Newsletter: 3 monthly FaSMEd newsletter

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Jill Clark, David Leat, Lucy Tiplady and David Wright

December 2016

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

Grant agreement no: 612337

FaSMEd Launch Conference

Partners from across Europe and South Africa met in Newcastle upon Tyne, UK for the launch of the project.

Stakeholder meetings happen across Europe and South Africa

FaSMEd partners

- Newcastle University, UK (Coordinator)
- The University of Nottingham, UK
- Ecole Normale Superieure De Lyon, France
- National University Of Ireland Maynooth
- University Of Duisburg Essen, Germany
- University Of Turin, Italy
- University Of Utrecht, The Netherlands
- African Institute For Mathematical Sciences Schools Enrichment Centre, South Africa
- University College Of Trondheim, Norway

FaSMEd

News Items

For further information please see:

FaSMEd

FaSMEd NEWSLETTER

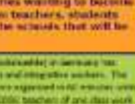
Issue 2 30th June 2014

FaSMEd

Welcome to our second issue of the FaSMEd newsletter. This issue reports on recent developments and news, and in particular features a selection of the schools that will be engaged in the FaSMEd project from across the partner countries.

Welcome to FaSMEd!

FaSMEd partner schools



Meet our Strategic Advisory Committee

Dr Alison Clark-Wilson

Chris Olley

Gill Leahy

Anders Jönsson

Professor Margareta Ekborg

Dr Ann Dowker

FaSMEd NEWSLETTER

Issue 3 30th September 2014

FaSMEd to launch Prototype Toolkit and Professional Development package in Torino

FaSMEd to attend Scientix Conference 24-26 October 2014

Welcome Diane Dalby

Focus on technology ....

FaSMEd seeks to research the use of technology in formative assessment practices in the classroom, although the exact nature of the technology used will vary across partner countries. Here we introduce some of the technology that partners are currently discussing with schools

National University of Ireland Maynooth, Ireland

In conjunction with our co-operating schools we intend to work with the Socrative app for ipads/smartphone and the Google Docs related programme Flubaroo.

Socrative is a smart student response system that empowers teachers by engaging their classrooms with a series of educational exercises and games. It runs on tablets, smartphones, and laptops. Teachers and students log into the app where teachers can pose questions and student responses are visually represented for multiple choice, true/false and Short Answer questions.

Flubaroo is a free tool that helps teachers quickly grade multiple-choice or fill-in-blank assignments using Google Forms. It also computes average assignment scores, average score per question and flags low scoring questions. It can show teachers a grade distribution graph and they can also email the students their grades and if wanted the answer key.

We are also contemplating working with other Ipad apps such as Educreations and Nearpod.

Utrecht University, The Netherlands

In Utrecht one main goal of the project is to design a computer based formative assessment toolkit for teachers. The toolkit will eventually comprise a collection of key problems on topics that are often difficult for students at the end of primary school.

Our first design is a set of two tests, A and B, on the topic of percentages. The two tests have similar problems; however, the numbers that are chosen for test B make the problems a little more difficult. Teachers can use this set in case the students can solve all problems in test A.

For each problem the students can apply their own way to solve it. When they cannot solve the problem mentally, they can choose for one of the tools that are built in in the test. The first one is Scrap Paper, the second tool is a Ratio Table, and the third one is an interactive Percentage Bar.

Fig 2

The teacher can then view the students' work through the software to see how they solved the problems and what tools they used.

Newcastle University, UK

Newcastle schools plan to trial a variety of technology tools with the FaSMEd materials and activities. These will range from mini-whiteboards and response cards to iPads, whole class response systems such as 'clickers' and hand held technology networks. We will experiment with software such as 'Classflow' developed by Promethean and TI-Nspire 'PublishView' documents.

Our first priority will be to gain more familiarity with the FaSMEd materials and formative assessment strategies promoted by the project and we look forward to getting together with some of our colleagues in other schools later in the year when the first prototypes are available. We see this meeting as a priority in order to initiate a community of teachers working together to develop our practice and to support the development of the FaSMEd project.

University of Nottingham, UK

The schools with which we will be working have class sets of iPads available and general teaching tools appropriate for the project such as Nearpod/Classflow, suitable for delivering interactive, collaborative lessons using the wall mounted whiteboard and responses from the pupils, and Showbie for individual student work on the iPad with annotation from the teacher. Specialist mathematics tools will also be used including Desmos for investigations in coordinate geometry and Geogebra, which is a teacher and student toolkit for the development of mathematics resources. Some work using tablet-based versions of 'Classroom Challenges' and 'Card Sorts' developed by CRME at Nottingham will be incorporated.

African Institute For Mathematical Sciences, South Africa

The focus of the South African FaSMEd effort has been on outreach work with teachers. We have run a small number of workshops and seminars for teachers working both locally in the Western Cape and further afield. Our approach has been to do some mathematics, model formative assessment approaches and lead some discussions on formative assessment. Through these workshops we have generated interest in FaSMEd amongst a number of the teachers and a FaSMEd meeting with anyone who is interested is planned for 30th October. After this meeting teachers will be selected to form the cluster group needed for the toolkit development and implementation.

Schools in South Africa vary widely in how well they are resourced and our philosophy is that we do not want to exclude anyone from taking part because of a lack of resources. We are therefore emphasising the formative assessment aspect of the project and, for the moment at least, underplaying the role of technology. However, for us, the most appropriate technologies will probably be non-digital tools such as mini-whiteboards and manipulatives such as card sets.

The photograph here shows some teachers at a FaSMEd workshop in Cape Town. They work in small groups to match cards in the same way that their students might. The activity provides many opportunities for formative assessment: the card-matching helps make the students' thinking explicit which provides information the teacher can use to inform, for example, their questioning.

Our blog at [illegible] provides more information.

Meet our Evaluators

Our evaluators are commissioned to evaluate whether FaSMEd reaches its objectives concerning low achievement in science and mathematics. They are a small group of world experts on science education, educational technology, mathematics education and assessment. They meet annually to review progress and produce a report, the first of which is due on the 31st December 2014.

Professor Justin Dillon

Justin is professor of science and environmental education and Head of School at the University of Bristol. After taking a degree in chemistry, Justin trained as a teacher and went on to teach in six secondary schools in London. His research originally focused on teaching and learning about chemistry in England and Spain. Over the past 15 years he has focused more on science learning outside the classroom particularly in museums, science centres and botanic gardens. Together with two colleagues at King's, Justin co-ordinated the ESRC's Targeted Initiative on Science and Mathematics Education (TISME) and was a member of the ASPIRES project. He was elected President of the European Science Education Research Association from 2007-2011 and co-edits of the International Journal of Science Education.

Council, the Nuffield Foundation, the Qualifications and Curriculum Authority, and the (former) National Council for Educational Technology.

Dr Alf Coles

Alf came to the University of Bristol after fifteen years' experience in secondary schools. His PhD study was centred around the role of discussion both in learning mathematics, and amongst teachers learning to teach mathematics via discussion of video recordings of lessons. Alf recently completed a project funded by The Rayne Foundation with five primary schools focused on tackling underachievement in primary mathematics through creativity. Alf has previously been involved in research projects funded by the ESRC, the Teacher Development Agency, the National Council for Excellence in Teaching Mathematics and BECTA.

Professor Kenneth Ruthven

After teaching in schools in Scotland and England, Kenneth Ruthven joined the Faculty of Education at the University of Cambridge, where he is now Professor of Education. His research focuses on curriculum, pedagogy and assessment, especially in school mathematics, and particularly in the light of technological change. His research and development projects have been carried out with support from agencies including the Economic and Social Research

Professor Vivienne Baumfield (Ethics Evaluator)

Vivienne is Professor of Pedagogy, Policy and Practice in the School of Education, University of Glasgow and International Dean for Eurasia and South Asia. Her research focuses on inquiry approaches to learning in the professional development of teachers and the role of school-university partnerships in the creation and translation of pedagogical knowledge. She is Editor of the Review of Education.

For further information please see: [illegible]
Or email: [illegible]

The project FaSMEd has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 612337

FaSMEd NEWSLETTER

Issue 4 — 19th December 2014

Welcome to our fourth issue of the FaSMEd newsletter. This issue includes news and updates from across the project, with a particular focus on our South African partner, AIMSSEC.

