

Media Education Practices

Media Education as a tool to promote critical thinking among students

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Abstract. Media Education is discussed in relation to critical thinking and the need to promote teaching and learning environments which form independent, empowered persons. The paper discusses the interplay between the Theory of Critical Thinking and Media Education. It demonstrates how the teaching of media education can be used as an effective means to promote a critical attitude and facilitate the process of registering, reflecting and exchanging knowledge thus enhancing the understanding of how the media can be related to broader social and economic changes. It also suggests how the media itself, in this paper through weblogs, can be used in teaching and learning contexts to promote critical thinking.

Keywords: Media Education, Critical Thinking, Critical Pedagogy, Weblogs.

1. Introduction

Digital technology has changed the media landscape in a radical way with the result that now a different media environment exits. As opposed to the traditional media, the model of communication of the new media is flattened, democratized, low cost, egalitarian, easy to use and involves communication from many to many (Castells, 2000). The Internet has a privileged space in this environment and is today used by a total 2.4 billion persons. The World Wide Web, freely available for only twenty years, is populated by around 630 million websites (Internet World Stats, 2012).

The many effects of this radical change in the way we communicate have positive and negative implications. Berners-Lee, the person who invented the Web believes that the egalitarian principles of universal free access are being undermined under pressure from business enterprises (Berners-Lee, 2010). This danger together with the pervasiveness and omnipresence of the new media make the development of a critical attitude an essential requisite for active citizenship.

Policy makers, particularly within UNESCO, the Council of Europe and the European Union emphasize the need for the development of an educational system based on the promotion of critical skills. This same objective is promoted by the exponents of Critical Thinking and Critical Pedagogy. Media education as well as critical pedagogy strives to empower students and adults become independent thinkers. The media themselves could be used for the development of such skills. This paper makes two contributions (i) it compares the objectives of media education with the objectives of Critical Thinking and Critical Pedagogy and (ii) it suggests how the media itself, in this paper through weblogs, can be used in teaching and learning contexts to promote critical thinking.

2. Media Education and Critical Pedagogy in the digital age

Researchers and policy makers have argued that media education is crucial to the development of young people (e.g. Buckingham, 2009). Every sphere of life - economy, politics, religion, culture and relationships - is influenced by the media. It is crucial, they argue, that media education should bea means of promoting and fostering critical thinking in students enabling them to face the rapidly changing media landscapes. The UNESCO (1982) sponsored Grunwald Declaration on Media Education declares that media education programmes should "develop the knowledge, skills and attitudes which will encourage the growth of critical awareness and, consequently, of greater competence among the users of electronic and print media. Ideally, such programmes should include the analysis of media products, the use of media as means of creative expression, and effective use of and participation in available media channels" (para.1). UNESCO again stressed this position in the Paris Agenda (UNESCO, 2007), which was published on the 25th anniversary of the Grunwald Declaration. It states that media education must necessarily stress the importance of developing skills for critical analysis of messages, both in news and entertainment, in order to strengthen the capacities of autonomous individuals and active users.

The Parliamentary Assembly of the Council of Europe also states that the objective of Media Education is "to develop media competence, understood as a critical and discerning attitude towards the media in order to form well-balanced citizens, capable of making their own judgments on the basis of the available information." (Paragraph 8 of Recommendation 1466, 2000). The media educated person should be able to access, analyse and interpret information while identifying the economic, political, social and/or cultural interests that lie behind it. The European Union similarly emphasizes that Media Education should include "the ability to ... critically evaluate different aspects of the media and media contents and to create communications in a variety of contexts" (Commission of the European Committees, 2007: Para 2).

At the core of these documents is the recognition and belief that children and adults, more than ever before, need to learn how to acquire, analyse and integrate knowledge they access from multiple sources, including music, video, online databases, and other social media. They need to discern the validity and reliability of the source of the information they are presented with. These documents acknowledge that it is crucial for media education to be included in the school curriculum in order to empower young people to critically assess the information that they can instantaneously access from anywhere around the world. When we truly understand what it means to live in a globalized world, represented mostly by the virtual realities of social networks that students are roaming in all the time, and the implications of this reality on their lives, then we realize the importance of educating them in understanding the perspective of others, developing a historical grounding, and seeing the interconnectedness of economic and ecological systems (Bruce, 2002).

