

## **Experiences with the use of personal learning environments in school settings: mobility and web 2.0 in the final grades of elementary education**

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### **Abstract:**

Studies point out that the use of web 2.0 applications in educational settings can enhance pedagogical innovations because they allow new forms of collective creation, sharing of content, and communication between students and teachers. The use of different web applications in education allows the creation of personalized learning environments centered on the student, and it is the basis of the PLE concept. However, there are many applications and services in web 2.0. How to choose the most appropriate one to achieve the educational goals? In this article, we present the preliminary results of an ongoing study, with a qualitative approach, which involves the use of web 2.0 applications in the final grades of elementary education in a private school in the south of Brazil. The aim of this paper is to present a framework that helps in the selection of web tools for use in the school context, from the perspective of the PLE. The analyzed tools are listed in the Top 100 Tools for Learning survey, developed by the Centre for Learning and Performance Technologies (Hart, 2012). The framework organizes the tools on the proposal of Castañeda & Adell (2013), where a PLE is constituted of tools for reading, producing, and sharing. The framework is based on the following criteria: web tool, access mode (desktop, mobile devices), gratuity, age, communication (synchronous or asynchronous), and visibility (considering the me, we, and see perspective as proposed by Heppel, 2012). Results point out that the proposed framework can be used to support the teacher in the design of learning activities and in the selection of web tools which are appropriate to the pedagogical approach applied in the teaching and learning process.

### **Introduction**

Cyberspace is based on three fundamental principles: production, distribution, and sharing (Lemos & Levy, 2010), which are also principles of web 2.0. These actions are possible through different web 2.0 applications such as blogs, micro-blogs, social networks, file sharing, etc.

Studies point out that the use of web 2.0 applications in educational settings can enhance pedagogical innovations because they allow new forms of collective creation, sharing of content, and communication between students and teachers/professors. Besides, the use of different web applications in education allows the creation of personalized learning environments centered on the student, and it is the basis of the PLE concept (Conole, 2013, Castañeda & Adell, 2013).

A review of the PLE concept conducted by Fiedler & Våljataga (2013) points out two perspectives involving the PLE research. One group focuses on the study of technical issues, addressing the research on networked tools and services that students can use. A second group focuses on the PLE concept from an educational approach. The findings of their research

show us that the PLE concept “is best treated as an intermediated concept that allows systematic further development of learning activity and its digital instrumentation” (Fiedler & Våljataga, 2013, p.8).

In the present study we understand that it is possible to take advantage of both approaches aiming to organize a proposal for the selection of web 2.0 applications which can be used in the educational setting. As the first research group, we understand the importance of providing a set of networked tools and services as a first step to the teachers in order to promote the use of web 2.0 in education. It is important that teachers have the opportunity to find and explore different web tools. However, the emphasis of this study is not on the tool, but in the relationship between the potential of the web 2.0 application and the learning project. Through this perspective, as the second research group, we understand that “PLE certainly goes beyond mere digital instrumentation of activity” (Fiedler & Våljataga, 2013, p.7).

In this study, we understand that a PLE is organized with tools, mechanisms, and activities that each student uses to read, produce, and share and reflect in communities (Castañeda & Adell, 2013). These actions refer to the principles of producing, distributing, and sharing inherent to web 2.0. The tools, mechanisms, and activities for reading involve the information source from different forms, such as text, audio and video, and are characterized by sites, blogs, newsletter, video channel, and others. Tools, mechanisms, and activities for producing are spaces where the student can document his process of reflection based on collected information; they are spaces to write, to reflect and to publish. Tools, mechanisms and activities for sharing and reflecting on communities are characterized as spaces where you can talk and exchange ideas with other subjects with the purpose of forming social networks (Castañeda & Adell, 2013).

Therefore in a PLE the students integrate both the experiences in formal education and the new experiences with the use of web applications and services. This way the PLE potentializes the recording of the learning process and also the interaction and communication processes with different subjects and groups, as well as the access to different learning digital resources. Thus, the PLE is not a technology but an approach, a way through which we can use the digital technology to teach and to learn (Castañeda & Adell, 2013).

Through this perspective, a PLE is composed by “my things” but also includes the social environment involving the interactions with other subjects. These interactions compose the Personal Learning Network (PLN). The PLN includes the subject-subject interactions mediated by the PLE, and characterizes the social part of the learning environment. (Castañeda & Adell, 2013).

Williams, Karousou and Mackness (2011) distinguish between two modes of learning called prescriptive learning systems and emergent learning networks. They are associated with two domains of application for learning: predictable domains and complex-adaptive domains. In predictable domains the learning is based on a prescriptive mode. Prescriptive learning is based on a proposal usually used in formal education, where the content is duplicated and distributed, based in a one-to-many perspective in a fixed and predictable context.

