

# Reconceptualising Understandings of Texts, Readers and Contexts: One English Teacher's Response to Using Multimodal Texts and Interactive Whiteboards

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**Abstract:** The comprehension of multimodal texts is now a key concern with the release of the Australian National Curriculum for English (ACARA, 2010). However, the nature of multimodal texts, the diversity of readers in classrooms, and the complex technological environments through which multimodal texts are mediated, requires English teachers to reconsider how they may use multimodal texts to support reading comprehension. This paper presents a micro-analysis of one classroom event, where a Year Four teacher and her students read three texts from a Learning Object. The text was selected by the teacher for the purpose of exploring one key understanding of multiliterate practice; how texts have different meanings for different people. Field notes, transcripts from the video observation, and teacher reflection after the classroom event are analysed. The implications of teacher practice, as well as the consideration of multimodal resources as cultural artefacts that afford and constrain opportunities for student learning are discussed.

## Introduction

Whilst print-based texts, especially literature hold a valued place in the Australian National English curriculum, students need to be able to interpret, appreciate, produce and communicate in digital and multimodal formats (ACARA, 2010). Digital and multimodal texts and their associated literacies are prominently positioned within all strands of the curriculum: Language, Literature, and Literacy. However, as Walsh (2010) has highlighted the Australian National Curriculum for English (ACARA, 2010) fails to sufficiently explicate how to use multimodal texts and technologies in the classroom. Similar concerns have been noted elsewhere, for example, in the UK (Goodwyn, 2010). In particular, Walsh (2010) emphasised the need for specific detail in relation to the new processes for reading multimodal and digital texts which consider the diverse contexts offered by technologies, such as Interactive Whiteboards (IWBs).

For all aspects of the curriculum, including English, IWBs offer access to a wider variety of instructional technologies, such as Learning Objects (LOs) that can be used for whole-class and small-group activities (Hedberg & Freebody, 2007). LOs are 'any digital resource that can be reused to support learning' (Wiley, 2000, p. 7). They can consist of learning objectives, instructional content and multimedia content, such as audio, images, text and animation. This multimodal presentation of instructional content makes LOs an interesting hybrid of technology and multimodal text.

As technologies for learning and teaching, IWBs and LOs each offer potential affordances and constraints. Both independently change how ideas and concepts are shared and represented, with the potential for challenges and 'disruptive pedagogies' in their combined usage (Hedberg, 2006). According to Freebody, McRae, and Freebody (2006) and Hedberg and Freebody (2007) the combined use of IWBs and LOs in dedicated English teaching contexts

warrants further investigation. This article addresses this warrant and provides a case study of one Year Four teacher, as she negotiates textual and pedagogical shifts, using a LO to develop reading comprehension, within the complex environment offered by an IWB.

### **Reading multimodal texts**

Comprehension is the central goal of reading. The ability to comprehend, develop 'curriculum literacies', and 'read to learn' with multimodal texts, including LOs, are expected outcomes of the Australian National English curriculum for all primary and secondary students (ACARA, 2010). To develop students who are effective comprehenders of text, it is important for teachers to have knowledge of key elements involved in reading comprehension: the text, the reader, the reading activity, and the social context in which the reading activity takes place (Pardo, 2004; RAND Reading Study Group, 2002). However, these elements are more often referenced to reading with traditional print-based texts. Notions of literacy have been broadened in contemporary times to acknowledge Multiliteracies, or multiple literacies, and include the full range of modes of communication offered by multimodal texts (Cope & Kalantzis, 2000; New London Group, 1996). Similarly, Coiro (2003) has called for these elements of text, reader, reading activity and social context to be broadened when considering reading comprehension on the Internet. In this paper I argue for the need to reconceptualise these key elements of the comprehension process in light of IWBs and LOs which are commonplace in classrooms globally today. To do so, first I review these elements in the context of the current literature. Second, I explore the ways in which the use of a LO with embedded English content, was sequenced into a learning activity and, whether and how the interaction around this LO allowed for the construction of meaningful knowledge within the multiliterate environment facilitated by the IWB.

