E/M-LEARNING TOOLS IN THE INCLUSIVE CLASSROOM

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Abstract
ICT tools have already proved to be effective means to empower learning and to support education; more recently, new frontiers seem to be opened by the educational use of mobile technologies. A reflection is proposed on the central role that elm-learning tools nowadays play in mainstream classroom education. The specific learning activities that can be effectively supported by such tools are investigated and a tentative answer is given to the question regarding whether, to what extent and how the use of such new tools may affect classroom dynamics. Evidence is also provided that elm-learning tools may support the idea of "inclusive" classroom; they can, in fact, effectively contribute to the full inclusion of those students who, due to personal problems (namely health problems, family concerns, migration etc...) cannot regularly attend their classes.

Keywords
E-learning, M-learning, Inclusion, Students with disability, Distance education

1. INTRODUCTION
ICT provides powerful tools for supporting learning. As suggested in a recent report of BECTA [1], which analyses the impact of ICT on the schools sector across the United Kingdom "Evidence of the impact on learning and teaching indicates that, where the use of ICT is most effective in enhancing the learning experience, teachers have been able to integrate a number of technologies such as laptops, interactive whiteboards and the internet. Such combinations of hardware, software and connectivity allow them to develop innovative approaches to learning and teaching". As a matter of fact, recently, new frontiers seem to be opened also by the educational use of mobile technologies: a specific term "m-learning" has been created, which refers to those educational situations where mobile technologies are used.
"M-learning" can be considered part (see Fig.1) of the world of "e-learning", which refers to the use of technology for learning in a broad sense and encompasses educational processes carried out in compliance with different theoretical models, pursued using different educational methods and is, normally, based on activities that "take places via any electronic medium" [2].

Fig.1. Hierarchical representation of distance-learning, e-learning and m-learning

E-learning and m-learning are naturally suited to "Distance-learning" (Fig. 1) and, reasonably, e-learning tools and technologies (possibly including those for m-learning) are used in any educational process performed "at distance".

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A number of research studies focus on how to maximize the effectiveness of both e-learning and m-learning tools in the field of "Distance Education" [3, 4]. Most of the studies, when dealing with distance learning (or education), actually refer to "online courses" [5], that is those educational environments where all the actors (students, teachers, mentors, experts ...) meet and interact only at distance, supported by a wide variety of net facilities/tools. Distance learning tools are often identified with the tools embedded (or provided by) e-learning platforms, those internet-based environments specifically addressed to the management of a variety of educational activities through the delivery of integrated electronic educational contents [6].

This paper looks at the matter from a slightly different perspective; it proposes a reflection on the key role that e/m-learning tools may have in mainstream classroom education and investigates which learning activities that originate in a traditional, non-virtual, classroom setting can be effectively supported by such tools.

2. E/M-LEARNING TOOLS IN MAINSTREAM CLASSROOMS: HOW CAN THEY FOSTER INCLUSION?

Almost all the schools face the problem of giving adequate support and valuable learning opportunities to students with "special needs": those with intellectual or physical disabilities and learning impairments, those who are disaffected, "hard to reach" or even those who cannot attend school for personal or family/cultural reasons.

There are grounds for believing that students with a range of special education needs are helped, through the use of ICT, to overcome barriers to learning, thereby raising achievement, increasing self esteem and encouraging participation in group and class activities [7]; in addition, a number of studies report that ICT-supported distance education technologies offer promising solutions and may enhance the learning possibilities of students who, due to a variety of problems, cannot attend regularly their classes [8].

Can we go further and say that ICT technologies also foster the "inclusion" of students with disabilities or other special needs?

- The idea of "integration" of such students has been, in fact, gradually substituted by the stronger concept of their full "inclusion" in the classroom [9], according to the basic principle that "All students should have equal opportunity in education, regardless of their background or physical disabilities"[10].