This critical approach is in line with the general approach to education of two academic streams that have contributed extensively in shaping the foundations of education since the 1970s. Exponents of the theories of Critical Thinking (e.g. Paul, 1990; Siegel, 1996) and those of Critical Pedagogy (Freire, 1970; McLaren and Leonard, 1993; Giroux, 1994), like the exponents of media education (e.g. Buckingham, 2003, 2009; Marcus, 2009), have the empowerment of people as their objective. The word 'critical' is common and is considered one of the main objectives and values of education. This use of the term entails a passion and sense of urgency about the need for more critically oriented classrooms. Burbules and Berk (1999) note that these academic streams are aware that society in general and many of its members lack, to some extent, the skills or disposition enabling them to recognise inaccuracies, distortions and even falsehoods. They add that one concern shared among these streams is how to empower people to recognise that their freedom is limited by the same inaccuracies and distortions. Critical thinking is a most necessary and indispensable component of the dialogical method of teaching, which contrasts heavily to the previous long-standing tradition of the banking concept of education (Freire, 1973). Freire and Shor believe that humans have become more and more critically communicative beings and consequently "dialogue is a moment where humans meet to reflect on their reality as they make and remake it" (1987: 98-99).

Advocates of both Critical Thinking and Critical Pedagogy believe that all human beings need to become better critical thinkers, thus bringing about a general humanizing effect, across all social groups and classes. Becoming more critical in thought and action enables the learner to see the world as it is and act accordingly. Thus, critical education can increase freedom and widen the scope of possibilities for learners. The method of Critical Pedagogy, for Freire, involves not only reading

the word but also and most importantly reading the world (Freire and Macedo, 1987). Critical consciousness requires one to have a discerning attitude towards social relations, social institutions, and social traditions that create and maintain conditions of oppression. Within this perspective, the teaching of media literacy and media education become a primary form of cultural action and therefore must "relate speaking the word to transforming reality" (Freire 1970: 4). Freire devises a process of decodification which is at the heart of the dialogical method. This involves a "reading" of social dynamics, of forces of reaction or change, of why the world is as it is and how it might be made different. Therefore exponents of Critical Thinking and Critical Pedagogy do their utmost to help learners understand the world as it is and not as sometimes presented by the media.

3. The Critical Consumer

It is in the context of such a liberating concept of and perspective on education that we must look at the digital world we are living in today. The advent of cyberspace in the 1990's brought about a revolution in its own right. The space that the computer screen invites us to join in is, in a certain sense, similar to the acoustic space of the pre-literate culture as it is not only everywhere around us but also potentially of our own making (Levinson, 1999). Today's cyberspace, which is the reality of so many people in the present world, also offers the space and opportunity for critical dialogue, a dialogue that can challenge people's perspectives and enlighten their minds In such a space people can realize that reality is socially constructed and the role of the educator is precisely to create this awareness and help people become active participants in the social construction of reality. Through such awareness, education can really liberate persons.

According to exponents of Critical Thinking (e.g. Scheffler, 1991; Ennis, 1996) the person becomes critical when he or she learns how to be a critical consumer of information. This means that learners necessarily seek reasons and evidence for everything they learn, and in the process master certain skills such as the ability to clarify, to seek and judge well the basis for a view, to infer wisely from the basis, to imaginatively suppose and integrate, and to do these things with sensitivity toward others. This overlaps with the objectives of media education. Buckingham points out that media education is also about "critical thinking, and about cultural dispositions or tastes ... It is about creativity, citizenship, empowerment, inclusion, personalisation, innovation, critical thinking" (2009: 15). The Report on the Results of the Public Consultation (2007) conducted by the European Union quotes Livingstone and Millwood Hargrave who argue that critical literacy should be part of the definition of Media Literacy. This helps one distinguish "the honest from the deceptive, the public interest from commercial persuasion, the objective and trustworthy from the biased or partisan" (Commission of the European Committees, 2007: 6).

4. The Use of Edublogs as a Pedagogical Tool

The second part of the paper will address how the media itself can be used as a tool to promote critical thinking. The use of a weblog, sometimes called edublog, in the classroom or lecture room is used as an example of one way of creating this dialogue. A weblog is one of several second generation web-based "read and write" powerful tools for informal learning. Educators consider their implementation in formal educational practice as a way of increasing understanding and interaction (McLoughlin and Lee, 2008; Wopereis et al., 2010). Weblogs are considered to be mainstream social software (Wijnia, 2005).

