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The educational landscape of the digital age: Communication practices pushing (us) forward

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Abstract

This paper identifies trends in the emerging models of knowledge production available in our society. We suggest it is crucial not only to be aware of these emerging models but also to be open to opportunities and possibilities that may still develop. We consider how people may express different levels of solidarity and commitment to these trends and models in their information consumption and distribution processes. We discuss how educators are now engaging in profound pedagogical renewal by expressing deeper levels of solidarity and commitment to knowledge production and educational projects through professional and personal interactions. These interactions are producing pedagogical models that allow both teachers and learners to become knowledgeable while simultaneously breaking away from domain conventions. These bottom-up pedagogies foster creativity, collaboration and the use of new digital tools. They are driven by learner interests and, as such, have the potential to bring the joy back into the learning process. Finally, we argue that emerging models of knowledge construction mediated by ICT provide new cultural landscapes and ecologies of learning that disrupt traditional inscriptions of individual identities and racial-cultural affinities.

Keywords

knowledge production, technology, learner identity, solidarity, social practices, bottom-up pedagogies

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El panorama educativo de la era digital: prácticas comunicativas que (nos) impulsan hacia adelante

Resumen

En este artículo, se identificarán algunos modelos y tendencias emergentes en la producción de conocimiento. Se hará hincapié especialmente en cómo los individuos implicados en los procesos de consumo y de distribución de la información expresan diferentes niveles de solidaridad y de compromiso, y se sugerirá que es crucial que las personas no solo conozcan estos procesos, sino que también estén abiertas a otros modelos, oportunidades y posibilidades que, dadas las condiciones sociotecnológicas y comunicativas actuales, aún deben desarrollarse. Se abordará con especial interés el ámbito de la educación, puesto que se entiende que los educadores están participando de forma comprometida en una profunda renovación pedagógica a través de proyectos compartidos cimentados en interacciones profesionales y personales facilitadas por las redes. Estas interacciones favorecen la emergencia de modelos pedagógicos que permiten a profesores y a alumnos convertirse en expertos al mismo tiempo que rompen con muchas convenciones epistemológicas clásicas. Estas pedagogías generadas de abajo arriba no solo fomentan la creatividad y la colaboración, y se sustentan en el uso de nuevas herramientas digitales, sino que las promueven e impulsan los intereses del alumnado, y por ello, tienen el potencial suficiente para devolverle la alegría al proceso de aprendizaje. Por último, se argumentará que los modelos emergentes en la construcción del conocimiento a través de las TIC ofrecen nuevos paisajes culturales y ecologías de aprendizaje que trastocan las inscripciones tradicionales de las identidades individuales y las afinidades raciales y culturales.

Palabras clave

producción de conocimiento, tecnología, identidad, solidaridad, prácticas sociales, pedagogías emergentes

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Introduction

It is often said that the 21st century, characterized by changes produced by globalization and technological advances, is a critical moment that obliges us to rethink everything that has gone before (Mishra, Koehler, & Henriksen, 2011). However, it is important to note that we are at the early stages of the 21st century. Clearly, technological change is not going to stop so we must be humble in the kinds of predictions we make. This is especially important because the meaning of a tool lies not only in its affordances but also in the broader cultural context within which it functions (Csiksentmihalyi, 1990). In other words, in order to understand how the future will play out we must be able to go beyond the surface of what people can do with the tools and consider their instantiation within a broader context.

In this paper we explore some of the emerging models of knowledge construction. We aim to explain some of the key issues concerning how the communication practices of the digital age both design and are designed by emerging forms of knowledge production and learning practices. Specifically, we suggest that as educators we need to focus on five broad themes or ideas that will be played out in the future. These are:

1. New models of knowledge construction are emerging.
2. These new models of knowledge construction are situated and contextualized within social interactions that link the individual, the group and the community at large within and across different levels of solidarity.
3. The above factors allow for the emergence of bottom-up pedagogies.
4. The multi-level bottom-up approaches to knowledge construction also have the potential for creative boundary breaking through the development of new possibilities that push the limit on traditional pedagogical structures by foregrounding user-driven creativity.
5. Finally, and perhaps most importantly, the new possibilities provided by digital and global networking technologies enable the liquefying of racial-cultural identities in ways that were previously impossible.

