

 This work is licensed under a Creative Commons Attribution 3.0

Maria Bortoluzzi

Multimodal Awareness in Ecology Discourse for Children Education

Abstract I: Questo studio presenta i risultati di una ricerca qualitativa sull'interazione di bambini e adolescenti dagli 8 ai 13 anni con siti web creati da adulti per bambini per promuovere consapevolezza sull'ecologia e comportamenti eco-sostenibili.

Il quadro teorico di riferimento è l'analisi critica multimodale e la multiliteracy. Le domande di ricerca principali vertono sui seguenti punti:

1. Quali sono i livelli di consapevolezza critica in bambini e adolescenti dagli 8 ai 13 anni in relazione a testi multimodali sull'ecologia creati da adulti per sensibilizzare bambini e adolescenti su tematiche eco-sostenibili?
2. Come variano gli aspetti di consapevolezza critica multimodale tra gli 8 e i 13 anni?

Gli ambiti di interesse comprendono due aspetti principali: a) la competenza delle strategie multimodali e di multiliteracy per contesti di narrative eco-sostenibili; b) i livelli di partecipazione nell'azione sociale attraverso testi multimodali.

L'analisi qualitativa dei dati contribuisce a formulare linee guida per promuovere competenze di autonomia digitale e di multiliteracy. Lo scopo ultimo è promuovere in maniera efficace la comunicazione eco-sostenibile attraverso la consapevolezza critica multimodale per fasce d'età e comunità di pratica diverse (PRIN project: ACT MACE 2009-2011).

Abstract II: The present study focuses on ecological narratives for children as presented in websites. The paper summarises the results of a qualitative research study on the interaction of children and adolescents aged from 8 to 13 with adult-generated websites promoting awareness about ecology and positive action about ecological behaviour.

This study is carried out within the theoretical frameworks of critical multimodal digital literacy and multiliteracy. The main research questions addressed in the present paper are:

1. What are the levels of critical awareness in children and adolescents (from age 8 to 13) when engaged with multimodal texts about ecology produced by adults for the purpose of children education?
2. How do phenomena related to critical awareness vary within a developmental perspective from Grade 3 to Grade 8?

The key areas of investigation encompass two wide-ranging aspects: a) Awareness of multimodal/multiliteracy strategies to decode eco-sustainable narra-

tives; b) Levels of participation in social action through multimodal texts. The discussion of the qualitative data analysis contributes to guidelines for empowering children, promote safe child autonomy and multiliteracy skills, and foster ecology of communication across generations and communities of practice (PRIN project: ACT MACE 2009-2011).

1. Introduction

This study is part of the ACT MACE¹ project and focuses on 'the participation and interaction of children and young learners as stakeholders and opinion makers on issues of public concern' (ACT MACE 2009-2011). The overall objectives of MACE are investigating multimodal literacy development in children from 8 to 13 (from Grade 3 to Grade 8: Primary and Middle school) and identifying good practices of children-adult communication in multimodal digital texts.

The present study focuses on ecology for children and discusses the results of the qualitative research carried out on the interaction of children aged from 8 to 13 with adult-generated websites for children. These websites have the aim to promote awareness about eco-sustainable narratives and positive action about ecological behaviour.

First the research questions will be presented and the theoretical framework outlined. Then the methodology of data gathering will be introduced and the qualitative data results presented. The discussion will contribute to providing guidelines for empowering children 'in order to promote safe child autonomy and multiliteracy skills and to foster ecology of communication across generations and communities of practice' (ACT MACE 2009-2011).

2. Research questions and initial expectations

The research questions fall within the scope of the ecology section of the MACE project, namely investigating the reception and perception children have of websites about ecology created for them by adults.

The two main questions are:

1. What are the levels of critical awareness in children and adolescents (from age 8 to 13) when engaged with multimodal texts about ecology produced by adults for educational aims?
2. How do phenomena related to critical awareness vary in a developmental perspective from Grade 3 to Grade 8?

The key areas of investigation encompass two main aspects:

- Awareness of multimodal/multiliteracy strategies to decode eco-sustainable narratives
- Levels of participation in social action through multimodal texts.

The initial expectations were the following:

1. As 'digital natives' (Bennet, Maton & Kervin 2008; Li & Ranieri 2010) children tend to show semiotic and critical awareness towards the multimodal texts and the text/user interaction.