On the other hand, a complex-adaptive domain is based in emergent learning networks and characterizes a learning process which is typically collaborative. This way, the emergent

learning is characterized by unpredictability and to emerge from the interaction between students and their context. Examples include the use of social software and personal learning environments (PLE).

This way, to boost the use of PLE in the context of formal education consists on validating the prescriptive learning as well as the emergent learning (Williams et al, 2011).

According to Williams et al (2011), web 2.0 provides condition for emergent learning, but does not necessarily lead to this. The authors point out that learning has always included prescriptive and emergent learning, but they highlight the importance of a “a shift from a monolithic learning environment in which everything must be controlled and predictable to a more pluralistic learning ecology in which both prescript and emergent application domains and modes of learning have their place” (Williams et al, 2011, p. 55).

Through this perspective, many web 2.0 tools are interesting to promote an emergent process of learning. However, there are many applications and services in web 2.0. How to choose the most appropriate one to achieve the educational goals? In this article, we present the preliminary results of an ongoing study, with a qualitative approach which involves the use of web 2.0 applications in the final grades of elementary education<sup>1</sup> in a private school in the south of Brazil. The aim of this paper is to present a framework that helps teachers and students in the selection of web tools for use in the school context, from the perspective of the PLE.

It is important to state that this study focuses on the role of the teachers in promoting the use of web 2.0 in an educational context. However, if the PLE is related to the experiences of a particular subject, how can the teacher indicate tools and applications? In this study, we understand that the teacher can enhance the student’s learning process by promoting the use of learning tools.

Recent researches show that Brazilian students use the computer and Internet frequently, but the main activity related to learning is research support. On the other hand teachers are using the Internet for personal and professional activities, but they need to improve the use in their teaching (ICT Education 2012, 2013, ICT Kids online 2012, 2013). Thus, we understand that in one first moment the teachers can start using web 2.0 in education through a PLE perspective in order to show students how they can use web applications in their learning activities. After, in a second moment, students can start to select and use web tools and services according to their learning necessities.

In the following section we present a reflection about frameworks for building web 2.0 based PLE, followed by the context of our research involving the use of web 2.0 applications in education based in a PLE perspective. Subsequently, we discuss the proposed model and finish the paper by presenting the findings and making recommendations for future research.

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<sup>1</sup>The educational system in Brazil is organized into basic education and higher education. Basic education involves the elementary school (9 years – children from 6 to 14 years old) and the high school (3 years – from 15 to 17). The beginning years of elementary school involve 5 grades (children from 6 to 10 years old) and the final years of elementary school involve 4 grades (children 11 to 14).

### **Frameworks for building web 2.0 based PLE**

A number of studies have been conducted involving the development of conceptual frameworks for building web 2.0-based PLE (Torres-Kompen & Mobbs, 2008, Rahimi, Van den Berg & Veen 2012, 2013, Castañeda & Adell, 2013).

The framework proposed by Torres-Kompen and Mobbs (2008) focuses in the use of a web 2.0 application as a hub. They understand that it is necessary that the student chooses an application as a central component for the PLE. This, according to them, facilitates the access to the student's collection of web 2.0 tools, facilitates the management of different logins and passwords, and allows the sharing of data between different tools that compose the PLE. In their study, they present four different approaches for building a PLE, and each approach is based in a web 2.0 tool as a central hub: wiki-based PLE (Google sites), social network-based PLE (Facebook), social aggregator-based PLE (Netvibes), and browser-based PLE (Flock).

Rahimi, Van den Berg, and Veen (2012) presented a framework to design and implement a PLE in a secondary school. The framework is based on constructivism as its theoretical foundation, and proposes a model to incorporate PLE building into teaching and learning processes. The model to integrate PLE building into teaching and learning processes based in a constructivist approach involves 8 elements: (a) selecting learning topic; (b) defining learning objectives; (c) defining pedagogical and/or technical tasks, guidelines and assignments based on the learning topic and objectives; (d) selecting organizational form and web tools for assigning to the tasks; (e) accomplishing tasks, developing PLE; (f) supporting learner pedagogically and/or technically; (g) assessment and evaluation; (h) reflection on process, learning experiences, learning outcomes, and learning values of tools (Rahimi et al, 2012). Their research was conducted with a group of thirty 12-13 year old students enrolled in a first year class of a secondary school. The web 2.0 tools "were selected based on prior experience of the teacher with tools, appropriateness to the defined learning objectives, and technological affordances of the school (p. 7)". During the research, teachers and students faced some technical problems to create an account in some web tools, and it caused some dissatisfaction. So, the researchers suggest that it is important not to "overestimate digital capabilities of students. They need preparation to be able to tailor web tools to their learning needs and activities" (p. 14).

