target languages, for example:



This page has also had the added benefit of having an explicit home for our deliverables that external visitors can find – and download - easily. An example of how this has worked well is when Scientix pulled through the deliverables (our website and project is registered on the Scientix site) and entered them into their annual competition. This has resulted in us winning an award for one of our Deliverables, D3.1 Prototype Toolkit.

⁴ <https://research.ncl.ac.uk/fasmed/deliverables/D13%20ResearchProtocols%20revised.pdf>

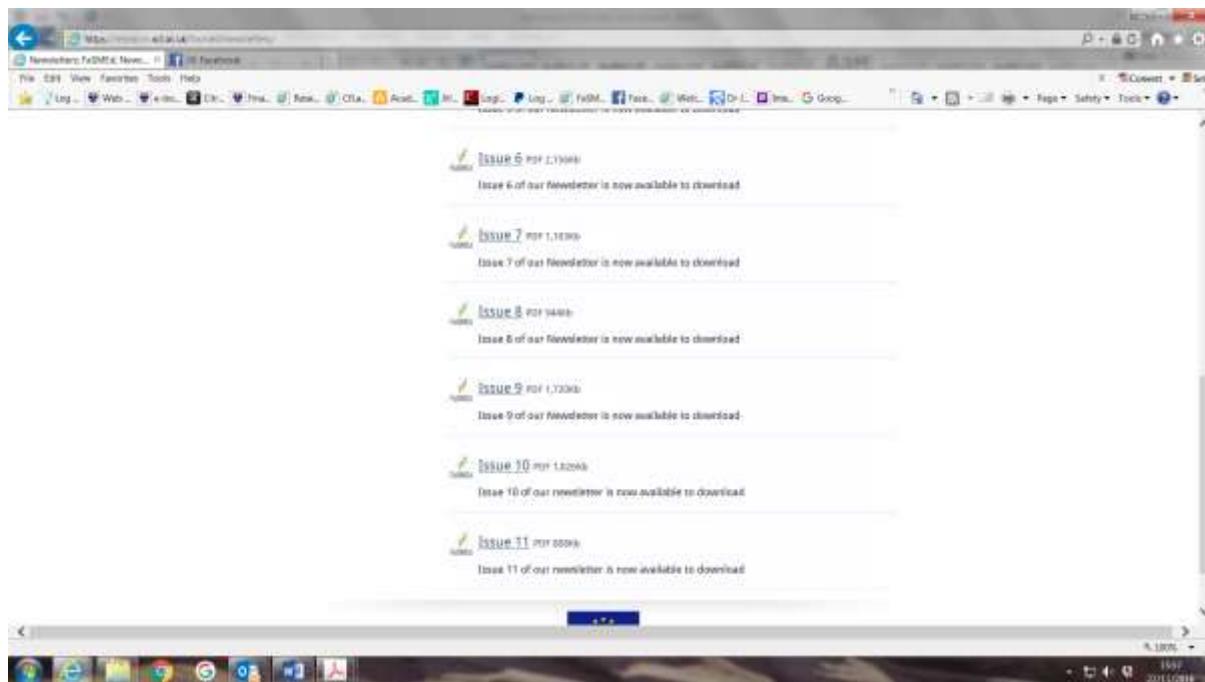
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A new section to the website was added in March 2016, following the advice from the Mid-Term Review Panel, who suggested a section listing all our outward facing dissemination activity. This new section has been populated, and is regularly updated with contributions from all our partners. Some presentations are in key target languages and these can all be downloaded as Pdf documents.

Being able to update the website regularly ourselves is a bonus – we have autonomy over the content, if not the style. Newcastle University will continue to host the site for at least two years after the project officially ends.

Deliverable 7.2 Newsletter. The deliverable should be updated to include all appropriate newsletters.

Action taken: Although there is only one deliverable, there are (over the lifetime of the project) 12 newsletters. We have regularly been adding our Newsletters to our Newsletters page on our website where they can be individually downloaded. The Deliverable 7.2 includes the 12 Newsletters and can be downloaded⁵:



Deliverable D7.3 Briefing documents and conference participation. The comprehensive table summarizing conference participation is good. Nonetheless, the deliverable should also include the title and authors of each presentation or event, and the content of the [presentation (e.g. as a pdf document of a PowerPoint presentation) or any accompanying documents.

