# The ‘One Laptop Per Child’ as Personal Learning Environment

*How the OLPC introduces the concept of PLE to children inside and outside classroom?*

# Abstract

*Some governments worldwide are distributing laptops for children in public schools with the support of the educational project called ‘One Laptop Per Child’ (OLPC)[[1]](#footnote-1).* *The OLPC motivation is that “…Internet access and tools for expression (text, music, video, graphics) are the contemporary ’toys’ for learning”. As projects like OLPC are introduced in schools, learning environments become more complex and distinctive from what our educators were taught to teach. These changes raise concerns about the processes that underlie learning inside and outside the classroom. And here, in this new reality, understanding the general nature of personal learning environment (PLE) and its salient aspects become very important to motivate autonomous learning experiences amongst students, regardless the present challenges facing the education system. This paper examines some ideas on how OLPC projects introduce the concepts of PLEs to children inside and outside the classroom.*

# Introduction

*What I understand about it?*

*We have always had a personal environment that we learn, although we may not have been aware of it and we have not needed to be, especially because the teacher-expert model was more than enough to provide us with the information relevant to living, even if we were still learning outside of it. Besides, there were limited sources of information and they were fully centralized in the educational institutions.*

*However, with the popularization of the small wireless devices such as laptops, tablets and smart phones and, the advent of Internet technology called Web 2.0[[2]](#footnote-2), things have changed. We are in an educational era that Weller* (2011) *calls ‘the abundance’. Now we can access quickly and easily to a huge amount of information and talk about almost anything, from different sources, with heterogeneous perspectives and multiple origins, in an incredible variety of formats. The information environment is no longer exclusive, it become inclusive. We can make all this information comes to us through a lot of ways and presented it when best suits us, on different devices, languages, manners and places of our choice. Almost everything that might interest us is a click away. This means that the experiences, exchanges and activities that the use of technology has allowed us has extraordinarily increased, diversified and can also be customized according to our learning styles, to the point that learning environments centralized and common to all seem insufficient and impoverishing.*

*How is it Important?*

*The challenge is no longer to access information and supporting tools and becomes to filter and learn how to use them in the way that matters for effective learning. In this new context, not all the conditions necessary to leverage learning using the information and communication technologies (ICTs) are in place, for example, many of our existing educators do not have enough understanding and abilities towards the ICTs to apply them into the learning environment. The same can be said about many education leaders, policymakers and higher education institutions that prepare new educators for the field.*

*This gap in technology understanding influences school’s program and curriculum development. Too often, this gap prevents technology from being used in ways that would improve instructional practices and learning outcomes.*

*Although children don’t need coaxing to take up digital technologies and their skills quickly improve relative to their elders as suggested XXXXX, without guidance most of the students will remain amateur users of the ICTs. This raises concerns about how these children will develop their knowledge because they are not fully digitally literate, yet are deeply immersed in the digital world. As pointed out in the report…. “children might not benefit either from traditional education – because there are a lot of distractions and time wasted to embed the laptops in the classroom activities, or from technology – because these children will not receive adequate guidance on how learn to learn in the digital age”. (ideal citar algum reporte para sustentar essa observação).*

*Consequently, it is imperative that technology plays a role beyond the mere information-diffusion and helps children learn to learn. This implies that technology must help children to tailor their PLEs whether in formal, informal, permanent or self-regulated learning/education.* **(add citations)**

*Which aspects I will deal with and why?*

*As a research topic, this paper analyses the general nature of PLEs and the OLPC foundation to verify how these two concepts are intertwined. The principal aim was to understand how OLPC projects can introduce some salient aspects of PLEs to children through a customized laptop and its learning platform and thus help leverage autonomous learning experiences regardless the present challenges facing the education system.*

*The paper is organized as follow: ‘Part 1’ explores the most salient aspects of PLE that can be found in literature. ‘Part 2’ describes the foundations of the OLPC project, ‘Part 3’ introduces the OLPC laptop as a PLE for children and, finally ‘Part 4’ draws some conclusions and depicts some research ideas for the near future.*

# What is a Personal Learning Environment (PLE)?

*The PLEs are not a theory of teaching but rather it can be perceived as a set of artefacts, cognitive processes, tools and physical connections gathered by the individuals that allow controlling and managing their learning process. The theoretical foundations on which to base the use of PLEs depend in great extent on the perspective in which will be introduced this approach. The concept itself is still developing and thus there are a number of definitions, which vary slightly from author to author. One of the first conceptualizations of PLE is found in the “VLE[[3]](#footnote-3) of the future”* (Wilson 2005)*, although the term itself already appears in “Lifelong Learning: The Need for Portable Personal Learning Environments and Supporting Interoperability Standards”* (Olivier and Liber 2001)*.*

*The following description proposed by Stephen Downes is intended to introduce the general nature of PLEs:*

*…not an institutional or corporate application, but a personal learning center, where content is reused and remixed according to the student's own needs and interests. It becomes, indeed, not a single application, but a collection of interoperating applications---an environment rather than a system. It also begins to look like a personal portfolio tool. The idea here is that students will have their own personal place to create and showcase their own work. (Downes 2005)*

*This description captures some salient aspects (listed above), which seem to be common across all current viewpoints found in the literature and which will guide the analyses of this paper:*