In another paper Rahimi, Van den Berg, and Veen (2013) present a study that focuses in the student's control as the core part of a PLE. They understand that web 2.0 has the potential to support students as knowledge producers, as socializers, and as decision makers. They proposed a roadmap to be used by educators to guide the design of technology-enhanced learning activities which can assist students in the development of their web 2.0-based PLE and to achieve control over their learning. Their framework is based on three aspects: the student's control model (producer, socializer, and decision maker), the learning potential of web 2.0 tools, and Bloom's digital taxonomy map (thinking process includes remembering, understanding, applying, analyzing, evaluating and creating sub-processes). According to them, "the roadmap can augment the decision making role of students by allowing them to find, use, assess, and introduce relevant web tools and services" (Rahimi et al, 2013, p. 11).

Thus, the framework proposed by Torres-Kompen and Mobbs (2008) focuses in a main tool as a hub to start the PLE, and the roadmap proposed by Rahimi et al (2012, 2013) is interesting because it focuses on learning activities which enhance the student's control. In

our research, we propose a framework that helps in the selection of web tools for use in school context, from a PLE perspective.

We understand that the PLE concept proposed by Castañeda and Adell (2013) offers an interesting base to our study. According to them, a PLE is composed of tools, mechanisms, and activities that each student uses in order to read, produce, and share. We understand that our framework can be articulated with Rahimi's et al (2012, p. 6) roadmap, especially in the task of "selecting organizational form and web tools for assigning to the tasks".

### **The research context**

In our context, in Brazil, the research called Survey on the Use of Information and Communication Technologies in Brazilian Schools (ICT Education 2012, 2013), conducted by Brazilian Internet Steering Committee (CGI), shows that 92% of the teachers use the Internet to prepare classes and download content (e-book, audio, video, etc.). However, the most frequent activities with the students are those that do not involve the use of computers and Internet, such as practical exercises related to the content of the class, lectures, and reading comprehension. On the other hand, 94% of the teachers don't have difficulty in using a search engine to look for information, 58% don't have difficulty in taking part in online discussion forums, and 74% of them don't have difficulty in taking part in social networking websites. So, we can understand that the teachers are using the Internet for personal and professional activities, but they need to improve the use in their teaching.

Besides, the results of ICT Education 2012 (2013) show that the students use the computer and Internet frequently, but the main activity related to learning is research support. This shows that the potential of communication and interaction of web 2.0 could be more explored in Brazilian educational context.

Another interesting research is the ICT Kids Online 2012 (2013), a survey called Internet Use by Children in Brazil, also conducted by Brazilian Internet Steering Committee. The survey, which involved children and teenagers between 9 and 16 years old, shows that 47% of them access Internet every day. Related to their activities online (considering 1 month of use), 82% used the internet for school work, 68% visited a social networking profile/page, 66% watched video clips (e.g., on YouTube), 54% played games with other people on the internet, 54% used instant messaging with friends or contacts, 49% sent/received e-mail, 44% downloaded music or film, 42% read or watched the news on the internet, 40% posted photos, videos, or music, 17% spent time in a virtual world, 10% wrote a blog or online diary, and only 6% used a file-sharing site. The ICT Kids Online 2012 (2013) research shows that Brazilian students are using the Internet for school research, but they also use it to communicate with friends. It's interesting to see that they are mainly content consumer but there is a movement to content producing.

We consider, then, that this context fosters the use of Internet tools in an educational proposal. Thus, for us, it is necessary to show students how they can use web applications in their learning activities.

It's necessary to mention that we understand that the school is an important space for digital inclusion. This means that in the context of this work we recognize the importance of the teachers in showing different possibilities to the students on how they can improve their learning possibilities using the Internet. This way, the teachers have an important role in

promoting activities that explore the potential of cyberspace as a learning space that foster production, distribution, and sharing of content and knowledge. This is our research focus.

Bates (2011) says that web 2.0 tools are relatively new in education and the educators still need to find new proposals to teach and to learn using the potential of interaction and communication of these tools.

In this study we understand that it is possible to enlarge the student's connectivity through web 2.0 tools once they can create their PLE, share content, and discuss with their group of colleagues. These elements are stated by several authors studying the characteristics of the users of the web. Pisani and Piotet (2010) indicate that current web users are no longer passive browsers, which only consume content provided by specialists. According to them, current users "propose services, share information, comment, engage, participate" (p.16). These new users, who are not satisfied with just browsing, but producing web content, are called web actors.

According to Prensky (2001), people of this generation can be classified as Digital Natives, because they are a generation that was born with the technology and are fluent in the digital language of computers, games, video games and the Internet. Therefore, they are the subjects of today's school. Thus, we need to investigate how to use the potential of technology in the teaching and learning process of these subjects.

There are many interesting web 2.0 applications that can be used in an educational setting. However, how can the teacher find these tools? And more important, how can the teacher choose the most appropriate web 2.0 tools for the learning goals?

The following section presents a proposal based in a PLE perspective for the selection and use of web 2.0 applications in education.