¹ ACT: Access through Text; MACE: Multimodal Awareness for Children Empowerment.

2. Increasing levels of metasemiotic strategies contribute to adopting a critical stance towards the multimodal text (purpose, content and design); it also raises awareness about the issue at stake and empowers children in their relation towards multimodal texts (see Ala-Mutka 2011; Ananiadu & Claro 2009).

3. Theoretical framework of the study

The wider theoretical framework of the whole MACE project is multimodal discourse analysis as developed in Baldry & Thibault (2006), Baldry (2011a, 2011b), Bateman (2008), Jewitt (2013 [2009]); Kress & van Leeuwen (2006 [1996]), O'Halloran (2004a, 2004b), Unsworth (2006, 2008a, 2008b), Ventola *et al.* (2004). Another area of interest for the project is critical discourse and multimodal awareness studies which investigate media and ICT discourses as *loci* of power relations and ideology (Caldas-Coulthard & Iedema 2008; Fairclough 2003, 2006).

On the basis of this wider framework, the present paper focuses on multimodal literacy as critical awareness for a 'digital generation' (Bennet, Maton & Kervin 2008; Li & Ranieri 2010) and literacies for the 21st century (Kress 2003; Dede 2009; Ananiadu & Claro 2009). The field is complex: ICT literacy, Internet literacy, media literacy, information literacy and digital literacy intersect and include the new challenges posed by a new 'learning ecology' based on participation and creative practice, content creation and interactivity (Greenhow *et al.* 2009; Ala-Mutka 2011). Literacy is thus viewed as complex social competences and not merely a set of cognitive or technical abilities (encoding or decoding spatial layout, organisational structure, pictures, etc.) (Jones & Hafner 2012; Rheingold 2012).

To underline the necessity of developing both traditional and new literacies in present-day contexts, the New London Group (1996, 2000) uses the inclusive term 'multiliteracies': traditional literacies are recontextualised to include multimodal awareness of text production and fruition (Cope & Kalantzis 2009a, 2009b, 2015). Ananiadu and Claro (2009) in their report on the 21st century skills emphasize the human, social, educational relevance of complex and articulated skills which go well beyond ICTs skills and encompass new and traditional literacy skills and learning competences.

4. Methodology and data gathering

In order to explore the reception and interpretation children have of websites created for children and young adolescents² by adults about ecology, we selected websites of official institutions (i.e. the Canadian, U.S., U.K. governmental agencies for the environment) suitable (according to analysts and their class teachers) for children aged from 8 to 13.

The primary and middle school chosen for our research experiment was the Udine International School (Italy, <http://www.udineis.org/>). In this school English is the medium of instruction and all its teachers are English native speakers or near-native speakers. The majority of children comes from families of Italian extraction, while a few of them come from international families where languages other than Italian are spoken³.

² For the sake of brevity, I will only use 'children' to mean young people from 8 to 13 years old.

³ Ethics procedures were followed throughout the data gathering: parental permissions to carry out the experiments were obtained and children privacy was closely pursued.

The questionnaire adopted for the MACE project was adapted to the specific characteristics of the websites and videos selected for data gathering in order to elicit information about user reception and interpretation of the websites and videos⁴. In the computer room of the school, children and students (monitored by the class teacher and two researchers) explored the website and watched the video; while doing so they individually answered the sections of the questionnaire related to what they explored or watched. The whole procedure, completely carried out in English, took approximately one hour per group. The total number of questionnaires administered to class groups in computer rooms is 106: 6 class groups from Grades 3 to 8 (from 8 to 13).

The present study focuses on the qualitative analysis of data resulting from the website section of the questionnaire (Part 1, see link in footnote 4). This choice was made to compare homogeneous data and obtain data-driven categories of multimodal behaviour about the relation between user and text in a learning context.

5. Data analysis and discussion

The children's written answers on the purpose of the website, its content and design were analysed bearing in mind the research questions (Section 2 above) and focusing on the suitability of the multimodal text in relation with levels of digital literacy and the age of the users (see Questionnaire, Part 1, footnote 4). Two macro-phenomena are investigated, as shown in Table 1:

Table 1. Multimodal macro-phenomena.