Inclusion is seen as a global process of addressing and responding to the diversity of needs of all learners; it involves changes and modifications in educational contents, approaches, structures and strategies, with a common vision which covers all learners and with the conviction that it is the responsibility of the regular school system to educate all students with no distinction among them.

As said before, there is a growing awareness (or a grounded expectation?) that students with special needs, who have the right to expect the same standard of education as their schoolmates, can highly benefit by the use of ICT and that the process of inclusion itself can be fostered by the use of such means. In this perspective, full accessibility and high-quality interaction of ICT products, applications, and services are fundamental requirements for allowing students' inclusion [11], but what is not less important (may be more?) is the pedagogical idea/project underpinning the whole educational didactical process to be enacted.

In this view, the inclusion in mainstream classrooms of all students requires both a well structured planning of the educational activities to be performed and a very careful analysis of the means to be used at this end (with specific attention to ICT technologies).

The teacher, then, must be aware of which are exactly the new opportunities offered to students with special needs by distance learning services and tools. He, then, while developing his "inclusive" pedagogical plan, should have a clear idea of what are the learning objectives to be met, and of what are the concrete possibilities offered by the different services/tools at hand, considering both the main possible advantages and drawbacks resulting by their use.

Keeping aside the fact that ICT services and tools, are particularly useful in personalising learning, in that they offer new possibilities for actualizing individualised learning programmers and/or activities [12], from the point of view of those students who cannot attend their class with regularity, ICT newest technologies offer three main inclusion opportunities:

- The opportunity to communicate with all the other actors of the educational process (teachers, schoolmates, mentors etc.)
- The possibility to participate at distance to lessons and classroom events
- The chance to study, work and perform educational tasks, not in isolation but in cooperation with each others.
2.1. COMMUNICATE

Nowadays, the new frontiers opened by the Internet to interpersonal communication are worldwide considered a valuable resource in almost all the fields, including education.

In particular students whose lifestyles make regular attendance at school problematic, today, have a number of different possibilities to communicate each other, with schoolmates, with teachers (as well as with other students and teachers from abroad); the systematic use of these facilities, reasonably, enhances their learning possibilities and may also increase their overall school achievement [1].

There are many different internet services which allow them to communicate in order to exchange ideas, pose question and receive answers; a number of specific tools is also available at that end (in the field of e-tools, no complete overlapping between services and tools can be found, because the same service can be provided by a variety of different tools, e.g. the "instant messaging" service is available through different tools such as ICQ, MSN Messenger etc.).

Asynchronous services such as email and discussion forums provide students with the possibility to exchange messages and network files that is to exchange ideas and material such as texts, working sheets, tests etc... Synchronous services such as “chat rooms” and “instant massaging environments” add the possibility to do the same things in real time: they, in fact, support online direct interaction, thus allowing also the instantaneous reception of feedbacks/answers to opinions and questions but also to the work done.

Other specific services, based on email, allow students to join mailing lists where they may have the possibility to discuss around different topics, or to receive announcements, newsletters, or electronic publications.

Weblogs, which embody a specific kind of communication, are also increasingly being used in education. Many personal and classroom blogs have been recently created with explicit educational purposes and they have also been employed in case of blended education, that is the case where "conventional", in presence, offline, non-electronic based instruction happens to include online working, tutoring or mentoring services [13].

2.2. TAKE PART IN CLASSROOM ACTIVITIES

ICT tools and services offer a double sided opportunity for taking part in classroom activities: the opportunity to enter the classroom in a virtual way, in real time, and the opportunity to take out of the classroom learning material of any kind (text, videos, pictures, audio lessons etc...).

Podcasting and audio/video streaming facilities allow "distant" students to access and use, for educational purposes, both audio and video material coming from the classroom: they can benefit from teacher’s direct explanations, they can follow discussions and classroom events of any kind; what is more important, they can do that any time, on demand and connected to the net in the case of educational material made available through streaming, and wherever they like, without being connected to the net, in the case of educational material made available through podcasting.

