Learning in Digital Media; the Legacy of McLuhan and his Impact on Formal Education

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Abstract. This paper describes a bibliographic analysis of the vision of Marshal McLuhan and the vision adopted by diverse current authors regarding the use of new interactive learning technologies. The paper also analyzes the transformation that will have to take place in the formal surroundings of education in order to improve their social function. The main points of view and contributions made by diverse authors are discussed. It is important that all actors involved in the educational process take in consideration these contributions in order to be ready for future changes.

Keywords: learning, digital media, McLuhan, formal education

1 Introduction

The works of McLuhan have a continuing influence upon academia and it is enough to substitute "electronic media" by "digital media" in his work so that his conclusions are still valid. Today, the education system faces an explosion of information and knowledge and a distribution of social knowledge, but also faces a fight for changing the linear speech and the frame normalized of formal technicians. This is the inheritance that is being left to the students; a legacy where the formal surroundings of education generate evaluation systems with standard criteria that legitimate the knowledge but that punish more than stimulate the creativity of the student.

McLuhan was able to anticipate the inexorable transit to a new age, which some texts named as the "Information Age", and also anticipated that education, amongst other things, would transform adopting technologies of electronic communication. These works were criticized in their time [14], and today also we can find critics on the use of technologies in the learning process, an example is the International Center of Research for the Development [12] that mentions the need to surpass this magic vision that the introduction of technologies improves education by itself. Díaz A. [9] bases his criticisms on the risks of implementing transformations that do not have a conceptual or strategic basis.

For education to adopt new communication technologies a paradigm change is required, that reflects not only modifications on a methodological level, but it also changes the culture and the organization of education itself. During the 80s, attention was given to the needs of teachers; in the 90s the attention was given to the

interaction, now however this decade requires a pronunciation on the effects that bring new technologies in the learning system and the organization of the formal surroundings of education.

This era has promoted an educational reform (definitely, most of the time) in which the students are no longer passive, but they choose innovative and interactive learning methodologies, in accordance with the contemporary theories of education, we could mention like an example the use of platforms such as Facebook, Slidshare or YouTube. The majority of these methodologies are a complement to the traditional classroom, or they work as a product of special projects that function outside the organization of the normalized school, but still have not been integrated on the organization of the education on a big scale.

If the technology is going to play a very important role in other ways in which we learn, then it would be important to pay more attention to the way institutions use these technologies, also, it would be important to take care of teachers on their role as managers of educational technology into use, and not only like creators of content. If an investment of infrastructure is made (hardware, software, connectivity), then it would be necessary to realize in a parallel way, diverse proposals for the infrastructure (contents, connection networks), for the management (sustainability, impact evaluation, operation), without forgetting the info-culture (digital literacy, collaboration, participation).

The use of the technologies should not be studied as a world far away of education, since their use generates new forms of informal learning, social expression and new ways to perceive reality. The “Lifelong Learning” establishes that it is necessary to recognize the value of this informal learning and for this, it is necessary to create mechanisms that help to validate this invisible knowledge which is not certified. Developed countries such as France promote its development [31], and some formal qualification systems like Cedefop, already advance in its accreditation.

In this paper, we carry out a bibliographic analysis on the vision of Marshal McLuhan and the vision adopted by diverse current authors regarding the use of the new interactive learning technologies. The paper also analyzes the transformation that the formal surroundings of education will have to undergo. The conclusions show us that the technologies open new possibilities of language and expression, and that technological advances have an impact necessarily on the social institutions that precede them, and therefore these entities have to study the way in that these new technologies need to be integrated into their educational work (proposals no only of investment of infrastructure) in order to improve their social function. This change could mean a reward for the students, and in the words of McLuhan “The citizens of the future ... they will be rewarded by their diversity and by their originality" [32].

2 The legacy of McLuhan

The ideas of McLuhan concerning the effects of the technologies of communication were inspired partially, by the work of Harold Innis (1894 - 1952). Harold Innis [18] argued which ones were the particular qualities of the technologies of communication and that the promotion of a technological invention can give place to the fall of a form of social organization. He also wrote that the technologies of communication have a central role in the creation of the human societies, since they affect to the flow or control of information, and he studied the properties and dominant ways of communication, his effects in human interaction and in social structures of power.