### **Web 2.0 applications in education based in a PLE perspective**

This paper presents the preliminary results of an ongoing research, with a qualitative approach which involves the use of web 2.0 applications in the final grades of elementary education in a private school in the south of Brazil. This research, which is called "Teaching and learning on the web: the architecture of participation of web 2.0 in the context of face-to-face education", aims to investigate the potential of the web's architecture of participation in the teaching and learning process in the final years of elementary school with the purpose of developing a proposal for the use of social software in education.

The results of the research are presented here and divided into four parts:

- a) investigating the most used tools for learning;
- b) identifying criteria to select the tool;
- c) articulating the selection of web tools and the PLE concept;
- d) sharing experiences.

Each part is explained below.

#### ***Investigating the most used tools for learning***

We assume, like Rahimi et al (2012), that the first experiences in the use of web 2.0 tools in education could involve tools in which the teacher has prior experience. However,

sometimes the proposal for learning outcomes will explore mechanisms and activities that will ask for unknown tools. Where can the teachers find information about them?

The Centre for Learning and Performance Technologies<sup>2</sup>, an independent website about learning trends, technologies, and tools, publishes studies about the use of technologies for learning. Every year it presents the results of a survey called Top 100 Tools for Learning.

According to Hart (2013, online) a learning tool “is defined as any software or online tool or service that you use either for your own personal or professional learning, for teaching or training, or for creating e-learning”.

The results of the 7th Annual Learning Tools Survey were presented in 2013. The data were compiled from the votes of 500+ learning professionals in around 48 countries (Hart, 2013). The tools are organized into 13 (thirteen) categories<sup>3</sup>, according the table 1.

**Table 1.** Categories of web 2.0 tools (Hart, 2013)

Category	Types
Instructional Tools	Course Authoring Tools; Testing, Quizzing and Other Interactive Tools; Course/Learning Management Systems & Learning Platforms
Social and Collaboration Spaces	Public social networks & micro-sharing platforms; Group, project, team, community and enterprise platforms Tools for the Social Classroom (for ages 5-18)
Twitter apps	Twitter Apps
Web meeting, conferencing and virtual world tools	Web meeting, webinar & virtual classroom tools Screen sharing tools Webcasting tools Virtual world tools
Document, Presentation and Spreadsheet Tools	Document creation & hosting tools Presentation creation & hosting tools PDF tools 3D (page turning) tools Spreadsheet tools
Blogging, Web and Wiki Tools	Blogging tools Wiki tools Web page/site tools Form, polling and survey tools RSS feed tools
Image, Audio & Video Tools	Image <ul style="list-style-type: none"> <li>• Image and photo editing</li> <li>• Screen capture</li> <li>• Image galleries &amp; photo sharing sites</li> </ul> Audio/podcast <ul style="list-style-type: none"> <li>• Audio/podcast editing</li> <li>• Audio/podcast streaming</li> <li>• Audio/podcast hosting</li> </ul> Video <ul style="list-style-type: none"> <li>• Video creation &amp; editing</li> <li>• Screencasting</li> <li>• Video streaming</li> <li>• Video hosting</li> </ul>
Communication Tools	Email tools Newsletter tools SMS/text tools

<sup>2</sup> <http://c4lpt.co.uk/>

<sup>3</sup> <http://c4lpt.co.uk/directory-of-learning-performance-tools/>

Category	Types
	Instant messaging tools Live chat tools Voice and video groups Discussion forum tools Audience response/Backchannel tools
Other Collaboration & Sharing Tools	Social bookmarking Collaborative research Content curation tools and services Shareable notes/notebooks Shareable/group organizers Collaborative corkboards Collaborative whiteboards Collaborative mindmapping Social calendaring tools Shareable mapping Sharing files across computers
Personal Productivity Tools	Search engines and discovery tools Research/Personal study tools Personal organizers Personal mindmapping Content curation tools and services Computing utilities Personal productivity tools Personal notebook tools
Browsers, Players & Readers	Web browsers and Add-ons RSS & News Readers Desktop apps & players Start pages
Public Learning Sites	Find out about anything and everything Learn a language online Learn about business

The table 2 presents the first 25 tools most used for learning, according the research Top 100 Tools for Learning 2013<sup>4</sup>.

**Table 2.** Top 25 Tools for Learning

	Tool	Description	Category	Link
1	Twitter	Social network and micro-blogging site	Social and Collaboration Spaces	<a href="http://twitter.com">http://twitter.com</a>
2	Google Drive/Docs	Office suite & file storage service	Document, Presentation and Spreadsheet Tools	<a href="http://drive.google.com/">http://drive.google.com/</a>
3	YouTube	Video-sharing site	Public Learning Sites	<a href="http://youtube.com">http://youtube.com</a>
4	Google Search	Web search engine	Personal Productivity Tools	<a href="http://www.google.com.br">http://www.google.com.br</a>
5	Power Point	Presentation software	Document, Presentation and Spreadsheet Tools	---
6	Evernote	Productivity tool	Personal	<a href="http://evernote.com">http://evernote.com</a>

<sup>4</sup> The complete list of Top 100 Tools for Learning is available in <http://c4lpt.co.uk/top100tools/>.