Nevertheless, from the point of view of students with special needs, one of the most disruptive benefits coming from the introduction in the schools of services and tools for distance learning is the fact that students connected in audio or video (or even both) can participate to mainstream classroom activities: they can present in the classroom, attend the lessons in a virtual way, participate actively and make the others hear their "voice".

Videoconferencing, instant messaging and audio/video communication services can be considered powerful tools at this end.

To date, the need for broadband connectivity and appropriate technologies has strongly limited the use of videoconferencing systems in schools and, more generally, for educational purposes although researches conducted in specific fields indicate that a wide range of social and educational benefits can accrue from the use of this technology [14].

We assist, on the contrary, to an increasing educational use of those cheaper and widespread technologies that most students use also for leisure; it is the case of instant messaging, chats and also VOIP tools allowing audio/video calls on the internet. Using such tools "distant" students can follow the lessons, pose questions and interact from home (or elsewhere) with the class at work. Such technologies are normally simple, free, easy customizable, ready to use and accessible for any kind of user.
2.3. WORK COLLABORATIVELY

Learning is no more considered as a process that students should perform in isolation: the importance of cooperative/collaborative study [15] is well known and the benefits of such an approach to learning are reported in a variety of scientific papers drawing on innovative experimental researches [16]. In particular, nowadays, CSCL – Computer Supported Collaborative Learning - is worldwide considered a valuable field of investigation [17].

Coming back to the perspective of students with special needs, their undeniable right of being part of the classroom learning community implies also that they have the right of collaborating and cooperating with the others. In terms of CSLC, there are a number of ICT services and tools that foster and allow cooperation among students; most of the services for instant messaging and audio video communication provide also specific environments where students can interact and produce texts or any other kind of files in a collaborative way.

Fig. 2 shows a picture which is the result of real time collaboration of two Msn Messenger users who have decided to "share" the whiteboard: thus they can both, at the same time, produce drawings and paintings on the same board.

![Fig. 2 Sharing the whiteboard through an instant messaging service](image)

The possibility to share a variety of different applications and files is also provided by most synchronous interpersonal communication services; the case represented in fig.3 shows how two distant users share a of Power Point file, thus being allowed to write down together their presentation. Files of many types can be shared as well as Power Point files: this possibility, for instance, allows people to write documents collaboratively or to put together and analyse data from different sources. The only difference between sharing the whiteboard and documents/files is that, in the first case, the whiteboard is available at the same time to both users (it can be used at the same time by the users) while the possibility of sharing applications other than the keyboard, implies that the users should interact sequentially, one after the other.

![Fig. 3 Sharing Power Point files through an instant messaging service](image)
Recently new frontiers for the online cooperation of multiple users have been opened by the Wiki – technology. Such a technology is aimed at the online production of documents, which are then available via the net; a Wiki can be read just like any web site and therefore it is generally considered as a combination of a Web site and a Word document. The real educational potential of Wikis, lies in the way they are created, in the fact that groups or single users, (teachers and different groups of students, for instance) can collaboratively work on its content using a standard web browser.
In this perspective, Wikis are considered by most educationalists as ideal tools to increase the amount of collaborative work done by both students and teachers (even at distance) [19]: students can use a wiki to collaborate on a group report, compile data or share the results of their research etc... Another feature that appears to be relevant for educational purposes is that, during the Wiki building process, it is possible to keep track of the history of the document: each time one of the authors makes changes, the latter revision of the content becomes the current version, and an older version is stored. All the versions of the document are available, can be compared, the document can be modified and/or restored in its original form.

3. USING E/M-LEARNING TOOLS IN THE CLASSROOM: WHAT CHANGES?

New times demand new ways of learning [20], but new ways of learning, on turn, ask for a lot of changes in classroom management and in the type of activities to be carried out.
In the case of the massive introduction of elm-learning tools in the class, there are a lot of changes to be taken into account: teachers and students face new learning environments and new educational material, classroom dynamics may vary, teachers and learners roles are deeply modified.