We wish you all a happy new year and look forward to our work together in 2015.

This issue was produced by Newcastle University, UK, and AIMSSEC, South Africa.

Thank you very much to our hosts at the Università degli Studi di Torino who organized a very productive and enjoyable meeting.

Toolkit Launch meeting in Torino

FaSMEd partners met at the Toolkit Launch in Torino from the 13th to the 15th October 2014. Here partners discussed the prototype toolkit which will begin to be trialled with teachers from January 2015 and will be the focus of the design study. The prototype toolkit can now be viewed at [illegible] and will undergo ongoing review over the coming year. We welcome feedback not only from our case study schools but also more widely and so if you have any comments please do not hesitate to get in touch by emailing [illegible]

We were also very fortunate to be able to visit a local school in the Torino area with teachers who will be working with FaSMEd. We were very warmly welcomed, given a tour of the school and invited to take part in a number of lessons with students aged nine to thirteen years.

FaSMEd at 2nd Scientix Conference, Brussels

David Wright (Newcastle, UK) represented FaSMEd at the 2nd Scientix conference from the 24th-26th October 2014. In total there were 600 participants at the conference, including 400 teachers of STEM subjects.

David gave a joint presentation with representatives from SAILS and Assist-me, who we also shared an exhibition booth with and distributed briefing papers. We look forward to future collaborations with our fellow EU projects; for more information on these projects please see:
http://www.sails-project.eu/
http://assistme.ku.dk/

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Focus on South Africa

AIMSSEC is the African partner within FaSMEd. As with all partners, it has specific cultural contexts which influence the way the FaSMEd research is developing. Here we provide some of the contextual background against which we are working and explain what we have done so far.

About AIMS and AIMSSEC

The African Institute of Mathematical Sciences, AIMS, has three main activities: Master's courses for young people from all over Africa, research in mathematics and schools enrichment. AIMSSEC is the schools enrichment centre of AIMS. It is a not-for-profit organisation, which provides professional development for mathematics teachers, subject advisors and field trainers in South Africa mainly from disadvantaged rural and township communities.

AIMS is located in Muizenberg in Cape Town. Muizenberg is probably best known for its long beach, which is very popular with surfers, and for the wind! As we will be having cluster meetings with our research participants, and we will be visiting them in classrooms, we have invited teachers from the Cape Town area to take part, although AIMSSEC generally works with teachers from all over South Africa.

The crisis in South African education in schools …

It is generally agreed that South Africa's education system is in crisis and maths and science education are particularly problematic. For example, Spaull (2013), in his report for the Centre for Development and Enterprise in South Africa, states that however South African pupils are measured, their performance is worrying.

> "However one chooses to measure learner performance, and at whichever grade one chooses to test, the vast majority of South African pupils are significantly below where they should be in terms of the curriculum, and more generally, have not reached a host of normal numeracy and literacy milestones (Spaull, 2013, p. 3)."

There seem to be many reasons for the 'crisis in education', which are related in complex ways. These include poor teacher content knowledge (particularly in mathematics), high drop-out rates in the last years of school, large class sizes, unequal educational opportunities, lack of accountability and professionalism amongst many teachers, teacher strikes, ongoing changes to curricula with insufficient support for teachers to make these changes and the fact that many young people are taught in a language (usually English) which is not their mother tongue and their teachers are also not fluent in this language.

(References available on our blog, fasmedsaimssec.wordpress.com, where there are also reports about initial visits to schools, outreach meetings, more on the South African context and our general progress)

… with pockets of excellence

In the problematic context we have described, FaSMEd South Africa has found teachers who want to take part in the project, are willing to give their time and from whom we will learn much. We are delighted to welcome these teachers to the project, whether they are able to make a full 'teacher collaborator' commitment or whether they can only promise to be 'critical friends'. The teachers come from a range of secondary schools, from those surrounded by informal settlements and shanty towns (these schools are free) to those in well-established Cape Town suburbs where the houses are big (which usually charge fees). There are some in-between and there are also two vocational colleges for post-16 students. We have chosen to work with a relatively high number of schools because a) we did not want to turn anyone away and b) we wanted to have schools from across the very wide range of state schools in South Africa.

Most of the teachers attended FaSMEd outreach workshops between July and October 2014 and have tried out at least one of the activities in the South African version of the FaSMEd toolkit. They have all agreed to teach at least one lesson from the toolkit, and many will teach more.

[illegible] and [illegible] from [illegible] Secondary School are two of the teacher collaborators. Here they are working on the 'Properties of Exponents' lesson.

It may be important to be flexible about how we work with some schools and in some cases the FaSMEd work will include workshops with, for example, the whole mathematics department.

Our over-arching research question relates to how the teachers use the toolkit: the teachers will be the focus of our data collection but we will also collect data from the students. Data collection will begin in mid February 2015. The school year begins in late January and the teachers need some time to settle into the new term before we come into their classrooms for observations.

The South African toolkit

Most teachers follow the 'Curriculum and Assessment Policy Statement', commonly referred to as 'CAPS'. Our understanding from stakeholder meetings is that teachers are more likely to implement new activities for formative assessment if these fit in with CAPS. We will be working mostly with Grade 8 and Grade 9 teachers from a range of schools. As a starting point, we identified CAPS topic areas that are common to both grades in the first term and are seen as difficult to teach.

Meet Julian Marshall, our FaSMEd Film contractor …

Julian Marshall (MLM Learning Design) will be working with the FaSMEd project team to capture key moments of the project on video.

With the footage that is recorded Julian, working closely with the team at Newcastle University, plans to produce an overview video and a series of shorter video sequences that can be used to support Professional Development (PD) sessions.

Julian intends to capture material using a range of methods, from full professional crews, reportage, and in some cases including material captured by the participants themselves.

The team hope that the resulting videos will promote the project mission, outcomes and legacy, and provide an over-arching description of the project process. We also hope to share the work of the project participants to convey the collaborative nature of the project across the different partners.

Julian has worked closely with teachers in mathematics and science over many years to develop the use of video both in the classroom and for PD. During this time he has been fortunate to work with the ShellMARS team at the University of Nottingham and others exploring formative assessment. Previously Julian was the education officer for science at BBC Education.

Julian will be attending the FaSMEd conference in Lyon with his camera in April. He is looking forward to meeting more project partners and exploring possibilities of getting video evidence from participants across the project.

Thank you to the teachers at George Stephenson High School already, for accommodating Julian and others to film during their project activities.

Here is a picture of Julian (third from right) and crew taken during a recent project for The National Archives to produce an enquiry based resource for schools based on the Magna Carta.

For further information please see: [illegible]
Our Facebook page: [illegible]
Or email: [illegible]

The project FaSMEd has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 612337

FaSMEd

FaSMEd NEWSLETTER

Issue 5 31st March 2015

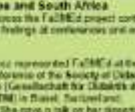
FaSMEd

Welcome to our fifth issue of the FaSMEd newsletter. This issue includes news and updates from across the project, with a particular focus on our Nottingham, UK, partner.

This issue was produced by Newcastle University, UK, and University of Nottingham, UK

FaSMEd Stakeholder meetings

FaSMEd partners have held this year's annual stakeholder meetings local to their own contexts inviting school leaders, teachers, policy makers, educational consultants, researchers and others. These meetings have provided opportunities to disseminate progress about the FaSMEd project, as well as creating spaces for those teachers involved in the project to share experiences and reflections about the research so far.



Congratulations to FaSMEd partner Malcolm Swan, University of Nottingham

The International Commission on Mathematical Instruction (ICMI) has announced the first recipients of the Emma Castelnuovo Award for Excellence in the Practice of Mathematics Education will be Hugh Burkhardt and Malcolm Swan from University of Nottingham, UK, in recognition of more than 35 years of development and implementation of innovative, influential work in the practice of mathematics education.

FaSMEd represented at Conferences across Europe and South Africa

Partners from across the FaSMEd project continue to present initial findings at conferences and workshops.

Hana Ruchniewicz represented FaSMEd at the 49th annual conference of the **Society of Didactics of Mathematics (Gesellschaft für Didaktik der Mathematik, GDM)** in Basel, Switzerland, February 2015. She gave a talk on her dissertation project explaining FaSMEd's aims and the development of classroom materials for self-assessment in the field of functions using a design research approach. The presentation ended with a case study of one student's work with the material showing that individual learning paths are possible within the developed self-assessment cards.