### **The nature of multimodal texts**

Texts provide the means for communicating and form an important part of study in an English reading program. It is important to understand how the characteristics of texts impact on reading comprehension, in particular the similarities and differences between traditional print-based and multimodal texts. Shared characteristics may include an understanding of: the author's intent, the social purpose of a text or genre, how it is structured, whether it adheres to that struc-

ture, how well it is written, the subject matter, vocabulary, language choices, the reading level, and other surface features (Pardo, 2004). However, Anstey (2002) proposed that there are key differences with multimodal texts. For example, there may be a blurring of genres as multimodal texts become more hybrid and intertextual in nature, with the notion of text continuing to change as technology and society changes. Multimodal texts such as LOs, rather than having a fixed surface, use different modes of communication, with particular modes or combination of modes separately and independently offering opportunities or affordances for meaning making (Bearne, 2003; Walsh, 2006). Further they can be structured, in multi-media formats and use non-linear hypertext (Coiro, 2003).

'Hypertext' refers to the structuring of information in blocks of text which are connected by electronic links. There are several kinds of hypertext, described by Niederhauser (2008) as linear, hierarchical, or relational. Linear hypertext is structured like a book and allows for forward and backward movement through content and is often a feature of LOs (Freebody, McRae & Freebody, 2006; Niederhauser, 2008). Hypertext may be structured in a hierarchical manner where the content is organised from more general concepts to more specific concepts. This may be supported by relational hypertext which allows readers to access additional, related information to content on the current screen. In multimodal texts it is the selection, use and placement of hypertext, hyperlinks, frames, windows, and images through which the author attempts to influence the construction of meaning and impose his intent, or assumptions and values (Anstey, 2002; Burbules, 1997; Unsworth, 2002).

### **The nature of 21st century readers**

Reading comprehension involves the active construction of meaning through the interaction of the reader and the text. If we equate this to learning in the classroom, the depth of meaning made by students is 'influenced by the interaction of a multitude of complex, individual and social factors', within and outside the classroom (Unsworth, 2002, p. 8). At the individual level learner characteristics, capabilities and dispositions associated with reading more traditional print-based texts, are still important for multimodal texts and include: a student's world knowledge, language skills and knowledge, cognitive development, culture, and purpose for reading (Pardo, 2004).

Key established theories which help explain the

reading and learning process of hypertext for the individual learner are the construction-integration model (Shapiro & Niederhauser, 2004) and cognitive flexibility theory (Spiro et al., 1992). Shapiro and Niederhauser (2004) have suggested a three stage process for hypertext comprehension. The first stage of character/word processing, is followed by the second stage where the text base is integrated into the prior knowledge or schema of the reader. These first two processes are 'thought to be invariant across media', and are reflected in research on text structures within traditional print-based texts (Niederhauser, 2008, p. 200). It is the third process, with the creation of a situation model, where meaning making is created in hypertext environments. Cognitive flexibility theory posits that:

The linked structure of hypertext allows the reader to access information from different paths ... and make connections among concepts that are not likely to occur when sequentially reading traditional texts. (Niederhauser, 2008, p. 200)

This increased 'learner control' (Niederhauser, 2008), where readers are free to follow their own reading pathways, associates with key variables that impact on learning with hypertext. These variables are: the effects of reader goals, navigational patterns, learner characteristics, and active engagement with the text, and the metacognitive strategies they use (Niederhauser, 2008). The meta-cognitive strategies readers use to navigate through hypertext, the decisions they make about the information they access, the order in which they make decisions, and the inclusion of navigational scaffolds, some relational links such as menus, concept maps, audio files, word glossaries, and hotlinks also appear to influence learning (Niederhauser, 2008). Researchers have suggested that students use traditional print-based comprehension strategies of activating prior knowledge, predicting, evaluating, monitoring and repairing but in new ways with online texts (Leu, Kinzer, Coiro & Cammack, 2004).

Additionally LOs have been stated to have positive effects on motivation and engagement for diverse students including students with special needs, learning difficulties, and non-English speaking backgrounds (Freebody, McRae, & Freebody, 2006). Key reasons offered are the 'multimedia effect' (Mayer, 2005), the availability of different entry points and work pace for diverse learners, with linear structures which allow students to move backwards and forwards.

Further, LOs are important for their link to popular culture texts. Freebody and Muspratt (2007) found that students prefer LOs that allow for interaction, control over their interaction and progress, and that are game-like. They advocated that teachers have a role to play 'in promoting classroom environments and structures that allow for participation, interaction and engagement' with LOs (p. 9).

