e- Learning and Digital Media

The Contribution of Virtual Education to Social Inclusion with the Consolidation of a New Conviviality

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ABSTRACT This article discusses some of the approaches implemented as socio-educational public policies - which have failed - aimed at strengthening social inclusion to encourage a substantive conviviality, an alternative to the existing one, which is included under the new comprehensive framework of Social Studies of Science and Technology in their relationship to the construction/application of scientific-technological knowledge through electronic distance education programs, specifically in Latin America. This field is linked to public policies/actions, when recognizing critical alternatives to the linear model of technological innovation (to replace it with the situated and distributed, systemic-holistic, and socio-technological interpretation), stressing the particular conditions of production and use of knowledge for the region, with the articulation of ICT, mainly to renovate and incorporate virtual higher-level educational proposals. So, this article contributes to the deepening not only of the 'new sociology of science and technology', but also to different lines of inquiry which affect the programmes of electronic distance education today, characterized by a consumerist scientific-technological boom within global controversy. The practice of a substantive reflexivity will result in not only a new meaning of the concept of social inclusion for a new conviviality within global social systems traversed by ICT, but also in the analysis of proposals that will overcome the socio-educational exclusion mediated by technology, for a social inclusion and a new conviviality. The configuration of this considers the empowerment and practice of digital skills to function with relevance and prudence, in a proactive and responsible way, in a progressive (cyber)-citizenry, with valuable, productive, and valid behaviour to meet equitable needs of life by an intercultural respect, recognition of contradictions and social tensions, theoretical and methodological negotiation, and practice in the hybrid production of alternative frameworks to overcome diverse e-exclusions.

Introduction

Some approaches implemented as socio-educational public policies have failed to consolidate springboards for a social inclusion that will favor a substantive conviviality, an alternative to the current one, thereby continuing situations of inequity not only in terms of access to ICT, opportunities for literacy, and development of digital skills, but also in the deepening of a more comprehensive framework with more comprehensive interpretations of contemporary highly fragmented educational phenomena.

It is expected that the new Social Studies of Science and Technology, in relation to the construction and implementation of a relevant as well as prudent and valuable scientific-technological knowledge, will lead to the solving of socio-cultural problems through electronic distance education programmes, because today these programmes may contribute to this from a greater view of the conventional instrumental rationality, in order to strengthen social inclusion and a new conviviality.

It is necessary to turn our attention to several aspects of the issues that are specific to Latin America, as it is included within a hybrid inter/transdisciplinary field of study of the socio-cultural

context, which is inextricably linked to public policies and actions, recognizing critical alternatives to the linear model of technological innovation to replace the systemic-holistic and socio-technological understanding, stressing the particular conditions of production and use of knowledge in this region, with the articulation of ICT, mainly to consolidate virtual higher education.

So, concurrently and through successive approximations, we propose not only a deepening of the 'new sociology of science and technology' [1], but also different lines of inquiry [2], -that affect the electronic distance education programmes which are characterized today by a consumerist scientific-technological boom, with global controversy, disparities, and adversity.

The practice of a substantive reflexivity will not only give a new meaning to the concept of social inclusion for a new conviviality within global social systems traversed by ICT, but will also allow the analysis of public policy proposals that would overcome socio-educational and technological exclusion.

The configuration of settings of *social inclusion* considers all forms of social inclusion for all users (students, groups, communities, etc.) with the tools for the practice of digital skills [3], in order to perform with relevance and prudence, proactively and responsibly, in a (cyber) citizenry, for valuable, productive, and valid behaviour that meets their life needs.

The recommendations for *consolidating a new conviviality*, an educational task *par excellence*, guarantee minimum conditions in terms of quality of life and global social peace through socio-educational interaction mechanisms increasingly mediated by technology today, and included within frameworks of ideas, values, and attitudes based on consensus, of civic responsibility, intersubjective empathy, intercultural respect, recognition of contradictions and tensions, etc., which involve several theoretical, methodological, and practical tasks of negotiation, an alternative means for overcoming various exclusions.