<i>Macro-phenomena</i>	<i>Focal macro-function</i>
Metasemiotic awareness	Textual macro-function
Levels of participation	Interpersonal macro-function

In this study, 'metasemiotic awareness' is the children's awareness regarding the relation between verbal and non-verbal meaning-making in the text and their interpretation of this relation. I call 'levels of participation' the features informed by the interpersonal macro-function, that is the expressions that establish a relation between the participants and the multimodal text. The three macro-functions (ideational, interpersonal and textual) are always present and interacting in the macro-phenomena; in the table, I highlighted the focal one.

The macro-phenomena analysed here, namely metasemiotic awareness and levels of

⁴ The second link is the link to the website saved and stored by the L3S Research Center at the time of the experiment (January 2013).

Websites for children from 8 to 10:

<http://www.ecology.com/ecology-kids/>,

<http://prometheus.kbs.uni-hannover.de/archive/ecology/www.ecology.com/ecology-kids/>.

Website for students from 11 to 14:

http://www.ecokids.ca/pub/kids_home.cfm,

http://prometheus.kbs.uni-hannover.de/archive/ecokids/www.ecokids.ca/pub/kids_home.html.

The questionnaire about the ecology websites and videos can be found at http://yell.uniud.it/?page_id=677.

participation are related to the wider field of metaknowledge (Oxford 2011: 19 *et passim*). Metaknowledge powerfully contributes to self-regulated learning whereby individuals are able to choose the most effective strategies for learning and hold positive beliefs about one's ability to learn (Schunk & Ertmer 2000). Some scholars maintain that metacognitive strategies include all the regulatory learning strategies; see for instance the working definition found in Anderson (2012) and derived from Flavell (1976) who first introduced the term 'metacognition': "Metacognitive knowledge refers to our acquired knowledge about our cognitive processes, knowledge that can be used to control thinking processes" (Anderson 2012: 170). Metacognition is the ability to make one's thinking visible, reflecting on what one knows and does (Anderson 2008) and it requires "a cognitive awareness and engagement with the awareness of one's thinking" (Anderson 2012: 170).

Oxford (2011: 17 *et passim*) believes that there are different types of meta-knowledge related to the three areas of cognition, affectivity and sociocultural-interaction. Metaknowledge underlying these three areas are: person knowledge (learning styles, goals, strengths, etc of the learner), group or culture knowledge (norms and expectations of the group), task knowledge (requirement of the learning task), whole-process knowledge (long-term requirements of the learning process), strategies knowledge (knowledge of strategies and metastrategies for learning), conditional knowledge (when and how to use a certain strategy) (Oxford 2011: 19-21). The two macro-phenomena of metasemiotic awareness and levels of participation cut across these 6 types of underlying metaknowledge.

In this paper I use the term 'awareness' rather than 'strategy' because I discuss how participants express through written language (in this case English as L2) their explicit awareness about what they do when accessing the multimodal text: participants write what they *think* they are doing when interpreting the multimodal text.

Since the whole interaction is mediated through language, the data show what the participants are aware of and what they are able to describe in written English. The children had to read the questions in L2, interpret them (at times with the help of the researchers and teachers) and express their answer in L2. As we shall see below, their greater or lesser competence in L2 is a variable to be taken into account in the data analysis.

The sections that follow describe the two macro-phenomena identified in the data analysis: 'metasemiotic awareness' and 'levels of participation'.

5.1. Metasemiotic awareness

Children show higher or lower levels of metasemiotic awareness, as summarised in Table 2. The definitions of sub-categories and the results of data analysis are given in the following sections.

Table 2. Awareness of multimodal text affordances.

Lower-level awareness

A. Transparency of medium or genre:

Transparency of traversals and transmedia traversals

Transparency of dynamic text

B. Transparency of multimodal cues

C. Transparency of purpose:	Trusting-the adult effect
	Easy-to-understand effect
<i>Higher-level awareness</i>	
D. Multimodal verbal cues: keywords and headlines	
E. Multimodal spatial cues: semiotic space, framing and salience	
F. Colour coding as semiotic affordance	

All quotes from the data are verbatim: no corrections are made to the children's/students' written responses in English as L2. To comply with ethics regulations, children are identified with initials which do not correspond to their real name and surname. Numbers from 3 to 8 correspond to the grade the children belonged to (in January 2013) and this gives an idea of their approximate age (with some exceptions, the children are from 8 years of age in Grade 3, to 13 years of age in Grade 8). The categorization in Table 2 is discussed in the sections that follow.