### **The nature of the reading activity**

The degree to which reader goals or purposes for reading are self or externally imposed, the specificity of the goals or purposes and the interaction amongst these, interact with the affordances and constraints of the multimodal text, the hypertext structure and the characteristics of learners, with consequences for what is learned from reading hypertext content (Niederhauser, 2008). Freebody, McRae, and Freebody (2006) in a review of schools trialling the implementation of curricular resources from the Le@rning Teaching Federation (TLF) found that most LOs did not offer pedagogical advice for teachers. This meant that it was left up to the teacher using them to decide purpose, provide instructions for use, and contextualise their use in relation to classroom curriculum. They discovered that LOs were used in a variety of ways: as a hook for learning, for lesson consolidation, unit related work, and for free access activities. The RAND Reading Study Group (2002, p. 26) emphasised with any text, 'when the teacher-imposed purpose is unclear to the learner, or in conflict with the learner's purpose, comprehension may well be disrupted'. This is a similar case with LOs, with Niederhauser (2008, p. 202) stating that even with specific learning purposes or goals, 'not all specific learning goals promote deep meaningful learning'. Teachers, therefore need to set clear purposes for learning, as well as creating a learning environment or social context that promotes depth of learning.

### **The nature of the social context**

Moss et al. (2007) identified three key purposes for teacher use of IWBs: increased use of multimodal resources, more interactive styles of whole class teaching, and increased pace of content delivery. They found that any change fostered by IWBs is dependent upon the teachers' purpose for use. However, the use of IWBs does not automatically improve levels of student achievement in spite of its potential for interactive teaching and learning. Moss et al. (2007) classified interactive uses of IWBs in three ways: 1) *Technical inter-*

activity – or interaction with the technological facilities of the board; 2) *Physical interactivity* – with a focus on students manipulating elements on the board and; 3) *Conceptual interactivity* – where there is the exploration and construction of curriculum concepts and ideas (Moss et al., p. 40). Moss et al. (2007) found that the way in which interactivity is used in the classroom is itself reflective of a complex interaction amongst teachers’ pedagogic theories of learning, the demands of content areas and topics, perceived student abilities, and available time and peripherals. As with the findings of Freebody, McRae, and Freebody (2006) with respect to the use of LOs, the IWB also does not:

In and of itself transform existing pedagogies. The main emphasis needs to rest with appropriateness of pedagogy, not the use of the technology per se. (Moss et al., 2007, p. 6)

Mishra and Koehler (2006) argued that effective use of technologies such as LOs and IWBs requires a complex, situated form of knowledge which they labelled Technological Pedagogical Content Knowledge (TPACK). In curriculum areas, a complex interaction between content knowledge of a subject area (e.g. English), pedagogy, and technology comes into play. In the next section I explore how one teacher manages a social context that allows her students to develop as comprehenders of a multimodal text, with the support of the LO and IWB.

### Context for the study

Data from this article draws from a larger ethnographic case study of one state primary school in Australia. The case study sought to explore whether and in what ways teachers integrate Interactive Whiteboards (IWBs)

into the curriculum to develop students’ multiliterate practices in the areas of reading, writing, shaping, viewing, listening and speaking. This article reports on one Year Four teacher, Janelle and her students as they interact with a LO using an IWB. As part of this study, I undertook a micro-analysis of a) field notes from the classroom observation, b) transcripts from the video observation and c) teacher reflection after the classroom event. The results and discussion presented below are structured around my understandings about the text, the reading activity, the social context, and the reader.

### In the classroom – results and discussion

#### *The Reading Activity – Bringing the text, the reader, and the context together*

Janelle was a keen, innovative teacher who regularly used the IWB and multimodal resources to support learning in English. After reflecting on her practice, she realised that one key understanding of multimodal texts which she had not catered for and deemed as significant was that texts have different meanings for different people (Anstey, 2002). To address this area of understanding, she selected a LO called *Picture This: Level 2* (Curriculum Corporation, 2004). It contained three texts: 1) ‘Snake’, a poem, 2) ‘Ace’, a narrative, and 3) ‘Crocodiles’, an informational text (see Screen shots Figure 1).