McLuhan [25] insisted on understanding the importance of the technological changes aside from opinions: «The effects of technology are not produced to the level of opinions or concepts, but they modify the sensory indexes, or guidelines of perception, regularly and without finding resistance». The city as a classroom (that regrettably did not have the attention that the educators wanted it to have) marked a clear aim; to sharpen the perception of the secondary school student about the cities where they live, and therefore mitigate the effects that the electronic life could have on them. McLuhan wanted young students to be more able to explore their surroundings find clues that enables them to better understand the nature of the contemporary world[1].

New generations are in a world where digital communications have a main role in his training and in the understanding of reality. Studies, like "Observatory of tendencies[2]" show precisely the habits of a digital born generation. This study was carried by Nokia and the consultancy CONECTA over two years and was initiated in 2010. Six further studies have been added that describe with his results the relation of the young adults with technology. Those born in the digital age of between 15 and 18 years, use currently social networks, chats and blogs without limit. They employ all type of devices to store information. All this without forgetting the constant exchange of archives through internet or bluetooth, which gives them the ability to obtain all types of information.

The computer is a basic element in the life of the digital generation. McLuhan [26] already mentioned in his writings the computer like an instrument more of electronic fixation of the information. His book of 1962 discusses the electronic interdependence that re-creates the world of a global village and states the following: «Instead to evolution toward an enormous library of Alexandria, the world has turned into a computer, an electronic brain, exactly like a story of science fiction for children». He

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[1] Letter from McLuhan to Elsie McLuhan, dated november 1952 in the book by Matie Molinaro, Corinne McLuhan y William Toye (eds). Letters of Marshall McLuhan, Toronto. Oxford University Press. 1987. p. 233

[2] "4to Observatorio Tendencias." Continuous observation concerning technology and mobile related perceptions, attitudes, habits and demands of adolescents and adults aged between 15 & 35. Study carried out by CONECTA. http://es.scribd.com/doc/25839000/4-Observatorio-Tendencias-FINAL

later made us a premonition that today is a reality; the “Internet Galaxy” of Manuel Castells [3]: «the computer keeps the promise of technologically creating a state of understanding and universal unit, a state of absorption in the logos that can join humanity in a family».

3 Digital Media on Formal Education

One of the characteristics of traditional education is the predominance of the printed media, and this was the case until a few years ago. McLuhan and Leonard [27] already they referred to this: «In an age when even such staid institutions as banks and insurance companies have been altered almost beyond recognition, today's typical classroom - in physical layout, method and content of instruction - still resembles the classroom of 30 or more years ago».

The organization of modern schools based in grouping the students according to their age and/or capacity, according to knowledge, thematic area and level of difficulty, reflects the same visual logic that is used in printed media: it is linear and hierarchical. Some of the structures used by formal institutions and that reflect this logic are [22]:

- Students grouped by age.
- Knowledge grouped in disciplines and/or subjects.
- Periods of time allocated to a particular subject matter or limiting access to subjects without having studied another.
- Subject matter is divided in parts and levels of difficulty.
- Classrooms designed for the education of masses and directed by the professor.
- The students work individually and in a competitive way.
- The hierarchical structure of knowledge in fields limiting the horizontal movement between subjects.
- The movement of students in the classroom and the communication between students is limited.
- Education based in projects or in studies of cases is not compatible with the available physical areas for the student.

This linear logic is based upon a standardized system and regulated in agreement with some formal and technical guidelines that teachers have to follow. Otherwise, this could lead to a lack of credibility in the new forms to produce the knowledge or

result in a less rigorous system. In the case of the students, without the widest possible standardization, they run the risk of not attaining the school aims. Those that attain them are not necessarily the strongest, but those that have adapted to the predominant paradigm, and not to the educational system or to the educational curriculum. This is the legacy that must not be taken away from the university careers, in which at present there are some standard criteria that are those that legitimate the knowledge.

McLuhan predicted that the structures and roles of the traditional school would transform, accepting increasingly the logic of the electronic communication. This can translate in to a situation where the current structure would have to include the integration of mixed age classes, the learning organized around the approach and resolution of problems, and in the learning based in projects. This would be the beginning and tasks of multidisciplinary investigation, flexible organization for the students and his time, and especially, classrooms designed to exert the interaction should be included.