5.1.1. Lower-level awareness

A. Transparency of medium or genre

The children/students, especially in lower grades (3 and 4) are aware of some characteristics of the multimodal text or, in some cases, they take them for granted. I call this 'transparency', e.g. some characteristics of multimodal texts become naturalised to the extent that they are not even noticed anymore. In particular, the data analysis shows the following phenomena:

- *Transparency of traversals and transmedia traversals* (Lemke, 2002)

Children take it for granted that by clicking on a hotspot, a hyperlink is activated and the user can access a different page (what Lemke 2002 calls transmedia traversals). Also, children know that the majority of images on the homepage gives access to a video: static images ('event photos', Baldry 2011a) are attractive for the children more as potential action (hotspots) to get to a video, than as images *per se*. Therefore, some children answer Question 4 (What elements most attracted your attention? Why?) writing that they are attracted by the photo (psychologically salient even though static), but they are attracted by the photo as representative of an event both in terms of narrative and in terms of potential hotspot to access videos (even when they are not there).

- *Transparency of dynamic text*

Children take for granted that websites are potentially dynamic texts. This will be commented on when dealing with the second macro-phenomenon in Table 1. Younger children tend to take for granted that a static image or a verbal cue can lead to a dynamic text such as a video and they are disappointed if this is not the case.

B. Transparency of multimodal cues

In all the grades, children are convinced that they understood the topic and purpose of the website because of verbal cues; in fact, their answers frequently reveal how influential visual and layout cues are in general comprehension. For instance, 7 UEZ (example below) thinks s/he understood topic and purpose because of verbal information (*I read, I read the informa-*

tions); in fact, his/her answer reveals the visual salience of the *title* and his/her ability to integrate different modes in text interpretation. The fact that children and students are not aware of this complex interaction of modes, called here ‘transparency of multimodal cues’, occurs throughout the data. This might be due to the overwhelming relevance of verbal input and traditional literacies of the school context. This is how 7 UEZ answers Question 2 (How do you know what [the homepage] is about?):

7 UEZ *because I read the title Ecokids and I read the informations about it.*

C. Transparency of purpose

Throughout the grades, there are children who express their trust in aspects which are not trustworthy in absolute terms. The answers to Question 5 (In your opinion, are there aspects which are not for young learners? If so, which ones?) exemplify attitudes which might become a potential danger or problem if applied without guidance or control:

- *Trusting-the-adult effect*
- Throughout the data children express total trust in websites created by adults for children. In this case, the ideational macro-function intersects the interpersonal macro-function. In educational terms, raising awareness that the website producer (and initiator of the interaction with children) is not trustworthy by default if it is an adult is one of the most relevant competences to develop in children.
- *Easy-to-understand effect*
- Many children remark that the website is suitable for them because it is ‘easy to understand’. The problem in this case is rather similar to the previous sub-category, but here the ideational macro-function overtly intersects the textual macro-function.

8 DH *If the website can be understood, then it is for children.*

5.1.2. Higher-level awareness

D. Multimodal verbal cues: keywords and headlines

In Grade 3 very few children identify the topic ‘ecology’ as such, given the complexity of the concept. Almost all identify some of the aspects included in ecology (animals, plants, environments such as oceans and forests, etc.) and are mostly influenced by visual cues. However, only some of the children realise that their comprehension is due to verbal and visual cues together (as mentioned in the previous section):

3 M *I know what it is about from the images and because I read a lot.*

In Grade 4 the majority were able to identify the topic in a more accurate way. Some write that they mostly focus on verbal cues:

4 NB *It is written and I understand it because it talks of science.*

Other children tend to rely on images only. In this latter case, however, the comprehension of the ideational content of the website is not accurate since images on their own cannot convey complex concepts such as ‘ecology’ and ‘saving the environment’.