The selection of suitable curriculum resources to use with her students was an ongoing problem for Janelle (see Kitson, 2011). In order to ensure learning, Janelle needed to adapt her pedagogical practices to help her students achieve the intended purpose of the reading activity (Niederhauser, 2008). Consistent with



Figure 1. Screenshots of *Picture This: Level 2 Learning Object* (Curriculum Corporation, 2004)

Table 1. Transcript Excerpt 'Snake' Poem

Line		Speech	Gestures, Actions
159	T	Okay. You need to listen now because we are changing the activities slightly. Darren.	Teacher puts her hand up to signal to stop and listen.
160	T	Okay we might look at the Snake please. Can you select the Snake for us up here?	Teacher looks at options on IWB screen. Tracey selects the Snake and a new screen appears.
161	Voice over	See if you can make a picture in your head to match the text. Think about what could be happening just as if it is a movie	
162	T	Ok. I want you to close your eyes first. I am going to read this to you and I want you to make a picture in your mind.	
163	T	The crooked wiggly slithering Snake Slides along the grass. The crooked wiggly slithering Snake Bites us when we pass. His jet black eyes Are very bright. In knots he ties Himself at night. The crooked wiggly slithering Snake Slides along the grass. The crooked wiggly slithering Snake Bites us when we pass.	There is a thought bubble which says to 'select to see pictures in his head'.
164	T	Open your eyes. Who would like to come out and share what you picture you made in your mind. Julie that would be great.	Teacher gets up and removes text with Snake poem on it. Sits back down on chair
165		Guys you need to listen carefully. Mark. Sorry Julie when you are ready.	Julie moves out to the front of the group, beside Tracey at the IWB. Julie puts her wrist to her mouth and pretends to make a biting action.
166		Okay so when what comes past?	
167	Julie	When you go past a Snake it goes ppphh	Makes biting action again. Classroom is very noisy. Unsure of whether it is this class or the other adjoining class.
168	T	Excellent thank you. Ok who else would like to share what picture they had in their minds? Megan. You will have to stand up and be really loud.	Teacher looks over to the other class.
169	Megan	A snake slithering	
170	T	A snake slithering. Excellent. Mark.	
171	Mark	I was in the rainforest and saw a snake xxxx	
172	T	And why were you in the rainforest?	
173	Mark	Because snakes live in the rainforest.	
174	T	Excellent. Did the text say. Let's put that text back up. Did the text say anything about a rainforest? Can you click there for it Tracey	Rephrases – Speaking to Tracey? (Teacher doesn't select the thought bubble to see what pictures the person had in their head.)
175	All Ss	No	
176	T	But that's ok that Mark did that because he is bringing his own meaning to the story when he reads it.	

findings by Freebody, McRae and Freebody (2006) the information guide for this LO did not provide specific pedagogical advice for classroom use. They did however provide certain keywords, and suggested an intended audience of students in Years 5–9 classified as ‘at risk’ in literacy. This information was helpful in allowing Janelle to select the LO to meet her intended purpose of helping students understand that different readers create different meanings. The risk was that the text she chose to meet these purposes could appear too challenging for her Year 4 students, some of whom struggled with literacy.

At the outset of the lesson, Janelle explicitly set out the purpose of the lesson and LO. ‘Now we are going to look at a Learning Object. Sometimes, when you read one of the things you do, especially with certain types of books, is you make a picture in your head’. She supported her explanation with linguistic and visual cues using the SmartBoard Software on the IWB. ‘What helps you understand when you read?’ she asked, accompanied by a clip art graphic, showing a pile of books. A conversation about comprehension strategies ensued. By using print-based texts to support her explanation, Janelle ran the risk of confusing her students. This appears the case with only two students responding ‘sounding out’ and ‘sound of letters’ which indicates print-based strategies. The example had the potential to be disruptive pedagogically in the context of reading multimodal texts (Hedberg & Freebody, 2007). This can be a concern especially with students who have difficulty in learning concepts, in this case comprehension (Hedberg, 2006).

Researchers (Coiro, 2003; Leu, Kinzer, Coiro & Cammack, 2004) have indicated that students do use some traditional print-based comprehension strategies with multimodal texts. However, these strategies are used in different ways for internet texts, whose key characteristics are: the presentation of information in multimodal formats and hypertext links. As these characteristics are also common to LOs teachers need to ensure that they demonstrate to students how the same strategies can vary when reading multimodal and print-based texts (Coiro, 2003). The example below (Table 1) illustrates this opportunity in relation to visualisation, the key purpose of Janelle’s reading activity around the first of the LO texts, ‘Snake’.

