Designing A Flexible Web-Based Reading Environment to Facilitate Self-Regulated Reading Comprehension

Smaragda S. Papadopoulou

smapapad@gmail.com

University of Piraeus (Greece)

Abstract

Reading has always been a foundational element of one's education. The ultimate goal of reading, however, is not limited to word recognition; the reader's success lies in comprehension. Comprehending a text is undoubtedly a complex process and it is even more difficult for all learners to acquire self-regulating reading skills. A framework of how a web-based reading environment should be designed in order to meet students' diverse needs and help them develop reading comprehension skills through processes that favor self regulated reading is outlined in this paper. The attempted synthesis is based on the main premises of Self-regulation Theory and the pedagogical approach of Universal Design for Learning, taking advantage of the new possibilities offered by digital texts and Web 2.0 applications.

1. Introduction

Reading has always been a foundational element of one's education. Learning to read is intended to provide students with skills that are necessary for proper word recognition and text decoding. The ultimate goal of reading though, is not limited to the recognition of isolated words, but lies in the reader accessing the meaning of the text. Reading comprehension is achieved when words are recognized and their meanings identified, relevant background knowledge is activated and inferences are generated as information is processed during the course of reading. It has also been pointed out that monitoring processes are essential in order to track both ongoing comprehension and the internal consistency of text, allowing the reader to apply repair strategies if there is a danger of comprehension breaking down [1].

Comprehending a text is undoubtedly a complex process. Currently both primary and secondary education teachers are frequently confronted with the same dual problem: the lack of reading comprehension skills on the part of many of their students and their own lack of experience on how to remedy this deficiency. It is therefore imperative that obstacles to reading comprehension instruction be overcome, that a shift towards a modern model of reading comprehension takes place and, crucially, that individual differences –a major factor that influences reading comprehension– are taken into consideration. Especially nowadays, as the emphasis on creating life-long learners increases, it is important that teachers not only foster reading comprehension but also help develop engaged self-regulated readers, i.e. readers *"who set themselves realistic goals, select effective reading strategies, monitor their understanding of the text, and evaluate progress towards their goals"* [2]. This implies that the appropriate theoretical and technological tools are identified and used so that specific learning procedures are supported in order to help all students develop self-regulation reading skills.

This paper addresses the aforementioned issues and aims to synthesize a framework based on which a web-based reading environment could be carefully designed to aid the instructor while at the same time fostering reading comprehension and self-regulated reading for diverse students.

2. Integrating Technology in Reading Comprehension Instruction

2.1 Rethinking reading comprehension instruction

There are three main obstacles to effective instruction in reading comprehension. The first is associated with teachers' inadequate training and preparation for the teaching of comprehension strategies. Secondly, effective strategy instruction requires a multitude of means for teacher-supervised practice given that good results depend on regular and continuous practice with abundant, personalized feedback. Finally, the third barrier is related to the growing diversity in contemporary classrooms [3].

There is no doubt that it is desirable to provide all students with the opportunity for significant improvement of their reading comprehension. This is indeed feasible firstly via the transition from the traditional to a modern model of understanding and the treatment of reading as a holistic process. In particular, the modern model perceives understanding as a result of the reader's active engagement and interaction with the text, in contrast to the traditional model where the dominant idea is that the reader is a passive recipient of the message. Moreover, the traditional perception of reading comprehension focuses on the linear acquisition of a carefully sequenced list of reading skills, whereas according to the modern model these skills are regarded as a set of interactions. Hence, reading comprehension is the result of an interaction and the outcome of individual psycholinguistic and cognitive skills [4].

The remaining challenge, therefore, is to identify effective methods and tools that will support teachers in their attempts to foster reading comprehension for all students. In order for them to do so, the factors affecting reading comprehension should be taken into account. This means that we need to emphasize the variety of textual types, the multimodality of texts, the readers' individual differences, their motivations and their involvement with the text during the reading process as well as the level of support that should be provided to them so that they can gradually become self-regulated readers.

At this point, technology has the potential to bridge the gap between research findings and educational practice, which the traditional media (such as the printed book) have failed to do, and thus it can substantially facilitate the teachers' work [5]. Technological advances have certainly helped to shape new book formats. Reading is increasingly shifting from paper-based "one-size fits all" texts to digital customizable ones. The future of books, as pointed out by Anastasiades [6], *"lies in a hybrid of an interactive learning environment that involves educators, students and authors"*, which is in this paper interpreted as an web-based learning environment for enhancing self-regulatory reading comprehension.