3.1. NEW LEARNING ENVIRONMENTS AND NEW EDUCATIONAL MATERIAL

The idea and the definition itself of classroom, changes: while in traditional school systems the class is basically identified with the physical place where lessons take place, the massive use of new tools for distant education enlarges the perspective, the classroom is more felt like a group of people (students and teachers) who interact for educational purposes.
In this case, since the actual physical classroom exists but is not the only place where learners and teachers interact, we should better speak of “enlarged classrooms” than simply of “virtual classrooms”: the community links are stronger, interpersonal relations are possible (even fostered!), the double possibility of working inside and outside the classroom help students to keep their own pace during the learning process, communicate and cooperate with “real persons” asking them for help and advice, if and when needed.
Virtual classrooms are, actually, something different: they exists only in the form of digital content that is stored, accessed, and exchanged through learning platforms and networked computer. Everything in a virtual classroom occurs in an non-physical environment; students access the classroom by connecting to the internet, rather than travelling to a real, physical classroom. Students' and teachers' identities, their personal attitudes and characteristics can be known and perceived by the others actors only through the mediation of computers systems.
The integration of the two educational environments (physical and virtual) is possible and welcome in the perspective of building a really "enlarged and inclusive" classroom. In order to better respond to a wider range of student needs, the net should be viewed as an important mean which provides additional possibilities, but does not replace the learning that occurs in the physical classroom: traditional learning environments can rely also on those facilities which are typical of those for virtual learning, some of the activities carried out in the real classroom can find the place also (or chiefly) in virtual spaces.
The structure of the educational process carried out in physical and virtual classrooms is often similar: both are based on the interaction between students and instructor/s, both may include lessons, assignments and homework, but the means by which content is transferred from the teacher/s to the students differ greatly. While in a physical classroom the work is mainly based on live face-to-face communication, in a virtual classroom, even the contents are fully delivered in virtual ways, that is using discussion boards, videoconferencing systems, e-mail and a variety of other online services and tools.
The educational material to be used in the "enlarged, inclusive" classroom can be far different from what is normally used in traditional classroom settings. Digital contents are needed to allow distant use by students and teachers: audio and video material need, obviously, to be stored in a digital form,
most textual material (including, articles, parts of books and also tests, graphics etc...) should be available in machine readable form (that is mainly html, PDF etc.).

3.2. NEW ROLES OF TEACHERS AND LEARNERS

The new form that educational material acquire (becoming mainly digital) asks for new competencies and abilities of both teachers and students; this is not, nevertheless, the only and the main change involving the two main actors of the educational process: the overall role of teachers and students changes, as well as their reciprocal relation and classroom dynamics.

• What is required to teachers is mainly:
  • New abilities/competencies in the technological field (they need to be aware of the possibilities and of the actual functioning of the tools)
  • New views and methods to effectively incorporate new educational material in mainstream activities
  • Renewed attention to lesson planning, according to the educational objectives (which, on turn, need to be defined very clearly).
  • Capacity to feel himself not only as a teacher but also as a facilitator of the educational process.
  • Capacity to change the evaluation methods of students attainment / performances

Teachers need to adapt themselves to a changing technological society where managing technology may occupy a great deal of time and intellectual energy for them but this is not the key point; the necessary changes in teaching methodology are the most important issues.

The role of the teacher in the enlarged classroom should shift, in fact, from the primary role of information giver to that of facilitator and guide: this role incorporates also mediation, modelling, and coaching and requires a high degree of adaptivity to new learning/teaching schemes and the ability to reflect on the work done, testing out new ideas and evaluating outcomes

As a facilitator, the teacher is required to become personally engaged in public and private dialogue with students in order to assist them (face-to-face and through computers) throughout the whole learning process (even in extra school time hours). He should also think of how to promote and orchestrate the collaborative study of the students and, in this view of “open cooperation”, often the teacher should also become a co-learner and co-investigator together with his students.