In the rest of this paper we will explore and discuss each of these themes in greater detail.

Emerging models of knowledge construction

Today we live in a liquid society, as defined by Bauman (1991), that is characterized by constant change, uncertainty and instability. Identifying models of knowledge construction to explain actual communication practices in full complexity is an insurmountable task. However, several trends in the scientific literature as well as in expert reports and innovation projects can be identified.

Explanatory models of knowledge construction now integrate the foundations of previous models that were based on cognitive variables. This moves us towards modern theories of a social and intrapsychological nature in which frameworks that acknowledge the importance of ICTs are generated. Examples of such approaches are the model of Knowledge Building (Bereiter, & Scardamalia, 1993), the Expansive Educational Transformation-through ICTs model (Batane, Engeström, Hakkarainen, Newnham, & Virkkunen, 2012), the Spiral Model of Knowledge Creation (Nonaka, & Takeuchi, 1995) and the Trialogic learning model proposed by Paavola and Hakkarainen (2005, 2009). These go beyond models that focus on the individual transmission of information towards multidirectional communication between educators and learners. As suggested by L.S. M. Bakhtin (1979) and Vygotsky (1979), social

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interaction through dialogue is at the heart of knowledge construction practices. However, much social dialogue today is mediated by ICTs and can connect individuals, groups and communities with shared or overlapping learning and communicative objectives.

Emerging theories of knowledge construction do not focus exclusively on formal education but account for a new ecology of learning experiences based on the ubiquity of the learning experiences enabled by ICT. There is broad consensus concerning the radical change that has taken place in recent decades with respect to the role of learning in our lives and across human society (Banks et al., 2007; Collins and Halverson, 2010; JISC, 2012). These changes, combined with the new economic, social, political and cultural landscape of the Information Society, have been known to create exponential shifts in the new ecology of learning (Ito, & al., 2012). The discussions cited here share the idea that learning is a life-long phenomenon (Banks et al., 2007). The growing acceptance of this idea has led to the concept of Learning Spaces (Leander, Phillips, & Taylor, 2010), bringing about a vision of education in which learning is no longer limited first and only to a single space (like schools) or to formal education. Above all, it has shifted the focus of interest towards the study of learning trajectories (Biesta et al., 2011) and learning pathways through scenarios or contexts of activity (Erstad, & Sefton -Green, 2013).

Personal uses of ICTs and learner identity are gaining strength in explanatory models of knowledge construction. People participate in informal activities and spaces that take advantage, to a greater or lesser extent, of the opportunities and resources provided for learning. These processes are characterized by deeply subjective experiences of learning that result from participation (Coll, 2013). Certainly, the skills and competencies involved in the formation of a competent learner are many and varied but at the base of all these is the learner's willingness to assume and develop an Apprentice Identity (Coll, & Falsafi, 2010; Falsafi, 2011).

Levels of solidarity in knowledge production, consumption and distribution dynamics

Theories of learning now acknowledge the importance of social interactions between individuals acting in a social world, as being influenced by the opportunities offered by digital technologies. Authors such as Crook (1996), Dillenbourg (2000) Harrasin et al. (2000) and Baker (2003) are important references in the field of collaborative learning mediated by technologies. The theory of situated cognition adds to this discussion, taking as a benchmark the sociocultural perspective of Vygotsky (1978) and, more recently, the work of Rogoff (1993), Bereiter (1997) and Wenger (2001), to name just a few of the best-known authors in the field of education. Social cognition problematizes learning as an activity located in a context that gives the process meaning. All knowledge acquisition is therefore contextualized in some form of social activity. The emphasis is put on meaning situationality, the skills and the strategies needed to interact with others. Learning is taken as a social, collaborative process that is situated, and therefore ordered and nurtured, at the heart of a community, its value systems, goals and participation dynamics. Knowledge acquisition is regarded as a process of social participation. This process is called legitimate peripheral participation as social actors, moving from the periphery towards the center of the community, become more active and more committed to the community culture. New participants progressively assume new roles. According to Lave and Wenger (1991), learning is the result of being part of the community. The authors develop the concept of community of practice to highlight the importance of work as a link between the individual and the community. Communities themselves have the function of legitimizing individual practices.