⁵ <https://research.ncl.ac.uk/fasmed/deliverables/Deliverable%20D7.2%20Newsletter2.pdf>

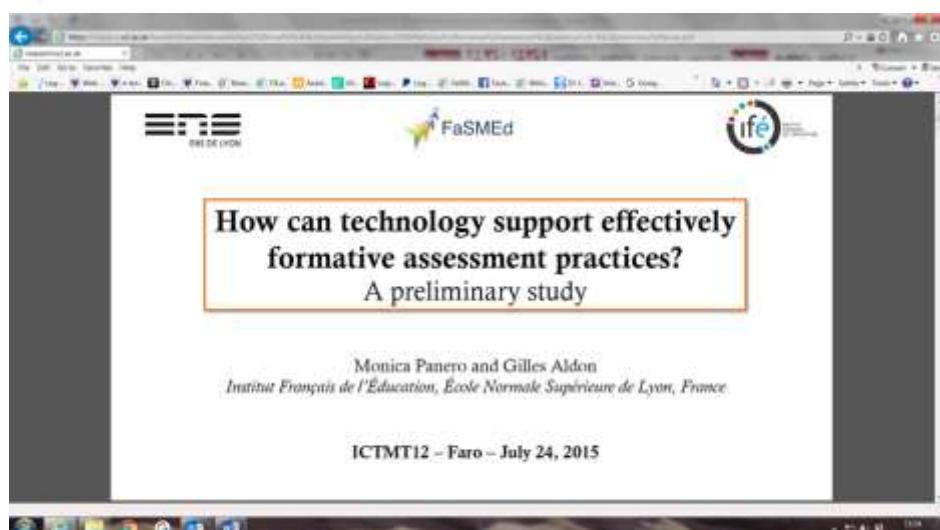
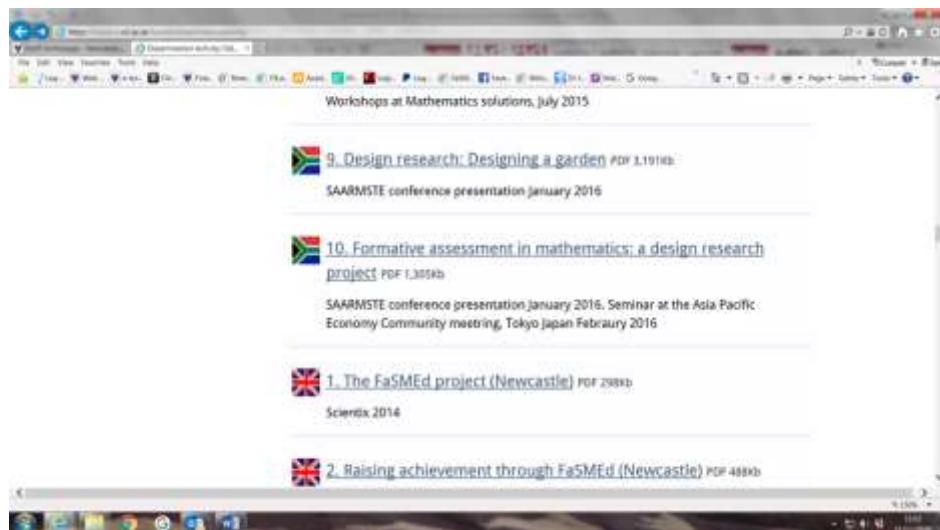
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Action taken: As a result of our mid-term review in November 2015, we now have a comprehensive list of all conference and dissemination events from the beginning of the project up to the present day. This will continue to be updated until 31st December 2016 (when the project officially ends). We will, however, endeavour to add additional activities if and when they happen after this date, in the following months. The activities are all listed on our official project website and can be found at:

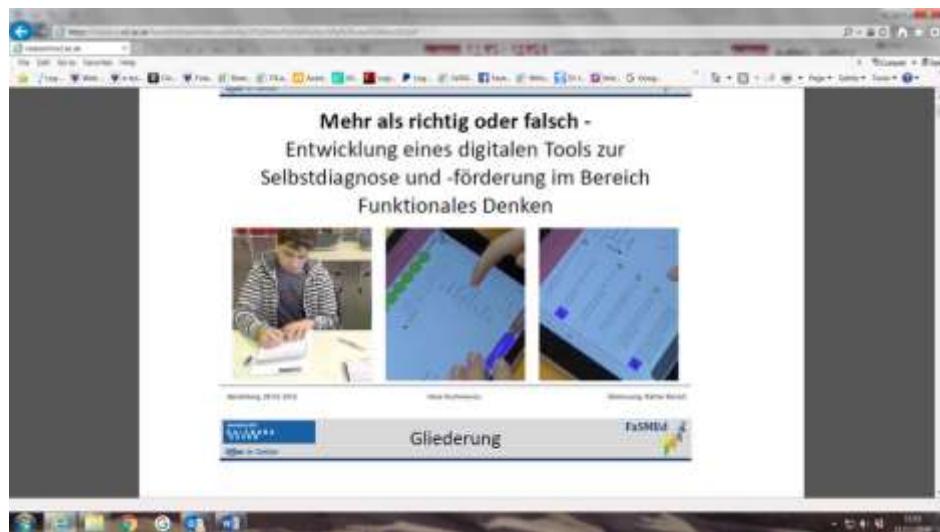
<https://research.ncl.ac.uk/fasmed/disseminationactivity/>

Here the information is presented by partner country for ease of navigation. Each entry contains a downloadable Pdf of the presentation or activity.

The following Screenshots provide examples:

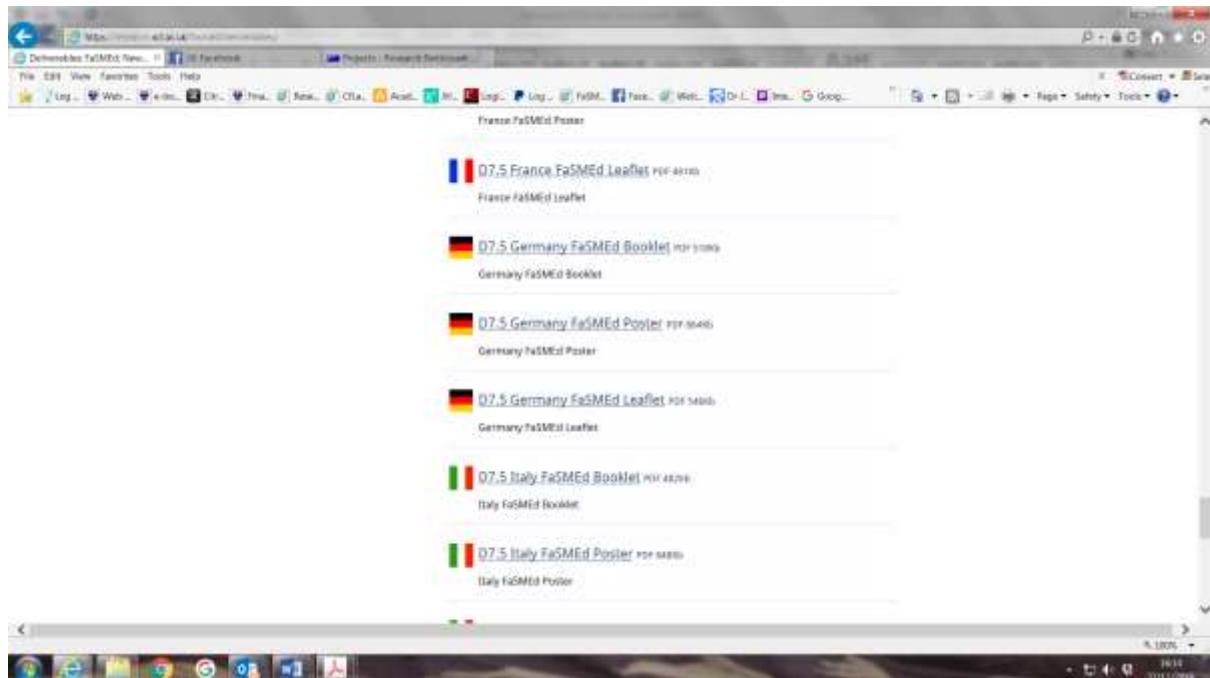


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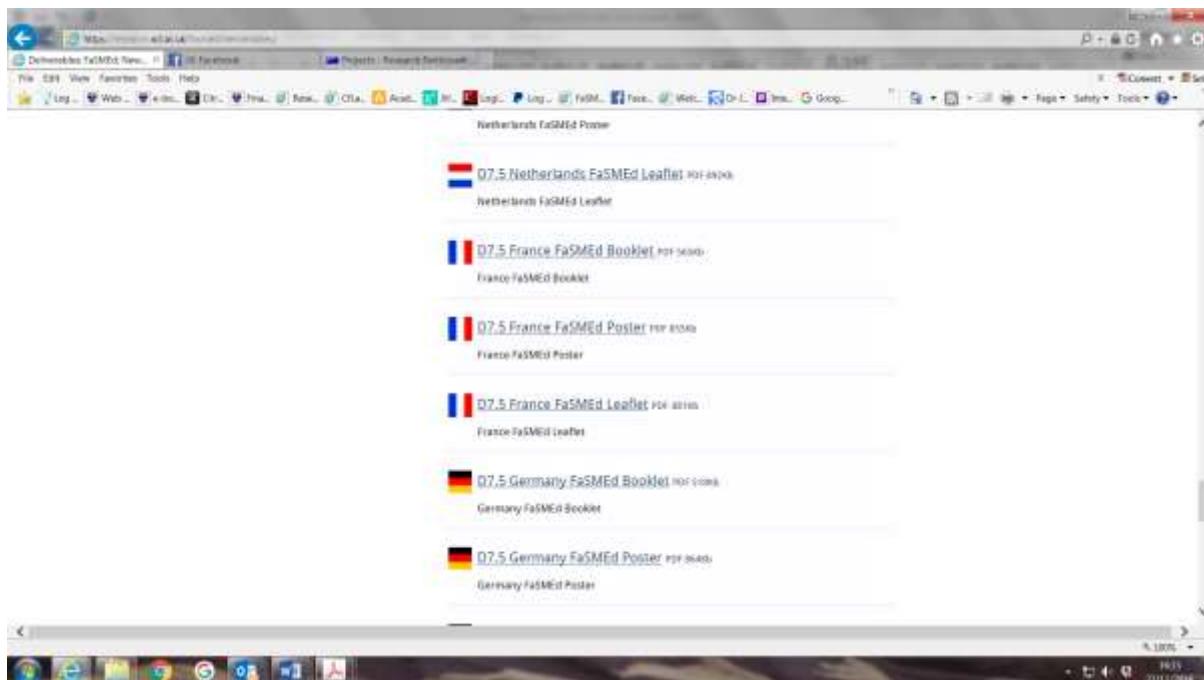


Deliverable D7.5 Posters and booklets. According to the DOW this deliverable should be made available in all partner languages, but currently only exists in English.

Action taken: Partners have translated all booklets, posters and leaflets into their target languages and these have all been merged and submitted as a single deliverable. For our outward-facing audience, however, each resource has been added to our website separately and can be downloaded. Each resource language can be easily identified by a country flag:



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Deliverable D8.2 Phase 2 launch (toolkit). This is a public deliverable which at the moment consists of notes of minutes which are not very comprehensible to the outside public. The deliverable should be re-written and should be a summary of the decisions made in preparation for the launching of the second phase of the toolkit.

Action taken: This directly links to Phase 2 of the Toolkit which was launched officially at the Consortium Meeting in Turin, which took place in October 2014. A great deal of strategic planning and discussion took place.

The following decisions were made:

- Toolkit would be web-based and a working prototype
- Target is teachers and trainers.
- We can add our position papers (earlier deliverables) for teachers to access and learn about the context of the project and the Toolkit.
- The website is open for teachers to use and access.
- Formative Assessment (FA) needs to be in front, alongside the design principles.... And how they can use them to create new and their own FA examples.
- There will be 2 page explanations, and all examples will be completed in the structure.
- Science and maths will be represented together.
- Like the model for Edumatics – where relevant materials and pages will be translated into target languages.
- Classroom activities can be also strategies.
- Classroom tasks and lesson plans – these will not be separate – the documents will be placed together to use together.
- Within the toolkit and the website we will detail what FA is, this needs to be explained and emphasised. This will help us to outline our vision and perspectives.

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- We will outline the design principles
- Every country is different and has different priorities – we will use the Newcastle website for general information – such as the rationale about what criteria and why criteria is chosen – and link to the Toolkit website
- We need to develop a sense of the audience – and include a section on ways of using the toolkit
- Acknowledge the difference between teachers and teacher educators. Professional Development (PD) obviously for the teachers, but the toolkit will also make it explicit for teacher educators. We can possibly have a TT link (teacher trainers) like Edumatic site.
- The Website and Toolkit will be in English – with links to other country websites.
- We can include case studies of people using the toolkit could be good example for use in both the PD and research section
- Also we will include things that do not work in the case studies and research section in the toolkit – these could be lessons from the field.