The use of most technological means implies that the students take more responsibility for their own learning and that they concretely switch from passive to active learning.

• Students’ new role envisages:
  • Capacity/ability to use a number of technological tools or willingness to learn how to do
  • Sense of personal responsibility
  • Ability to set a reasonable pace for the activities to be done
  • Motivation to interact with the other actors of the educational process and socialize using virtual tools
  • Capacity to see the teacher mainly as a guide, a facilitator who can help to reach the educational objectives
  • Capacity to adapt to new dimensions of learning such as that of learning through discovery

Depending on the educational objectives and tasks, in fact, the role of the students can also be regarded as that of explorers. A number of elm-learning tools can be used to stimulate students to discover concepts, connections and apply skills. Such discovery-oriented exploration provides students with opportunities to make decisions while figuring out the components/attributes of events, objects, people, or concepts.

Such a learning opportunity is fostered by the use of technological means, used both for individual or collaborative learning.

The students, interacting with the others, are actively encouraged to reflect upon their discoveries, which is essential for their cognitive growth. Students may also become teachers themselves by integrating, discussing and sharing with the others what they have learned.

• Both students and teachers are required to:
  • Look at the educational process to be carried out at distance as a multifaceted process in which each single actor should give his own valuable contribution
  • To be aware that the use of Internet facilities/tools/services can fruitfully support collaborative learning
  • To look at the learning process as not limited to class hours
Once e/m tools for distance learning have entered the school, there is also an immediate impact upon classroom dynamics, including both the interaction among teachers and learners and that among students in extra school hours.

- Such new classroom dynamics produced by the use of distance learning tools envisage:
- The fact that the teacher should assist the learners while they afford the use of technological tools (which is far different from teaching the use of technology)
- The consciousness of both teachers and learners that technical problems may arise and that solutions can be found collaboratively, sharing problems, previous experience, different technological competencies
- Both students and learners should be conscious of the fact that virtual environments may affect, to some extent, interpersonal communication in that there are a lot of different communication attitude/styles (such as humor, mood, adaptivity...)
- An increased sense of responsibility and self-control
- The capacity to feel himself as a vital part of the overall learning community

Fundamental changes in the processes by which teaching and learning activities occur in classrooms can be found and the traditional techniques of class instruction and scheduling are brought into question: the type of activities to be done may change, multiple activities may occur simultaneously, changing the ways in which the teacher might/must facilitate learning and changing also the ways in which learners afford educational tasks.

Once instituted, these changes are likely to permeate classroom procedures and influence behaviour and classroom dynamics in a permanent way.

4. CONCLUSIONS

ICT offers a wealth of possibilities to support the distance learning of students who, due to personal or family/cultural reasons, cannot attend school with regularity. There is evidence from research that, in this case, ICT tools (both e- and m-learning tools) can help students to learn and teachers to teach more effectively. There is also evidence that ICT tools do not make the difference per se, simply by being used; what really makes the difference is the teaching approach and the teacher’s ability to make a good use of these tools, fully exploiting their educational potential.

In this view, some authors [21] while trying to interpret the amount of positive data regarding the impact of ICT tools on students’ achievement could not find a cause-effect link between them; they noted, instead, that more effective teachers and more effective schools tend to make a wider use of innovative tools and are able to use technology more effectively.

The effectiveness of the use of technological means (exactly as well as that of other traditional means) depends primarily on the choices that teachers make; substantial gains are achievable, for instance, when the use of ICT is planned, structured and conceptually well integrated in mainstream activities.

One of the key advantages provided by the use of ICT tools is represented by the opportunity that they offer for developing personalized learning environments: when the teachers are conscious of this possibility and are able to take advantage of this opportunity, tailoring their educational approaches on the needs/attitudes of all their students, they certainly have a better chance to make their class really "inclusive".

References