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When we talk about current and emerging trends in the construction of knowledge through ICT, we can identify three progressive and often overlapping levels of solidarity and commitment that link individuals, groups and communities. First is the individual, conscious of his or her own needs and responsible for his or her own personal learning project. Second is the group, which offers individuals the opportunity for interaction with others, responds to their needs and is the beneficiary of information-sharing and feedback processes in knowledge construction. Third is the community, which establishes the means, values and goals shared by the collective. At this level, interactions occur in the framework of a joint project to build knowledge collaboratively in processes that transcend individuals and groups.

At the first level of solidarity we find individuals who are able to recognize, from both the personal and professional perspectives, their own learning needs throughout life and to organize their own personal learning and work environments. They make connections between what they learn, how they learn, and whom they learn with and from. In this sense, ICTs provide individuals with tools for information management and communication that allow them to constantly adapt their learning and knowledge production processes. As examples, we can see uses of learning portfolios and personal learning environments (PLE – Dabbagh, & Kitsantas, 2012; and Castañeda, & Adell, 2013). What is relevant here is not simply the technology used to construct these spaces but all the methodological approaches and actual design processes with important educational and institutional implications.

At the second level of solidarity we find group forms of interaction that promote joint construction of knowledge. ICTs are the medium that allows the creation of communication systems, websites or group editable documents, virtual discussion forums, chat rooms and video conferencing for content negotiation, etc. This introduces new ways of working based on the benefit of feedback for achieving common learning or knowledge production objectives. It is important to bear in mind, however, that technology alone will not create spaces for learning or communication. Educational strategies that promote collaborative learning in environments mediated by technology (CSCL) are necessary.

At the third level of solidarity we find the community. Here, both groups and individuals offer their knowledge to the collective, while benefiting from a global project. Participation is not exclusively directed by individual compensation but by an underlying will to contribute. One example is Wikipedia. We can use Wikipedia to find information at a given moment (first level of solidarity) or we can decide to provide/correct/improve its information (second level of solidarity). However, if we approach Wikipedia from the third level of solidarity, we: value the potential of the project as a tool for the joint construction of knowledge and social participation on a global scale; support it either intellectually or economically; and help organize and enhance strategies users can apply to provide/correct/improve information.

The three levels of solidarity are not mutually exclusive since they can share common aspects. People involved in emerging trends of knowledge production will be participating in different endeavors and expressing different levels of solidarity depending on their goals and values. Decisions are always contextual and situated, and always generate commitment to learning and knowledge construction projects. This highlights the complexity of processes mediated by technology, where individuals and groups of individuals, both in formal and non-formal contexts, express different levels of solidarity and commitment to the project on which they collaborate. These collaboration practices break geographical, time and even cultural barriers. Educational projects using ICT should take into account the social dimension of learning with the different levels of solidarity and commitment described above.

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Bottom-up pedagogies

Taking advantage of the opportunities for creating knowledge together is more than a possibility in itself and becomes a condition of knowledge production dynamics. The notion of learning and knowledge as "something" fixed that can be collected, stored and accumulated individually is becoming obsolete. Learning happens in communities. However, communities are not just meetings of individuals but gatherings of potentials in action – networks where learning and knowledge remain, flow, grow, change and move through and by people. There are now a number of theoretical approaches that attempt to provide answers to the challenges posed to education in the face of this new scenario.

Beetham, McGill and Littlejohn (2009: 12) drew up a list of "new pedagogies" that included 2.0 Learning, 2.0 counter evidence Learning, Connectivism, Communities of Enquiry, the Practical Inquiry, Academic Apprenticeship, e-Learning and e-Pedagogy. Attwell and Hughes (2010) have added to this list Constructivism, Communities of Practice, Activity Theory, Vygotsky and Social Constructivism, Scaffolding Learning, Boundary Objects, Models for a Pedagogic Toolkit, Curriculum Development and Rhizomatic Knowledge, Discourse, Collaboration and Meta Cognition, Bricolage and Learning styles. Following the perspective of Snowden and Boone (2007) on complexity, we could say that this is a really –and impressively– complex environment where pedagogical "solutions" and "answers" cannot be prescribed or even discovered. The pedagogies that respond to new knowledge construction dynamics are "emerging" –as is learning (Williams, Karousou, & Mackness, 2011).