A revised deliverable including these decisions made at the launch has been submitted through ECAS for approval.

Appendix 1

Work Package 1: Project design

The objectives for this work package were to: *Establish the theoretical and methodological foundations of the design study by drawing on evidence based approaches to educational change with a focus on raising the achievement of students in mathematics, science and technology.*

The Inception meeting (28th-31st January 2014, Newcastle, UK) was key in gathering all the partners together to ensure that there was a project wide understanding of the general framework and management of the project, including the regulations of FP7, partners responsibilities and reporting requirements, and deliverable sign-off procedures. The project benefited from the attendance of our EU Project Officer, Maria Korda, who was able to present on a number of these issues and provide clarification where necessary. Key staff from UNEW's EU Research Office were also able to present on financial and contractual matters and answer questions.

The meeting was further an opportunity for all partners to discuss each of the work packages and in particular work packages 1-4 were discussed and programmes of activity planned. An important aspect of the discussions involved the varying cultural and educational contexts in which all the partners are situated in, understanding more about these contexts and cultural interpretations of key concepts and terminology would be important as the project progressed.

As work package leaders, UNEW led on the WP1 framework and deliverables, structuring the theoretical and methodological foundations of the project. Discussions at the Inception meeting had revealed varying interpretations of key educational concepts that would be important to the FaSMEd project and so it was proposed that a number of 'position papers' be written that would clarify whole project understandings. Drawing upon key areas of partners' expertise, partners volunteered for individual papers and two other partners took responsibility for reviewing the paper and providing feedback which was used for revisions (please see details below).

Position papers:

- [Low attaining learners in science and mathematics – Ireland \(NUIM\)](#)
- [The use of technology in formative assessment to raise achievement – Italy \(UNITO\)](#)
- [The use of technology in mathematics and science education – France \(ENS\)](#)
- [learning through 'cognitive conflict' in science and mathematics education – Nottingham \(UNOTT\)](#)
- [Professional learning of teachers – Newcastle \(UNEW\)](#)
- [What makes an effective toolkit for teachers – South Africa \(AIMSSEC\)](#)

Reviewers:

- Germany (UDE) reviewed AIMSSEC and UNOTT
- Netherlands (UU) reviewed UNITO and ENS
- Norway (HiST) reviewed UNEW and NUIM

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The creation of these position papers was key in establishing joint understandings and theoretical foundations for the FaSMEd project and have been read and used by both our Strategic Advisory Committee and Evaluators to inform discussions. The papers are now available on the FaSMEd website:

<https://research.ncl.ac.uk/fasmed/positionpapers/>

UNEW led on producing the deliverables for this work package (detailed below), working particularly closely with the WP3 and WP4 leaders, and consulting the FaSMEd team as a whole. The following deliverables were uploaded to the EU ECAS system on time:

- [D1.1\) Map: Map out the stages of the design study and evaluation process](#)
- [D1.2\) Glossary: A glossary of terminology used within the project, translated into the required languages](#)
- [D1.3\) Protocols: A set of research protocols to support the collection of data at each stage of the project](#)
- [D1.4\) Schools: School selection criteria – schools, teachers, students](#)
- [D1.5\) Professional development: An agreed approach to professional development](#)

The only variation has been that it has proved difficult to arrange translation of the Glossary document. It was originally thought that this could be arranged through Scientix but as the document does not qualify as a teacher resource this has been rejected. Advice on this would be appreciated as we do not have a specific cost allocation or budget for translation. The Glossary has now, however, been translated into partner languages and these can be downloaded from our website⁶.

The successful completion of Work Package 1 laid the theoretical and methodological base for the historical and current assessments and the intervention cases that were to follow in the partner countries.

Work Package 2: Landscape collection of data and review of literature and systemic practices

The objective for this work package was *the establishment of a baseline of data on the approaches to low achievers in mathematics and science across the EU and South Africa*.

The collection of data necessary to reach this objective was developed through:

- 1) a questionnaire meant to collect data and information from each FaSMEd country about the approach to low achievers and related educative approaches and tools;
- 2) an integration with other data, derived from different sources, such as the Eurydice reports, the descriptions of European education systems provided by Eurypedia, different surveys commissioned by OECD, reports published by European Schoolnet and specific sections of this website, different documents

⁶ <https://research.ncl.ac.uk/fasmed/deliverables/>

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commissioned by the European Commission, the website of the international project iTEC, the National overviews proposed in the website of EdReNe and a range of research papers.