From Grade 5 onwards comprehension is more balanced and children accurately identify the verbal cues that help them understand what the website is really about (not only animals and plants). Frequently children refer to texts made salient by framing and central-

ity in the graphic layout; in many of these cases children are able to identify salience. In the example below the sections of text underlined are transcribed verbatim from the website where they are graphically salient headings (underlined in the example below) and perceived by the child as relevant:

6 AF *The website is about how children can help the environment and keep their families and friends healthy.*

E. Multimodal spatial cues: semiotic space, framing and salience

As mentioned, children are aware of the influence semiotic space has for the identification of website topic and purpose. Using simple metalanguage adapted from traditional literacy terms and general digital literacy, children manage to identify the main multimodal textual features that point to the ideational meaning: the following instances exemplify semiotic space (4EN, 6TD), framing and salience (6TD, 6UI):

4 EN *Ecology for kids: it is right on the top.*

6 TD *Because its written at the top of the page and, because its the thickest writing of all.*

6 UI *'Let's get started' I clicked it first because I wanted to see what was on the next page.*

F. Colour coding as semiotic affordance

As early as Grade 4, children are able to express the metaphoric meaning that colours might have in the context of the websites.

5 DT *colour green because it is the ecological colour, blue because it represents the same thing as the green.*

As age progresses, children show that they are able to recognise the function of colour as orienting interpretation on the interpersonal, textual but also ideational plane (van Leeuwen 2011). They also show the ability to interpret the metaphoric meaning of colour by establishing relations among shared cultural knowledge (green equals ecology, for instance) and other textual instances of the website.

In conclusion, the categories of metasemiotic awareness show a progression related to age in the ability to identify the affordances in multimodal texts and understand their meanings, topic and purpose. In the next sub-section, I will look at the relation between the participants and the multimodal texts.

5.2. Levels of participation

I call 'levels of participation' features informed by the interpersonal macro-function: they are the expressions of relation between participants and the multimodal text and its context. More specifically this macro-category includes the users as participants: their feelings, their competence, their attitude towards the text, their attitude towards other participants and the virtual community of the multimodal text. I also included in this macro-category 'the text as participated action': multimodal action on the text and action on other users and society through the multimodal text (see Table 3).

Table 3. Levels of participation.

Levels of participation

- | |
|---|
| a. Receptive, self-referential and affectively overt |
| b. Participation related to L2/FL competence |
| c. Recognition of interactive sections as action on text: text in action and learning |
| d. Connecting with other children/people: text as social environment |
| e. Influencing others: text as social action – user-generated content |
| f. Challenging the multimodal text |

a. Receptive, self-referential and affectively overt

This category is related to the levels of affective and self-centred participation of children with the multimodal text. Younger children (Grade 3 and 4) mainly tend to emphasise their individual relation with the multimodal text and explain their positive or negative attitude towards it in terms of liking/disliking its ideational content (verbal and non-verbal) in an affectively overt way. What is remarkable for this category, however, is that affectively-loaded expressions are used by younger children to give their opinion about the whole website. They are often not able to go beyond specific examples and self-centred expressions: in other words, their cognitive and affective development influences their ability to extract less impressionistic evaluative judgements. This can be linked to the cognitive ability to use specific or generic references. The following are two examples which well represent younger children's affectively loaded and self-referential answers to Question 9 (How do you like this site? Why?):

3 HQ [I like it] *Because I like a lot Rudoph and the reindeers.*

4 FB *the animals most attract me because they are so cute and I like them very much.*

b. Participation related to L2/FL competence

Levels of participation are influenced by the degree of multimodal text comprehension. Verbal aspects have a special relevance because the medium of instruction is L2 for the majority of children; only a minority of individuals have English as one of their native languages. A few students in the higher grades had just arrived in the International school and therefore, at the time of data gathering, English was still a foreign language for them. Whereas L2/FL competence is perceived as eminently verbal by the participants, children understand the L2 verbal sections also thanks to non-verbal cues. Some of the children/students who are less competent in English remark on their positive interaction with the multimodal text because they 'understand' it better. Some of the answers to Question 9b (Why do you like this website?) reveal the users' satisfaction in 'comprehending' what the multimodal text proposes:

3 DE *Because I understand everything!*

In a few cases, the limited verbal competence in English influenced some of the incorrect or incomplete answers in terms of the ideational content of the website. However, it is often impossible to differentiate linguistic competence from cognitive and metacognitive development. Child 4 ED, for instance, answering Question 5 (In your opinion, are there aspects which are not for children? If so, which ones?) wrote '*Anithing*'.

The answer shows low competence level in English as L2, but also limited control of cognitive and metacognitive variables such as generic/specific references.