These emerging pedagogies have been defined as "the set of pedagogical approaches and ideas, not yet well systematized, that arise around the use of ICT in education and attempt to bring out its communicative, informational, collaborative, interactive, creative and innovative potential in the context of a new culture of learning" (Adell, & Castañeda, 2012, p. 15). Most are proposals developed by educators who are engaged in collaborative environments of practice and, though loosely associated with professional networks, are intensively participative in both discussions and the exchange of experiences on social networking sites such as Twitter and Facebook or on specific contextualized networks.

The new models of knowledge production presented allow for a change of paradigms in pedagogical approaches. Practitioners (teachers and educators) look for ways of answering new environmental needs through dialog and participation in communities of practice. They engage in profound pedagogical renewal, expressing, through their personal and professional communicative practices, deep levels of solidarity and commitment to knowledge production. Bottom-up pedagogies become influential in pervasive ways, opening space for sharing creative solutions and the critical re-usage of ideas.

Breaking the knowledge boundaries by which we live

In 21st century learning, educational scholars (and popular culture at large) often suggest that because of new digital technologies "everything has changed." And yet, when we consider the fact that timeless issues of pedagogy and of human thought and learning remain the same, it is clear that in some ways "nothing has changed". We suggest that both are occurring at the same time – there is a dual reality here in which nothing has changed and yet everything has changed (Kereluik, et al., 2012). It therefore becomes important to consider ways of thinking that

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are flexible and adaptable and that promote new growth within these expansive environments. It has been noted that there is a "zone of possibility" in smart uses of technology that focuses not just on the technology but keeps humanistic concerns front and center (Dirkin, & Mishra, 2010).

Of specific interest to us in these aspects of 21st century learning is the idea of creativity. One thing that is clear from the research on creativity is that creativity requires a dual view of the world – a strong grounding in a discipline and an ability to break out of the discipline (Root-Bernstein, 1999; Mishra, Henriksen, & the Deep Play Research Group, 2012). Clearly, this view demands new pedagogical structures that respect nonconformity and the urge to explore for the sake of exploration, to value risk-taking and learning from failure and error. In fact, it has been argued that, in contexts characterized by change, fear of failure may actually be the greatest barrier to learning (Amabile, 1996). In this context, a tolerance for risk combined with an ability to re-signify error as not being the "end of the world", so to speak, but rather as a stepping-stone to future success is of critical importance (Clifford, 1991; and Dewett, 2007).

The biggest task in getting teachers and students to be creative involves helping them see the world as something one can play with, that most of the things we think of as "rules" are actually conventions created by other humans that can be manipulated and changed (Mishra, Henriksen, & The Deep-Play Research Group, 2012). We would argue that the goals require us to construct environments that encourage people to see the world with new eyes and be opportunistic to the potential for these new tools to help us engage with the world in innovative ways.

What we need is what has been described as an "(in)disciplined" pedagogy (Mishra, Henriksen, & the Deep-Play Research Group, 2012; 2013). This concept of "(in)disciplined" pedagogy suggests that being creative in a given domain requires being both knowledgeable and skilled in the domain or discipline while also being able to break away from the domain's conventions. Research shows that some of the most creative people (in both Sciences and Arts) have widely varied and interdisciplinary interests that are key to their creativity in their professional field. This is a dual focus on developing disciplinary ways of thinking while being flexible in bringing in ideas from outside the discipline. This suggests the value of developing curricula that break traditional boundaries and are driven more by the interests of the learner (and of the teacher) than the typical top-down, lock-step, standard curricular structures we have become stuck within (Giroux, & Schmidt, 2004).