McLuhan and Leonard [27] describe: «New educational devices, though important, are not as central to tomorrow's schooling as are new roles for student and teacher. Citizens of the future will find much less need for sameness of function or vision. To the contrary, they will be rewarded for diversity and originality. Therefore, any real or imagined need for standardized classroom presentation may rapidly fade; the very first casualty of the present-day school system may well be the whole business of teacher-led instruction as we know it».

In the literature review, criticisms can be found concerning the use of technologies in the learning [12]. The International Center of Investigations for the Development, mentions for example the need to surpass this magic vision that the introduction of technologies improves education by itself, while Díaz [9] directs his critique at the risk of implementing transformations that are not accompanied by conceptual and strategic frames.

The introduction of technologies or new devices in education although important, are not so for education as much as the new roles of the student and of the professor. Without a change in the roles, the introduction of the technology, massive as it has done up to now, ends up generating an ineffective repetition of the pre-existing situation simply expanded by the technological media.

If we concentrate on the review of Juliane Linch [22], the qualities that have to reflect a new logic in the roles, include the following activities:

- The teachers have to facilitate the location and understanding of the multidisciplinary information.
- The distinctions between teacher, professor, tutor and/or administrator have to disappear.
- The students have to be free to move around the buildings and school.

- The communication between the students has to be promoted and maximized.
- The students have to participate directly in the solution of real problems.
- The students have to work in a cooperative way.

McLuhan himself reflects on the media and technologies, referring to his linguistic fundamental structure. In addition, Bruce Powers, professor of the University of Niágara and a recognized expert in the area of the technologies of communication, reflect on the subject, referring to the media and the technologies: Not only are they like language, if not that in its essential form, are language whose origin comes from the capacity of man to extend himself through his senses to the part that surrounds it [28].

4 The current vision of learning via digital media

The reforms resulting from contemporary theories, the predictions of diverse authors on education, and the effects noticed by researchers, are ideas near to the vision promoted by McLuhan, who discovered this phenomenon. He discovered the way in which technology changes man and vice versa and redefines them in a bidirectional unfinished movement [21]. For example, Cornu [6] wrote about the integration of technology as a process that transforms the organization of the school at all levels.

Diverse authors have expressed the opinion that the application of new technologies in formal educational institutions goes hand in hand with the reform of the functions and structures of the education. Duchateau [11] maintains that allowing students to work in a group represents a valuable opportunity for inter and multi disciplined activities that are not limited by borders of the subject. The interpretation is that subjects would no longer be grouped in future, reflecting that the main aim of the education is turning into the act of learning in general.

In his review on the effects of information technology on education and learning, Toomey [36] observes that diverse reports identify information technology as a cause of reform in the school system, and concludes that the strategic introduction of technology in schools could become daily practice.

The Group US Panel on Educational Technology [1] argued that the true promise of the use of technology in education is its potential to facilitate fundamental and qualitative changes in the nature of learning. Pierson [33] finds that the skills of the professors, technology and pedagogical strategies, are all important in the determination of how education integrates with information technology on a daily basis. Therefore, if it is required that professors succeed to integrate information technology in their teaching, in addition to ensuring that they have the opportunity to

develop knowledge and pertinent skills, is important to foresee the opportunities for the continuous development of the pedagogical capacity in general.

All these visions of education and the role of new technologies, amongst other things, show that the majority of researchers have studied whether the secondary effects of the integration of technologies are coherent with the predictions of the changes in the organization of education. There are also some publications that question the structures and traditional functions of schooling. These include: Commission of the European Communities [5], Crawford [7], Hawkins [17], Knupfer [20], and UK Department of Education & Skills [37].

There is no doubt that the introduction of information technology and the modification of the education system are taking place. Examples such as the project initiated by Bill Clinton in 1996 (the report Getting America's Students Ready for the 21st Century, Meeting the Technology Literacy Challenge[3], describes it) and project 1X1 implemented in Spain in 2009 by the Spanish government, demonstrate a change, although not with the planned rapidity and scope. This can be attributed to institutions keeping their traditional strategies and a lack of understanding concerning the challenge and opportunities that the technology can offer.

It is necessary to take advantage of these movements to create customized new learning surroundings, able to articulate all the dimensions and anchorages of previous learning methodologies and generate others [10]. Web 2.0 already has allowed the generation of diverse methodologies of learning and new options of the use of the free tools. Facebook, Twitter, You tube, Second Life are examples of this. As a result of the joint work of hundreds of professors, the base of digital pedagogy is beginning to take shape [2], [34]. They are no longer the odd virtual ethnographies and studies and can be found in common use [35], [24], [38]. The most significant changes take place in the knowledge communities of because they represent new forms of collaboration and participation and create a new perspective for digital natives.