The research subtended to the data collection took into account the three polarities of the FaSMEd Project: low achievers, use of technology and formative assessment.

As work package leaders, UNITO led on the WP2 documentation and on producing the deliverables for this work package:

[D2.1 Report on comparative data on the landscape for low achiever in Mathematics and Science in the partner countries;](#)

[D2.2 Survey of EU systemic practices in respect of low achievers in Mathematics and Science;](#)

[D2.3 Report on the use of tools and technology to support teaching and assessment.](#)

Deliverable D2.1 is aimed at highlighting the following aspects:

- a) the different interpretations of lower achievement in the participating countries, with a specific focus on the assessment tools used to identify low achievers;
- b) the typical pathways for lower achievers through the different school systems will be identified, together with the other educational opportunities available for these students;
- c) the analysis of the main outcomes of the possible trajectories for lower achievers in the participating countries.

In deliverable D2.2 the crucial issues of disadvantaged students and schools is tackled, with a specific focus on low achievement in mathematics and science, discussing possible causes for such phenomena and systemic practices to contrast them. General recommendations, coming from international studies, are presented, and some relevant examples of specific countries are discussed.

Deliverable D2.3 is devoted to:

- a) the analysis of examples of digital technologies useful in teaching and assessment, focusing in particular on the role they could play in fostering formative assessment.
- b) an overview of significant tools, programs, initiatives to support teaching and assessment through digital technologies within the FaSMEd countries
- c) an overview of further international surveys and projects focused on the use of digital technologies in teaching and assessment.

The successful completion of Work Package 2 offered to all partners an overall view on the existing approaches to low achievers in both the participating partners and across the EU outside the participating partners. Moreover, it enabled to identify the range of tools and technology available to support teaching and assessment in mathematics and science, with

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a specific focus on the existing tools to support low achievers, in a formative assessment perspective, as well as possible constraints to their use.

These results were informative with respect to the development of the toolkit.

Work Package 3: Design and production of toolkit for teaching and assessment toolkit

All partners are working cooperatively on the main objective of work package 3, which is the *design, evaluation and further development of the toolkit and professional development package*. The partners UDE, ENS, NUIM and HiST are working on the toolkit in the areas of Science and Mathematics and the partners UNOTT, UNEW, UNITO, UU and AIMSSEC are concentrating on the toolkit in the area of Mathematics. This was agreed as an acceptable balance given the partners' working contexts following discussions with the projects' Strategic Advisory Committee, Evaluators and our EU Scientific Project Officer.

The prototype toolkit and professional development package consist of different elements, which are published in the FaSMEd toolkit website (<https://toolkitfasmed.wordpress.com>) that was explained in deliverables D3.1 and D3.4 (submitted in month 10 of the project).

[D3.1 Prototype toolkit: A prototype toolkit](#)

[D3.4 Prototype professional development package for teachers](#)

During the Consortium meeting in Lyon (April 2015), all partners participated in a workshop on how to adapt this toolkit. Therefore, developments can be integrated and shared by each partner. However, we are aware that the current website is a temporary one and the final output needs to be designed, hosted and updated somewhere. Advice would be appreciated on this as the project has no specific budget or cost to support this.

The structure of the toolkit was created during the FaSMEd meetings and is based on a cooperative decision: it includes concrete classroom activities, which focus on formative assessment for groups as well as for individual students. This enables FaSMEd to explore a wide range of possible implementations of formative assessment in classrooms, as the assessment is not only done by the teacher, but also students themselves and their peers. Seven partners develop and evaluate materials for formative assessment in groups, two partners (UDE, UU) focus on materials for single students. The partners are currently working on the evaluation of the toolkit D3.2 and professional development package D3.5 with the previously described foci. The materials are being implemented in the cluster schools' classrooms or tested in interview settings. Different types of technology (see table 1 below) are being tested and their role of technology during formative assessment is explored. Based on the partners' work with teachers and students, the classroom activities are being adapted and redesigned to inform the final toolkit and Professional Development package D3.3 and D3.6 at the end of the project.