2.2 A web-based reading environment for developing self-regulated readers

Using digital texts, web applications and social media it is now possible to develop online reading environments that can dramatically facilitate the role of the teacher while rapidly developing students' skills. In particular, there is a vast body of research demonstrating the value of technology-supported reading and studying environments [7]. In this connection, the model of self-regulated learning is being used by many scholars in order to describe complex interactions that promote learning through technology-supported learning systems [8] [9] [10]. In general, *'students can be described as self-regulated to the degree that they are metacognitively, motivationally, and behaviorally active participants in their own learning process'* [11]. In particular, self-regulated readers are those who set themselves realistic goals, select effective reading strategies, monitor their understanding of the text, and evaluate progress toward their goals [12].

Fortunately, the advent and dominance of the new generation web (Web 2.0) has allowed us to envision the formation of more flexible technology-enhanced reading environments that can promote self-regulated reading. Moreover, it is suggested that in order for such a reading environment to be consistent with the diverse needs of students and fulfill its goal of developing self-regulated readers it should be designed upon the principles of Universal Design For Learning (UDL), and must incorporate functionalities that allow the implementation of self-regulatory strategies, i.e *"actions and processes directed at acquiring information or skill that involve agency, purpose, and instrumentality perceptions by learners"* [13].

In particular, the Center for Applied Special Technology (CAST - USA) began in the late 1980s to research, develop, and articulate the principles and practices of Universal Design for Learning (UDL). UDL is a framework that helps meet the challenge of diversity by promoting the creation of flexible instructional goals, methods, materials, and assessments that can be customized and adjusted for individual needs and thus be effective for all [14] [15].

Steaming from research in the fields of learning differences and effective instructional settings, UDL principles call for varied and flexible ways for students to (i) present or access information, concepts, and ideas (the "what" of learning), (ii) plan and execute learning tasks (the "how" of learning) and (iii) get engaged--and remain engaged--in learning (the "why" of learning)

The UDL Guidelines 2.0 are organized according to the three main principles of UDL that address representation, expression, and engagement. For each of these areas, specific checkpoints for options are presented [16].

I. Provide Multiple Means of Representation	II. Provide Multiple Means for Action and Expression	III. Provide Multiple Means for Engagement
1. Provide options for perception	**4. Provide options for physical action**	**7. Provide options for recruiting interest**
1.1 Offer ways of customizing the display of information	*4.1 Vary the methods for response and navigation*	*7.1 Optimize individual choice and autonomy*
1.2 Offer alternatives for auditory information	*4.2 Optimize access to tools and assistive technologies*	*7.2 Optimize relevance, value, and authenticity*
1.3 Offer alternatives for visual information		*7.3 Minimize threats and distractions*
2. Provide options for language, mathematical expressions, and symbols	**5. Provide options for expression and communication**	**8. Provide options for sustaining effort and persistence**
2.1 Clarify vocabulary and symbols	*5.1 Use multiple media for communication*	*8.1 Heighten salience of goals and objectives*
2.2 Clarify syntax and structure	*5.2 Use multiple tools for construction and composition*	*8.2 Vary demands and resources to optimize challenge*
2.3 Support decoding of text, and mathematical notation, and symbols	*5.3 Build fluencies with graduated labels of support for practice and performance*	*8.3 Foster collaboration and community*
2.4 Promote understanding across language		*8.4 Increase mastery-oriented feedback*
2.5 Illustrate through multiple media		
3. Provide options for comprehension	**6. Provide options for executive functions**	**9. Provide options for self-regulation**
3.1 Activate or supply background knowledge	*6.1 Guide appropriate goal setting*	*9.1 Promote expectations and beliefs that optimize motivation*
3.2 Highlight patterns, critical features, big ideas, and relationships	*6.2 Support planning and strategy development*	*9.2 Facilitate personal coping skills and strategies*
3.3 Guide information processing, visualization, and manipulation	*6.3 Facilitate managing information and resources*	*9.3 Develop self-assessment and reflection*
3.4 Maximize transfer and generalization	*6.4 Enhance capacity for monitoring progress*	

Figure 1. UDL Principles, Guidelines & Checkpoints [CAST (2011)]

It is proposed that the above UDL principles are embedded in a web-based reading environment (WBRE) and that the UDL guidelines are correlated with a self-regulation scenario in order to help all learners acquire self-regulatory reading comprehension skills through a flexible technology-supported learning environment. Specifically, based on the main features of the self-regulation theory [17], Paraskeva et Al. [18] have proposed a framework which can be used as a template for developing self-regulation teaching scenarios. The self-regulated learning strategies that can be used in each of the self-regulation phases are shown in Table 1.