Objectives

1. To concisely describe the current situation of a consumerist technological boom, full of global contradictions, disparities, and adversity which prevent social inclusion;
2. To provide a necessary new conceptual meaning and useful methodological articulation in relation to the issue raised;
3. To list some lines of inquiry related to electronic socio-educational public policies for social inclusion;
4. To anticipate critical, open, feasible, and sustainable suggestions towards a new conviviality.

Certain Features of the Current Situation of a Consumerist Scientific-Technological Boom of ICT, with Controversy, Disparities, and Adversity

The twenty-first-century capitalism that is surviving the most varied crises organizes the world into a fantastic and ghostly network of connections of contradictory effects. Industrial products from advanced countries arrive at the periphery of poor countries through the Internet in which, despite opening up vast new possibilities for human communication, only the hegemonic-commercial spirit prevails.

This diagnosis, recorded in multiple researches and existing literature in this regard, is not included here for reasons of space. But despite everything written, it does not mean that we have overcome the stage of inequality and/or ambiguity/disbelief of ideas, and unfamiliarity with a combined, contextual application, relevant to a humanizing spirit of renewed substantive approaches [4], with the technological tools that are now increasingly available (although not always within everyone's reach). The worrisome fact is that records of experimentation and draft proposals of *appropriation* [5] of technological-electronic resources are still absent or scarce, which proves that isolation persists and decision making in terms of public policy is not carried out. Thus, little is provided in the form of dynamic forces to local fields of work and research, in terms of training plans and programmes, and exchange of best practices concerning a critical generalization of the use of technology, in attitudes and artefacts. While ICTs impact with changes involving the whole of social life across the planet, beyond their promising speeches proposing to change and

link the men and women of the world (or tangle them in their 'net') as 'prosumers' with the use of socio-technological networks [6], and with this behaviour, perhaps tempted by the market, achieve a greater chance of inclusion, do not think that this is always the case.

In this context, digital technologies have attracted diverse and conflicting connotations within institutions, ranging from excessive optimism to harsh questioning, passing through positions that call for their critical appropriation in learning situations. Different epistemologies have held these positions when they have been applied to knowledge production and its utilization, which has caused conflicting social impacts in their specific strategies.

So, the acknowledgement that the use of ICT in education does not in itself guarantee educational quality and innovations, nor social inclusion and equity, where important sectors benefit from virtual education through the educational uses of ICT, is a reality that has been documented by many experiences - some good, and others where online courses were failed where the supposed scientific-technological innovation [7] failed to meet the expectations of users, among other features, because they did not agree with the respective socio-cultural profiles.

The integration of ICT in different countries, geographical regions, and social groups per se and in their educative articulation has not taken place uniformly, and in addition, despite the fact that their consumption is related to increased personal self-esteem and a high status of social, human dignity, in all human (and ecological) manifestations, an interpretive, investigative, systemic-holistic approach of great *complexity* in critical articulation with distance education programmes that incorporate the same trends has not been used, and this is now practically the norm.

It is worthwhile to remember that technology-mediated education is a social practice consisting of a set of human and artifactual actions that require comprehensive study, seeking to overcome the scientific and technological knowledge provided by an interdisciplinary paradigm. The problem lies in simultaneously considering both what is being investigated and the theoretical and methodological operations of those who investigate in context, putting together these relationships to evaluate results and consequences, as central to a new paradigm of technology-mediated education that should overcome exclusions [8], achieve social inclusion [9], and inaugurate guidelines for a new conviviality.

Among the controversies that need to be recognized as contributing to the complexity of the situation described above, we acknowledge the deepening of relationships of domination embodied by the *hegemony of electronic technology* and the resulting inequalities it causes. The computer and telematic knowledge incorporated into the production and distribution of material and symbolic goods with their respective services are now the source of power, prestige, and wealth within a heterogeneous global, fragmented, violent society in constant tension. This is not without techno-scientific risks [10]: it requires a continuous monitoring/surveillance by the citizenry by social participation through the use of ICT in electronic educational programmes: such action would be a great success.