With the arrival of the first blog-hosting tools the usage of blogs spread during 1999 and the years following. By the beginning of the new millennium, blogging was established for how-to manuals, news sources, and platforms for politicians and political candidates. Eventually, weblogs emerged as online educational tools which offer many affordances for teaching and learning. Edublogs have the potential and applicability as a format that encourages collaborative learning and provoke higher order thinking skills such as critical thinking and reflection (Lee and Allen, 2006). They support asynchronous and synchronous communication, carry multimedia elements, are easy to use and encourage users to share their thoughts and ideas in an informal way (Wang and Woo, 2008). Interactivity is also one of the main characteristics of weblogs. They can promote and facilitate collaborative teaching and learning on the web (Godwin-Jones, 2003). These affordances make second generation web-based "read and write" tools which include social networks, wikis and weblogs and folksonomies, powerful tools for informal learning (Boyd and Ellison, 2008; Mason and Rennie, 2007). An increasing number of educators from several countries are also using weblogs in the formal teaching and learning setting (Greenhow et al., 2009; Ravenscroft, 2009).

Weblogs are conversational in nature and can provide reflection through dialogue, information and commentary on a particular issue or subject. They may also include photographs (photoblogs), videos (vlogs) or audio (podcasting). They are part of a wider network of social media as they offer easy ways to create bulletin boards (Ray, 2006). Within the parameters of an educational context, blogs can serve as resource centers (Oravec, 2002) and as showcases for students' projects (Ray, 2006), support the formation of online communities, serve as interactive knowledge-exchange tools and most of all, allow the exchange of thoughts on a public channel without using HTML language, allowing the users to focus their attention on the writing content (Herring et al., 2004). Participants in a blog can share their resources and findings and receive feedback not only from the members of their online community but also from people outside it who would be interested in that particular subject.



Figure 1: Example of an edublog

Weblogs offer three main educational affordances: (i) ownership, (ii) developmental processes and (iii) interactivity (Wang & Woo, 2008). (i) Ownership

In contemporary educational practice students are increasingly responsible for their own learning. Thus, they should be in charge of their learning toolbox. In the case of weblogs, students are fully responsible for content and interface. They "own" the tool, because they are allowed to customize the interface, add, edit or delete postings and external comments. Feeling a sense of ownership of a blog might also contribute to a decentralized system of interaction and learning. Students with blogs no longer need to intentionally visit a hub site to communicate with others. Instead, the students concentrate on blogging activities on their own site and simultaneously communicate with other peer students by using the Rich Site Summary (RSS) system which delivers a list of updates of comments and entries. A sense of ownership is a critical impact factor that can also motivate students to voluntarily join online activities. In line with the spiral of silence theory (Noelle-Neumann, 1984), people tend to remain silent if the public sphere seems to

be dominated by an opinion different from theirs as many people do not like to belong to the minority group. A blog, in a certain sense, is considered to be a personal spacein which an owner of a blog feels safe precisely because he/she is the owner. Consequently students would be more likely to express their own opinion without fear of isolation even if their opinion happens to be a minority one. In a personal blog it would be easier for students to meet others with a similar opinion thus realising that they are not alone. This could give them enough courage to criticise and challenge the opinion which was considered to be dominant.

(ii) Developmental tools

A study carried out by <u>Wang et al.</u> (2009) used an interactive learning environment involving three forms of interaction, i.e. individual reflection, group collaboration and classroom discussion to investigate the extent to which the three forms of interaction promoted students critical thinking and knowledge construction. The results of the study showed that writing reflections had the potential to promote critical thinking however not all students reached the same level.

Interactive learning environments like edublogs provide an informal learning environment. The formal learning environment in schools does not necessarily reflect the stage of development of the individual students. In contrast the blog and its content is in the total control of the student whose contributions in it reflect his/her developmental stage. Blogs also offer the opportunity to display developmental processes since they present posts in reverse chronological order and therefore capture sequences of learning activities. Such an activity becomes all the more significant because the students can add keywords (tags) to posts, and thus engage in a process of categorization. Blogs enable students to interact with other students in the same stage of development. This interaction can develop their critical skills. A study by Subrahmanyam et al. (2009) connected the posts adolescents made in their blogs to their developmental processes. The majority of the entries used in the text, were narrative and reflective in style, and contained themes related to their authors' peers and everyday life. The same research shows that adolescent bloggers project off-line themes to their blog, suggesting that their on-line and off-line contexts are psychologically connected.

