Las TIC y la investigación, modelos que hacen viables proyectos interdisciplinares e internacionales

ICT and Research: Elements That Enable Multidisciplinary and International Educational Models

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Topics in the presentation

- **IT AND ICT RESEARCH AND APPLICATION**
- **RESULTS FROM THE EXPERIENCE AND PROPOSAL OF A NEW MODEL FOR KNOWLEDGE CONSTRUCTION**
- **ANALYSIS OF A CASE STUDY AND CONCLUSION**
LAS TECNOLOGÍAS DE INFORMACIÓN Y COMUNICACIÓN AL SERVICIO DEL CIUDADANO


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The results from the above human studies show that

- IT, ICT and psycho-pedagogical theories influenced each other for:
  - the effects that the results of the experiences had on the human paradigms,
  - the growth of the presence and relevance of IT and ICT in every human activity

- There is the need for a unifying *knowledge theory* helping people in finding the best results for the integration of IT and ICT in traditional teaching-learning practices

**Description of some experiences the author carried out**
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Students’ errors become evident with the exponential growth in the number of topics and disciplines. They are usually identified with the difficulties students have in building the right knowledge (due to wrong ideas) and in applying it.

It has to be remarked what follows:

a) wrong ideas involve almost all domains of human knowledge (including IT and ICT)
b) they are reported in differently aged and skilled people (including teachers)
c) the distribution of wrong ideas all over the world is not influenced from geographic locations (no relevant differences were detected when passing from North to South, or from West to East).

IT and ICT can help in building special learning environments for helping students:

a) also if there is no certainty for the overcoming of the learning problems,
b) they can monitor teaching-learning processes and let teachers intervene soon
Web technologies and Communities of Learners and Practices

The cooperation with M. Palma, professor of Latin paleography, led to the creation of the following web sites:

- Teaching materials for paleography
- Women and written culture in the Middle Ages
- The Open Catalogue of the Manuscripts in the Malatestiana Library
- The BMB on line
Teaching materials for paleography

It is the only site directly made for teaching.

It has three sections:

a) Reproductions of the pages in ancient manuscripts written in the different handwriting styles
b) Transcriptions of the texts in the pages in section a
c) Works in progress, cooperatively made by professor and students

Reference site:
http://dida.let.unicas.it/links/didattica/palma/paldimat.html

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Women and written culture in the Middle Ages

It is an information system where two kinds of people have access to information:

- Scientific editors (management of data)
- General users (querying)

It is a dynamic web site interfaced with the database of women copyists who wrote ancient manuscripts and signed them.

Reference site: http://edu.let.unicas.it/womediev/
The Open Catalogue of Malatestiana Library

It is an information system like the former one. It is made of five sections. The more innovative is the forum where works in progress are activated on special manuscripts and documents can be shared among people having common interests.

Reference site: http://www.malatestiana.it/manoscritti/

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The BMB on line

It is an information system where three different kind of people can access:
- scientific administrators (editors)
- drawers, compilers of the bibliographical cards,
- general users (querying the database of bibliographies)

Reference site: http://edu.let.unicas.it/bmb/

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Results from the introduction of the above sites in everyday teaching => students’ side

The sites (i.e., the information systems), were constructivist learning environments, helped students in developing cognitive apprenticeship strategies and, what’s more, highly contributed in improving students’ learning and performances.

The students involved in the teaching-learning experiences showed all the features of the communities of learners; this phenomenon, as reported from lecturers and professors who used the sites, was observed the first time with respect to traditional former courses.

The same students showed new skills never detected in traditional paleography courses: a) they worked in a group more easily than the colleagues, b) they easier faced complex tasks and c) they enhanced their peculiarities within the community.
Results from the introduction of the above sites in everyday teaching => communities’ side

Every group, i.e. the students, the scholars and the researchers working on a given system, made a community of practice (CoP), as defined from E. Wenger (1998, 2004).

The systems implemented the practices of the communities as they were suggested from the researchers, when the software was planned and carried out; they also forced the students and all the people involved in their use to the respect of new times and procedures and, due to the presence of special communication instruments (forums, electronic blackboards etc.), they made easier the processes’ socialization.

The data and information collected in the databases of the sites expanded the community memory (Trentin, 2004) and could be shared with other people involved in the experience and with everyone who would like to query the data stored in the web sites.
Consequences for knowledge construction in communities

- Suitably planned on line information systems can induce the construction of communities of learners and of practices,
- the systems implement all or part of the implicit knowledge developed from people working on manuscripts (by means of the processes they manage),

- with respect to the SECI cycle by I. Nonaka and H. Takeuchi (1995), the experiences described before induce two relevant changes:
  a) they introduce the need for a new element “implementation of practices by means of the ICT”, in the management of community knowledge,
  b) they create the premises for the induction of new SECI cycles (before the use of the information systems there were no communities and no knowledge cycles)
A model for knowledge construction and development

**Individual’s perspective**
Knowledge is built in at least three different ways: a) autonomously (mostly constructively, by interacting with phenomena), b) by socially interacting with other individuals in a community, c) being an active part of the society they are immersed in.