Majella Dempsey and David Wright presented at a **workshop on assessment in science and mathematics at secondary level** at Dublin City University, February 2015. The aim of the workshop was to share and discuss different approaches, frameworks, instruments and examples for how to assess science and mathematics at the secondary level. There was a diverse range of attendees including policy makers, education officers, researchers and research students. Majella and David presented initial findings from the FaSMEd project, alongside other research projects represented including:

- Project Maths, National Council for Curriculum and Assessment (Republic of Ireland (RoI)
- Senior Cycle Science, National Council for Curriculum and Assessment (RoI)
- ASSIST ME - Assess Inquiry in Science, Technology and Mathematics Education
- SAILS - Strategies for Assessment of Inquiry-based Learning in Science - http://sails-project.eu/
- INSTEM is a Comenius network, which brings together the experience and learning of a wide range of projects in European Science and Mathematics education.

Majella Dempsey and Niamh Burke will also be presenting on FaSMEd at the **Educational Studies Association of Ireland** (ESAI) conference 'Educational Research and Practice in Times of Transition: Looking to the Future' in April 2015.

We look forward to hearing about forthcoming dissemination across the project. Please send details to: [illegible]

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News from Nottingham

The Centre for Research in Mathematics Education (CRME) at the University of Nottingham is a well-established research centre, known for the quality of its research and design on mathematics education policies, curricula, assessment, CPD and classroom practice. Its particular strength lies in its emphasis on designing and analysing processes, products and experiences with and for teachers and learners. For full details, see our website at http://www.nottingham.ac.uk/education/research/crme/

Our challenge

With a long history in the area of design research, the Centre holds a rich bank of lesson materials that encourage formative assessment through diagnostic tasks, collaborative work, questioning, peer assessment and the use of sample student work. The challenge for us with the FaSMEd project is to build on that foundation and explore how technology can be used effectively to support formative assessment in similar ways.

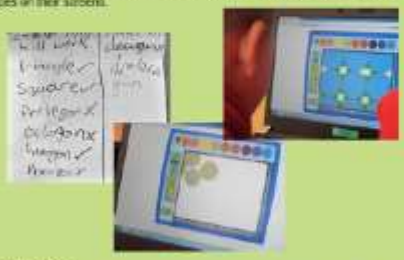
Our local schools

We are working in with three local schools, with three participating teachers in each and focusing on the use of iPads in mathematics lessons. Many schools have class sets of iPads in England but how much they are used varies between and across schools. Typically, each of our schools has their own particular interest in how they can use the iPads effectively and they each commence from a different starting point. In one school iPads are issued to every student in Year 10 (age 14/15 years) and teachers use these confidently in lessons. One of the concerns here is that in using the iPads teachers have identified that there is less small group discussion and peer assessment in mathematics lessons so they are keen to explore how this can be improved. The other two schools use class sets of iPads and one of the barriers for some of the less experienced teachers is the perception of time being wasted in setting up, logging on and dealing with technological failures. In an education system where there is pressure to achieve high levels of student attainment, any time investment in alternative pedagogy creates tensions until the benefits have been clearly identified. FaSMEd is building the confidence of these teachers and allowing them to explore ways in which technology can enhance the students' learning experience, thereby providing benefits that may outweigh the possible inconveniences.

Lesson activities

In the first round of activity each school has developed a lesson suitable for their students by drawing on CRME materials but also incorporating their own ideas. Each teacher has then taught the lesson, with space for discussion, reflection and adaptation in between these lessons. These have included some creative and interesting features, for example:

- teachers using a web-based resource to send diagnostic questions to students in advance of the lesson that then provided an overview of students' responses/reasons for choosing each of their answers;
- teachers displaying students' solutions to questions on the interactive whiteboard in various ways and being able to select appropriate work for class discussion to address common misconceptions;
- students working on 'mirrored' questions and then comparing answers in pairs, engaging in peer assessment and reaching a shared understanding (i.e. some students constructed a distance-time graph from the description of a journey whilst others were writing a 'story' to match the graph);
- students working in pairs and predicting which regular shapes would tessellate before testing their predictions using software that allowed them to quickly move and rotate shapes on their screens.



Areas to explore

In this first phase of lesson activity the technology was clearly beneficial to teachers in providing information that they could use to adapt their lessons or to address misconceptions through class discussion. Students also benefitted from being able to explore and construct visual representations quickly, thereby allowing more time for questioning and discussion. We are currently exploring ways of analysing the video-recorded sessions in greater detail, using software developed by CRME. Our questions now focus on identifying the benefits more clearly and examining ways in which technology may change the formative assessment processes more significantly than simply providing a substitute for a paper-based approach.

FaSMEd partners meet in Lyon, France, 28th-30th April 2015

At the end of April 2015, partners from France, Italy, Germany, Norway, Ireland, the UK and South Africa met in Lyon to share preliminary findings from the case study schools and discuss the developing toolkit.

This was an opportunity for partners to share FaSMEd practice happening within schools and was exemplified with visits to a primary and lower secondary school in the Lyon area. Partners welcomed the opportunity to see FaSMEd mathematics, chemistry and sciences at life and earth in action and the opportunity to talk with teachers after the lessons.

There were also a number of opportunities to enjoy the excellent local cuisine that Lyon offers, which was enjoyed by all!

For further information please see: http://www.fasmed.eu/
Our Facebook page: https://www.facebook.com/fasmedproject
Or contact: fasmed@nottm.ac.uk

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FaSMEd

FaSMEd NEWSLETTER

Issue 6 — 30th June 2015

FaSMEd

Welcome to our sixth issue of the FaSMEd newsletter. This issue includes news and updates from across the project, with a particular focus on Torino, our Italian partner.

This issue was produced by Edinburgh University, UK, and the University of Turin (UNITO), Italy.

News from across the project ...

It has been an eventful half year for the FaSMEd project. The following gives examples of work in schools, with teachers and with the international academic community.

South Africa - MMSSC has had a busy second school term. We have had cycles of planning a lesson, observing it, interviewing the teachers and writing up with fifteen teachers in seven schools. With all teachers we did a card-matching activity such as matching graphs, equations, ordered pairs and rules. We had a cluster meeting on 18th June in which we shared what everyone had done. We encouraged teachers to talk to one another about their experiences.

In May, Ingrid presented two papers at the local conference for teachers of mathematics, one on the design of a lesson about quadrilaterals and one on a task which requires students to design a garden. For both, she worked with teachers who had taught the lesson.

Utrecht - Presented preliminary FaSMEd findings at the Utah conference of the Primary Mathematics Study on Whole Numbers in Macau, China.

Lyon and Torino - FaSMEd will be well represented at the next CIEAEM conference which will be held this July in Aosta (Italy). The French and the Italian FaSMEd teams are presenting together a workshop during this conference: *Which support technology can give to teaching mathematics formative assessment? The FaSMEd project in Italy and France.*

In Lyon, a general meeting with all partner schools will be held the first of July in order to take stock of the ongoing work.

Newcastle, UK - teachers have been busy considering their final research cycles before the summer holidays start in July. We will end the term with a cluster meeting where teachers from across three schools can share their experiences of the project, discuss future plans and celebrate achievements so far!

David has presented on the FaSMEd project to date at the British Society for Research in Learning Mathematics and at the 12th International Conference on Technology in Mathematics Teaching, Faro.

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News from Torino

The University of Torino (UNITO) is one of the largest Italian Universities, with an international perspective in the fields of both research and education. The three members of the UNITO team work within the Department of Philosophy and Education, which combines study of matters related to education (including teacher education) and philosophical enquiry.

Our perspective on formative assessment

Two assumptions inspired our planning of the teaching materials and of the activities implemented in the classes: (a) low achievement is linked to lack of basic competences, but also to affective and metacognitive factors; (b) argumentation can represent an effective formative assessment tool in the interaction between teacher and students.

This led us to focus on assessment lessons that involve collective discussions aimed at the sharing and comparing of students' productions. For this reason, we looked for a technology that could support the teachers in the sharing of students' screens and of their ongoing and final written productions and in the collection of students' opinions and reflections both during and at the end of each activity.