The ambitious and idyllic visions of an online learning that contributes to inclusion will only be possible in so far as the educational paradigms that sustain them profoundly change. The coordination and integration of innovations for a valuable/relevant use of ICT with the disciplines and audiences that must be literate in the issue of diversity and respect for difference form the platform for the mindware and socialware of socio-technological networks, which will support any inclusive educational project aimed at addressing conviviality (i.e. as a carrier in another sense of educational aims and the spirit to learn and teach).

Concurrently and through successive approximations we would be contributing to the deepening of the 'new sociology of science and technology' [11], which has a significant impact on online distance education programmes which require the substantive practice of reflexivity, for public policies that give a new meaning to the concept of social inclusion towards a new conviviality within global social systems traversed by ICT, in modernity.[12]

The Lines of Inquiry Referred to in Electronic Distance Education, Social Inclusion, and a New Conviviality

There are four interrelated lines of inquiry referred to in the field of electronic distance education or with the use of ICT, in reference to the issue of social inclusion and achievement of a new conviviality, within the new Social Studies of Science and Technology:

1. The *epistemological line* that identifies and encodes the features of the situated production of scientific-technological knowledge for a socially useful, pertinent, and prudent use to counter the techno-scientific effects of risk;

2. The *socio-cultural line* that leads us to think collectively and reflectively (with special emphasis placed in the communities of virtual learning, practice, knowledge production, and research) on the aims and content of a necessary training, as well as of the role of knowledge and its social legitimization produced in the peripheral societies or emerging countries, and which would be distributed (equally) by ICT;

3. The *historical-political line* represented by two types of existing interpellations throughout time: the one provoked 'from the outside' to stimulate the creation and implementation of policies and instruments of socio-structural change; and those 'from the inside', given by the greater active participation of social actors that require not only knowing more but also developing the skills to perform in the knowledge society, and who are 'clients' of higher electronic distance education;

4. The *pedagogical and technological-educational line* that strays – after revealing the educational decontextualized standardization produced by a lineal and senseless electronic learning - from the features that the online education training programmes and materials should possess, taking advantage of the potentialities of human interaction/communication in telematic networks of strong socio-cultural grounding, mediated by the Internet.[13] In turn, they denounce and propose an equitable distribution and collaboration through a 'humanizing' configuration of electronic systems: a design alternative, and opportunities and ways to communicate, are multiplied, as an aid to human development and the *online* community.

Lines of Inquiry as Fields of Work

In the study of the lines of inquiry, these characteristics are understood as 'research programmes' [14], which would strengthen several fields of work, all related to electronic distance education, through public policies of social inclusion, to promote a new conviviality, as subjects for analysis included in the new Studies in Science and Technology. These subjects are:

1. A critical reflection of electronic distance education, from its contextual socio-scientific-technological and cultural features to its administrative-communicative and semiotic-didactic considerations, in the peripheral societies in Latin America. Conceptual and methodological strategies are proposed where ICT would help broadly overcome exclusion and promote conviviality. These are feasible from solid theoretical and empirical, creative and rigorous bases, if we acknowledge that often programs mediated by ICT developed in central countries are not (through a linear transposition) suitable for peripheral societies.

2. The analysis of the definition of the above-mentioned interdisciplinary field of work, to incorporate other new concepts for the 'new sociology of science and technology' [15], this time applied to the analysis of higher education mediated by global electronic technologies. This would contribute, thus, to a theoretical-methodological and practical strengthening conducive to the outline of robust and accurate public policies to overcome global socio-cognitive inequalities, which limit not only the investigation of these issues but also the acknowledgement of alternative scientific-technological practices in contexts that are far from the hegemonic centers where organized science and validated knowledge production are found.

3. A real democratization of knowledge, following on from the above, through the communication and teaching of cultural practices which must address social problems that are unknown in increasingly large audiences in Latin America, which would be achieved through the use of ICT in higher training programmes.