**Knowledge perspective**
- **Individual knowledge**, is built by subjects while interacting with reality (and can be affected by errors, preconceptions or misconceptions),
- **Community knowledge**, is developed from communities in their entirety and is made of the signs, symbols and strategies shared in the community,
- **Society knowledge** (scientific knowledge?), is codified, evaluated and approved from a relevant number of individuals and communities
From a static model to a dynamic model for knowledge construction and development

The above scheme is adequate to describe knowledge phenomenon both at an individual level and at an abstract level, but it is inadequate to describe the influences and interconnections among the different elements it is made of, that is subject, community and society knowledge.

A better description for the influence that each section has on the others is obtained from a look at the single elements as separated from one another, without considering the overlapping and/or excluding features. By applying this criterion one can say that in a subject like in the more abstract knowledge theory, all knowledge elements interact among themselves.
Suggestions for the application of the model

The model reported above has interest by itself for the discussion on knowledge features at all levels (i.e., subject, community and society), but has further consequences when applied to the planning of ICT use in human activities. It states, in fact, a multi-level structure for knowledge description, so that all contributions must be adequately considered. Otherwise stated, personal learning, collaborative learning, interaction into communities and creation of publicly available information must be carefully planned to obtain the best results from subjects and communities and for the construction of socially accepted rules, behaviors and knowledge.

It has to be noted, on the contrary, that most part of the online activities usually do not involve all the knowledge elements and interactions described above but mostly one or two among them.

To help all stakeholders, including practitioners and developers, in better analyzing situations and planning interventions a socio-technical approach can be used.
The reviewed socio-technical approach

In the model on the right are still present the social and the technical sub-system. The Management Information System (MIS) acts on the technical sub-system (i.e., technology and tasks). The social sub-system is made on the contrary by three elements: subjects, community/ies and the whole social structure of the organization.
Case study: TETIS platform

The above model has been used to plan the introduction of the TETIS platform in everyday teaching. TETIS (Teaching Transparency Information System) is an information system aiming at implementing teaching-learning processes so that every actor of the educational activity can access his/her data and look at the evolution of his/her profile.

- users accessing the information system have different rights and powers,
- students’ personal data can be accessed only from students and their families,
- the first step in system use is the input of data concerning students, families, teachers, school and learning units; soon after teachers can record data on the planning and carrying out of their work and students’ personal study programs, presences and assessments,
- people can communicate by means of at least the following instruments:
  - one forum for every class which is only devoted to teachers,
  - one forum for every class where teachers, students and family can interact,
  - one forum for every discipline where teachers can discuss among themselves.
Data flow and levels of interaction

Levels for knowledge construction:

**individual**: everyone builds his/her personal knowledge while accessing the section he/she is allowed for,

**community**: teachers in a class, teachers of the same discipline, all the people in a class are communities which create information by working on the system,

**society**: general information on the schools in the TETIS platform and on their activities can be accessed by using special query functions
Use of the platform and results from a questionnaire

TETIS platform has been used in a Master course for teachers (in service or temporarily employed), for simulating everyday work by means of an information system. Some people attending the course (50 persons) has been invited to answer the questions in the survey on the right at the end of the course. The high percentage of positive answers is encouraging also if most part of the work has still to be done (the system has to be tested in a real context).

<table>
<thead>
<tr>
<th>Questions</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Is the planning of the teaching work as supported from TETIS coherent and complete?</td>
<td>98,1 1,2</td>
</tr>
<tr>
<td>Is the work with the platform TETIS easy enough to manage?</td>
<td>94,4 5,6</td>
</tr>
<tr>
<td>Do the information in the platform completely describe teachers’ work?</td>
<td>87,0 13,0</td>
</tr>
<tr>
<td>Do the information in the platform adequately describe students’ behaviors and performances?</td>
<td>75,9 24,1</td>
</tr>
<tr>
<td>Do TETIS platform lead teachers to better programming their work and to obtain better results?</td>
<td>94,4 5,6</td>
</tr>
<tr>
<td>Do TETIS platform make easier for teachers the customization of student’s teaching-learning phenomena?</td>
<td>92,6 7,4</td>
</tr>
<tr>
<td>Can TETIS platform improve the dialogue between the teacher and the students?</td>
<td>70,4 29,6</td>
</tr>
<tr>
<td>Can TETIS platform improve the dialogue among the teachers in the class?</td>
<td>90,7 9,3</td>
</tr>
<tr>
<td>Can TETIS platform improve the dialogue between the teacher and the student’s relations?</td>
<td>87,0 13,0</td>
</tr>
<tr>
<td>Can TETIS platform induce the creation of communities of practices?</td>
<td>90,7 9,3</td>
</tr>
</tbody>
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