It is important to emphasize that, though the tools we have today are powerful and have great potential for transforming pedagogy, it is far more important to rethink the contexts within which these tools are used. So, when we think about developing learning communities, the availability of social media and user networks is a great boon. Such environments tend to be more bottom-up and driven by user and learner interest, thus fostering collaboration and creativity. As time goes by, these tools will have lower barriers to entry, making them easier to access and use.

These new learning environments, as described above, foster creativity and collaboration through bottom-up pedagogies and new digital tools and are driven by learner interests. They therefore have the potential to bring joy back into the learning process. Successful scientists and professionals often speak about the aesthetic aspects of learning – similar to how artists speak about their work (Root-Bernstein, 1999; 2003). We believe that new tools will truly be able to transform how we develop and apply knowledge in the future.

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Liquefying racial-cultural identities

As digital texts and tools enable individuals to engage the world in a multitude of innovative ways, their use also works to liquefy "solid" forms of racial-cultural identification and organization that earlier forces of modernity attempted to inscribe (Bauman, 1991). In their solid form, hierarchies of power and privilege define individuals within constructed (and constrained) racial, cultural, and language categories as part of a larger project of division, domination, and control. Emerging models of knowledge construction mediated by ICT provide new cultural landscapes and ecologies of learning that disrupt traditional inscriptions of individual identities and racial-cultural affinities.

Learning with digital texts and tools "involves taking on and playing with identities in such a way that the learner has real choices (in developing virtual identities) and ample opportunity to mediate the relationship between new identities and old ones" (Gee, 2003, p. 208). As digital and virtual spaces for participatory learning allow for choice and play with new identities, these liquefying processes dissolve the logic and limits of solid, static forms of racial-cultural identification. The term "micro-culture" can be used to indicate the distinct set of practices, prerogatives, and perspectives engaged in by an individual in a specific digitally mediated learning context. These contexts permit multisensory, multidimensional, interactive cyber experiences with an almost infinite range of written, audio, visual, and animated texts. Learners do not just consume and respond to digitally accessed messages and images, they also produce and propagate meanings and representations of their own (including representations of themselves). These meanings can challenge or counter the social constructions of identity from other societal institutions. The re-mixing practices that are characteristic of digital production lend themselves to experimenting, analyzing and performing different realities and different positioning of individual selves (Knobel and Lankshear, 2008; Mahiri, 2011), and the use of online spaces and tools for identity exploration, formulation and expression are pervasive for many learners.

Following authentic, immediate, and customized interests, learners elude local structures of space and place and virtually participate in affinity groups in which they are "bonded primarily through shared endeavors, goals, and practices and not shared race, gender, nation, ethnicity, or culture" (Gee, 2003, p. 197). Aided by avatars and digitally distanced from stereotypes embodied in physical contexts, racial identities and categories can become more ambivalent, if not entirely indeterminant. Identities are constructed through learning and participation in communities of practice (Lave, & Wenger, 1991). However, as a learner moves from the periphery towards the center of a virtual community, the expert may be embedded in the material intelligence of the digital device that mediates the group's interactions and activities. Essentially, the Internet and other digitally mediated, virtual practices have significantly transformed how 21st century learners leverage online communities and digital texts and tools for exploring, expressing and transforming personal or cultural identities and affinities.

Conclusion

In this paper we have identified five key aspects of learning in this new millennium. We do not suggest that these are the only important issues to consider but we do believe that these five aspects capture key themes that we as educators need to consider as we look to the future. To summarize, we suggest that the forces of technology-change

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and globalization, combined with increasing ease of use and access to these technologies, have implications for knowledge construction that are situated at different levels of solidarity and commitment (individual, group and community). These new forms of interaction and knowledge-construction allow for the emergence of bottom-up pedagogies that can creatively disrupt extant boundaries and, through this, lead to the liquefying of racial and cultural identities.

We therefore suggest that it has become essential to acquire skills that enable people to make best use of the opportunities, resources and tools available to them for learning in a given context. Educators should direct their efforts towards structuring learning environments in which solidarity and commitment are nurtured rather than hindered. In this way, the knowledge-production goals of the individual, the group and the community are achieved. A key issue is how to promote legitimate peripheral participation that empowers people to move from the periphery towards the center and become more active and more committed to the culture of the community.