4. An alternative discussion about why these countries fail to strengthen the production of the latest scientific-technological knowledge that may lead to solving their problems of social exclusion, poverty, and lack of global positioning. We should revisit for further study distance education's many shortcomings [16], still existing in spite of ICT appropriation and its participatory modes with Web 2.0, that prevent it, for now, from creating a new profile of conviviality which, while criticizing consumerist and disciplining values that have characterized hegemonic knowledge production, recreates proposals of genuine social-structural change, supported by the values of critical deconstruction, solidarity, inclusion, and general respect.[17]

Analysis of Some Factors that Prevent a Socio-Technological and Pedagogical Inclusion Mediated by Technologies

It is easy to see who is included and who is not, through the impact produced in the construction of their identities, given in turn by the practice of the intersubjective interaction or communicational interplay (increasingly mediated in a virtual way) of the future construction of subjectivities. This is also true due to the fact that mechanisms of e-exclusion are defined by the other users rather than being defined by their own protagonists. Thus, continuous re-negotiations are needed in terms of underlying political-representational and communications models, if the goal is to reach certain *conviviality*, without constant alternative adjustment of the existing - tacit and explicit - agreements regarding the rethinking of interactions of social life towards more convivial proposals. Myopic visions abound and disorientation is great in reference to this: co-existence is almost impossible in such simple terms as live and let live, which involves acknowledging and respecting the intercultural.

As all the variables detailed below are recorded in numerous documents and publications that diagnose and report multiple historical and cultural gaps in new digital technologies of information and communication, and the cultural backwardness of the school curricula in most levels and modalities of the educational system, we will only briefly mention them, as they all impact on the educational results as much as the success or the failure of the projects. Therefore:

1. *From the teachers' standpoint*: with mental representations linked to times of linear, reproductivist, and industrial models, they pour the same content into digital containers, hoping for innovative responses. In other words, the level of teacher competence in the strategic use of technologies, as well as the consistency between their beliefs and pedagogical approaches, demonstrate zero experience and practice with the technologies in question.

2. *From the students' standpoint*: their experience in virtual environments is often the result of an adaptation of the traditional classroom-based courses, of linear exposure to information, of reading of texts, and of completion of questionnaires or exercises, while the vast majority are 'digital children/youth' with a different rationality and mindset. These are the 'millennials' [18], the first generation that has grown up surrounded by digital media, and most of their activities are conducted in the context of communication and knowledge management, in a broad sense, and mediated by technology, with their peers.

3. *From the standpoint of the educational administration and organization*: still rigid in design and with no flexibility, it does not consider or include students' interests and modalities of work-study, thus continuing to do the same thing with new clothes, ignoring their intrinsic innovative possibilities. In other words, the extension of educational models specific to transmissive-receptive classroom-based education takes place.

4. *From the standpoint of the socio-cultural context*: the huge gap between everyday social practices of the twenty-first century stands out as the contradiction between the atmosphere created by the transplantation of technology, or the lack/absence of the available technological resources (software, hardware, connectivity, infrastructure of technical staff to provide support and maintenance of the technologies, lack of policies and processes to facilitate teacher training, etc.), or is due to the inter-generational and intergeneric clash of mentalities, and so on.

5. *From the standpoint of local production of scientific-technological knowledge* [19]: training should be given to researchers for equitable distribution of knowledge through electronic education programmes or those mediated by ICT.

A Possible Anticipation of Ambitious, Critical, and Feasible Frameworks towards a New Conviviality

Electronic education programmes and ICT in education in themselves do not guarantee social inclusion and equity, nor do they guarantee educational quality and innovations. This does not belong to the world of machines but to attitudes and public policy approach to technology management that are generated in the close interdependence of multiple factors related to the production of local scientific and technological knowledge, anchored in specific socio-economic and cultural contexts.

So, sustainable and self-sustaining development of the regional and national units will not take place only through the introduction of ICT – although without it little can be accomplished and grown today; while considering that to be essential, overall socio-educational development must be based on technological support.

The public policy approach for the management of local scientific and technological innovations should consider in a systemic and coordinated way the following contrasting lines of thought and action:

1. Renewing the educational paradigm – at all levels and modalities, with teachers trained and skilled in competition, within which individuals, groups, and social organizations are trained;
2. Strengthening the research system at its basic centres, as state policy, related to the above, with the training of researchers and professionals in coordinated actions among these centers - universities, industries, businesses, and guilds;
3. A strong and sustained investment in infrastructure: computer chips are not produced only through good politicians and scientists of great importance; the poles of technological development require a basic network with electricity services, transportation, communications - that is, technology, without which, exclusion and the various gaps will continue growing in the southern hemisphere.