(iii) Interactivity

Finally, educational blogs also promote interactivity, an educational affordance of the utmost importance in today's digital world. Chou (2003) distinguishes between the learner–teacher and learner–learner interaction (social affordances), from the learner–content interaction (educational affordance). According to Wang and Woo (2008) learner–content interaction is central to weblogs: students write content and "interact" with content by reflecting on it. Social interaction intensifies this process (Wopereis et al., 2010). Students may

post examples related to course assignments as well as discuss reflections on course materials (Betts and Glogoff, 2004; Maag, 2005). Blogs can even facilitate a series of extended discussions beyond class meetings (Betts and Glogoff, 2004). They also promote intellectual exchange (Williams and Jacobs, 2004). Students who read blog postings but rarely write are also able to benefit from considering their peer students' entries and comments as important feedback (Lin et al., 1999). Through educational blogs, students have the possibility of sharing their learning experiences and expressing their thoughts with the instructor and peers (Maag, 2005). These possibilities encourage learners to become independent in thought.

5. Extending Dialogue, Reflection and Critical Thinking

Blogs do not only promote individual reflective thinking but they can also serve as an ideal forum for social constructivist learning. Students have the opportunity of exchanging ideas, sharing experiences and generating knowledge through social intercourse (Ferdig and Trammell, 2004). Moreover, through this interaction students can even advance their level of knowledge and construct their own meaning of the reality in which they live. This construction of meaning takes place through interactions with different perspectives and wider horizons of meaning that may help to stimulate debate among participants and provide them the opportunities to express different perspectives while challenging and redefining their own. When students have the possibility of negotiating meanings with other peers in a social learning environment, learning will be more meaningful and their critical attitude towards learning is enhanced (Jonassen and Reeves, 1996).

Blogs can be used as instruments to promote reflection. Reflection is a complex process of exploration, discovery and learning, embedded within social interaction. Interactivity is an essential element of this process because it promotes and fosters multiple perspectives on learning and receiving feedback on one's own performance and understanding (Lin et al., 1999). Research also shows that using peers as "critical friends" in the learning process can serve a very powerful instructional method (Boud, 1999). Burbules and Berk (1999), in line with the exponents and adherents of Critical Thinking and Critical Pedagogy, emphasizes that criticality is always a function of collective questioning, criticism and creativity. It is thus social in character, influences relationships and interaction and impacts on thinking in new ways and forming alternative views as a direct result of being in an interaction with different challenging views.

Freire (1973) and Freire and Macedo (1987) use the metaphor of "decodification" for learning. He does this to emphasize that the main purpose of critical thinking is to discern the world, a real world of relations, structures and social dynamics that has been obscured by the distortions of ideology. Thus critical thinking and reflection lead one to find the actual hidden meanings of things, an ability which is complimentary to, moves simultaneously with but at the same time

goes beyond mere interpretation as the process of creating meaning and seeking different alternatives. These mental processes, therefore, go beyond logical and analytical skills as they also involve the ability to think outside a framework of conventional meanings. Critical thinking and reflection enhanced by media education generated skills increase students' ability to think in completely different and new ways.

6. Conclusion

Media education helps students break away from convention. It provides the knowledge and skills necessary for students to use media products like weblogs for personal reflection and critical thinking which they share with others. Blogs can thus provide students with challenging alternatives to the traditional teaching and learning environment. The cyberspace used by blogs can complement the physical space occupied during traditional educational learning and teaching experiences and opens the students to deeply challenging alternatives and an attitude of openness.

When blogs are used by the media educated student they can contribute in the paradigmatic shift from a teacher-centered to a student-centered approach to learning. They create excellent opportunities for students to discuss, reflect, analyse and evaluate different perspectives and construct their own meanings through the feedback of their peers in the blog. Feedback can even be extended to participants in other schools or learning institution and even on a globalized level (Effandi, 2005). In our digital era characterized by so many new technologies, basic technological skills of using and interpreting media products are indeed indispensable to make students become critical thinkers and consumers of knowledge.