Our local schools

Sixteen teachers from three schools are participating within the FaSMEd Project:

- Eight teachers and their nine classes (seven primary school classes, grades 4-5, and two lower secondary school classes, grades 6-7) from the Istituto Comprensivo di Vinovo (Torino);
- Five teachers and their seven classes (lower secondary school classes, grades 6-7) from the Istituto Comprensivo di Carcare (Savona);
- Four teachers and their four classes (primary school classes, grades 4-5) from the Circolo Salgari (Torino).

Each school has been provided with tablets for the students (who work in pairs), computers for the teachers and, where the interactive whiteboard was not available, a data projector.

The students' tablets are connected with the teachers' laptop through the IDM-TClass software. In particular, during the lessons, the software allows the teacher to: (a) show, to one or more students, the teacher's screen and also other students' screens; (b) distribute documents to students and collect documents from the students' tablets; (c) create different kinds of tests and have a real-time visualization of the correct and the wrong answers; (d) create instant polls and immediately show their results to the whole class. Moreover, the students' written production can be displayed (through the data projector or the interactive whiteboard), compared and discussed.

Lesson activities

In the first phase of the teaching experiments (the second phase will be carried out in autumn), each class worked on sequences of tasks on early algebra and on functions, with a focus on their different representations (verbal descriptions of relations, symbolic expressions, graphs and tables). The teaching materials were inspired by the ArAl Units, models of teaching sequences conceived within the ArAl project, included in the European Ellmagic Project (Effective Learning and Teaching of Mathematics from Primary to Secondary School, 71678-CP-1-2001-1-UK-COMENIUS-C21).

The ArAl Units include: (a) a focus on the mathematical meaning and the objectives of the activities; (b) excerpts of class discussions; (c) typical students' trajectories and comments on their answers; (d) reflections on teachers' possible feedbacks.

For each lesson, a set of different worksheets were prepared. They were aimed at:

- supporting the students in the verbalisation and the representation of the relations considered within the lesson;
- enabling the students to compare and discuss their answers;
- making the students reflect at both the cognitive and metacognitive level.

After each lesson, the teachers have been interviewed. Many of them have faced some difficulties because they were not used to using digital technologies during their lessons. However, all the teachers recognized the effectiveness of the use of the classroom management system in fostering formative assessment in their classes, as the following excerpts from the interviews testify.

... the instant monitoring of what happens ... is the winning key of every activity. It is not about the activity you are doing, but about the way in which you are working. (Anna Lisa, Circolo Salgari)

Displaying the different protocols on the interactive whiteboard is really useful for the discussion because it enables all the students to become aware of the possible mistakes and about the effective ways of constructing the problems' solutions. Another effective aspect of the lessons was the possibility of individualising students' work through the different worksheets that could be sent to specific pairs of students. (Grazia, Istituto Comprensivo di Vinovo)

The technology represented a stimulus, for students ... a stimulus to produce, to try to write something which can be understood, because they knew that it would have been projected (at the interactive whiteboard), so it had to be understandable and complete (Monica, Istituto Comprensivo di Carcare).

I really liked the instant poll ... I think it is effective because it enables to make a synthesis. If you are able to identify the proper questions, you can summarise and effectively group if they did or did not understand. (Elena, Istituto Comprensivo di Carcare)

FaSMEd Project Developments ...

Ethical Review Report 1 submitted

FaSMEd has received its external Ethical Review for the first half of the project from Professor Vivienne Baumfield, University of Exeter, UK.

The report examines and reflects on the FaSMEd project to date, with particular focus on the project design, governance structure and ethical framework.

FaSMEd has been recognised for its emphasis on collaborative inquiry using multiple channels for communication. As we move into the second period of the project, the report makes recommendations for continued development and evaluation.

A copy of the report will soon be available at: https://research.ncl.ac.uk/fasmed/deliverables/

Mid-term Project Review in Brussels

Work Package leaders have travelled to Brussels ahead of the project's Mid-term Review on the 28th September 2015. We look forward to this as an opportunity to review achievements and milestones so far and look forward to project developments as we enter the second half of the FaSMEd project.

FaSMEd film

Julian Marshall and his team from MLM Learning Design are continuing to work on the development of the FaSMEd film.

It is intended that the film will have two purposes:

1. To promote and celebrate the project (its mission, process, outcomes and legacy) with the intended purpose that it encourages others to explore and develop the use of technology in supporting formative assessment (in science and mathematics) in their own settings.
2. A collection of short extracts or episodes that could be used for Continued Professional Development and form part of the FaSMEd Professional Development Package for teachers; it is intended that these episodes could provide valuable material for teacher reflection and discussion.

For more information about the developing FaSMEd film please email: info@mlmlearningdesign.com

For further information please see: [illegible]
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The project FaSMEd has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 612337

FaSMEd NEWSLETTER

Issue 7 30th September 2015

Welcome to our seventh issue of the FaSMEd newsletter. This issue includes news and updates from across the project.

This issue was produced by Newcastle University, UK

FaSMEd Resource Winner of the Sixth Scientix Resource Award

Work Package 3 deliverable *The Prototype Toolkit*, has been selected in best STEM reports category of the Sixth Scientix Resource Awards. *The Prototype toolkit*, created by the FaSMEd project, along with *Moving schools closer to the world of science*, by the Eduscience project, were selected as joint winners of this category.

Also recognised in these awards were *FEAST workshop 1: Talking about science – floating and sinking* selected as the best teaching material addressed to teachers in STEM education, published by the FEAST project and *The Annals – Primary Resource Book*, of the ESERO project, as the best teaching materials for students in STEM education.

More information about this competition and the 57 materials that were submitted can be seen at: http://www.scientix.eu/web/guest/scientixawards/resources-competition-6

Ulrike Thomas joins FaSMEd team at Newcastle, UK

A big welcome to Ulrike who has recently joined the team at Newcastle, UK. As many of you know, Lucy Tiplady will be taking maternity leave from November 2015 and so Ulrike will be taking on many of Lucy's responsibilities within FaSMEd.

Ulrike is an experienced researcher from the Research Centre for Learning and Teaching (CfLaT) at Newcastle University. Before embarking on a career in research she was a primary school teacher for 9 years. Ulrike has been involved in a range of research projects and evaluations which have examined the impact of innovative pedagogy and curricular on students and teachers. In her capacity as a researcher she has been developing her role as an interviewer and is particularly interested in exploring techniques and tools which encourage a more ethical, participatory and meaningful exchange.

Please get in touch with Ulrike at: U.Thomas@newcastle.ac.uk

Lucy hopes to return to the FaSMEd project in September 2016.

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FaSMEd Project reaching International audiences

It may have been summer holiday season, with many of our project teachers and students taking a well deserved break, but a number of our partners have taken the opportunity to join forces and deliver presentations together reporting on the ongoing developments and emerging impacts of the FaSMEd project.

Partners from the Ecole Normale Supérieure de Lyon and Università degli studi di Torino delivered a workshop in July 2015 entitled "Which support technology can give to mathematics formative assessment? The FaSMEd project in Italy and France", followed by a Round table "Formative assessment in the FaSMEd Project: reflections from classroom experiences" at the *Commission Internationale pour l'Etude et l'Amélioration de l'Enseignement des Mathématiques* (CIEAEM) conference, Aosta, Italy. These two presentations were well attended and produced fruitful discussions about the importance of feedback, the role of technology and the fundamental role of the teacher in the formative assessment process. For the French and the Italian teams, it was a rich occasion of exchanging about classroom observations and analysis of case studies, leading to the collaborative writing of a chapter in the next CIEAEM sourcebook, which will be published by Springer.

Newcastle University collaborated with fellow European projects *Strategies for Assessment of Inquiry Learning in Science* (SAILS) and *Assessment of Science, Technology and Mathematics Education* (ASSIST-ME) to deliver a Symposium in Strand 11: Evaluation and assessment of student learning and development, at the *11th Conference of the European Science Education Research Association* (ESERA), University of Helsinki in September 2015. The symposium entitled 'A pan-European perspective on assessment and inquiry based learning in science, technology and mathematics instruction' presented on the approaches adopted by these three large-scale European projects focusing on assessment and inquiry based learning in STM education across primary and secondary education.

