

## Liquid book and Special Educational Needs

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### Abstract

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I ricercatori che studiano le strategie di apprendimento e le metodologie di insegnamento più efficaci hanno dimostrato che un approccio multimediale alla scrittura e alla lettura è utile per aumentare queste abilità in alunni con Bisogni Educativi Speciali (BES). Il gruppo di studio per l'educazione speciale dell'Università degli Studi dell'Aquila e la casa editrice Anicia di Roma, al fine di sviluppare un metodo di studio e di insegnamento, hanno progettato l'applicazione multimediale "Libro liquido". Essa risponde alle esigenze di apprendimento degli studenti realizzando una didattica inclusiva.

**Parole chiave:** bisogni educativi speciali; tecnologie; libro liquido; didattica inclusiva.

### Abstract

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Researchers studying the most effective learning strategies and teaching techniques have shown that a multimedia approach to writing and reading is useful in increasing these skills in pupils with Special Educational Needs (SEN). The study group for special education at the University of L'Aquila and the publisher Anicia in Rome, in order to develop a study and teaching method, designed the multimedia application "Liquid book". It responds to each student learning needs through an inclusive education.

**Keywords:** special educational needs; technologies; liquid book; inclusive education.

## 1. Introduction

The development/dissemination of information and multimedia technologies influences the way we think and learn. For this reason, it is crucial that educators, especially teachers, use as teaching and educational aids not only those of classical culture but also digital technologies. The use of multimedia approach, particularly for special needs of some students, allows a personalization of the teaching intervention and supports its motivation (Poobrasert & Cercone, 2009).

One of the greatest challenges for educators is how to reach each student despite different abilities and learning styles within the classroom. The use of multimedia to educate and highlight the strengths of students with special educational needs – students who have biological, social or contextual difficulties that hinder them in learning and development– can be the key to overcoming this challenge (Warschauer & Matuchniak, 2010).

## 2. Differences between the Conventional and Digital Literacies

It is crucial that teachers, in addition to know how to use digital resources, also know how to communicate the usefulness of digital aids to their students and explain how to solve learning problems, through their use. There is a growing interest about these issues and especially about the differences between the traditional methods of reading and writing and those mediated by digital aids. Coiro (2009) identified five differences between traditional and online reading: first of all, online reading requires new skills and strategies, such as the ability in searching, viewing various digital texts, synthesizing information from various websites. Secondly attitudes and predisposition towards the use of new technologies have a great influence on their successfully use. Students who are eager to use internet are more successful than those who do not find it helpful. The third difference relates the social nature of online reading: students can collaborate by exchanging information and sharing sites. The fourth difference is that the student, in the online reading, must make a selection of information, choosing trusted sites and excluding information that are not important. Finally, the digital reading compared to the traditional is evolving.

Also writing online differs from the traditional one. Knobel and Lankshear (2006) show that writing online has a more social nature than the traditional one, which allows greater sharing content between users. Moreover, writing online allows to integrate traditional contents with the addition of audio and video files, with fast connections to the network (New London Group, 2000). The use of digital tools has already provided many positive results. Video games, for example, can improve visual-spatial problem solving skills (Schmidt & Vandewater, 2008). Even a simple game can produce increase in the speed of information processing. The use of technology can lead to a higher IQ, a better memory and a faster information processing (Rosen, 2012).

Digital technology is definitely influencing education. Many schools are already implementing projects using platforms and blogs as learning tools. Applications such as Google Docs and Facebook allow students to collect and share information to make school projects outside of the classroom (O’Keeffe, Clarke-Pearson & Council, 2011). On the other hand, studies have shown that technological activities such as playing video games have residual neurological effects on the brain that extend to a period following

the end of the game itself (Rosen, 2012). Digital students generation definitely displays attention problems and inability to delay gratification. Attention Deficit Disorder (ADD) is a syndrome (usually diagnosed in childhood) characterized by persistent patterns of impulsiveness, short attention span, often hyperactivity, and can interfere with academic, occupational, and social performance. In 2007, the diagnosis of “video game addiction” or “internet addiction” as formal psychological disorders were proposed and rejected for the Diagnostic and Statistical Manual of Mental Disorders the DSM (APA, 2007).

### **3. Inclusive model**

In order to provide students with special needs equal learning opportunities and an effective learning environment, several researchers have recommended an inclusive model (Cole, Waldron, Majd & Hasazi, 2004; McLeskey & Waldron, 2000). School must educate students with disabilities in regular programs and provide them with appropriate support such as curriculum modification, teachers with special education preparation and computer-assisted devices (Ferretti, MacArthur & Okolo, 2001; Waldron & McLeskey, 1998).