References

Berners-Lee, T. Long Live the Web: A Call for Continued Open Standards and Neutrality http://www.scientificamerican.com/article.cfm?id=long-live-the-web. Scientific American, November 2010.

Betts, D. J. and Glogoff, S. J. (2004), Instructional Models for Using Weblogs in E-learning: A case study from a virtual and hybrid course. Paper presented at the Syllabus 2004 Conference, San Francisco, CA.

Boud, D. (1999), Situated Academic Development in Professional Work: Using Peer Learning, International Journal for Academic Development 4: 3-10.

Boyd, D.M and Ellison, N.B. (2008), Social Network Sites: Definition, History, and Scholarship, Journal of Computer-Mediated Communication 13: 210-230.

Bruce, B. C. (2002), New technologies and Social Change: Learning in the Global Cyberage. In Research in International Education: Experience, Theory and Practice, eds. L. Bresler and A. A. Ardichvili, New York: Peter Lang.

Buckingham, D. (2003), Media Education, Literacy Learning and Contemporary Culture, Cambridge: Polity.

Buckingham, D. (2009), The Future of Media Literacy in the Digital Age: Some Challenges for Policy and Practice. In Europe: Controversies, Challenges and Perspectives, ed. Patrick Verniers, Media Literacy in. Brussels: EuroMeduc.

Burbules, N.C. and Berk, R. (1999), Critical Thinking and Critical Pedagogy: Relations, Differences and Limits. In Critical Theories in Education Thomas, eds. S. Popkewitz and Lynn Fendler, NY: Routledge.

Castells, M. (2000), The Rise of the Network Society, 2nd ed., Cambridge, MA: Blackwell.

Chou, C. (2003), Interactivity and Interactive Functions in Web-based Learning Systems: A Technical Framework for Designers, British Journal of Educational Technology 34: 256-279.

Commission of the European Communities, 2007. Report on the results of the public consultation on media literacy. Retrieved from http://ec.europa.eu/cult ure/media/literacy/docs/report_on_ml_2007.pdf

Commission of the European Communities, December, 2007. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions. A European approach to media literacy in the digital environment (COM(2007) 833 final). Brussels. Retrieved from http://ec.europa.eu/culture/media/literacy/docs/com/en.pdf

Effandi, Z. (2005), Cooperative Learning Environment with the Web 2.0 Tool E-portfolios, European Journal of Social Sciences 21: 17-27.

Ennis, R. H. (1996), Critical Thinking, Upper Saddle River, NJ: Prentice Hall.

Ferdig, R.E. and Trammell, K.D. (2004), Content Delivery in the 'Blogosphere', T.H.E. Journal 31(7): 12-20.

Freire, P. (1970), Cultural Action for Freedom, Cambridge, MA: Harvard Educational Review.

Freire, P. (1973), Education for Critical Consciousness, New York: Seabury.

Freire, P. and Macedo, D. (1987), Literacy: Reading the World and the Word, Soth Hadley, MA: Bergin Garvey.

Freire, P. and Shor, I. (1987), What is the Dialogical Method of Teaching?', Journal of Education169(3): 11-31.

Giroux, H.A. (1994), Toward a Pedagogy of Critical Thinking. InRe-Thinking Reason: New Perspectives in Critical Thinking, ed. Kerry S. Walters, Albany: Suny Press.

Godwin-Jones, R. (2003), Emerging Technologies, Blogs and Wikis: Environments for Online Collaboration, Language Learning & Technology7(2): 12-16.

Greenhow, C., Robelia, B. and Hughes, J.E. (2009), Learning, Teaching and Scholarship in a Digital Age: Web 2.0 and Classroom Research. What path should we take now?, Educational Researcher 38: 246-259.

Herring, S. C., Scheidt, L.A., Bonus, S. and Wright, E. (2004), Bridging the Gap: A Genre Analysis of Weblogs, Proceedings of the Hawaii International Conference on Systems Science HICSS-37.

Internet Users in the World. http://www.internetworldstats.com/stats.htm. By Internet World Stats: Usage and Population Statistics, June, 2012.