In general, however, in the Udine International School, the competence of English as L2 of the children/adolescents was way beyond our expectations as far as the efficacy of communication was concerned, both in the written answers for the questionnaire and during the semi-structured oral interviews (which are not included in the present analysis).

c. Recognition of interactive sections as action on text: text in action and learning

As mentioned in the section about awareness of multimodal text affordances, children take for granted that a multimodal text consists of traversals and transmedia traversals (when multimodal texts are 'interactive' through hyperlinks). However, Question 6 (Are there elements which let you interact with the site? Which ones?) was one of the most complex for younger children to understand; most of them asked our help or the help of teachers to make sure they understood its meaning. In fact, we soon realised that the question is rather ambiguous and unclear. While younger children tended to take for granted the interactivity of traversals (Grade 3, 4), nobody in Grade 3 and only a few in Grade 4 noticed that there are sections that explicitly asked for interaction (for instance *Homework helpers*). From Grade 5, pupils show an explicit greater awareness of 'text in action':

5 BT *The photos in the 'kid power' if I click on them, will make me understand how the other children of the world live and what they think, it would be like knowing them.*

From Grade 6 children start recognising the call-for-action of the website:

7 WEB *I would click the take action section because I would like to see how the interaction works and how I can help the ecosystem.*

In the higher grades not only is 'text-in-action' overtly present in their answers, but games and activities are mentioned as the most desirable text-as-action and as a link to the community of the website. This takes us to the next category.

d. Connecting with other children/people: text as social environment

Children and students in higher grades (but as young as 10-year olds, see example 5 BT above) show awareness that website interactivity means relating to other children and people. Thus, the text creates a common social environment, an e-community that includes participants geographically distant and belonging to different cultural backgrounds.

7 DQ *All the website games and pictures are related to games or pictures that give more clues and explanations to the people (kids) watching the website.*

8 CT *Because it can be a quite interesting way to learn and relax at the same time. Also, i would check to see if there are any new articles by the Eco Reporter.*

Eco Reporter, mentioned in example 8 CT, consists of children/student-generated articles, namely articles by the e-community. This brings us to the next level of participation.

e. Influencing others: text as social action – user-generated content

From the last grade of primary school, children realise that using websites can have a social impact: one of the purposes of the multimodal text is precisely having an effect on the users'

behaviour promoting changes in their life and having a positive effect on the environment. The change is not only 'learning about' facts, but also taking positive action and 'empowering' participants: children explicitly quote these words directly from the website, since they were not prompted by the questionnaire or by the teachers:

5 DB *I think the website is about the love of nature and how children can use there 'power' without hearting [hurting] nature.*

6 BN *I think that every element is important for people like us because we should learn to save the world still when you are little*

8 DA *I want to know what else will be posted on how to help the environment and next time I want to post some comments, check more games and maybe even write an article or something.*

These users are aware that not only can they change the world, but, as shown below, they can also improve on the multimodal text: text as social action has an effect on the text itself. The affordance of updating digital texts is used by the respondent as part of social action.

f. Challenging the multimodal text

Some students in Grades 7 and 8 challenge the multimodal text explaining why it is not up to their expectations and it is not suitable for them as expert users:

7 HU *because games are for little kids which don't know how to use a computer, but info is ok.*

8 OU *I like it a lot how it is constructed but still, I think, needs some help.*

The process has gone full circle: the multimodal text becomes the aim of social action on the part of the e-community. The aim of the user is to transform the website into a more suitable one for expert participants and for their complex communicative goals and actions to be taken.

6. Discussion of findings

The data, however limited, offer a remarkably complex view of the relation that children and adolescents are able to establish with digital texts. The level of awareness the participants showed towards their interaction with the multimodal text, and the level of competence in the L2 literacy to express it in a comprehensible and articulate way are surprising and noticeable. It must be mentioned that the school context is socio-culturally privileged and conducive to multimodal literacy because most teachers use ICT tools for teaching and promoting learning.

Expectation 1 in Section 2 mentioned that as 'digital natives' (Bennet, Maton & Kervin 2008; Li & Ranieri 2010) the children would tend to show semiotic and critical awareness towards multimodal texts and text/user interaction. The data only partly confirm this expectation. Children (especially younger ones, but not only) rely too openly on the fact that when the website looks as if it is made 'for children', it is trustworthy (trusting appearances). Unfortunately, easy-to-comprehend texts created by adults for children do not necessarily mean safe or suitable. Also, affective evaluation has an impact on the acceptance and use of websites especially (but not only) for younger children. 'Digital natives' need multiliteracy education to develop critical competences.