Table 1. Self Regulation (SR) Phases and Learning Strategies

SR Phase	A. Forethought Phase	B. Performance Phase	C. Self-reflection Phase
SR Learning Strategies	▪ Intrinsic interest ▪ Goal Setting ▪ Modeling ▪ Keeping records & monitoring ▪ Planning ▪ Strategic planning ▪ Self-motivation	▪ Rehearsing and memorizing ▪ Self-control ▪ Keeping records & monitoring ▪ Self-instruction ▪ Self-observation ▪ Self-recording ▪ Seeking social assistance	▪ Self-evaluation ▪ Self-monitoring ▪ Self-judgment ▪ Self-reaction ▪ Strategic planning ▪ Reflective Thinking

The framework for self-regulation scenarios was based on these phases and incorporates most of these strategies, as suggested by Paraskeva et Al. This is presented in Figure 2 in correlation with the UDL checkpoints and along with the features and affordances of the proposed web-based reading environment (WBRE) which align both with the self-regulation scenario and the UDL principles. The proposed WBRE features comply with the research evidence provided by CAST and wish to extend the work already conducted in this field, with the integration of the latest web technologies.

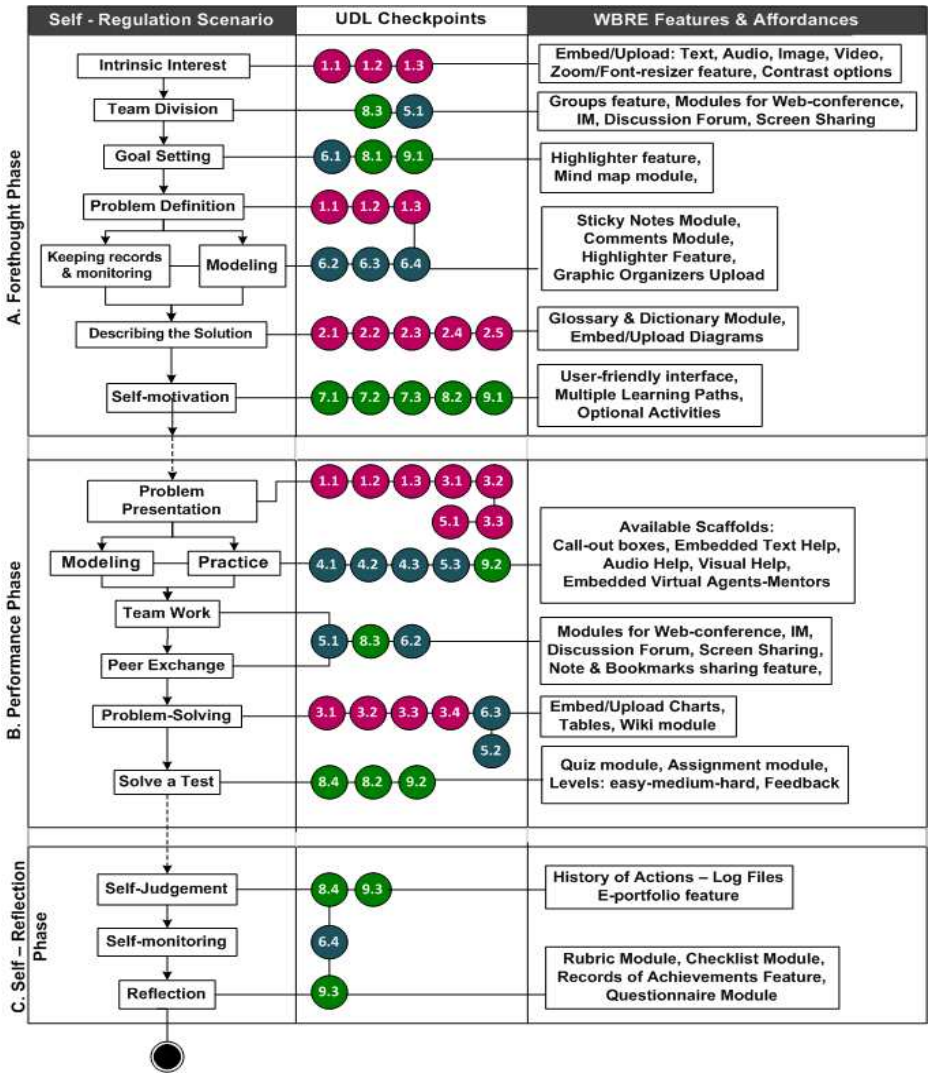

Figure 1. Self-Regulation Scenario, UDL checkpoints & WBRE features

3. Conclusions

The WBRE which will be based on the proposed framework should not be designed to replace the teacher, but it should aim instead to enable him/her to do his/her job more effectively. A carefully designed WBRE will take advantage of universal design for learning to customize a reading experience so that it offers the right level of challenge and support for each student while implementing a self-regulation scenario.

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