These publications show the vision of McLuhan and his influence, however, other ideas can be found regarding the interaction of the technologies with the institutionalized structures and its functions. Furlong, Facer and Sutherland [13], state that the way technologies are becoming part of daily life has been much more complex than initially planned.

In the investigations, the technology is often described with an approach in which the roles of professors and students require of real modifications in their relation and in the exchange of information and experience. Games, for example, represent a format of instruction similar to immersion [29] and some educational surroundings

3 Getting America's Students Ready for the 21th Century, Meeting the Technology Literacy Challenge. http://www.ed.gov/about/offices/list/os/technology/plan/national/index.html

provide complex relations and rich experiences that the traditional educational system does not provide.

In the report School innovation: Pathway to the knowledge society, Cuttance [8] carried out a review in twenty schools and showed a split between learning in the school and the learning outside the classroom due to changes in the school calendar and changes in the physical surroundings of the classroom. It concludes that, "the experiences of the schools that have treated to integrate information technology in its learning environment in the last decade, indicate clearly the need for other compatible changes".

It is therefore the moment to transform the role of teachers as managers of technology used and not only simply creators of content. It is the moment to look for experiences that enrich learning and generate personalized learning surroundings in addition to promoting a real reform in the function and structure of education. What could involve the transformation of subjects that, until now, have been grouped as we know them to be, and succeed in transforming education into understanding how to learn rather than just memorizing a traditional subject.

5 Conclusions

The points of view of the contemporary authors on the effects of technologies of communication in education reflect the influence of the already adopted ideas previously put forward by Marshall McLuhan in the years 1950 and 1960. His contributions confirm the effects of the introduction of technologies in the development of new societies, and verify the need to modify the operational procedures of educational institutions, as well as the form in which individuals relate to one other and learn.

As a conclusion, the main points of view and contributions of diverse authors are grouped and described. They should be taken into account in future by all the actors involved in formal education.

a) Digital Media: An Opportunity to Change the Organization of Education.

Digital media have impacted social institutions that precede them, and therefore these entities have to study the way that the new technologies have to be integrated in teaching. This pressure creates new rules in which digital media have to form part of education, and thus the use of the technologies has to be studied as part of education due of its importance. This also needs to be seen from a transversal critical and integrated perspective. Schooling is often seen in forms that reflect the tribal logic of these technologies, however, the realization of this logic consists in practices, structures and functions that are incongruous with the institutions of education. The transition of an education that reflects the logic of the impression supposes a major

change, but no only in the implementation of the technology, but it also requires changes in the culture and the organization of education. As stated by Cobo [4], if an investment is made to create infrastructure (hardware, software, connectivity), there would have to exist diverse proposals for its use (contents, networks of exchange), for the management (sustainability, evaluation of impact, operation), without forgetting to the info-culture (digital literacy, collaboration, participation). Other authors like Duchateau [11], Toomey [36], Cornu [6], LabCom [21], and Becker and Ravitz [1] agree that the technology is a door to change the organization of education.

b) The New Role of Education

Juliane Linch [22], Nokia and CONECTA [30], Pierson [33], Commission of the European Communities [5], Crawford [7], Hawkins [17], Knupfer [20], UK Department of Education & Skills [37] mention the importance of modifying the current roles. What matters are neither the contents nor the media that bear them, but the structure of the space in which the student takes control, splitting of some strategic notions of the teacher. In this situation, the teacher renounces the role of being only actor in possession of the knowledge and yielding space to the student. In the era of internet, a vertical transmission of the information and control of power. When new roles between professor and student are created, the taking of decisions becomes decentralized and contributes to generate new profiles of students. This will create leaders of projects, creators of documentation or perhaps a community manager. Therefore, the change of the role of the professor will allow the implementation of strategies that promote the auto learning on a day to day basis and learning based in problems and/or collaborative learning.