Thus, we cannot fail to consider the issue of social exclusion and inequality, which is what leads us to understand the articulated incorporation of cutting-edge technology as an intervening variable in the production of knowledge in the digital age. In other words, there cannot be a model of sustainable human development, and neither is conviviality possible, without the achievement of social inclusion, given by an education for all, where today ICT can contribute to this.

Therefore we understand that with only the inclusion of ICT in everyday use - in general, through an instrumental approach – a new conviviality *will not* take place automatically, but without it and without distance education programmes, little will be achieved in terms of a new covenant of coexistence; that is, a society that produces and distributes productive and valuable knowledge through ICTs to be shared and recreated by all.

To produce inclusion, we will have to work hard to carry out tasks such as:

- *Removing perceptual and mental frameworks* [20]*, prejudices, and habits* after conducting serious diagnoses – which involves 'being open to discover the reality' of the current situation in terms of what exists in the fields of education, culture, science, technology, and innovation, which, through public policies, guide us (or not) in a grounded – albeit uncertain- way in a reformulation of the exclusionary situations;
- Assessing the 'technological flexibility' that arises as we abandon the (erroneous) beliefs held as we acknowledge other social uses of ICTs, via respect for cultural diversity and critical appropriation of knowledge and ways of solving problems, which are processed by the reflective capacity of users to meet their demands for information, communication, and recreation of knowledge, which contributes to their sustainability;
- Agreeing on public policy to integrate ICT into education in an articulated way, from a substantive educational technology with innovative teaching bases, which takes full advantage of all the spaces for learning: we understand this needs to be ubiquitous, collaborative, and lifelong, and should advance towards *e-maturity* (or significant adoption of ICT with a different training relevance for people, groups, and organizations) and *e-awareness* (or electronic consciousness towards a genuine democratic citizen participation that will overcome the socio-cognitive ancestral and current deficit of a merely instrumental conception of technology);

- Planning in a decentralized way with regional and local policies for the global translation of demands according to cultural patterns to be distributed in a customized way, in flows, with the strengthening of the power of knowledge;
- Developing/building *new capacities for power* - that is, leading and empowering ourselves in a representative and shared way in the usability of ICTs within telematic socio-reticular spaces to design and develop contexts sustained by critical political decisions on technology to reconcile various reflective, apparently conflicting, schools of thought by way of a theoretical and empirical synthesis.

This proposal would produce a new conviviality - in other words, the experience of collaborative, distributed, contextual, and interactive processes of material and symbolic products, goods, and services, which in turn, presuppose two types of learning: (1) the traditional approach, referring to the historical idea that reflection takes place by anchoring the new information in past experiences; and (2) the approach to 'future emergents' through the practice of insights (or visionary or intuitive findings), where a surprising or sudden clarity about what to do is produced. As a result, ranks of freedom are earned, released from constraints, and the way of seeing and thinking is changed, and this would then have to be worked on for the finding to become innovation.

It is also necessary to practise the following:

1. *New literacies*, to develop skills in the form of e-skills that refer to digital media literacy, with the appropriate use of technologies for communication and expression in appealing to the role of the user, with the resources of Web 2.0, in everyday use, at work, etc., in the interaction with networks for teletraining (e-learning, blended learning, etc), teleworking, etc. This implies not only access to telematics, but also a critical reading [21] and strategic writing on the Internet to reach a self-regulatory protagonism towards social inclusion in the virtual environment. In addition, it implies sustainable technologies from the user perspective, user/student-centred learning, community, families, etc. with respect for diversity [22]. Literacy, deconstruction, and awareness are the processes that characterize and consider the various types of social inclusion in general, and especially the digital kind. This means seeing how ICT help to overcome exclusion, that they constitute unavoidable measures, named above, to begin training and appropriating the tasks of languages and tools necessary to acquire digital skills. These concepts and procedures are only understood when real use is made of the conceptual, procedural, and artefactual tools corresponding to the required processes and products.