	<b>Tool</b>	<b>Description</b>	<b>Category</b>	<b>Link</b>
			Productivity Tools	
7	Dropbox	File storage & synchronization	Other Collaboration & Sharing Tools	<a href="http://dropbox.com">http://dropbox.com</a>
8	Wordpress	Blogging/website tool	Blogging, Web and Wiki Tools	<a href="http://wordpress.com">http://wordpress.com</a>
9	Facebook	Social network	Social and Collaboration Spaces	<a href="http://www.facebook.com.br">http://www.facebook.com.br</a>
10	Google+ & Hangouts	Social networking & video meetings	Web meeting, conferencing and virtual world tools	<a href="http://plus.google.com">http://plus.google.com</a>
11	Moodle	Course management system	Instructional Tools	---
12	Linkedin	Professional social network	Social and Collaboration Spaces	<a href="http://www.linkedin.com">http://www.linkedin.com</a>
13	Skype	Text and voice chat tool	Communication Tools	<a href="http://skype.com">http://skype.com</a>
14	Wikipedia	Collaborative encyclopedia	Other Collaboration & Sharing Tools	<a href="http://wikipedia.com">http://wikipedia.com</a>
15	Prezi	Presentation creation and hosting service	Document, Presentation and Spreadsheet Tools	<a href="http://www.prezi.com">http://www.prezi.com</a>
16	Slideshare	Presentation hosting service	Document, Presentation and Spreadsheet Tools	<a href="http://slideshare.net">http://slideshare.net</a>
17	Word	Word processing software	Document, Presentation and Spreadsheet Tools	---
18	Blogger/Blogspot	Blogging tool	Blogging, Web and Wiki Tools	<a href="http://www.blogger.com">http://www.blogger.com</a>
19	Feedly	RSS reader/ aggregator	Browsers, Players & Readers	<a href="http://feedly.com">http://feedly.com</a>
20	Yammer	Enterprise social network	Social and Collaboration Spaces	<a href="http://yammer.com">http://yammer.com</a>
21	Diigo	Social bookmarking/ annotation tool	Other Collaboration & Sharing Tools	<a href="http://diigo.com">http://diigo.com</a>
22	Pinterest	Pinning tool	Other Collaboration & Sharing Tools	<a href="http://pinterest.com/">http://pinterest.com/</a>
23	Scoopit	Curation tool	Other Collaboration & Sharing Tools	<a href="http://www.scoop.it/">http://www.scoop.it/</a>
24	Articulate	E-learning authoring software	Instructional Tools	<a href="http://www.articulate.com">http://www.articulate.com</a>
25	TED talks/Ed	Inspirational tools/ lessons	Public Learning Sites	<a href="http://ted.com">http://ted.com</a>

The results of the Top 100 Tools for Learning research (Hart, 2013) show that Twitter is in first place since 2009. GoogleDocs/Drive, which was in third place in the last three years, assumes the second position, and YouTube, which was in second place in the last three years, assumes the third place. According to the research, since 2010 Twitter, GoogleDocs/Drive, and YouTube share the first three positions in the ranking of the most used tools for learning (Hart, 2013). Therefore, we can observe a tendency for the use of tools based on emergent learning networks, as stated by Williams et al (2011).

After the identification of the 25 most used tools for learning we established criteria for the selection of tools, considering the goals of our study, as described below.

### ***Identifying criteria to select the tool***

The main point of this paper is the use of web 2.0 in educational settings. This way, it's important to observe that some of the top 25 tools in the list (table 2) aren't web 2.0 applications. For example, PowerPoint and Word are desktop applications. Therefore, from the point of view of this study, they are not considered as possible applications. However it's interesting to observe that these tools are available on the web in the format of GoogleDocs/Drive. This way, we clearly perceive a movement towards the use of web 2.0 tools in education, including tools that were previously used as desktop applications. Thus, the first selection criterion, in the context of our study, is that the tool should be a **Web Tool**.

**Gratuity** is the second selection criterion to use a web tool in an educational context. We understand that a free tool can be used in the classroom, but also in the student's private life to improve his personal learning network.

Another thing to consider in a learning tool is the **Age** criterion. Some tools are open to everyone and others have age restrictions. For example, Facebook and Google ask for 13 years old.

The use of an application through different access devices (computer, mobile devices) is another important element to analysis. Different devices promote different experiences. Furthermore, there are web tools that don't have applications available to mobile devices, and some don't have all functions available to mobile. In this study, we understand that mobile devices, especially smartphones and tablets, allow the remote access to communication and information everywhere the subject is. This context is building a new mixed space between the virtual, the cyberspace, and the physical space. These spaces are known as hybrid spaces because they "combine the physical and the digital in a social environment created by the mobility of users connected via mobile communication devices" (Santaella, 2010). Therefore, a hybrid space must necessarily combine the physical and digital environments in social practices that build connections from various devices such as mobile phones, laptops and tablets.