The development of ICTs and new possibilities for social networking have enabled educators to engage in collaborative environments of practice, participating in the discussion and exchange of experiences that favor profound pedagogical renewal. Many educators now engage in bottom-up pedagogies that allow them to express, through their communicative practices, deep levels of solidarity and commitment to knowledge-production and educational projects. This further promotes creative solutions and fosters the critical re-usage and re-purposing of ideas. This movement creates space for pedagogical structures that are characterized by nonconformity, exploration, risk-taking and positive views of error and fun in learning. It also liquefies "solid" forms of racial-cultural identification and organization as communicative practices are driven by authentic, immediate, and customized interests. This allows participation in affinity groups that elude local structures of space.

As the educational context of the 21st century expands and shifts, it becomes increasingly important for educators to make sense of the participation, interaction and collaboration practices that move us forward. In this paper we have explored some of the emerging models of knowledge construction and suggest that it is crucial not only to be aware of them but also to be open to the opportunities, possibilities and new models that may still develop in this context.

References

Adell, J., & Castañeda, L. (2012). Tecnologías emergentes, ¿pedagogías emergentes? In J. Hernández, M. Pennesi, D. Sobrino, & A. Vázquez (Eds.), *Tendencias emergentes en educación con TIC* (pp. 13-32). Barcelona: Asociación Espiral, Educación y Tecnología.

Amabile, T. M. (1996). *Creativity in context.* Boulder, CO: Westview Press Harper Collins Publishers.

Attwell, G., & Hughes, J. (2010). Pedagogic approaches to using technology for learning: Literature review. Wales: Pontydysgu: Lifelong Learning UK (LLUK). Retrieved from http://dera.ioe.ac.uk/2021/1/harnessing-technology-literature-review-january-111.pdf

Baker, M. J., Quignard, M., Lund, K., & Séjourné, A. (2003). Computer-supported collaborative learning in the space of debate. In B. Wasson, S. Ludvigsen, & U. Hoppe (Eds.). *Designing for Change in Networked Learning Environments: Proceedings of the International Conference on Computer Support for Collaborative Learning 2003*, pp. 11-20. Dordrecht: Kluwer Academic Publishers.

http://rusc.uoc.edu | ISSN 1698-580X http://dx.doi.org/10.7238/rusc.v12i2.2440

Bakhtin, M. M. (1979). *[The] Aesthetics of Verbal Art*. Moscow: Iskusstvo.

Banks, A. et. al. (2007). *Learning In and Out of School in Diverse Environments: Life-Long, Life-Wide, Life-Deep. The Learning in Informal and Formal Environments Center*. University of Washington, Stanford University, and SRI International. Retrieved from http://education.washington.edu/cme/cenpub.htm

Batane, T., Engeström, Y., Hakkarainen, K., Newnham, D., & Virkkunen, J. (2012). Dilemmas of promoting expansive educational transformation through ICTs in Botswana. International Society of the Learning Sciences. Proceedings of the 10th international conference of the learning science.

Bauman, Z. 1991: *Modernity and ambivalence*. Ithaca, N.Y.: Cornell University Press.

Beetham, H., McGill, L., & Littlejohn, A. (2009). Thriving in the 21st century: Learning literacies for the digital age (LLiDA project). Glasgow: the Caledonian Academy, Glasgow Caledonian University. Retrieved from http://www.jisc.ac.uk/media/documents/projects/llidareportjune2009.pdf

Bereiter, C. (1997). Situated cognition and how to overcome it. In D. Kirshner, & J. A. Whitson (Eds.), *Situated cognition: Social, semiotic, and psychological perspectives* (pp. 281-300). Hillsdale, NJ: Erlbaum.

Bereiter, C., & Scardamalia, M. (1993). *Surpassing ourselves: An inquiry into the nature and implications of expertise*. Chicago: Open Court.

Biesta, G. J. J., Field, J., Hodkinson, Ph., Macleod, F. J., & Goodson, I. F. (2011). *Improving learning through the lifecourse. Learning lives*. New York and London: Routledge.