Also in September, partners from the National University of Ireland Maynooth, Ecole Normale Supérieure de Lyon, Università degli Studi di Torino and Newcastle University presented a joint symposium in Network 9, Assessment, Evaluation, Testing and Measurement, at the *European Conference of Educational Research*, at Budapest University. The symposium entitled 'Formative Assessment in Science and Mathematics Education (FaSMEd)' began with an overview of the project, its values and approaches, before presenting in more detail how the project is developing through working with teachers and students in each of the partner countries represented. Our external evaluator, Dr Alf Coles, was the discussant and stimulated a very useful discussion with attendees.

FaSMEd partner news from ....

South Africa

The South African partner has just completed the third round of classroom interventions. As with previous rounds, this involved meeting individual teachers at their schools and jointly planning a lesson. Whereas previously many of the teachers had taught the same lesson, this time around it seemed that their needs were all quite different. For example, one teacher, Greg, asked the FaSMEd team to find or devise a classroom activity to address his students' difficulties with reading graphs, to determine, for example, where g(x) is greater than f(x), or where f(x) is increasing. Two other teachers, Rob and Regis, were looking for activities to use as revision for the upcoming Annual National Assessments. Rob wanted a lesson on straight line graphs and Regis wanted something to pull together a range of topics that had been covered during the year.

All the South African FaSMEd lessons adopt 'active learning' approaches, with students working in small groups or pairs, usually on an activity involving card sorts or similar. Very often teachers use big versions of the cards to model the activity and to go through the card matches at the end of the lesson. All teachers have sets of mini whiteboards and these are used by the students at all stages of the lesson, and in particular in the introductory part of the lesson to provide teachers with information about the students' current understandings.

Overall, teachers and students appear to have enjoyed using the FaSMEd lessons, and it seems that teachers and students are now more comfortable with the different approaches the FaSMEd lessons require them to take. There is considerable evidence that teachers feel that they have developed professionally over the course of the project and that some of the FaSMEd teaching strategies are being used in other lessons, such as the use of mini whiteboards for formative assessment.

Large-scale study in The Netherlands

After extensive piloting of the Utrecht toolkit that was developed within the FaSMEd project, the Utrecht team has now started a large-scale study in which 8th grade teachers use and evaluate the toolkit. No less than 26 schools have agreed to participate in this study, which runs from September 2015 to February 2016.

Participating teachers attend three PD meetings, in which the Digital Assessment Environment (DAE) is discussed and explained, and results of the students are analysed with the help of the research team and other participants. Four subject domains are assessed over the course of three months: percentages, fractions, the metric system, and graphs. Teachers also share details of their assessment practices with the researchers by filling out questionnaires, and give access to their students' achievement scores on mathematics in the Cito Monitoring System, both before the start of the study (June 2015) and after completion of the study (February 2016).

FaSMEd Project Developments ...

EMINENT 2015

After receiving the Scientix Resource Award for WP3 Deliverable: The Prototype Toolkit, Scientix invited two members of FaSMEd to represent the project at EMINENT 2015 – STEM IN EDUCATION AND LIFE. It is the Experts Meeting in Education Networking annual event by European Schoolnet that was held from 19–20 November 2015 in Barcelona and was organised in cooperation with Scientix and the Department of Education of Catalonia. EMINENT 2015 brought together 200 participants from 37 countries including ministries representatives, researchers, STEM teachers and other stakeholders. Hana Ruchniewicz and Raphael Hoffmann of the German team took the opportunity to spread the idea of FaSMEd, hosting a stand throughout both days of the conference. Besides current news and information on the project, they brought examples of classroom materials for both Mathematics and Biology to Barcelona for stakeholders to try out tools for formative self-assessment. In addition to disseminating the idea of FaSMEd, the conference gave us great insight on current achievements and problems in STEM education throughout Europe. Most of the key points that were discussed, are of importance for the FaSMEd project as well, for example the relevance of disseminating existing knowledge and research findings, high quality CPD and scaling up ideas, supporting the close cooperation of researchers, teachers and policy makers and including all students as well as raising interest and motivation. Finally, it was stressed that assessment methods should not focus on the outcomes of student learning, but rather be included in the process of teaching and learning.

International Collaboration Through FaSMEd

The opportunities for international collaboration in the FaSMEd project are not just limited to the core project activity or restricted to activity by university staff. Supported by the Erasmus programme, Simona Limardelli, a student from the University of Turin, has recently been spending time at the University of Nottingham with the FaSMEd team. Simona first worked with the Italian FaSMEd team, observing and analysing lessons in Italy and is now comparing approaches to using digital technology in formative assessment with those used in an English school. Whilst working with the Nottingham FaSMEd team, Simona has also been busy writing her Masters thesis and improving her English whilst in Nottingham. The combination of studies in Turin and Nottingham has provided opportunities for her to gain a wider understanding of the different education systems, cultural influences and research projects within the two countries, all of which may prove useful in her future career.

For further information please see: http://research.ncl.ac.uk/fasmed/
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FaSMEd NEWSLETTER

Issue 8 31st December 2015

Welcome to our eigth issue of the FaSMEd newsletter. This issue includes news and updates from across the project

FaSMEd partner news from Norway

Our Norwegian partner, HiST has just finished the case studies, observations in classrooms and interviews with students and teachers at three different schools. At two schools groups of around 12 year old students experimented with technology for visualisation of time-distance graphs. Four groups, each with 2 or 3 students, participated in a two part lesson. One part of the lesson was spent on a task about connecting graphical representations and stories. The other part of the lesson, the students tried out how to make graphs by walking in front of an echosounder connected to a computer. The computer would give a live display of graph in a time – position coordinate system.

For the "walking a graph" activity, we used data logger technology, a motion sensor based on ultrasonic pulses connected to a laptop, and an app with premade tasks was presented to the students. The tasks were a mix of practical tasks "walk a graph", and open-ended questions about interpretation of the graphs from the walks. All the results were saved and were used by the teacher for assessment and feedback to the students.

We observed enthusiasm as well as useful discussions and interpretations from both parts of the lesson. It seems that a combination of technology and paper tasks were very valuable. Students having done the "walk a graph" activity, seemed to have a good understanding of the connection between a text describing a practical situation and how the corresponding graph would look.

Depending on age and ability, students may need close supervision when working with technological tools, in particular if these are not especially designed for school use. Obstacles we experienced included understanding the vocabulary and technical difficulties with the software. In our session we were able to overcome these problems by being a team of up to 4 researchers and teachers available for helping the students.

After the lessons, both the teacher [illegible] and the students expressed that they had really enjoyed this type of lesson, and that they had learned a lot from it.

From January 1st 2016 our college (HiST) will be part of the Norwegian University of Science and Technology – NTNU.

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News from France

IFÉ (Institut Français de l'Éducation) is a national institute of research, of training and of knowledge mediation in the field of education. It is part of ENSL (Ecole Normale Supérieure de Lyon), that is a recent institution which has inherited a long tradition of research and training. IFÉ's Research Department plans to set up a platform for research in education, useful for research teams of the ENS in Lyon that are interested in educational and training issues. This is for teams with contract-based links with our partner ENS in Lyon, and in a more general way for the advancement of research in education.

The French context

The research team involved in the FaSMEd project has been working for several years on the integration of technology in teaching and classroom practices. The FaSMEd project has been an occasion to combine the research about formative assessment with this focus on technology.

In particular, the team is responsible for the "Intervention Cases" work package (WP4). Its focus is interventions with teachers and students to implement formative assessment lessons with technology.

Different schools at different levels are involved in the FaSMEd project: from grade 4 to grade 10. This wide range allows us to account for the particularity of the French educational system and the possibilities for pupils to make course choices late. More precisely, at the end of grade 9 they have to choose between professional and classical studies and at the end of grade 10 they have the choice between economics, literature, languages and science. Furthermore, the majority of the French classrooms participating in the FaSMEd project are from primary and lower secondary schools, because difficulties in mathematics and in science may occur in the early years of education.

15 pairs of teachers are working in Mathematics, in Science and in Mathematics and Science in the sense that some teachers are collaborating to create learning sequences around a common topic (i.e., magnitudes and measure) and, in some cases, they co-animate lessons sharing common language, notation and tools.


All teachers are using connected classroom technologies in their classrooms: they work either with tablets or with student response systems and/or work here with an interactive whiteboard (IWB).

Case studies around the time-distance activity

Two of the different intervention cases in the schools have implemented the time-distance activity with different goals in Mathematics (grade 9) or in Mathematics and Science (grade 7). Teachers have implemented and adapted this activity following their own creativity and passion.