Work Package 5: Cross comparison analysis of historical and intervention cases

According to the FaSMEd Description of Work, WP5 starts in month 22 to be finalised in month 31. However, in order to prepare the setting up and conduct of the fieldwork for the case studies, the colleagues at HiST have proposed and discussed theoretical frames, data collection strategies and analyses at both the meeting in Torino as well as in Lyon. In this process HiST has produced the following:

- a framework/guide for the case investigation (as discussed in Torino and Lyon), analysis and write-up;
- particular data collection strategies (and their analyses), e.g. Q-sorting with pupils;
- an inventory of what consortium partners have done so far in terms of data collection.

Work Package 6: Final synthesis – policy recommendations – identified future research needs

This work package is due to start from June 2016 and so is not part of this reporting period. As the project is on track and delivering on time, we do not anticipate any foreseeable difficulties in delivering WP6.

Work Package 7: Exploitation and Dissemination

Work Package 7 began at the start of the FaSMEd project and runs throughout the length of the project. The objectives of this work package are to:

- *Create and maintain a clear internal project identity and goal, which comes from teacher experimentation using proven principles of feedback, using ICT and involving students as much as possible, the refrain being 'working with students';*
- *Relate the project to other school improvement, inclusion and employment related agendas, so that it is not presented as a bolt-on activity;*
- *Use the distinct project identity and coherence to establish and maintain relationships with other stakeholders, as relationships underpin communication, influence and getting messages into networks both during and at the end of the project;*
- *Relate the project to vocational training agendas and use vocational education stakeholder groups to communicate the messages;*
- *Relate the training and toolkit to national agendas and contexts rather than just presenting a monolithic block, whilst maintaining an essential coherence;*
- *Disseminate and communicate the progress and results of the project in manner to a broad audience (all the stakeholders) and to defined targeted groups (such as science teachers who are involved in the project, or employers in engineering).*
- *Implement a comprehensive programme of engagement and dissemination of the project's results with the aim of a major intervention in an international conference in y3.*

Deliverable D10.1 Mid-term Review

A summary of progress towards these objectives during the reporting period is given below. In particular we have assured that all deliverables have been submitted to the EU ECAS system on time.

As discussed in our report on WP1, creating and maintaining a clear internal project identity and shared goals was extremely important at the start of the project and much work went into this at the Inception meeting and in the following six months of the project. This work culminated in our WP1 deliverables which provided the theoretical and methodological foundations of the project. Building in dissemination and communication about this project identity has been integral from the start. As work package leaders, UNEW have led in setting up, managing and updating the project website (please see: <https://research.ncl.ac.uk/fasmed/>) (D7.1), coordinating the production of a three monthly project newsletter (D7.2), and in collating the many dissemination activities recorded through the EU ECAS system. Partners have taken responsibility for delivering dissemination activities most applicable to their own countries and contexts, these include Stakeholder meetings (D7.7) held annually in each partner country.

A coordinated strategy has been developed to communicate with European wide and international audiences (for example joint presentations at the European Educational Research Conference (ECER 2015), Commission internationale pour l'étude et l'amélioration de l'enseignement des mathématiques (CIEAEM) conference and a workshop on Assessment in Science and Mathematics at secondary level, Dublin). In order to facilitate these activities, briefing documents (D7.3), posters and booklets (D7.5) were produced by the end of month 12 of the project. These are at present in English language have been used in English speaking countries and at international events; partners have further developed posters and dissemination materials more suited to their own specific contexts where appropriate. In addition, a strategic effort has been made to identify other EU projects in the Science in Society theme and to communicate with them regarding possible areas for collaboration.

The FaSMEd project is registered on the Scientix website and at present relationships have been formed with ASSIST-me, Sis-Catalyst, INSTEM, S-TEAM and SAILS, where we have discussed joint interests, shared appropriate materials and presented together at conferences (for example FaSMEd, SAILS and ASSIST-me presented together at the 2nd Scientix Conference, Brussels, as well as sharing an exhibition booth and distributing briefing papers; ASSIST-ME, SAILS and INSTEM presented at a workshop on assessment in science and mathematics at secondary level at Dublin City University, February 2015; and FaSMEd and SAILS will be presenting in a joint symposium at the European Science Education Research Association (ESERA) conference in September 2015).

All dissemination activities (such as presentations and posters) completed by FaSMEd partners can be downloaded from our website⁷.