Castañeda, L., & Adell, J. (Eds.). (2013). *Entornos Personales de Aprendizaje: claves para el ecosistema educativo en red*. Alcoy: Marfil. Retrieved from http://digitum.um.es/xmlui/bitstream/10201/30427/1/CastanedayAdelllibroPLE.pdf

Clifford, M.M. (1991). Risk Taking: Theoretical, Empirical, and Educational Considerations. *Educational Psychologist, 26*, 263-297. doi: http://dx.doi.org/10.1080/00461520.1991.9653135

Coll, C. (2013). La educación formal en la nueva ecología del aprendizaje: tendencias, retos y agenda de investigación. In J. L. Rodríguez Illera (Eds.), Aprendizaje y Educación en la Sociedad Digital (pp. 156-170). Barcelona: Universitat de Barcelona. Retrieved from http://www.psyed.edu.es/archivos/grintie/AprendizajeEducacionSociedadDigital.pdf

Coll, C., & Falsafi, L. (2010). Learner identity. An educational and analytical tool. *Revista de Educación, 353*, 211-233. Retrieved from http://www.revistaeducacion.educacion.es/re353/re353_08esp.pdf

Collins, A., & Halverson, R. (2010). *Rethinking education in the age of technology. The digital revolution and schooling in America*. New York: Teachers College.

Crook, C. (1996). *Computers and the collaborative experience of learning*. New York: Routledge.

Csikszentmihalyi, M. (1990). Creativity: Flow and the psychology of discovery and invention. New York: Harper Collins.

Dabbagh, N., & Kitsantas, A. (2012). Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. *The Internet and Higher Education*, *15*(1), 3-8. doi: http://dx.doi.org/10.1016/j.iheduc.2011.06.002

Dewett, T. (2007). Linking intrinsic motivation, risk taking, and employee creativity in an R&D environment. *R&D Management*, *37*(3), 197-208. doi: http://dx.doi.org/10.1111/j.1467-9310.2007.00469.x

Dillenbourg, P. (2000). Virtual learning environments. Workshop on virtual learning environments. Retrieved from http://tecfa.unige.ch/tecfa/publicat/dil-papers-2/Dil.7.5.18.pdf

http://rusc.uoc.edu | ISSN 1698-580X http://dx.doi.org/10.7238/rusc.v12i2.2440

Dirkin, K. H., & Mishra, P. (2010). Values, beliefs, and perspectives: Teaching online within the zone of possibility created by technology. In D. Gibson, & B. Dodge (Eds.), Proceedings of the Society for Information Technology & Teacher Education International Conference 2010 (pp. 3811–3817). Chesapeake, VA: AACE. Retrieved from http://editlib.org/p/33974

Erstad, O., & Sefton-Green, J. (2013). (Eds.). *Identity, community and learning lives in the digital age*. Cambridge: Cambridge University Press.

Falsafi, L. (2011). Learner identity. A sociocultural approach to how people recognize and construct themselves as learners. Doctoral thesis. Universidad de Barcelona. Retrieved from http://www.psyed.edu.es/prodGrintie/tesis/Falsafi_Thesis.pdf

Gee, J. 2003. *What video games have to teach us about learning and literacy*. New York: Palgrave MacMillan.

Giroux, H.A., & Schmidt, M. (2004). Closing the achievement gap: A metaphor for children left behind. *Journal of Educational Change, 5*, 213-228. doi: http://dx.doi.org/10.1023/B:JEDU.0000041041.71525.67

Harasim, L. et al. (2000). *Redes de aprendizaje. Guía para la enseñanza y el aprendizaje en red*. Barcelona: Gedisa.

Harasim, L., Hiltz, S.R., Teles, L. and Turoff, M. (2000). *Learning Networks: A Field Guide to Teaching & Learning Online*. Cambridge: MIT Press.

Ito, M., Gutierrez, K., Livingstone, S., Penuel, B., Rhodes, J., Salen, K., Schor, J., Sefton-Green, J., & Watkins, C. (2013) *Connected Learning: An Agenda for Research and Design*. Irvine, CA: Digital Media and Learning Research Hub.