After asking students to share the ‘pictures’ they made in their minds, Janelle acknowledged Julie’s response (Line 167), but did not link it back explicitly to the purpose of the LO, i.e. to ‘make a picture in your

head to match the text’. She prompted another student, Mark to share the picture in his head (lines 171–176). Whilst Janelle acknowledged his prior knowledge for bringing meaning to the text, she did not get Mark to cross-check his interpretation with the written text, which is an important aspect of comprehension. If Janelle had selected the visual and audio support provided in the ‘Select to see pictures in his head’ hyperlink, which provided a visual of grass (See Figure 2), it would have explicitly demonstrated the need to base one’s interpretation on the actual text and not purely on one’s prior knowledge.



Figure 2. Screenshot from ‘Snake’ poem.  
Select to see the pictures in his head

As evident in the ‘Snake’ example, the selected LO offered particular affordances and constraints to support meaning making in relation to their multimodality and to their structure (Bearne, 2003; Niederhauser, 2008; Walsh, 2006). This LO was structured using both linear and relational hypertext. It offers students a variety of modes and relational links or cognitive supports that could be used to assist with learning (Niederhauser, 2008), as with the ‘select to see pictures in his head’. Also available, when you enter the LO, is an Introduction with audio support, a help button, and a ‘Tricky words’ options which is organised alphabetically (See Figure 3).

As well as ‘Tricky Words’, all texts include embedded hyperlinks for words which may be challenging to students as they read. For example, in ‘Ace’, these include ‘cruiser’, ‘vessel’, ‘disappearing’, ‘nova’, ‘photon torpedoes’ and ‘knuckle’ (See Figure 4).

Selection of these hyperlinks provides a relational link to a pop-up box that provides a definition and prompts a reading strategy. To continue with ‘Ace’, the prompt is ‘think about the topic of the text. What word might fit here?’ On several occasions, when teaching with the two more challenging texts: ‘Ace’ and