"Lifelong Learning" establishes that it is necessary to recognize the value of the informal learning [23] and although the mechanisms have not been created that would help to validate this knowledge and certify it, is strategic to promote the change of roles. The aim would be that in the future it is possible to create these mechanisms to validate knowledge that has not been learned in the classroom. Recognize the strategic value of the knowledge obtained in an informal manner, is a pending task of formal education, but is necessary to begin the transformation from down upwards, changing the current roles of the education.

c) Innovative and Interactive Methodologies

Technology has been used to deliver content, in other words, the message of modern education. This means that new technologies open up new possibilities of language and expression, and champion a new form to carry the educational reform by innovative uses of media that are consistent with the contemporary theories of education [22]. With this, the students stop being passive, and opt for methodologies of innovative and interactive learning. The use of innovative and interactive methodologies does not mean to use alternative methodologies instead of the

traditional method. Instead, it tries to develop competitions between teachers and students so that there is a more dynamic role, using sources of current varied and motivating information and a definite, interactive and cooperative methodology of work [15].

The conclusions show us that technological advances have an impact necessarily on the social institutions that precede them, and therefore these entities have to study the way to incorporate them into their educational work in order to improve their social function. It is important to introduce modifications on a methodological level, but it is important not to forget that technological advances change the culture and the organization of education itself. It is necessary to invest in infrastructure (hardware, software, connectivity), but also it would be necessary to realize in a parallel way, diverse proposals for the infrastructure (contents, connection networks), for the management (sustainability, impact evaluation, operation), without forgetting the info-culture (digital literacy, collaboration, participation).

In summary, technology has to integrate entirely with the organization of the education and become a complement of the traditional classroom or has to be integrated as a special product from outside of the organization of the normal school. If the technologies are to play an important role in the transformation of the way schools are seen and conceived, then the institutions have to promote the use of these technologies in order to be able to improve its social function. The development of the native digital generation will definitively have a very strong influence over the course of education, which undergoes radical transformations in institutions. More value will be given to anything that wakes up interest in this generation of much more demanding consumers and citizens who are better informed [19]. The capacity to carry out multiple tasks represents a distinctive characteristic of this generation. The systems of current formal education will, not without difficulty, achieve to call the attention of individuals that understand the possibility to transform education into being much more interactive, dynamic and of course, motivating.

References

1. Becker, H, J, Ravitz, J 1999, *The influence of computer and Internet use on teachers' pedagogical practices and perceptions,* Journal of Research on Computing in Education, 31(4), 356-384.
2. Buckingham, D 2008, *Más allá de la tecnología,* Buenos Aires, Manantial.
3. Castells, M 1997, *La era de la información,*Vol II. Economía, sociedad y cultura, Madrid, Alianza Editorial.
4. Cobo, C 2010, *¿Y si las nuevas tecnologías no fueran la respuesta?. El proyecto Facebook y la Posuniversidad. Sistemas operat ivos sociales y entornos abiertos de aprendizaje,* Ariel, Madrid, p 261.
5. Commission of the European Communities 2000, *Designing tomorrow's education: Promoting innovation with new technology,* Brussels, 27.1.2000, http://ec.europa.eu/education/archive/elearning/rapen.pdf

