Motivating young people to study MST: the role of digital learning resources

Dr. Àgueda Gras-Velázquez

26/03/2010
Network of 31 Ministries of Education in Europe

Support schools in bringing about the best use of technology in learning

Promote the European dimension in schools and education

Improve and raise the quality of education in Europe
EUN and ICT / MST projects
Inspire (Innovative Science Pedagogy in Research and Education).

**Purpose**: challenge the lack of interest of students to start scientific studies and more widely to extend the supply of scientific specialists and develop a scientific culture in European countries.

During 10 months Inspire gathered data to:

- **Observe** the impact of these new teaching methods on pupils and on their motivation.
- **Analyse** the pre-requisites to be defined for enabling teachers to integrate these new techniques in their pedagogy.
- **Identify** the critical success factors to be mastered at teacher and school level for the generalization of such practices.

**December 2007 – November 2009**
Inspire

LR = digital learning resources
Inspire

+ LR =
Inspire

+ LR = ?
Inspire methodology

http://inspire.eun.org

62 schools
5 countries
5 languages

questionnaires
list of LOs
how to use the LOs

Inspire – Motivating young people to study MST: the role of digital LR – Àgueda Gras-Velázquez

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EdReNe, 4th strategic seminar, Barcelona, March 24-26, 2010

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Learning resource

- Max. voltage: 10 V
- Max. amperage: 100 mA
- Increase resistance
- Reduce resistance
- Increase voltage
- Reduce voltage

U = 6.00 V
I = 0.0300 A
© W. Fendt 1997
Pilot schools

**Schools**

Number of schools per country

**Teachers**

<table>
<thead>
<tr>
<th>Country</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT</td>
<td>75</td>
</tr>
<tr>
<td>DE</td>
<td>63</td>
</tr>
<tr>
<td>LT</td>
<td>52</td>
</tr>
<tr>
<td>IT</td>
<td>21</td>
</tr>
<tr>
<td>ES</td>
<td>11</td>
</tr>
</tbody>
</table>

**Pupils**

<table>
<thead>
<tr>
<th>Country</th>
<th>Pupils</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT</td>
<td>1896</td>
</tr>
<tr>
<td>DE</td>
<td>1599</td>
</tr>
<tr>
<td>LT</td>
<td>1254</td>
</tr>
<tr>
<td>IT</td>
<td>692</td>
</tr>
<tr>
<td>ES</td>
<td>152</td>
</tr>
</tbody>
</table>

**Types of schools involved**

- Pre-school education (3-6 yrs)
- Primary Education (6-12 yrs)
- Secondary school
- Vocational Training
- Special Needs Education (SEN)

<table>
<thead>
<tr>
<th>Type</th>
<th>Countries</th>
<th>AT</th>
<th>DE</th>
<th>LT</th>
<th>IT</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-school education</td>
<td>11%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>Primary Education (6-12 yrs)</td>
<td>74%</td>
<td>5%</td>
<td>0%</td>
<td>11%</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>Secondary school</td>
<td>5%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>11%</td>
</tr>
</tbody>
</table>
Selection of LR

The LR were used 904 times

Conservation of Energy

Tarzan

Tarzan, represented by a blue ball, is swinging from a 55 meter massless vine. Air resistance is negligible.

We also show Tarzan’s weight $\vec{w}$, the force exerted on him by the tension of the vine $\vec{T}$, and the sum of these two forces $\vec{S}$.

$\vec{S} = \vec{T} + \vec{w}$

Click to pause:

Tension (in units of Tarzan’s weight): 1.00
### Selection criteria for the LR

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR concerns topic that is part of the normal MST curriculum</td>
<td>79%</td>
</tr>
<tr>
<td>LR took into account ICT expertise of teachers</td>
<td>76%</td>
</tr>
<tr>
<td>LR took into account ICT expertise of pupils</td>
<td>75%</td>
</tr>
<tr>
<td>LR clearly combines MST with ICT technology</td>
<td>71%</td>
</tr>
<tr>
<td>LR is based on an inquiry-based approach</td>
<td>60%</td>
</tr>
<tr>
<td>LR is based on a hands-on science approach</td>
<td>52%</td>
</tr>
<tr>
<td>LR develops creative learning environment</td>
<td>51%</td>
</tr>
<tr>
<td>A clear description of how to use LR is available</td>
<td>37%</td>
</tr>
<tr>
<td>Use of ICT is presented as example of good practice</td>
<td>33%</td>
</tr>
<tr>
<td>A clear description is available on how to introduce LR</td>
<td>14%</td>
</tr>
<tr>
<td>LR results from cooperation between schools</td>
<td>10%</td>
</tr>
<tr>
<td>LR has been used by other experienced teachers</td>
<td>9%</td>
</tr>
<tr>
<td>Description is backed up by action-research reports</td>
<td>7%</td>
</tr>
</tbody>
</table>
Results from teachers

Good!

- highest impact: autonomous learning of pupils.
- ¾ LR stimulated own interest and motivation for teaching MST.
- 2/3 noticed that the LR stimulated pupils’ interest and motivation for learning MST

Not so good...

- AT, DE, ES and IT: [en] → [local lang]
- ES + IT: problems with PC / Internet...
Results from students

- Allowed me to integrate better and to remember what I was learning
- Made it easier for me to understand and learn MST
- Made it easier to study by myself and at my own pace and speed
- Made it easier to better understand the use of ICT in general
- Stimulated my interest and motivation for MST
- Made it easier for me to understand the work of scientists and researchers
- Helped me evaluate critically the use of data and scientific methods
- Made it easier for me to link MST easier to my everyday life
- Improved the relations and the cooperation between the pupils in the classroom
- Develop my ability to use scientific methods
- Stimulated debate with fellow pupils about scientific issues
- Helped my clarify the choice of my profession for later life
Results from students

- Greater impact on boys than on girls;
- Impact decreases with the age, specially among female students (ICT survey);
- For virtually all items surveyed impact perceived by LT and ES (and IT) >> AT and DE;
- No real impact as far as the number of LR used.
Conclusions

Overall, use of LR:
• positive impact on MST education
• but, special attention has to be placed on:
  – technical requirements
  – localization of the LR
Further information

http://inspire.eun.org

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Gràcies - Thank you

Take a copy of the Inspire report!!