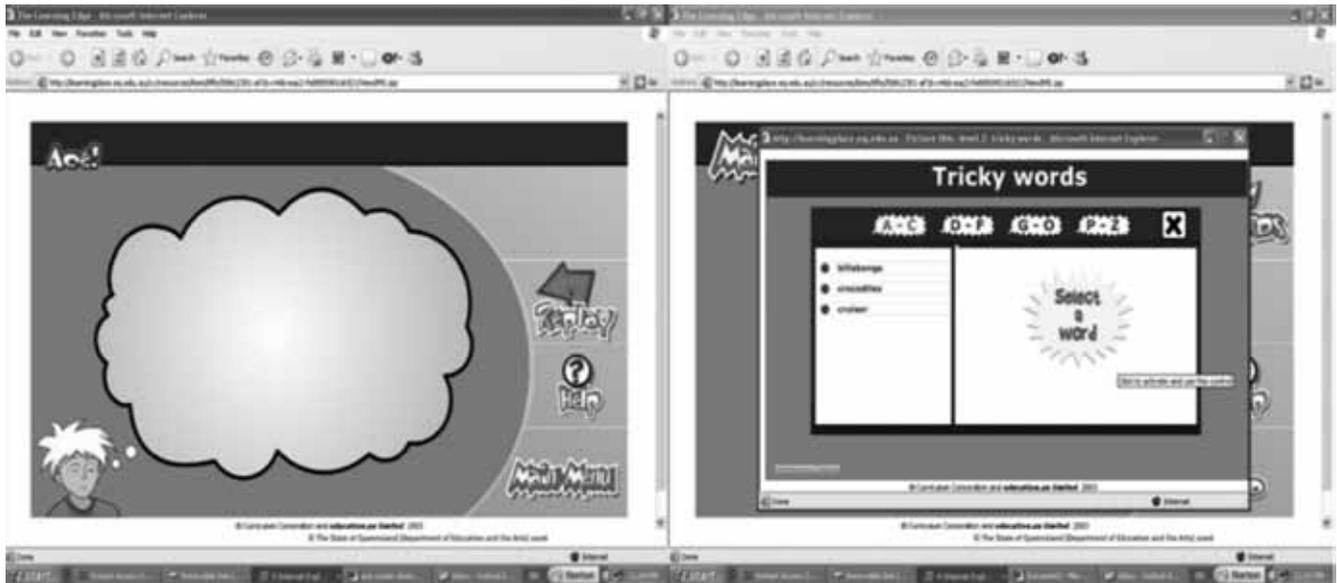


Figure 3. Relational hyperlinks

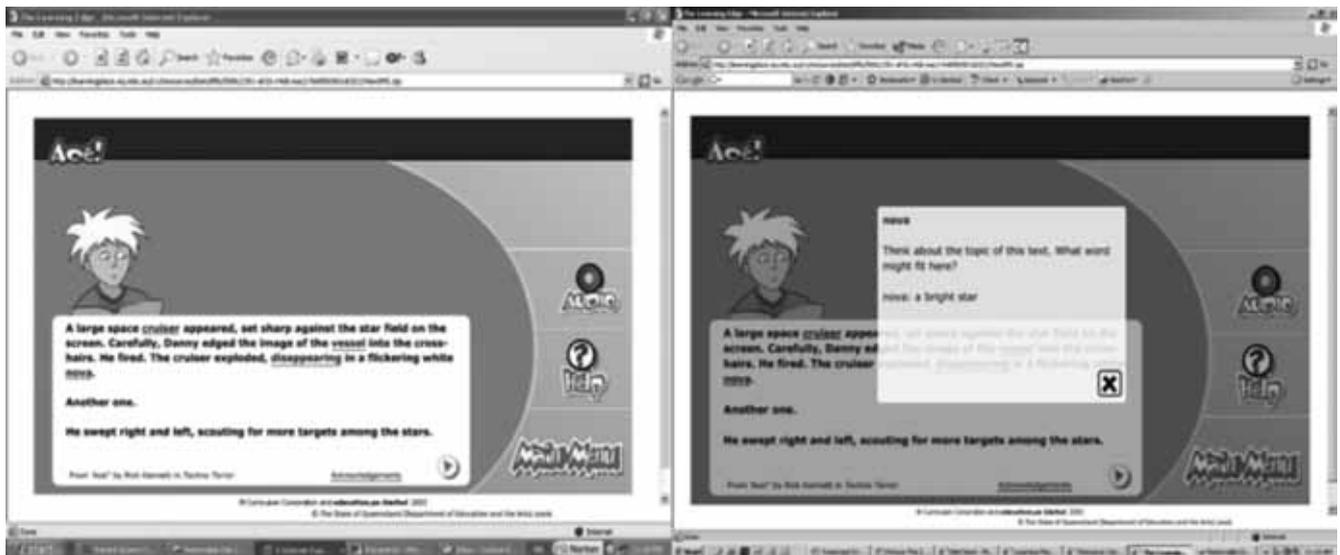


Figure 4. Embedded hyperlinks and relational hyperlinks

'Crocodiles', Janelle did select the relational hyperlinks within the LO which provided contextualising information. For example, she selected 'nova' and 'vessel' in 'Ace', after asking students if they knew what the words meant in an attempt to draw out students' prior knowledge prior to them reading the text on their own. However, at other times, familiar teaching approaches and resources continued to shape Janelle's approach, so that she did not make use of the opportunities offered by the LO affordances. Unfamiliarity with some of the vocabulary, and lack of prior knowledge of 'lasers', 'vessels', and spaceships were identified by the students as constraints to their comprehension of 'Ace'. Exploring hyperlinks to 'see the pictures in his head', information on the story title, and using the

strategy suggested above in the LO, were all designed to assist students in decoding the meaning and may have helped this class to make meaning of the text (Niederhauser, 2008).

In reading activities such as this one, which is teacher directed, 'learner control' of the LO is situated with the teacher (Niederhauser, 2008). This positioning meant it was hard for Janelle to determine which reading pathways or which hyperlinks to select that would promote deeper levels of learning for her students. In another example when exploring 'Crocodiles', Janelle could have engaged in an elaborated discussion of vocabulary with the word 'prey' or modelled the reading strategy of locating the main idea of the text, through skimming the text, as suggested by

the pop-up screen, or using contextual clues like the title 'Crocodiles'. It was only after the lesson, when she had time to reflect on what had occurred that Janelle identified the knowledge that her students needed. Her selections, or lack of selection of hyperlinks, did not allow students to criss-cross the conceptual landscape to make sense of the texts in some cases (Jacobson & Spiro, 1995).