6. Cornu, B 1995, *New technologies: Integration into education*, In Watson D, Tinsley (Eds.), Integrating information technology into education (pp.3-11), London: Chapman & Hall.
7. Crawford, R 1999, *Managing information technology in secondary schools*, London: Routledge.
8. Cuttance, P 2000, *School innovation: Pathway to the knowledge society*, Centre for Applied Educational Research, Commonwealth of Australia, http://www.dest.gov.au/schools/publications/2001/innovation/report.pdf
9. Díaz, A 2006, *El enfoque de competencias en la educación: ¿una alternativa o un disfraz de cambio?*, En Perfiles educativos, vol. 28, nº 111.
10. Downes, S 2009, *New Technology Supporting Informal Learning. En Half an Hour*, http://halfanhour.blogspot.com/2009/04/new-technology-supporting-informal.html
11. Duchateau, C 1995, *The computer: Ally or alien?*, In Watson D, Tinsley (Eds.), Integrating information technology into education (pp.13-25). London: Chapman & Hall.
12. Fonseca, C 2005, *Educación, tecnologías digitales y poblaciones vulnerables: Una aproximación a la realidad de América Latina y el Caribe*, Documento preparado para la Consulta Regional del Programa Pan Américas IDRC, Fundación Omar Dengo.
13. Furlong, J, Furlong, R, Facer, K, Sutherland, R 2000, *The National Grid for Learning: A curriculum without walls*, Cambridge Journal of Education, 30(1): 91-109.
14. Gambino, R 1972, *McLuhanism: A massage that muddles*, Midwest Quarterly, 14(1).
15. García, M, R, González, N 2005, *El Aprendizaje Cooperativo como Alternativa Metodológica en la Formación Universitaria*, Comunicación y Pedagogía, nº 208, 9-14
16. Getting America's Students Ready for the 21th Century, Meeting the Technology Literacy Challenge, http://www.ed.gov/about/offices/list/os/technology/plan/national/index.html
17. Hawkins, J 1993, *Technology and the organization of schooling*, Communications of the ACM, 36(5), 30-5.
18. Innis, H, A, 1951, *The bias of communication*, Toronto: University of Toronto Press.
19. Islas, O 2009, *La convergencia cultural a través de la ecología de medios*, Comunicar, Revista Científica de Educomunicación. no 33, V. XVII, 2009, pp 25-33
20. Knupfer, N 1993, *Teachers and educational computing: Changing roles and changing pedagogy*, In Muffoletto N, Knupfer (Eds.), Computers in education (pp. 163-179), Cresskill, New Jersey: Hampton Press.
21. LabCom Javeriana 2010, *El medio es el debate o reencuentro con McLuhan en el ciberespacio: un experimento de investigación y escritura académica en el escenario digital*, Signo y Pensamiento 57, Documentos de Investigación, Vol. XXIX, Diciembre 2010, pp 478-485
22. Lynch, J 2002, *What can we learn from McLuhan? Electronic communication technologies and the future of schooling*, Autralian Association for Research in Education (AARE), http://www.aare.edu.au/02pap/lyn02031.htm
23. Longworth, N 2002, *Learning cities for a learning century: Citizens and sectors - stakeholders in the lifelong learning community*. Retrieved May 15, 2003, http://www.library.cqu.edu.au/conference/papers/Longworth.pdf
24. Markham, A, N 1998, *Life Online. Researching Real Experience in Virtual Space*, vol. 6, Londres, Altamira Press.
25. McLuhan, M 1996, *Comprender los medios de comunicación. Las extensiones del ser humano*, Barcelona: Paidós Comunicación.
26. McLuhan, M. 1969, *La Galaxia Gutenberg. Génesis del Homo Typographicus*, Madrid, Aguilar.
27. McLuhan, M, Leonard, G, B 1967, *The future of education: The class of 1989*, Look, February 21, pp 23-24.

28. McLuhan, M, Powers, B, R, 1989, T*he global village: Transformations in world life and media in the 21st Century*, New York: Oxford University Press.
29. Molano, M, Martínez Loné, P 2006, *La dimensión simbólica del jugador de videojuegos,* Icono 14, Nº. 8, http://www.icono14.net/revista/num8/articulos/02.pdf.
30. Observatorio Tendencias 4,*Observatorio continúo sobre las percepciones, actitudes, hábitos y demandas de los jóvenes y jóvenes-adultos de 15 a 35 años en relación al móvil y a la tecnología*, http://es.scribd.com/doc/25839000/4-Observatorio-Tendencias-FINAL.
31. OE CD/CERI 2009, *Evidence and Policy Implications. Technology in Higher Education to 2030*, New Millenium Learners in Higher Education.
32. Oliveira Lima, L 1976, *Mutaciones en Educación*, Editorial Humanitas, Colección Cosmovisión, Buenos Aires.
33. Pierson, M, E, 2001, *Technology integration practice as a function of pedagogical expertise*, Journal of Research on Computing in Education, 33(4), 413-430,http://ezproxy.usq.edu.au/login url=http://search.epnet.com/direct.asp?an=5078141&db=aph
34. Piscitelli, A 2009, *Nativos digitales*, Buenos Aires, Paidós.
35. Reid, E, 1994, *Cultural Formations in Text-Based Virtual Realities*, Melbourne, University of Melbourne.
36. Toomey, R 2001, *Schooling Issues Digest No. 2: Information and communication technologies for teaching and learning*, Canberra: Commonwealth of Australia, http://www.dest.gov.au/archivehttp://dest.gov.au/sc.publications/2001/digest/technology.htm
37. UK Department of Education & Skills 2001, *White paper: Schools - Achieving success*, London: Department of Education & Skills.
38. Wilson, S, Peterson, L 2002, *The Anthropology of Online Communities*, Annual Review of Anthropology, n. 31, pp. 449-467.