⁷ <https://research.ncl.ac.uk/fasmed/disseminationactivity/>

Work Package 8: Scientific Coordination

The scientific co-ordination of the project (WP8) work package is responsible for the technical management of the project. This WP is the overall responsibility of UNEW with the Project Coordinator having final responsibility for the delivery of the scientific elements of the project. This has been facilitated by the participation of UNEW in all the work packages across the project, in conjunction with continuous dialogue (virtual, Skype, electronic, in person, etc.) with the Work package Leaders (WPL). Our Strategic Advisory Committee and our Evaluators have provided ongoing advice and guidance to the project throughout.

The main progress and successful outcomes of WP8 so far have been:

- coordination and monitoring of scientific work within the consortium and work-packages
- overall coordination and communication with the Commission
- the supervision of project progress milestones and project global critical path;
- contacts and meetings with the project Strategic Advisory Committee and Evaluation team
- the scientific review of the work performed by the partners including scientific monitoring of deliverables and milestones and the work plan, including the verification of the quality, consistency and respect of deadlines.

Each of the WPL have been responsible for the coordination of activities in their work packages.

The scientific coordination within the project has been supported by management meetings, as reported elsewhere (Work Package 10. Liaison between the participants has been maintained by email, Skype or by telephone. A password protected website has been developed to ensure that communication flows securely between the coordinator and the partners. This has been accompanied by short bullet point progress reports presented to our Strategic Advisory Committee and Evaluators every six months. Progress consortium meetings will be held 3 times during the project, 1 in the UK, 1 in Italy and 1 in South Africa – the first two successfully have taken place. In addition we held an additional meeting in Lyon (April 2015) to bring partners together to discuss scientific progress. This meeting focused on our sharing of experiences and exchanging of information with regards to the intervention cases (WP 4). Outcomes of this meeting helped with our scientific management as we finalised case study analysis and developed data collection tools such as our Q sort activity and interview questions, etc. A further meeting took place (with a selected number of partners) in Germany. This sub-group focused on – and developed – a framework for analysis of the toolkit. Each meeting has helped to establish the trajectory for the following periods in the project.

Work Package 9: Evaluation

The objective of the Evaluation work package is to: *evaluate whether the proposed project reaches its objectives concerning low achievement in science and mathematics.*

Deliverable D10.1 Mid-term Review

We invited a small number of world experts on science education, educational technology, mathematics education and assessment to form an evaluation group who will meet annually to review progress and provide evaluation reports throughout the project. This evaluation group provides the third mechanism of quality control. For details of the team membership see: <http://research.ncl.ac.uk/fasmed/meettheteam/evaluationteam/>

Members of the Evaluation team have been an active part of the project through our various quality assurance mechanisms and attendance at our scheduled meetings:

Strategic Advisory Committee meetings. These have taken place regularly:

- 18th June 2014, 10am-2pm, at Kings College London.
- 26th November 2014, 10am-2pm, at Kings College London.
- 20th May 2015, 10am-2pm, at Kings College London.

Evaluators Meetings. These have taken place regularly:

- 18th June 2014, 10am-2pm, at Kings College London.
- 26th November 2014, 10am-2pm, at Kings College London.
- 9th December 2014, 10am-3pm, at Newcastle University.
- 20th May 2015, 10am-2pm, at Kings College London.

Deliverable D9.1 First year (month 12) Evaluation Report was delivered on time and proved to be very positive. This can be downloaded from our website⁸.

⁸ <https://research.ncl.ac.uk/fasmed/deliverables/>

Work Package 10: Project management and administration

The objectives of this work package is: *Administration and co-ordination of project; and Maintenance of the consortium agreement*

• Consortium management tasks and achievements

This includes the overall legal, ethical, financial and administrative management, including, for each of the beneficiaries, and the obtaining of the certificates on the financial statements. Within this periodic review time period, there are no deliverables due.

• Problems which have occurred and how they were solved or envisaged solutions

There are no major problem to report, although working with the ECAS system has proved difficult as the Co-ordinator (in error) is not named as the main contact and so has not been directly been receiving notifications through the system. This needs to be rectified as it has caused several communication problems which are time-consuming and potentially put the project at risk.

We did not anticipate costs associated with two aspects that have had an impact on the UNEW travel budget for management activities:

1. The extra meetings in Lyon and Essen
2. Strategic Advisory Committee daily rate costs

We did not budget for both 1. and 2. And so we have overspent on this heading. We would like to reallocate €3,000 of our personnel budget to cover travel related to management activities.