Expectation 2 is confirmed by the data: higher levels of metasemiotic awareness help users adopt a more balanced and critical stance towards the multimodal text (purpose, content and design), it raises awareness about the ideational issue at stake and empowers children in their relation towards the multimodal texts (Ala-Mutka 2011; Ananiadu & Claro 2009). The higher the levels of digital literacy, cognitive development and awareness of the relation text-user, and the more autonomous and critical towards the texts children become.

Metasemiotic awareness towards the text and towards text-user interaction positively correlates with key multiliteracy moves, and increases participation of young users with the digital text as social action. Children and adolescents increasingly perceive digital texts as participatory events and demand higher levels of direct involvement (text as action in context, user-generated materials, games and activities).

7. Conclusion and guidelines

The study shows the relevance of quality eco-sustainable multimodal narratives for children from an early age, and critical semiotic competence explicitly taught from primary school onwards. Children show the need to interact with multimodal texts and become active users in a participatory way. Therefore, they need to become autonomous and informed evaluators of websites in order to recognise their potential dangers but also to be empowered as active participants who enjoy and create eco-sustainable narratives for their peers and for adults.

The results of this study can be summarised in the following educational guidelines:

1. Levels of multimodal transparency should be lowered by explicitly guiding the children to recognise multimodal text affordances in different media and genres (in relation to the children's age and their cognitive and literacy development).
2. Levels of metacompetence for multimodal text affordances (verbal cues, spatial cues, colour coding, etc.) should be promoted, and actively taught.
3. Levels of informed participation should be carefully enhanced and discussed as action in text, action on text, and social action; this should include informed and careful participation of young users in virtual communities of users.
4. Levels of participation should be overtly discussed with young users.
5. Awareness should be raised about what 'seems to be' trustworthy and suitable for children is not necessarily so.
6. Criteria should be discussed with young users to decide whether a website is suitable for them or not (easiness of comprehension is not a sufficient criterion and neither are layout, structure and general attractiveness).

Acknowledgements: The author of this paper and the team of the project are grateful to the Udine International School: the Head, Mr Matthew Conn, the teachers and the students were welcoming, enthusiastic and offered us an extraordinary experience in a special and hospitable school. I am grateful to Piergiorgio Trevisan for helping me with data gathering.

Special thanks to Ivana Marenzi and the L3S Research Center team who offered us a platform to share materials, ideas and technical support throughout.

Giovanni Ferrin (Udine University) gave his invaluable support, good advice and kind help throughout.

I am grateful to Nicoletta Vasta for her comments on an earlier version of this paper. Many thanks to Mityana Vaccaro for her kind language feedback.

BIBLIOGRAPHY

ACT MACE. 2009-2011. Action Through Text – Multimodal Awareness for Children Empowerment. Progetto di Interesse Nazionale. MIUR. Anno 2009 prot. 2009RL3NF4; codice CUP J41J11000230001.

Ala-Mutka, Kirsti. 2011. *Mapping Digital Competence: Towards a Conceptual Understanding*. Sevilla: Institute for Prospective Technological Studies, http://ftp.jrc.es/EURdoc/JRC67075_TN.pdf (consulted on 10/01/2014).

Ananiadou, Katerina & Magdalen Claro. 2009. 21st Century Skills and Competences for New Millennium Learners in OECD Countries. *OECD Education Working Papers*, 41, <http://www.oecd-ilibrary.org/content/workingpaper/218525261154> (consulted on 10/01/2014).

Anderson, Neil. 2008. Metacognition and the good language learner. Carol Griffiths ed. *Lessons from good language learners*. Cambridge: Cambridge University Press, 99-109.

Anderson, Neil. 2012. Metacognition: Awareness of Language Learning. Sarah Mercer, Stephen Ryan & Marion William eds. *Psychology for language learning*. London: Palgrave Macmillan, 169-187.

Baldry, Anthony. 2011a. *Multimodal Web-genres. Exploring Scientific English*. Como: Ibis.

Baldry, Anthony. 2011b. Characterising Transitions in Identities in the Web: Multimodal Approaches and Methods. Nicoletta Vasta et al. eds. *Identities in Transition in the English-Speaking World*. Udine: Forum, 17-38.