So, as a fourth selection criterion, we highlight the **Hybrid Access Mode**, i.e., it is necessary that the access to the web tool is made both by mobile devices (especially tablets) and desktops/laptops. This is an important criterion for our research because we use both computers and tablets in practices with teachers.

The **Type of Communication** is another criterion. Some tools can be used in both synchronous and asynchronous mode. Besides asynchronous experiences, we understand that

the synchronous experience is interesting to use in an educational face-to-face context, because the students can continue the work at home.

The context of our research is the use of web 2.0 tools in face-to-face classes. Thus, from the point of view of this study, we understand that the asynchronous interaction allows more flexibility.

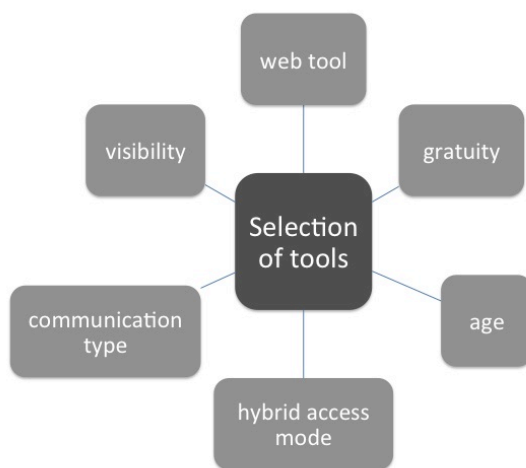
Another aspect that we highlight is that the use of web 2.0 tools in education can be analyzed through the **Visibility** perspective. Heppell (2012) introduces three possible spaces online: me, we, and see.

The first space is the private one (**me**) and it is characterized by applications where the subject can organize his own contents, annotations, and other personal and private information and materials. The second space is called **we**, and it involves tools that allow the subject to work in groups sharing the space with colleagues and friends. Finally, the third space is the public one where all web users can **see** the materials published by an author (Heppell, 2012).

Through this perspective, the students develop their tasks in different web 2.0 applications, and each of them has a different kind of visibility (Heppell, 2012).

Therefore, students can use some tools for personal use (me), for sharing with a group and practicing collaborative work (we), or even sharing on Internet (see). This way, the material produced by the student can only be used for private purposes, be shared with a group (teachers, colleague), or published on the public space of Internet.

Figure 1 shows the six criteria used in this study.



**Figure 1.** Criteria to select web tools

Based on the criteria proposed for the selection of tools, we established a relationship between these criteria and the PLE perspective, thus articulating a set of tools related to our research goals, as expressed below.

### ***Articulating the selection of web tools and the PLE concept***

It is important to remember that the choice of some tools to be used in an educational context should be articulated with the learning goal. However it's relevant to consider that in a PLE perspective the selection of the tool is also a choice of the student.

As we presented before, a PLE is organized with tools for reading, producing and sharing (Castañeda & Adell, 2013). We now start an analysis of the tools listed on table 2 based on the studies of PLE. It is important to mention that there aren't tools which can be considered exclusive to one only part of the PLE.

Each tool was developed for some specific function and we use it to make our classification. However, the same tool can be used in different ways, according to the pedagogical approach. Therefore, the organization of table 3 was based on the characteristics of the tool and not in the various uses that we can make of it.

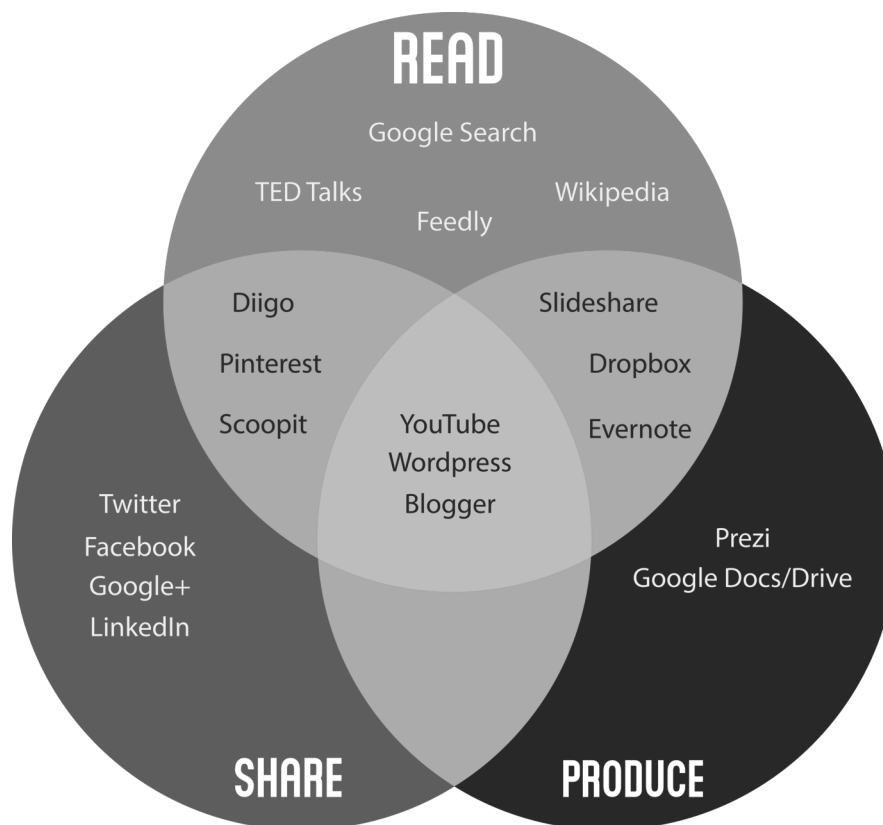
Thus, table 3 presents the selected tools from the Top 25 Tools for Learning (table 2). The selection was based on three criteria: **web tool**, **gratuity**, and **synchronous communication**. This way, some tools which did not fit into the established criteria were withdrawn from the list (Skype, PowerPoint, etc.).

