



## Engaged Research Case Study Template

### Education

<b>Project title</b>	Teaching Enquiry with Mysteries Incorporated
<p><b>Project synopsis (100 words max)</b> Please give a very short description of the societal challenge, the action taken, and the intended/ achieved result.</p> <p><b>Societal Challenge (50 words max)</b></p> <p><b>Project Synopsis (200 words max)</b></p>	<p>TEMI was an FP7 Science and Society project, which aimed to work with schools across Europe to develop and implement innovative continuous professional development programmes that assist teachers in using enquiry to teach science, in order to tackle “the alarming decline in young people’s interest for key science studies and mathematics”.</p> <p>Science teachers across Europe were supported in developing new teaching methods using mysteries or unexplained events, which, in turn, provided a platform for teachers to improve their ability to capture the attention of their students and motivate them to study science. The project equipped teachers with new resources and methods to teach STEM subjects (science, technology, engineering and mathematics) using a mystery as the starting point. The idea is to use mysteries or discrepant events to arouse student interest, motivate students to inquire and develop scientific explanations, and science enquiry skills. The project involved 13 partners in 11 countries, with the University of Limerick (UL) as the Irish partner. One of the unique aspects of the UL team’s contribution was the involvement of pre-service science teachers (PSSTs) in the project. The UL team worked closely with a number of PSSTs, in preparing for the teacher workshops. 11 PSSTs were involved in three rounds of development from 2013-2016. The PSSTs have developed TEMI classroom materials for the project as part of their Final Year Research Projects (FYRP) through a Participatory Action Research (PAR) Framework. The UL TEMI team now have a bank of over 30 developed, trialled and evaluated TEMI lessons.</p>
<b>Higher Education Institution:</b>	University of Limerick
<b>Engaged Research Partners</b> (civic, civil society organisations, Social enterprises, public or professional service or product users, policy makers, members of the public).	Post-primary schools across Ireland and Europe CERN European Space Agency Scientix Science on Stage Europe
<b>Engagement (research method or activity) (100 words max)</b>	<p>Participatory Action Research carried out between the UL team, PSSTs and In-service Science Teachers (ISSTs), involving co-design and co-production, and with implementation by the PSSTs and ISSTs.</p> <p>The TEMI approach is based on using 4 innovations, integrated in a structured way into the CPD workshops. The four innovations are:</p>



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	<p>a) The use of mysteries or discrepant events to engage students in science;</p> <p>b) The use of the 5E learning model to structure inquiry-based science education (IBSE);</p> <p>c) The use of showmanship to sustain student engagement;</p> <p>d) The use of the Gradual Release of Responsibility (GRR) model to embed inquiry in a student’s experience of science.</p> <p>The Irish team, based at the University of Limerick, ran a series of workshops over the course of the project for six cohorts of ISSTs, and a number of PSSTs. Each cohort of teachers was involved in two workshops, separated by 8-10 weeks. In the first workshop, teachers were introduced to the TEMI idea, and given examples of how mysteries can be used to introduce science topics. The teacher’s prior experience of inquiry was explored through group discussion and they were introduced to the 5E model of inquiry. Working in small group comprising ISSTs, PSSTs and members of the UL TEMI team, teachers were encouraged to develop their own TEMI lessons starting from a mystery and linked to a topic in the junior cycle science curriculum. Finally, teachers were introduced to the Community of Practice and signed up to an on-line forum for sharing resources and ideas.</p>
<p><b>Project outputs and outcomes: (600 words max)</b></p> <p>Please describe briefly the target audience and activities that occurred and short terms results.</p> <p>This information could include:</p> <ul style="list-style-type: none"> <li>• who you worked with;</li> <li>• issue to be addressed</li> <li>• what actions you took;</li> <li>• the geographical location;</li> <li>• any shorter-term outcomes or changes in local situation and circumstances, knowledge and skills attitudes or behaviour, policy, practice, organisational development etc, decision-making.</li> </ul>	<p>The outputs are as follows:</p> <ul style="list-style-type: none"> <li>• TEMI delivered 58 CPD courses (cohorts) in 11 countries, which amounts to 958 teachers recruited and trained over 1371 hours in 183 workshops.</li> <li>• In Ireland, 64 teachers were trained in six cohorts. A further 383 teachers were trained through a shortened adapted CPD course in partnership with the Irish Science Teachers Association and the Professional Development Service for Teachers.</li> <li>• Irish teachers were given access to a bank of TEMI lessons developed in Ireland by team members, PSSTs and previous ISSTs from earlier cohorts. This bank of TEMI lessons has been added to over the course of the project and over 100 lessons are available, including three full eight-week Transition Year modules.</li> <li>• Peer reviewed journal articles, conference participation and associated media coverage.</li> <li>• Other outputs include Teaching the TEMI way: how using mysteries support science learning a booklet describing in an easy format the TEMI methodology and the TEMI Book of Science Mysteries which provides 30 lessons plans deploying the methodology (<a href="http://projecttemi.eu/en/classroom/?guide=1">http://projecttemi.eu/en/classroom/?guide=1</a>) and the TEMI</li> </ul>



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	<p>book of mysteries (<a href="http://projecttemi.eu/en/book-of-mysteries/">http://projecttemi.eu/en/book-of-mysteries/</a>).</p> <ul style="list-style-type: none"> <li>• TEMI produced Light Mystery: A script with added comments, a resource for schools and theatre companies. The play explores the world of physics to trigger wonder and curiosity.</li> <li>• A TEMI app was also developed. It contains 15 mysteries and offers teachers and students with an extra resource to investigate mysteries from smartphones (<a href="http://projecttemi.eu/en/classroom/?mom=1">http://projecttemi.eu/en/classroom/?mom=1</a>).</li> </ul> <p>The outcomes are as follows:</p> <ul style="list-style-type: none"> <li>• The participants reported a high level of satisfaction with the project. 90% of teachers who participated in the programme estimated that the CPD aided them in tackling aspects of the curricula; specifically in the areas of relevance, clarity and applicability. 80% of teachers applied the TEMI lessons. 81% of teachers noted that the TEMI approach increased their pupils' motivation.</li> <li>• Science was less popular in disadvantaged (DEIS) schools, with 62.5% not enjoying science, despite 75% of these pupils considering science to be important. 91.5% of DEIS pupils stated they were interested in science when presented in the TEMI fashion. These findings corroborate similar studies indicating that pupils and the wider public appreciate the importance and value of science but frequently do not view themselves as scientists or enjoy science.</li> </ul>
<p><b>Longer term anticipated areas for Impact (Choose from below):</b> Economic Policy &amp; Public Service Societal Engagement Health &amp; Wellbeing Professional services Environmental New knowledge Human Capacity</p>	<p>Professional and Public Services Capacity Building Policy and/or Product Development Societal Engagement</p>
<p><b>Funding source</b></p>	<p>European Commission</p>
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