Jonassen, D.H. and Reeves, T.C. (1996), Learning with Technology: Using Computers as Cognitive Tools. In Handbook of Research for Educational Communications and Technology, ed. D. H. Jonassen, New York: Macmillan Press.

Lee, J. and Allen, K. (2006), Edublogs as an Online Assessment Tool, Current Developments in Technology-Assisted Education 391-395.

Levinson, P. (1999), Digital McLuhan: A Guide to the Information Millennium, Routledge, London.

Lin, X., Hmelo, C., Kinzer, C.K. and Secules, T.J. (1999), Designing Technology to Support Reflection, Educational Technology, Research & Development 47: 43-62.

Maag, M. (2005), The Potential Use of "Blogs" in Nursing Education', CIN: Computers, Informatics, Nursing 23: 16–24.

Marcus, L. (2009), Issues in Information and Media Literacy. Criticism, history and policy, Santa Rosa, Calif.: Science Press.

Mason, R. and Rennie, F. (2007), Using Web 2.0 for Learning in the Community, Internet and Higher Education 10: 196-203.

McLaren, P. and Leonard, P. (1993), Paulo Freire: A Critical Encounter, New York: Routledge.

McLoughlin, P. and Lee, M. J. W. (2008), The Three P's of Pedagogy for the Networked Society: Personalisation, Partecipation and Productivity, Internetional Journal of Teaching and Learning in Higher Education 20: 10-27.

Noelle-Neumann, E. (1984), The Spiral of Silence: Public opinion – Our social Skin, Chicago: University of Chicago Press.

Oravec, J.A. (2002), Bookmarking the World: Weblog Applications in Education, Journal of Adolescents & Adult Literacy 45(7): 616-621.

Parliamentary Assembly of the Council of Europe, 2000. Recommendation 1466 (2000). Retrieved from http://www.assembly.coe.int//main.asp?link=http://www.assembly.coe.int/documents/adoptedtext/ta00/erec1466.htm#1

Paul, R. (1990), Critical Thinking: What Every Person Needs to Survive in a Rapidly Changing World, Rohnert Park, CA: Center for Critical Thinking and Moral Critique.

Ravenscroft, A. (2009), Social software, Web 2.0 and Learning: Status and Implications of an Evolving Paradigm, British Journal of Educational Technology 25: 1-5.

Ray, J. (2006), Welcome to the Blogosphere: The Educational Use of Blogs (aka Edublogs), Kappa Delta Pi Record 42(4): 175-177.

Scheffler, I. (1991), Praise of the Cognitive Emotions. In Praise of the Cognitive Emotions, ed. Isreal Scheffler, New York: Routledge.

Siegel, H. (1996), What price inclusion? In Philosophy of Education 1995, ed. Alven Neiman, Urbana, IL: Philosophy of Education Society.

Subrahmanyam, K., Garcia, E.C.M., Stella-Harsono, L., Li, J.S. and Lipana, L. (2009), In their Words: Connecting On-line Weblogs to Developmental Processes, British Journal of Developmental Psychology 27(1): 219-245.

UNESCO, 1982. The Grunwald Declaration on Media Education. Retrieved from: www.unesco.org/education/pdf/MEDIA E.PDF.

UNESCO. 2007. Paris Agenda or 12 Recommendations for Media Education. Retrieved from: www.collectifciem.org/spip.php?article62

Wang, Q.Y. and Woo, H.L. (2008), The Affordances of Weblogs and Discussion Forums for Learning: A Comparative Analysis, Educational Technology 48: 34-38.

Wang, Q.Y., Woo,H.L. and Zhao, J.H. (2009), Investigating Critical Thinking and Knowledge Construction in an Interactive Learning Environment, *Interactive learning environments* 17 (1): 95-104.

Wijnia, E. (2005), Understanding Weblogs: A Communicative Perspective. In BlogTalks 2.0: The European Conference on Weblogs, ed. Thomas Burg, Krems, Austria: Donau-Universitat.

Williams, J.B. and Jacobs, J. (2004), Exploring the Use of Blogs as Learning Spaces in the Higher Education Sector, Australasian Journal of Educational Technology 20: 232–247.

Wopereis, I.G.J.H., Sloep, P.B., and Poortman, S.H. (2010), Weblogs as Instruments for Reflection on Action in Teacher Education, Interactive Learning Environments 18(3): 245-261.