The **age**, **hybrid access mode**, and **visibility** criteria will be applied in a second moment.

**Table 3.** Selected tools from the Top 25 Tools for Learning

Category	Web tool	PLE
Social and Collaboration Spaces	Twitter Facebook Linkedin	Share
Web meeting, conferencing and virtual world tools	Google +	Share
Document, Presentation and Spreadsheet Tools	Google Docs/Drive Prezi Slideshare	Produce Produce Produce/read
Public Learning Sites	YouTube TED Talks	Read/produce/share read
Personal Productivity Tools	Google Search Evernote	Read Read/produce
Blogging, Web and Wiki Tools	Wordpress Blogger/Blogspot	Read/produce/share
Other Collaboration & Sharing Tools	Dropbox Wikipedia Diigo Pinterest Scoopit	Read/Produce Read Read/share Read/share Read/share
Browsers, Players & Readers	Feedly	Read

Figure 2 presents the table 3 in a visual form, highlighting the tools which can be used in a PLE.



**Figure 2.** Selected tools and PLE

There are three criteria that don't appear in this first analysis: **age**, **hybrid access mode** and **visibility**. We understand these criteria are related to the learning objective which involves the use of some web tool, since each tool allows access through different devices, to subjects with different ages, and has different possibilities of visibility.

As we said before, different devices allow different experiences. In the case of our study, we want to test mobile experiences with the use of tablets. The age is another important issue. In our study, the students are between 11 and 13 years old.

The visibility is an important criterion. We understand that the articulation between the PLE perspective (tools for reading, producing, and sharing) and the visibility criterion (me, we, or see) is connected to the learning goals. These characteristics can foster multiple practices. We will share some experiences in the next section.

### ***Sharing experiences***

In this section we present four case studies involving our experiences with mobility and web 2.0 in the final grades of elementary school based on our proposal for classification and organization of the tools. Table 4 summarizes the cases.

**Table 4.** Case studies

Case	Subject	Grade	Goal	Visibility	Category	Tool
1	Arts	8 <sup>o</sup> ( $\pm 13$ y)	Share and read	See	Other Collaboration & Sharing Tools	Pinterest
2	Portuguese	7 <sup>o</sup> ( $\pm 12$ y)	Produce	We	Document, Presentation and Spreadsheet Tools	GoogleDocs
3	Spanish	6 <sup>o</sup> ( $\pm 11$ y)	Produce and Share	We	Other Collaboration & Sharing Tools	Dropbox
4	Spanish	7 <sup>o</sup> ( $\pm 12$ y)	Produce and Share	We	Personal Productivity Tools	Evernote

The **case 1** occurred in 8<sup>th</sup> grade Art classes. All students were 13 years old. First, we discussed with the teacher the aim of the proposal. The aim was to share the student's work on the web – an artistic photo created by students. The teacher did not propose a specific tool.

So, considering the goal (to **share** the students's photo productions on the web, allowing them to see each other's production), and based on table 3 (category Other Collaboration & Sharing Tools), we proposed the use of Pinterest.

This tool is available through computers, tablets, and smartphones. So, it is suitable with the **hybrid access mode** criterion. The work published on Pinterest is public on the web (**see visibility**). In this case, Pinterest attended the three criteria: age, visibility, and hybrid access mode.

The students published their work on Pinterest and looked for the work of their colleagues. It was interesting to observe that only 1 student had used Pinterest before the practice. In this case, the students had the opportunity to know a new tool.

Another interesting fact we observe is that students don't use email frequently. They had to make login in Pinterest using Facebook. Thus, the limitation of this practice was the fact that the students had difficulty to find the colleague's work since it was necessary to know each other's e-mail or username. We tried to use a private hash tag but even so we had problems to find the productions.