In the grade 9 classroom, the teacher has explored all the possibilities of a network of tablets:

- to collect information about students' knowledge;
- to share students' productions using the interactive whiteboard;
- to feed the debate with the classroom and to provide feedback to students.

Students, working in groups, have benefited from different interactive environments, including their tablet and the interactive whiteboard:

- to consult and to solve tasks;
- to switch between different representations of mathematical objects;
- to share their work with their peers as well as with the teacher.


In the grade 7 classroom, the two teachers have adapted the time-distance activity in order to fit their objectives in mathematics and in physics. They have taken advantage of the graph as a boundary object to design and implement a learning sequence between mathematics and science, starting from the physical experience of water solidification, they have profited from a student response system to talk information of:

- students' understanding of the experience as well as the graphical representation of the temperature as a function of time;
- students' ability to switch to another context of graph interpretation in mathematics.

From this information, teachers have detected students' difficulties with the graph interpretation both in mathematics and in science to treat them together, providing feedback to each student.


As a conclusion, we give the floor to one of the involved teachers: *"Before FaSMEd, for me formative assessment was just oral interrogations expecting to detect which students were lost. Now, formative assessment for me is an occasion to know where the students are, to give them feedback and to modify my teaching according to students' understandings"*.

FaSMEd NEWSLETTER

Issue 9 **31st March 2016**

Welcome to our ninth issue of the FaSMEd newsletter. This issue includes news and updates from across the project.

Student Voice: using comics to reflect on maths learning in the FaSMEd project

'Comics Boss' Lydia Wysocki (Applied Comics Ltd; http://www.lydiawysocki.com/) worked with FaSMEd to run a lunchtime comics club at George Stephenson High School, helping students age 12-13 to make comics as a way to reflect on their new-style science and maths lessons. There were the fastest comics workshops we've ever done: 35minutes a week, including lunch! The students' comics are fantastic and the comic is now in the process of being put together and published. We're looking forward to sharing the finished comics in 2016.

FaSMEd partner news from Germany

After cycles of testing and redeveloping, the German FaSMEd team is proud to present a first running draft of a digital tool for formative self-assessment. The tool uses the software TI Inspire Navigator and gives students the opportunity to explore the mathematical content of functions. Thereby, they adopt the role of the assessor themselves, which is more than deciding if a solution is right or wrong. It encourages learners to question their thinking, giving self-feedback and use metacognitive strategies.

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FaSMEd Project Consortium meeting in Cape Town

February 2016

It is difficult to believe that the FaSMEd project is now two years old. In February 2016, we held our consortium meeting in Cape Town in South Africa, wonderfully hosted by our South African partners at AIMSSEC. AIMSSEC is an initiative of the African Institute for Mathematical Sciences (AIMS), a centre for education and research based in Muizenberg, Cape Town. Established in 2003 as a partnership project with Cambridge, Cape Town, Oxford, Paris Sud XI, Stellenbosch, and Western Cape Universities, AIMS promotes mathematics and science in Africa, recruits and trains talented students and teachers and works to build capacity for African initiatives in education, research, and technology.

This was a significant meeting as we reflected on particular Work Packages and how we take our work forward in the final year. In recent months each partner has completed a huge body of work – our case studies – which are an essential and very fruitful source of data from our interventions. This was our first opportunity to share our case studies and initial findings across all partners. We dedicated significant time to discussing the analysis of our interventions and case studies across our partner countries and agreed on a process for taking this forward.

The web-based toolkit

We were also able to present our latest (work in progress) version of the web-based toolkit. This is being designed by a local Newcastle-based graphic design company called Ready Salted. This company has a great deal of experience of working with the University and so the process of producing the website has been very straightforward.

Since returning from South Africa David Wright has met with the designers again to ensure that the suggestions for improvements to the design proposed by the partners will be enacted.

School visits

One of the highlights of the programme was our visits to some of the schools that our South African partners have been working with during the FaSMEd project. Our AIMSSEC partners organised for us to visit three different (and contrasting) schools in the area, and each school visit took place in the morning and then we returned to Muizenberg for our meetings. The school visits were both inspiring and thought-provoking, and illustrated the differences of the schools, and schooling, compared to some of our partner schools. Our inclusion of a South African partner has always been prompted by the fact that there are such obvious differences and that we can learn from this, and our visits really brought this to life for all our partners.

Invigorated by the beautiful country and location, we returned to our particular countries with renewed vigour and a fresh perspective.

FaSMEd Project Developments ...

FaSMEd filming: Ruth Marshall from MLM Learning Design keeps us up-to-date

It has been a pleasure liaising with different team members and partners across the project, to gather material for the video outputs. Our aim is to capture an essential witness to the activity of the project and to provide a legacy, in video, that not only celebrates the work of the project, but also delivers video sequences that will fuel discussions and have a place in teachers' professional development – and, where appropriate, initial training. In doing this, we have been privileged to have been invited into a diverse range of classrooms.

Ireland. Julian travelled to Maynooth, Ireland in October 2015 to record at three very different schools. The visit gave Julian an excellent opportunity to capture video of students using technology while trying some of the FaSMEd mathematics and science tasks, along with some valuable interviews with teachers, students and the Maynooth University team. We were encouraged not solely in pupils' engagement with the tasks, but also their willingness to perceive themselves as collaborators in gaining a better understanding of their own learning. We are very grateful to Majella and Mairéad for their welcome and for organising the visits, and also to staff and pupils of [illegible], [illegible] Community College and Maynooth Community College.

South Africa. Meanwhile, Marie and Ingrid at the African Institute for Mathematical Sciences (AIMSSEC) have been busy capturing a range of evidence on video from numerous settings, reflecting the enthusiasm, energy and commitment of their teachers. We are grateful to Marie and Ingrid for not only sharing much of this with us, but also for gathering a record of the consortium conference in February. We are now enjoying looking through the recordings to gain insights into partners' thinking now that we are towards the end of the project.

Germany. Julian is looking forward to travelling to Essen in April, to capture something of the reasoning behind the design of some of the classroom tasks on evaporation. We send our thanks to Philip, Raphael and colleagues from the University of Duisburg-Essen for helping to set this filming up and for corralling us all into a workable schedule. Julian looks forward to meeting the team after the Easter break.

Outcomes. What we've seen so far, is not simply the industrious gathering of research data, but teachers and students who are excited by their involvement in the project. The interest of researchers has encouraged teachers and schools not only to consider the technologies, but also to reflect more deeply on teaching and learning, and the contribution pupils can bring to the process.

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FaSMEd

FaSMEd NEWSLETTER

Issue 10 30th June 2016

FaSMEd

Welcome to our tenth issue of the FaSMEd newsletter. This issue includes news and updates from across the project

This issue was produced by Newcastle University, UK

The new FaSMEd project website

A major strand in the dissemination of the outcomes of FaSMEd will be our website. It will provide a legacy of the story of the project, resources for teachers and information for researchers. The final structure for the website was agreed by a working party at our conference in South Africa. Newcastle University have arranged for it to be hosted on its servers, provided the template for the website in collaboration with the design team at 'Readyfuse' and registered the new name for it: www.fasmed.eu.

Our colleagues in Essen, South Africa and Utrecht will be focusing on the development of the website and collecting the materials which will go to make up the most important feature of it – ***the teachers' toolkit.***

The website is adapted to work equally well on PCs, tablets and phones. There are still 'dummy' pages without any content, but we aim to ensure that it will be finished for the final FaSMEd conference in November in Maynooth, Ireland. Please do have a look and tell us what you think of it so far – any feedback would be very welcome.

David Wright, Jill Clark and Ulrike Thomas,
The Newcastle University Team

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The Role of technology in promoting formative assessment practices in science classes

Gilles Aldon École Normale Supérieure de Lyon, France and and Majella Dempsey Maynooth University, Ireland

Gilles and Majella presented findings from the FaSMEd project in France and Ireland at the New Perspectives in Science Education Conference 2016.