However, there were also constraints evident within this LO. The pop-up boxes for embedded hyperlinks (see Figure 3) for example, could disrupt comprehension and fluency of reading, as they would not allow the reader to contextualise the word within the sentence in which it is located as they were reading. Additionally, the 'Tricky words' option, which provided visual support for the meaning of the word, was not available during the actual reading of the texts. It was only available from the Menu Option. Only a print-based and audio option via the pop-up box was readily available to the reader. So not only do teachers need to select texts that offer cognitive supports through the use of hypertext and hyperlinks, and make active use of the opportunities they provide, they also need to examine the constraints of LOs and how these may impact on the cognitive load of students to ensure the active construction of meaning (Niederhauser, 2008).

Active engagement with the text is an important component of learning with hypertext (Niederhauser, 2008). With the IWB, Moss et al. (2007) and others promote that deep learning is achieved through 'conceptual interactivity' with the content displayed, i.e., the LO. Janelle tried to encourage more conceptual interactivity (Moss et al, 2007) by asking students more open questions to elicit discussion. At the begin-

ning of the lesson, for example, she asked students to nominate the reading strategies they use. After not having much success with student responses, Janelle moved on rather than reframing the questions. In other examples, Janelle often accepted one word responses e.g. 'Fighters' or 'Lasers', when she had asked students to tell her what pictures they formed in their minds, rather than have them elaborate. Observation of Janelle's practice would suggest a definition of interactivity that aligns with Moss et al.'s (2007) notions of technical and physical interactivity with a focus on 'turn-taking'. This is reflected by Janelle's question, 'Is there anyone else who hasn't had a turn that wanted a turn?' As suggested by Freebody and Muspratt (2007) when using LOs and IWBs in a combined manner, teachers need to provide interaction and discussion around LOs so that effective engagement is realised and learning enhanced.

**Reconceptualised understandings of text, reader, reading activity, and social context**

The use of multimodal texts, including LOs, within technological environments raises many issues for consideration for classroom teachers, educators, and researchers as we seek to create literate students in multiliterate times. Comprehension in such circumstances is a complex interplay between texts, students, and contextual factors. These complexities create the need for a re-conceptualisation of the elements of text, reader, reading activity, and social context viewed from more traditional print-based approaches (Pardo, 2004). In this article I propose a model which highlights the complexities of the reading process and comprehension with the hypertexts of LOs and IWBs

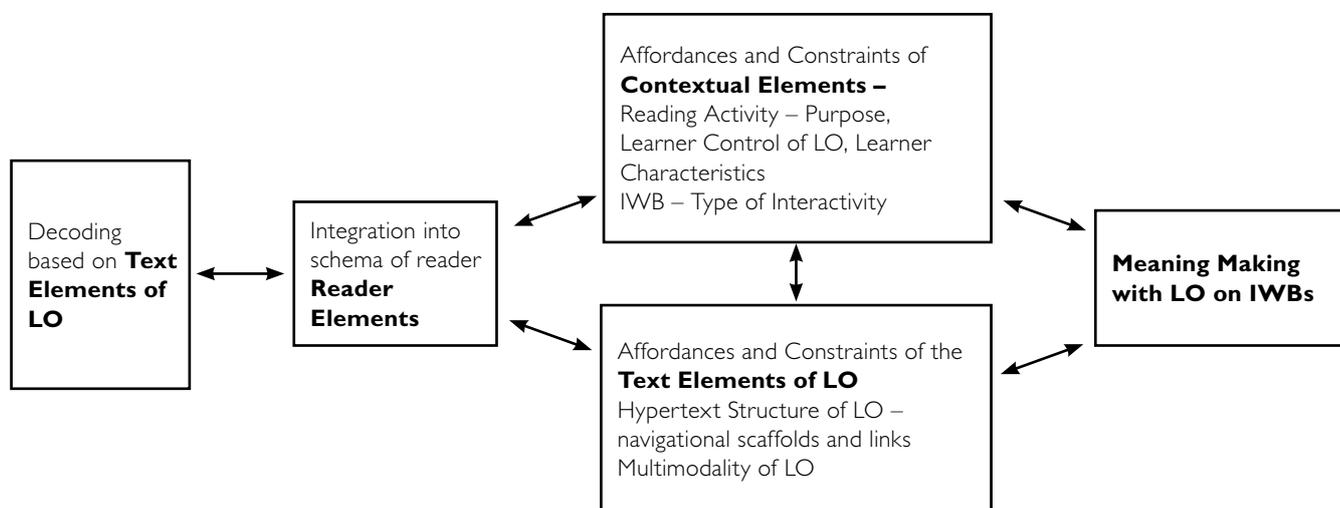


Figure 5. Stages of Reading Comprehension Process with Learning Objects and IWBs (Kitson, 2011)

(See Figure 5). The model is drawn from key established theories of reading with hypertext, and is based on the three processes advocated by Shapiro and Niederhauser (2004) in the literature review. My model is not intended to represent a linear process, but rather a complex interaction of text, reader, reading activity, and social context.