**Case 2** involved a 7<sup>th</sup> grade Portuguese class. The aim was to **produce** a collective text in groups. So, considering table 3, the first idea was to use GoogleDocs, a tool from Document, Presentation and Spreadsheet Tools category. However, GoogleDocs is not well supported in tablets and, in this case, doesn't fit on the **hybrid access mode** criterion. On the other hand, GoogleDocs allows the three kinds of **visibility**: me, we, and see. Another important issue is related to the **age** criterion, since a Google account is not allowed for children under 13 years old.

As said before, we understand the teacher has an important role in promoting activities that explore the potential of cyberspace as a learning space introducing new tools to students which allow them to improve their learning activities. In this case, we decided to make an experience with GoogleDocs even though it doesn't fit all three criteria. We created different accounts for each group and the students had the opportunity to explore the potential of this tool for collective writing. We mixed the use of tablets and laptops.

This practice was very interesting because the students had the opportunity to see that the tools behave in different ways according to the device used. The students had to finish their work on laptops.

**Case 3** and **Case 4** relate a practice developed in Spanish classes. Case 3 involved a 6<sup>th</sup> grade class and case 4 a 7<sup>th</sup> grade one.

In **case 3**, the aim of the task was to exercise Spanish conversation. The students had to produce a video in pairs. Afterwards, students had to see each other's production. So, considering the aim (**produce** and **read**), we proposed Dropbox (Other Collaboration & Sharing Tools category). Dropbox is not a tool to produce videos, but we can share our productions in it. In this case, the video was produced using the camera application available on tablets. Dropbox allows **we visibility**, as intended by the teacher for this learning task, and can be used with tablets (**hybrid access mode**). However, we had problems with the **age** of the students. Most students were 11 years old and some of them did not have e-mail. In this case, we decided to create an account for the class and everybody published the videos in the same folder. So, even though it was possible to create **we visibility** in Dropbox, we simulated it creating only one account. In this case, all students had access to the same account and we discussed about the rules of sharing a space (erase the colleague's videos or change the password).

The last case presented here (**case 4**) involves grammar studies in Spanish. The task proposed by the teacher involved a mix of photo, text, and audio. The students had to produce in pairs/groups and see the colleague's production in the perspective of **we visibility**. Thus, considering the aim of the task (produce and read) we suggested the use of Evernote. Evernote is a tool based on Personal Productivity Tools category (table 3). The **age** and **hybrid access mode** criterion was not a problem. However, we had problems with **visibility**. In Evernote, to maintain the visibility into the **we** perspective involves that each student needs to connect (invite) his colleague using the colleague's e-mail. We realized that it was a big effort. However, we understand it is important to promote the group formation and the sharing of productions in a PLE.

Based on this four cases presented here, we can see the importance of using some criteria to select the web tools in educational settings. The use of social software in education is possible but is also a challenge since there are many different tools that can be selected to certain educational practice.

Overall, it was interesting to realize that the students didn't know the selected tools (Pinterest, Dropbox, Evernote, and GoogleDocs). Therefore, even considering that Brazilian students use the Internet, they don't know many tools and their possibilities as learning tools (ICT Education 2012, 2013). On the other hand, from the perspective of the teacher, we understand that the proposed framework can also guide the first experiences with the use of web 2.0 in education.

Thus, the proposed criteria (web tool, gratuity, age, communication type, hybrid access mode, and visibility) were important to assist the teacher in choosing the PLE tools to be used in the development of learning activities. In addition, students also perceive and become familiar with the establishment of criteria for choosing tools that will foster their PLE.

The case study also allowed the discussion about the tool and the access device, where students and teacher realized the possibilities of the tools considering the use of tablets and laptops.

An interesting aspect of the case studies is related to visibility criteria. As the activities were conducted in groups the we visibility prevailed, but it was possible to discuss the possibilities and limitations of different types of visibility.

### **Final considerations**

The analyzed tools are listed in the Top 100 Tools for Learning survey, developed by the Centre for Learning and Performance Technologies (Hart, 2012). The framework organizes the tools based on the proposal of Castañeda & Adell (2013), where a PLE is constituted of tools for reading, producing and sharing. The framework is based on the six following criteria: Web Tool, Gratuity, Age, Hybrid Access Mode (computer, mobile devices), Type of Communication (synchronous or asynchronous), and Visibility (considering the me, we, and see perspective as proposed by Heppel, 2012).

The proposed framework was experienced in four case studies involving our experiences with mobility and web 2.0 in the final grades of elementary school. Results point out that the proposed framework can be used to support the teacher in the design of learning activities and in the selection of web tools, which are appropriated to the pedagogical approach applied in the teaching and learning process. However, besides the 25 top tools for learning used in this study there are many interesting tools available on the web.

Thus, futures studies involve the analyses of the potential of different web tools in emergent learning practices, and the use of web tools and services by the students according to their learning necessities in a PLE perspective.

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