JISC. (2012). Learning in a digital age. Retrieved from http://www.jisc.ac.uk/whatwedo/programmes/elearning/digilifelong.aspx

Kereluik, K., Mishra, P., Hagerman, M., DeSchryver, M., Wolf, L., Fisser, P., Shin, T., Terry, L., & Koehler, M. (2012). What would John Dewey Do: Programmatic design for developing TPACK for 21st Century Learning. In P. Resta (Ed.), Proceedings of Society for Information Technology & Teacher Education International Conference 2012 (pp. 4724-4728). Chesapeake, VA: AACE.

Kereluik, K., Mishra, P., Fahnoe, C., & Terry, L. (2013). What knowledge is of most worth: Teacher knowledge for 21st century learning. *Journal of Digital Learning in Teacher Education, 29*(4), 127-140. doi: http://dx.doi.org/10.1080/21532974.2013.10784716

Knobel, M., & Lankshear, C. (2008). Remix: The art and craft of endless hybridization. *Journal of Adolescent & Adult Literacy. 52*(1), 22-33. doi: http://dx.doi.org/10.1598/JAAL.52.1.3

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press. doi: http://dx.doi.org/10.1017/CBO9780511815355

Leander, K. M., Phillips, N. C., & Taylor, K. H. (2010). The changing social spaces of learning: Mapping new mobilities. *Review of Research in Education*, 34, 329-394. doi: http://dx.doi.org/10.3102/0091732X09358129

Mahiri, J. (2011). *Digital tools in urban schools: Mediating a remix of learning*. Ann Arbor: University of Michigan Press. doi: http://dx.doi.org/10.3998/toi.10329379.0001.001

Mishra, P., Henriksen, D., & The Deep-Play Research Group. (2012). On Being (In)disciplined. *Tech Trends 56*(6), 18-21. doi: http://dx.doi.org/10.1007/s11528-012-0608-y

Mishra, P., Koehler, M. J., & Henriksen, D. (2011). The Seven Trans-disciplinary Habits of Mind: Extending the TPACK Framework Towards 21st Century Learning. *Educational Technology*, *11*(2), 22-28.

Nonaka, I., & Takenchi H. (1995). *The knowledge creating company; How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.

http://rusc.uoc.edu | ISSN 1698-580X http://dx.doi.org/10.7238/rusc.v12i2.2440

Paavola, S., & Hakkarainen, K. (2005). The knowledge creation metaphor – an emergent epistemological approach to learning. *Science & Education,* 14, 535-557. doi: http://dx.doi.org/10.1007/s11191-004-5157-0

Paavola, S., & Hakkarainen, K. (2009). From meaning making to joint construction of knowledge practices and artefacts – A trialogical approach to CSCL. Retrieved from http://www.helsinki.fi/science/networkedlearning/texts/paavola-hakkarainen-2009-trialogical-cscl.pdf

Rogoff, B. (1993). *Aprendices del pensamiento. El desarrollo cognitivo en el contexto social.* Barcelona: Paidós.

Root-Bernstein, R. S. (2003). The art of innovation: Polymaths and the universality of the creative process. In L. Shavanina (Ed.), *International handbook of innovation* (pp. 267-278). Amsterdam: Elsevier. doi: http://dx.doi.org/10.1016/B978-008044198-6/50018-8

Root-Bernstein, R. S., & Root-Bernstein, M. M. (1999). *Sparks of genius: The thirteen thinking tools of the world's most creative people.* Houghton Mifflin Harcourt.

Snowden, D. J., & Boone, M. E. (2007). A leader's framework for decision making. *Harvard Business Review*, *85*(11), 68. Retrieved from http://aacu-secure.nisgroup.com/meetings/ild/documents/Symonette.MakeAssessmentWork.ALeadersFramework.pdf

Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.

Wenger, E. (2001). *Comunidades de práctica. Aprendizaje, significado e identidad*. Barcelona: Paidós.

Williams, R., Karousou, R., & Mackness, J. (2011). Emergent learning and learning ecologies in web 2.0. *The International Review of Research in Open and Distance Learning*, *12*(3), 39-59. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/88

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