### **Reconceptualising understandings of text**

As hypertext is character and text-based, the first process of Shapiro and Niederhauser's (2004) model posits that this is when characters and words are processed. In order to decode the text in the LO students need to know the codes and conventions of written print, concepts of print, the layout of hypertext, and the types of strategies needed to make sense of it.

However, as hypertext is only one component of a LO, understanding of how hypertexts operate is not sufficient for the decoding of multimodal texts. As Walsh (2006, p. 34) proposed, 'particular modes and combinations of modes may influence a reader's meaning making process'. From a teachers' point of view, this means understanding the bases of diversity of the different modes of communication and how language, image and digital rhetorics can be situated independently or interactively to construct different meanings (Unsworth, 2002). Teachers then need to apply this developed knowledge about the nature, structure and multimodality of texts to texts which are suitable for teaching English content and can support student learning.

### **Reconceptualising understandings of the reader**

The second process in Shapiro and Niederhauser's (2004) model, is the integration of the content of the hypertext into the reader's schema to form 'a hierarchical propositional representation of the textual information' or text base (Niederhauser, 2008, p. 200). For LOs, individual learner characteristics, capabilities and dispositions associated with reading as discussed in the literature review are still important (Pardo, 2004). As shown in the examples in this article, with texts like 'Ace' and 'Crocodiles', knowledge of the world, or students' prior knowledge of topic matter, and vocabulary was paramount for students to develop this text base.

### **Reconceptualising understandings of the context**

In the third process of Shapiro and Niederhauser's

(2004) model, is where the reader constructs a situation model. This is:

Active integration of the text base with prior knowledge constitutes meaning making – a deep, complex, and coherent understanding of the material presented in the text'. (Niederhauser, 2008, p. 200)

In other words, this is where the real learning takes place. In the classroom this occurs in an interaction between LO, IWB, the teacher and students. However, this is also where 'disruptive pedagogies' may occur (Hedberg, 2006). Key variables come into play. Teachers, whether using LOs for whole class, small group or individual activities, need to ensure there are specific goals that promote deep learning or conceptual interactivity (Moss et al, 2007), either provided by the teacher or evident in the LO itself. In whole class situations, there needs to be a match between the imposed purpose of the teacher, and that of students to ensure comprehension is not disrupted (Niederhauser, 2008; RAND Reading Study Group, 2002). These factors all interact with the affordances and constraints of the LO, with the navigational scaffolds and hyperlinks of offer for the learner to select. As evident in the examples provided, the placement of 'learner control' (Niederhauser, 2008) is an important consideration. If teachers are in charge of this 'learner control', they need to be aware of the potential challenges to meaning making for their students, and choose a reading pathway that supports their learning needs. Further, best practice in reading comprehension for multimodal texts suggests that teachers need to model and make explicit the declarative, procedural and conditional knowledge for comprehension, considering reader factors, textual factors and contextual factors (Almasi & Hart, 2011).

### **Conclusion**

Developing literate students for the 21st Century is the core business of practicing English teachers. Whilst research (Kitson, 2010; Walsh, 2010) has highlighted the keenness and innovation of teachers to integrate technology into their teaching practice, their knowledge of how to teach with multimodal texts including LOs has often been shaped by their experiences with more traditional print-based texts. As highlighted in this article, the combined use of LOs and IWBs has the potential for disruption to learning (Hedberg, 2006). Further, the process of reading and developing meaning in hypertext and multimodal environments

is highly complex, with teachers needing to transform their pedagogies and to re-conceptualise their understanding of the nature of multimodal texts, their notions of readers, and reading activities. The model proposed in this article is a starting point for considering these elements individually and collectively, and in highlighting where the affordances and constraints of these elements can lead to disruptions in the criss-crossing of the conceptual landscapes for students.

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