The paper reported on two case studies, one in France and one in Ireland carried out as part of FaSMEd, on the use of technology in formative assessment (FA) classroom practices in mathematics and science. The paper focuses on the role and impact of technology in supporting FA practices in science teaching and learning. The process in this research consisted of a cycle of design, implementation and analysis with teachers, where activities were planned in professional development sessions, carried out by teachers in classrooms and reviewed in meetings both with other teachers and individually. Work with teachers and students centred on exploring and modifying FA practices. Data for the research were collected using the following methods: semi-structured interviews with all teachers (before and after the implementation of a lesson); semi-structured interviews with students with an emphasis on a Q-Sort activity, analysis of video data and field notes from classroom observations; and questionnaires distributed to all students participating in the study regarding their views of science teaching, learning and assessment.

The research work within the project has led to the elaboration of a three-dimensional model taking into account the FA strategies, the properties of technologies and the role of actors. This model has been used for lesson analysis and completes the variety of viewpoints coming from qualitative interviews analysed using MAXQDA software. Q-Sort data was analysed using PQMethod software, video data using a whole-to-part inductive approach and the questionnaire data analysed using SPSS. Technology helped teachers to enrol in a complete FA process instead of considering some moments, enhancing their understanding of the process. The model used in this research highlights not only the role of the teacher in FA but also the role of peers and the students. Several of the class activities resulted in shifting ownership and agency towards students thereby activating them as the owners of their own learning.

Conference paper available here:
http://conference.pixel-online.net/NPSE/files/npse/ed0005/FP/2134-NTST1908-FP-NPSE5.pdf

The team at Newcastle University trial an innovative research method in order to find out what the students thought of FaSMEd: Comics

Research at its very best is all about trying out new ideas and the team at Newcastle University have been trialling an innovative approach to eliciting the views of students who take part in research projects. Over a period of 4 months eight students, who had taken part in FaSMEd maths lessons, worked with the Newcastle team and Lydia Wysocki, researcher and founder of Applied Comics etc. During weekly lunchtime sessions the students learnt about comic making and then used this knowledge to create their own individual comic strip. They were asked to choose an aspect of their FaSMEd maths lessons that they had found interesting and enjoyable and use this as the focus for their work. The final comic strips were then put together in one comic which also included contextualising information i.e. examples of the maths activities, images of the comic making process as well as quotes from the students about their views of the FaSMEd activities.

On Tuesday 21st June 2016 the printed comics were presented to the students, then maths teacher Jen Hanlon and the Deputy Head Teacher Tracey Anderson. The delight and pride of the students at seeing their work published was clear to see and they all took the opportunity to take home several copies to show their families.

Katie has already been busy considering the efficacy of using comic making as a research method and used evidence from the FaSMEd project in her presentation at a recent conference organised by the British Consortium of Comics Scholars, which took place at the University of Sussex on 4th June 2016. Her presentation had the title:

'Setting boundaries, communicating, and reflecting: 4 projects using comics as a method'

Slides and photos are linked online here:

http://www.applied-comics.com/we-should-talk/portfolio-rate/events/

FaSMEd Project Developments ...

News from the team at Ecole Normale Supérieure de Lyon, France

The ENS team is working with all the teachers involved in the project to find out some general results on formative assessment practices with technology, to provide advice from the specific implemented experiments. Teachers and researchers are formulating together some general advice, suggestions, recommendations for effectively doing formative assessment in the classroom and using technology to this purpose. Throughout this phase of the work the professional development of the teachers involved in the project is arranging along with their awareness of the intrapositive reflection and deep modifications that implementing FA with technology has triggered on their practices. Some insights on a first evaluation of practices are provided in the article titled "Does teachers' online short formative assessment practice affect digital tools' use inside and at the classroom" that has been recently published by the journal "Digital Experiences in Mathematics Education".

Teachers and researchers' reflections on this subject will constitute an important part of the finalization of the [redacted] which is still in progress but already full of material coming from the teaching experiences. The French FaSMEd experiences will be presented this summer in Hamburg at the ICME conference.

FaSMEd partner news from South Africa

The South African team has been working on revising some of the materials that developed for the classroom intervention. We have added some of the teachers to our three-strand materials and will be publishing about the design process.

We offered all the schools which had been involved in the intervention a workshop on FaSMEd and formative assessment, tailored to their interests and needs. A number of schools have already taken up the offer, and others are still to let us know.

In terms of further dissemination, we have been writing about our research and contributing to SAAME and AMESEC newsletters. We gave a seminar at the University of Bristol and have plans for seminars at a number of South African Universities. We have presented FASMEd workshops at the conference for the Association for Mathematics Education of South Africa which took take place in June 2016.

Daily in July one of our researchers, Ingrid Mostert, will be visiting Essen in Germany to work on the module with our German partners. Later in July we will be taking part in the ICTMA and ICME conferences in Hamburg.

Exploring a FaSMEd activity at Vosloorus Secondary School

Ingrid working with the teachers at Vaaldendal College

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FaSMEd Project Developments ...

A valuable exchange of ideas

Ingrid Mostert is the junior researcher on the FaSMEd project in South Africa. She was invited to visit the German team in Essen, and went there for two weeks in early July. During this time she worked intensively with the team, most particularly Hana Ruchniewicz, the junior researcher on that team. The focus of their work was on developing the FaSMEd toolkit, concentrating on the section entitled 'Formative Assessment', which they restructured to include four subsections: 1) Principles 2) Formative Assessment and Technology 3) The FaSMEd Framework and 4) Glossary. They populated most of these four subsections during the two weeks. Ingrid took part in many of the departmental activities, such as research seminars, team meetings and even a dissertation defence.

In August, Hana visited AIMSSEC for two weeks. She worked closely with Marie Joubert and Ingrid, and this time the work again focused on the toolkit, mainly the sections on professional development and the tools for classroom use. Five of the six professional development modules were finalised and important decisions were made about the sixth, which is still work-in-progress. They together decided that the previous proposed organisation of the tools would not work well, and prepared a different organisation. This process allowed them to see with much more clarity what still needed to be done and what each partner in the consortium still needed to contribute.

For FaSMEd, both these visits were important: the face-to-face working meant that discussions about important toolkit decisions were relatively straightforward and decisions could be made on the spot. Hana estimated that at least a hundred emails, and much delay, were avoided! In consequence, important areas of the toolkit were almost fully developed. For Hana and Ingrid, the visits were important in a myriad of different ways, such as learning about different educational contexts, understanding about how the two organisations work, developing networks and cementing their own professional (and personal) relationships.

Ingrid reported: 'It was really worthwhile. I learnt so much, not just about FaSMEd and the way the German team works, but also about the value of being part of a whole team of academics interested in a variety of areas of mathematics education.'

Hana reported: 'Our work in Germany focused on the development of a digital tool and so we didn't get to spend a lot of time in schools. I therefore enjoyed seeing how closely the South African team worked with teachers in the large variety of contexts in the country's school system.'

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FaSMEd NEWSLETTER

Issue 11 **30th September 2016**

Welcome to our eleventh issue of the FaSMEd newsletter. This issue includes news and updates from across the project and details about our upcoming International Conference and Final Meeting.

Produced by Newcastle University, UK

FaSMEd at the 13th International Congress on Mathematical Education

From 24th July to 31st July, the 13th International Congress on Mathematical Education 2016 (ICME) took place in Hamburg, Germany. The ICME is an international congress, attended by scholars and practitioners from all over the world, and held once every four years. This year, the FaSMEd project was well-represented in the conference programme. FaSMEd was discussed in no less than five different Topic Study Groups, each focusing on a specific aspect of mathematics education.

In Topic Study Group 42, which centred around the use of technology in lower secondary school, three presentations were held about FaSMEd: a presentation on the role of technology in formative assessment by Gilles Aldon, a presentation about the development of a digital tool for formative self-assessment by Hana Ruchniewicz, and a presentation about the outcomes of an experiment using a digital assessment environment for formative assessment by Ilona Fitor-van den Bos.

Two presentations about FaSMEd were held in Topic Study Group 40, which focused on classroom assessment. David Wright gave a presentation on design for formative assessment, and Annalisa Cusi gave a presentation on the use of digital technologies to enhance formative assessment processes.

Marie Joubert was in TSG 36, about task design, and presented on the use of learning experiences and implications for a teacher toolkit. Moreover, Ingrid Mostert presented about what teachers learnt from designing lesson plans in Topic Study Group 50, which was about professional development for secondary teachers. Finally, Hana Ruchniewicz gave a presentation about the German tool for self-assessment in graphs in the TS discussion group.