2. Including the above mentioned in frameworks given by the relevant principles of precaution [23], sustainability, and ethics [24]. These standards of relevance and prudence [25] open development strategies that originate from the paradigm of inclusion, which drives the creative potential of users, recognizing its economy and culture, transforming the negative aspects (lack of infrastructure, shortage of strategies of abstract thinking, and reduced resources for production) into processes and products of relevant socio-cultural and technological innovation.

It is the state's role to assume and promote an economic-financial-cultural agenda corresponding to the training of people in general and using multidirectional virtual networks to shorten communications and install viable innovation.[26] This in turn is feasible for universities in Latin American countries – and other peripheral countries - as they are the leaders who assume, design, and protect, with 'designs for all', educational and technological strategies and policies of digital inclusion. Among them are the incubators for innovative efforts - aided by governments, which also complement and support strategies for technology support – that help with originating capital for genuine commitments to production and the use of socially useful technology.[27]

However, we still see that despite the huge presence of explicit statements such as this, there is little realization of these goals and there are curious paradoxes, given, for example, by some good economic indicators that do not, however, comply with the achievement levels the information society should achieve not only to create knowledge, but also to apply it to reducing material poverty and increasing symbolic production for the greatest social benefit.

No breakthroughs have been found in the concepts and their significant practical applications, viewed generally as integrating into society the advanced technological apparatus needed to promote skill development (i.e. full liberties) as opportunities for all. In other words, the hegemony

of 'official' knowledge still abounds, supported by socio-economic, political, and cultural inequality adopting new clothes.

Practical Measures

The above mentioned should be taught with and through ICT [28] to develop digital skills involved in the production of socially useful knowledge. ICT is the continent on which digital skills or e-skills are shaped, and is defined as: the availability of skills to seek, obtain, process, and communicate information and thus transform it into knowledge. It needs to be carried out by an independent, resolute, responsible, critical, and reflective individual when selecting and editing the information as well as its sources, using different technological tools as needed.

The respective digital tools and knowledge needed to develop digital skills are those that correspond to a media and telematics literacy, today with Web 2.0 for sharing and collaborating in the production of knowledge. Their development and teaching presuppose [29], among other things, the following main points:

1. *Access*: learning to appropriately use artefactual and invisible or socio-cognitive technology;
2. *Adoption*: supporting a revisionist way of teaching and learning;
3. *Adaptation*: integrating technology in an articulated way into various teaching and learning situations;
4. *Appropriation*: resignifying technology according to cognitive styles and multiple intelligences of users in a collaborative use according to the necessary projects and situations;
5. *Innovation*: discovering new uses of technology to combine them and enrich them on demand.

By Way of an Open Conclusion

Rethinking and resignifying the role of electronic education for social inclusion highlights the essential learnings from an inclusive approach, focused on the contrasted application in action, which, with the use of digital socio-cultural skills, improves social inclusion as a result of rethinking the knowledge acquired and to be acquired at various times and spaces, from various perspectives and dimensions, for socially useful production and use, in service to the community.

A steady education makes increasingly less sense in this uncertain and changing world. Skills and competencies should be developed for virtual environments, based on complexity and problem solving. The conduction of situated projects of personal and social relevance, with a contrasted assessment, the use of narrative strategies, with simulations, etc. invite us to explore, discuss, rebuild the information and generate our own, relevant and meaningful, learning. These are some of the strategies required for socio-cultural inclusion to occur in twenty-first-century society.

The ideas that lead to the deepening of the field of social studies of science and technology in its chapter on studying education – especially in its higher and electronic form - should be questioned in terms of their relevance in the light of philosophy of technology and critical theory, and their ability to cause not only theoretical-practical synthesis but also systemic-holistic approaches that amplify the interpretive horizon of these research programmes. Today it is of urgency when electronic education crosses all fields and areas of knowledge.

What is required is an integrated and unified construction of the world today, including everyone within a new covenant of liberty and power through rethinking and breaking down multiple barriers of zero cultural significance. We must challenge disciplinary and methodological preconceptions from all sides, moving them towards flexible and open mentalities and designs, to overcome narrow channels and perspectives for the future, as a field of research and practice.