Baldry, A. & P. Thibault. 2006. *Multimodal Transcription and Text Analysis*. London: Equinox.

Bateman, John. 2008. *Multimodality and Genre*. Basingstoke: Palgrave.

Bennett, Sue, Maton, Karl & Kervin Lisa. 2008. The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology*, 39, 5: 775-786.

Caldas-Coulthard, C. & R. Iedema eds. 2008. *Identity Trouble*. Basingstoke: Palgrave.

Cope, B. & M. Kalantzis. 2009a. A Grammar of Multimodality. *The International Journal of Learning*, 16, 2: 361-425.

Cope, B. & M. Kalantzis. 2009b. 'Multiliteracies': New Literacies, New Learning. *Pedagogies: An International Journal*, 4, 3: 164-195.

Cope, B. & M. Kalantzis eds. 2015. *A Pedagogy of Multiliteracies: Learning By Design*. London: Palgrave.

Dede, Chris. 2009. Comparing Frameworks for '21st century Skills', http://www.watertown.k12.ma.us/dept/ed_tech/research/pdf/ChrisDede.pdf (consulted on 03/02/2014).

Fairclough, Norman. 2003. *Analysing Discourse*. London: Routledge.

Fairclough, Norman. 2006. *Language and Globalization*. London: Routledge.

Flavell, John. 1976. Metacognitive aspects of problem solving. Lauren Resnick ed. *The Nature of Intelligence*. Hillsdale: Erlbaum, 231-236.

- Greenhow, Christine, Beth Robelia & Joan Hughes. 2009. Learning, teaching, and scholarship in a digital age. Web 2.0 and classroom research: What path should we take now? *Educational Researcher*, 38, 4: 246-259.
- Jewitt, Cary ed. 2013 [2009]. *The Routledge Handbook of Multimodal Analysis*. London: Routledge.
- Jones, R. & C. Hafne. 2012. *Understanding Digital Literacies. A Practical Introduction*. London: Routledge.
- Kress, Gunther. 2003. *Literacy in the New Media Age*. London: Routledge.
- Kress, G. & T. van Leeuwen. 2006 [1996]. *Reading Images*. London: Routledge.
- Lemke, Jay. 2002. Travels in Hypermodality. *Visual Communication*, 1, 3: 299-325.
- Li, Y. & M. Ranieri. 2010. Are 'digital natives' really digitally competent? A study on Chinese teenagers. *British Journal of Educational Technology*, 41, 6: 1029-1042.
- New London Group. 2000. A pedagogy of multiliteracies: Designing social futures. Bill C. & M. Kalantzis eds. *Multiliteracies: Literacy learning and the design of social futures*. Melbourne (Vic.): Macmillan, 182-202.
- O'Halloran, Kay ed. 2004. *Multimodal discourse analysis: Systemic functional perspectives*. London-New York: Continuum.
- O'Halloran, Kay ed. 2004. *Multimodal Discourse Analysis*. London: Continuum.
- Oxford, Rebecca. 2011. *Teaching and Researching Language Learning Strategies*. Harlow (UK): Pearson Education.
- Rheingold, Howard. 2012. *Net Smart. How to Thrive Online*. Cambridge (MA): The MIT Press.
- Schunk, D. & P. Ertmer. 2002. Self-regulation and academic learning: self-efficacy enhancing interventions. Monique Boeckaerts et al. eds. *Handbook of Self-regulation*. San Diego: Academic Press, 631-650.
- Unsworth, Len. 2006. *E-literature for children: Enhancing digital literacy learning*. Oxford (UK): Routledge.
- Unsworth, Len ed. 2008a. *Multimodal Semiotics*. London: Continuum.
- Unsworth Len ed. 2008b. *Functional Analysis in Contexts of Education*. London: Continuum.
- Van Leeuwen, Theo. 2011. *The Language of Colour. An Introduction*. London: Routledge.
- Ventola, E. et al. eds. 2004. *Perspectives on Multimodality*. Amsterdam: Benjamins.

Maria Bortoluzzi is Associate Professor of English language at the University of Udine (Italy). Her research interests are in the areas of critical discourse studies and teacher education. Her latest research work deals with the analysis of social media communities and ICT multiliteracy for teacher education.

maria.bortoluzzi@uniud.it