Researchers studying the most effective teaching and learning techniques have shown that a multimedia approach to writing and reading is useful in increasing the skills of reading and writing in pupils with special educational needs. Instruction that values technological expertise in students energizes them in learning, helps them to reach their potential, and ensures their school success. Writing, for example, is difficult for many students, and poses special challenges for students with Learning Disabilities (LD). Historically these students have been disadvantaged from school contexts that were not adequate to the development of their potential. Students diagnosed with learning disabilities often work on isolated skills and fail in gaining a broader picture of writing complexities (Graham & Harris, 2005).

Inclusive education is a new area that goes beyond traditional approaches of integration: it aims at providing students with opportunities to receive a high quality education independently from their social or cultural background through the curriculum adaptation to the students diversity (Griol Barres, Callejas Carrión & Delgado, 2013).

### **4. Liquid Book project**

The study group on special education at the University of L’Aquila and the publisher Anicia, in order to develop a method of studying and teaching, designed and realized the “Liquid book” application. It aims at responding to the learning needs of each student through an inclusive education.

Practical applications of multimedia technologies that support early literacy are described and evaluated, including several variations of recorded books and stories, utilizing mainstream audio and video recording appropriate for libraries and schools. Special emphasis is given to the needs of children with disabilities and children who are learning a second language.

Writing and reading are closely related and inseparable. Best writers tend to be best readers, or rather it seems that reading produces a better writing. Assisted reading and writing of new words helps children, particularly those with special educational needs, in

the development of phonetic and phonemic skills. Children can analyze abilities and skills developed through pieces they have read: they can reflect on how to understand the text structure and make suggestions to improve this understanding.

## **5. Application design and main features of Liquid book**

Better writers tend to be better readers, and better reader produces better writing. It makes sense that the strategies pupils use to read are the same ones they use to write. Parents and teachers can take advantage of the connection between reading and writing by showing the children how reading is enjoyable. Reading helps them learning the language and developing reading and writing skills, this is especially true for the ones with special educational needs who are developing phonemic awareness and phonics skills. This happens by reading and writing new words. Older children develop the abilities shown by analyzing the pieces that they read. The main features of liquid book are:

- adaptation of each device and available operating system to the student (at home and at school);
- zoom function of the pages for text areas and images;
- change font color, background color and font printed edition in uppercase and interriga 1.5;
- treatment of the text with text to speech (TTS);
- speech synthesis;
- audiobook functionality;
- recording and storage of audio notes (metacognitive teaching);
- exercises in karaoke mode;
- direct access from the text related to dictionaries;
- activation of video resources;
- access to interactive conceptual maps.

## **6. Functions and phases of the development multimedia application**

Many different types of experiences and input are necessary during the development of cognitive skills. These include opportunities to discover skills required for learning, as well as applying those skills (Bandura, 1989). Teachers must identify what skills need to be taught and how to teach them; students need to self-regulate their learning by understanding which strategies to use and when (Butler & Winnie, 1995).

The applicative plan develops through the realization of the six following steps.

### **1. Review:**

- presentation of the text through figures, graphics, captions;
- insert of images and video (visual teaching);
- preliminary iconographic approach.

### **2. Read:**

- chance to change the font;
- audio files for reading passages;
- key words in the margin of the text;

- ability to write text.
3. Question:
    - projection of the text, by the user, answering the following questions:
    - who;
    - what;
    - when;
    - where;
    - why.
  4. Reflect:
    - opportunity to highlight parts/sections of text by the user;
    - presentation in the text of examples relating to the subject, teaching laboratory experiments (depending on the discipline), the main logical connections intra/inter-disciplinary.
  5. Recite:
    - user can record his/her voice;
    - inclusion in the text of interactive conceptual maps.
  6. Review:
    - synthesis audio and video on the subject.

Only by teaching several strategies – some of which may be curriculum-specific – teachers can help students to become effective in using metacognitive strategies in specific situations (Baker, 2002). Teachers must also construct learning environments that support all students' metacognitive thinking through systems and strategies that help learners to implement strategies independently. Research on learning demonstrates that many students, particularly low-achieving students, have weak metacognitive processes and their learning is affected accordingly (Brown & Campione, 1996; Zohar & Dori, 2003). Students need to plan for learning, to think about the learning process as it is taking place, to monitor, understand, and evaluate learning after an activity.

Teaching students to monitor their performance as they are learning by thinking aloud can enhance students' learning about how to explore and inquire and assess their comprehension while they are on-task (Mitchell, 2008). Thinking aloud promotes active processing by way of bringing processes to conscious awareness (McKeown, Beck & Blake, 2009).

## **7. Conclusions**

The practical realization of an inclusive teaching model, firstly addressed to special needs students and then extended to all students, enhances the specificity and learning styles of each of the pupils. The application design described is the first step of a comparative analysis in primary schools in L'Aquila and province that aims to study the relationship between the use of the multimedia application presented and the reading comprehension of a text.

Liquid book can become an effective tool for the program personalization and a chance to include students with different knowledge, skills and abilities from the cognitive, relational, affective and motor point of view.

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