Notes

[1] This considers new issues such as the creation of social images for a perception of science and technology that may be embodied in electronic educational programmes; the relationship between the production of scientific-technological knowledge and gender; the association between local knowledge and knowledge that is institutionalized throughout the world (e.g. in global educational programmes); the extent of appropriation of scientific and technological knowledge both from a

glocal mix or from the cooption in the hands of transnational programmes of local knowledge to return it to the world circuit; the role of knowledge production networks and their share of power and capacity to intervene in the direction of knowledge; the acknowledgement of new social spaces of knowledge production that transcend universities, as well as businesses, NGOs, etc. that drive the democratization of the same, and so on. See Kreimer, 2007.

[2] These are seen in the various axes represented by the doctorate programme on Online Distance Education as a reflective effort of educational processes mediated by advanced technology.

[3] Feenberg, 2009.

[4] Osorio, 2002.

[5] Grupo Gesyt et al, 1999.

[6] Bauman, 2007.

[7] An innovation is not only about producing new knowledge, but is also about creating 'new needs in society, since [society] has to be convinced that the benefits it may obtain from the innovation outweigh the cognitive costs generated in the transition period between the old and the new situation' (UNESCO, 2005a, b).

[8] The digital divide involves unequal movements in the access to infrastructure, media and/or connectivity, but though visible, they are not the only mechanisms that lead to asymmetric interaction and potential and significant appropriation of media and languages for expression on the part of users, through ICT, the Internet, and technology in general in a society of fragmented groups.

[9] Digital inclusion involves all forms of social integration offered to users, and the tools to build and exercise various and varied digital skills needed to function and be a part of a proactive and responsible citizenry with specialized training in various educational contents, in technology, which should be valid for various productive enterprises.

[10] Beck, 2006; Fainholc, 2008a, b.

[11] Considered by Giddens, 2001; Lash, 2005, among others.

[12] Olivé, 2006.

[13] Luna, 2003.

[14] Lakatos, 1993.

[15] Andrade, 2007.

[16] As per all diagnoses carried out in the southern hemisphere.

[17] Referencing Merton, 1980.

[18] The millennials are adept at using screens, are creative with technology, and highly skilled with 'multitasking' in a world of ubiquitous connectivity. They are known as the *Net Generation*, the *IM Generation*, or *the Instant-Message Generation*, *the Gamer Generation*, for the obvious reference to video games, and also as 'homo zappiens' for their ability to simultaneously control different sources of digital information (Howe & Strauss, 2000; Pew Research Centre, 2010).

[19] Knowledge is not something that can be limited to a time or to a definite place, which makes this ecosystem invisible, dynamic, and ubiquitous, today enhanced by the reality of the network, where complex learning, collaborative construction of knowledge, and teaching based on problem solving should be promoted with situated and evaluable projects with personal and social relevance.

[20] This involves suspending judgement, empathizing with a different someone, opening the mind, heart and will, overcoming the fragmented view of the world, creating prototypes (to take ideas to a physical embodiment), testing and disseminating them, which increases commitment and cooperation on the part of those involved - in other words, the invisible mechanisms of the individual and group condition.

[21] Fainholc, 2004.

[22] TECNONEET, 2004.

[23] Bijker, 2005.

[24] Vilches & Gil-Perez, 2003.

[25] Tecnologías para un desarrollo tecnológico con sostenibilidad (http//:www.oei.es/década/accion003.htm).

[26] For example, a small local inventor reaches someone in another part of the planet, who is able to/wants to invest as an entrepreneur: today it is possible to think optimally and optimistically, given the use of ICT and the Internet.

[27] Armony, 2007.

[28] Consisting of languages, media, and telematic tools that process, store, develop, transform, and share all types of multi and hypermedia information. Within these processes, digital skills and e-skills are configured.

[29] Inspired by J. Adell's YouTube video on Digital Skills, completed by the author of this article, and available at
http://web20ele.blogspot.com/2008/06/chequen-mi-skinflix_03.html.

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