All in all, the FaSMEd project has received ample attention at the ICME conference, and people's awareness of the project and its aims is increasing. As David Wright stated: 'So many people have now started saying to me: "So what is FaSMEd about?"'.

FaSMEd paper wins award at the British Educational Research Association conference

At the University of Nottingham, work has continued on further analysis and dissemination. Diane recently presented two papers, based on different aspects of Fasmed, at the British Education Research Association conference (BERA) in Leeds. Her paper on 'Enhancing formative assessment with digital technology' was particularly well received, winning a special commendation and being judged runner up best EdTech paper of the conference.

The project FaSMEd has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 612337.

FaSMEd International Conference

1st November 2016
Maynooth University, Ireland

We are delighted to announce that the FaSMEd Project will be holding an International Conference in Maynooth, Ireland, to disseminate outcomes of the project. We look forward to welcoming delegates from academia, policy and practice. For programme details and to secure a place at this event please see below:

8.30	Registration
9.00	Keynote: Dr Alison Clark-Wilson The FaSMEd project and the wider context
9.30	4 Case Study Presentations
10.30	Refreshments and Poster Session
11.00	3 Case Study Presentations
11.45	Comfort break
12.00	2 Case Study Presentations
12.30	Posters and Q & A Session
13.00	Lunch
14.00	FaSMEd Film
14.15	Cross Comparison of Case Studies
15.00	Refreshments
15.15	Cross Comparison of Countries
16.00	Introduction of the FaSMEd Toolkit website
17.00	Finish

To attend, please register at: http://bit.ly/2cOdBnV

Registration will remain open until all places are allocated. The event is free of charge.
For further information about the event please email: [illegible]
For further information about the project please see [illegible] or email [illegible]

FaSMEd Final Meeting

2nd November 2016
Maynooth University, Ireland

As we reach the end of our three year project, this final meeting will bring together project partners with invited experts from academia, policy and practice to discuss in detail the future implications of the FaSMEd project.

9.00	Coffee and Welcome
9.30	The FaSMEd toolkit: reflections and next steps
10.30	Refreshments
11.00	Parallel symposia on FaSMEd and Policy: Formative Assessment in Mathematics/Science
12.30	Lunch
1.30	Symposium on FaSMEd and Policy: Formative Assessment using Technology
15.00	Refreshments
15.30	FaSMEd Panel Q & A: Next steps
17.00	Finish

To attend, please register at: http://bit.ly/2cOdBnV

Registration will remain open until all places are allocated.
For further information about the event please email: [illegible]
For further information about the project please see [illegible] or email [illegible]

FaSMEd International Conference and Final Meeting, Maynooth University, Ireland.

The FaSMEd partners, members of the Strategic Advisory Committee and Evaluators met together with invited guests from research, policy and practice for the FaSMEd International Conference on the 1st November 2016. This was an opportunity to share many of the outcomes of the FaSMEd project, including research findings from the partners case studies as well as the FaSMEd Film and FaSMEd Toolkit website (www.fasmed.eu). Each partner produced a research poster and these were displayed and used as a focus of discussion throughout the conference (copies of these posters can be downloaded at: https://research.ncl.ac.uk/fasmed/deliverables/).

The FaSMEd Final Meeting on the 2nd November brought together again consortium members and key invited guests, representing a significant international academic community of experience, expertise and practice in science and mathematics education with specific knowledge of digital technologies and Formative Assessment. The meeting was designed to facilitate discussions around raising achievement in mathematics and science education with a focus on implications for future research and policies and our final deliverables due at the end of the project.

At the end of the day we also took the opportunity to celebrate the achievements of FaSMEd and the extremely productive working relationships we have established with each other and with our teachers and students in schools over the life of the project - a big thank you to all those involved!

For further information please see: [illegible]
Our Facebook page: [illegible]
Follow us on Twitter @ FaSMEdProject
Or email: [illegible]

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FaSMEd NEWSLETTER

Raising Achievement through Formative Assessment in Science and Mathematics Education

Issue 12 16th December 2016

Welcome to our twelfth and final issue of the FaSMEd newsletter. This issue includes final news and updates from the project and provides information about of FaSMEd Toolkit and Professional Development package now available online.

Produced by Newcastle University, UK

Newcastle (UK) teachers meet to discuss the impact of FaSMEd

Teachers from the two Newcastle case study schools met with researchers to discuss the impact of FaSMEd in their schools one year after the end of the intervention phase of the project.

Despite the ever increasing pressure on schools to engage with a multitude of agendas, leading to what has been termed 'initiative overload', teachers remained committed to those practices they found most beneficial in their classrooms.

In one school, the practice of using pre-assessment tasks has been rolled out throughout the mathematics department and is now a part of standard practice. A teacher commented "Its now just what everyone does and that's because of FaSMEd".

The head of department from another school commented that at his school they could see the potential of using FaSMEd lessons with students from Year 7 as a grounding in problem solving tasks. This is particularly important in the UK context as the mathematics GCSE curriculum now requires many of these skills.

FaSMEd @ AIMSSEC winds down

The AIMSSEC team has been busy making sure that the legacy of FaSMEd lives on in South Africa. We have made sure that all the teachers who were involved in the project know about the international Toolkit and that our own tools have been added to the AIMSSEC Aiming High network. This network is the 'go-to' place for many of the South African teachers who know about the work of AIMSSEC. It provides access to teachers' notes and learning activities that are designed to engage teachers and learners in thinking mathematically, and is an ideal home for the lessons we used in the intervention phase of the project.

FaSMEd findings disseminated at Educating the Educators conference, Freiburg (Germany)

FaSMEd partners from Nottingham University (UK) and the Norwegian University of Science and Technology (Norway) presented FaSMEd case study findings at the Educating the Educators conference in November 2016. This conference was hosted by fellow European project mascil and was focused upon international approaches to scaling-up professional development in maths and science education.

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The FaSMEd Toolkit and Professional Development Package

www.fasmed.eu

FaSMEd has developed a toolkit to support teachers as well as teacher educators, stake-holders and other interested parties in using technology for formative assessment in mathematics and science education. This can be accessed at: www.fasmed.eu

The website is primarily in English but you will also find materials in all partner languages (English, German, Italian, French, Norwegian and Dutch) under the heading "Tools for Formative Assessment". Furthermore, links to country specific versions of the FaSMEd toolkit (French and Norwegian) are provided.

The FaSMEd Toolkit homepage gives an overview of the project, along with an introductory short film that includes various discussions between researchers and teachers, scenes from FaSMEd project meetings, lessons, classroom discussions, the use of different technologies and tools as well as interviews. Please take a look!

The FaSMEd Toolkit includes the following sub-sections:

How to use the toolkit. There is a dedicated section of the toolkit that provides guidance on how to use the website. It shows a 'map' of the toolkit's sections (shown above) and explains how to enter the different subsections. Furthermore, short descriptions, aims and advice on what is in each section and who it is for are given. A short introduction is given here:

Formative assessment. This section draws on theory and research related to formative assessment. It outlines FaSMEd's understanding of what formative assessment is, and in particular, how technology can be used within formative assessment. In addition, the theoretical FaSMEd framework is explained as a way to characterise and analyse technology enhanced formative assessment processes. Read this section if you are interested in background research related to formative assessment.

Tools for formative assessment. This section is aimed at teachers and includes ideas for classroom activities, in the form of lesson plans or lesson accounts. These are organised within three overarching categories: mathematics, science and time-distance graphs (which presents all partners' adaptations of a particular lesson). Each tool consists of a teacher guide and mostly also downloadable classroom materials.

Professional development. This section contains the FaSMEd professional development (PD) package. It includes a set of six professional development modules (see below) designed to help teachers use formative assessment more effectively in their classrooms. The resources also include a theoretical section on principles for effective PD and a practical section on ways in which professional development can be organised. This section is meant to be used by teacher educators of mathematics and science but can also be used by teachers either individually or working with peers.

There are six modules available:

- Module 1: Introducing formative assessment
- Module 2: Using students' mistakes to promote learning
- Module 3: Improving questioning
- Module 4: Improving student collaboration
- Module 5: Students becoming assessors
- Module 6: Using technology for formative assessment

Research. This section explains FaSMEd's research approach and provides links to downloadable files reporting on our research results. Further links to published work emanating from FaSMEd work are given. Brief information about some related EU projects is provided in the sub-page with that name.

About. Here we explain more about the project and the partners.