1. ***Personal and Global:*** *The* ***learning experiences are centred in the individual*** *and he/she* ***controls*** *its own PLE****,*** *thus it is not tight to an institutional portal like the VLE* ***(i.e. autonomy and ownership)****. As* Wilson et al (2007) pointed out*, the PLE is considerate personal and operates in a global scope, as the range of services is not restricted within any particular organization.*
2. ***Aggregation:*** *One of the side effects of* ***Web 2.0*** *is the large number of services and tools available. Users spend a lot of time trying new services, creating accounts, profiles, user names and passwords, and adding them to their growing and dynamic* ***digital identity.*** *This situation can create disorder, confusion and distraction for average learner. To work around these constrains, Attwell* (2007) *suggested a PLE should provide framework and tools to facilitate the use and aggregation of different services. The PLEs can help users to concentrate and manage all services from a single point. Technically, the PLEs should act as a hub of content related to the learning experience of a single person. Some good metaphors for PLEs as an aggregator: ‘****personalized dashboard’*** *or* ***‘online learning desk’****.*
3. ***Space:*** *As we move into a world where information is fragmented and dispersed in multiple spaces* ***(i.e. decentralized information)****, formats are shaped by the technology and ‘…learning will take place in different contexts and situations and will not be provided by a single learning provider’*(Attwell 2007)***.***
4. ***Flow:*** *As the individual become the centre of the PLE, he/she can personalize its own learning environment reflecting his/her learning moods, styles (visual, auditory or kinaesthetic) and learning experiences. Indeed, these intrinsic interactions around his/her own learning events can facilitate the* ***embodiment*** *of ‘the holistic experience that people feel when they act with total involvement – as flow’ (Csikszentmihalyi 1975).*
5. ***Digital identity & Identity:*** *While the individuals build, expand and manage their PLEs, they also gain experience in developing their own personal and professional identity (i.e.* ***personal portfolio)****. As they gain experience in a number of skills related to identity in the online environment, they also strengthen the network that supports a large part of their learning. Dabbagh and Kitsantas* (2012) *afirm that the learner develops an online identity where the personalized learning environment provides cues (affordances or possibilities for action) that prompt the learner about what to share, what not to share, who they choose to share with, and how to effectively merge formal and informal learning.*
6. ***Collaboration:*** *Collaboration is an important skill to encompass the diversity of knowledge available in a rapid changing and sophisticate society. Its essence is directly linked with the assumptions of the PLEs because by collaborating and exchanging information, learners can test their knowledge, receive feedback on their works and scaffold their learning. It has always been possible to collaborate, but the Web 2.0 and its social tools (such as blogs, wikis and all kinds of different personal knowledge bases including bookmarks and tags) have added a new dimension to the concept of collaboration by* ***empowering learners*** *to also become producers of learning material collections (Attwell 2007). Now it is easier, cheaper and faster to work with peers and experts regardless of time zone or physical distance.*
7. ***Connectivism****: Connectivism is defined as a learning theory for the digital age that underlines the use of the opportunities offered by technology to enrich formal and informal learning (Siemens, 2005; Downes, 2006 and 2007). Siemens (2005) has formulated the principles of connectivism briefly: (i) Learning and knowledge depend on the diversity of opinions. (ii) Learning is a process of connecting nodes or specialized information sources. (iii) Learning may reside in non-human. (iv) The ability to know more is more critical than what we know at any given time. (v) Feeding and maintaining connections is needed to facilitate continual learning. (vi) The ability to see connections between fields, ideas and concepts is a key skill. (vii) The update (current and precise knowledge) is the intent of all connectivist learning activities. (viii) Decision-making is itself a learning process.The act of choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. A right decision today may be wrong tomorrow due to alterations in the information environment that affects the decision (Siemens, 2005).*

*Below, some others aspects embedded in the PLEs that are important to highlight:*

1. *Learning experiences are centred in the individual.*
2. *Control: Individuals are the responsible for their personal information.*
3. *Autonomy.*
4. *Ownership.*
5. *Web 2.0 tools.*
6. *Online learning desk.*
7. *Decentralised information.*
8. *Embodiment.*
9. *Personal portfolio.*
10. *Empowering learners.*

# Foundations of the One Laptop Per Child (OLPC)

*Inspired by the educational ideas of Jerome Bruner[[4]](#footnote-4) and Seymour Papert[[5]](#footnote-5) to create an autonomous personal-computer for children of all ages, the OLPC Project aims to “empower the world’s poorest through education” (OLPC n.d.), by providing each child with a collaborative and joyful laptop that could engage children in their own education. Thus, talk about OLPC is to discover new uses and combinations for technologies to address old concerns such as Education for All (EFA)*[[6]](#footnote-6) *and, universal access to information and knowledge* (UNESCO n.d.)*.*

*The OLPC hypothesis is that children can unlock the potential that they have with a personal learning device with them at all times. This idea also conforms to Attwell (2007) visions that ubiquitous computing may offer new opportunities for learning (Attwell 2007). Therefore, if each child owns its own laptop (the OLPC laptop), this would enable a more learner centred approach as an alternative to the traditional instructional approach focused on trainers' needs, which is in many places is affected by deprivation, physical isolation, cultural and political barriers.*

*The OLPC project has a view of learning known as constructionist learning, a philosophy inspired by Jean Piaget’ constructivism[[7]](#footnote-7)* (Attwell 2007) *model, where the children act as the builders of their own intellectual structures to understand the world around them* (Papert 1980)*.*

*The collaborative and joyful aspects of the laptop to engage children in their own education are indeed good examples to differentiate Piaget's constructivism and Papert’s constructionism, as described by Papert himself:*

*My little play on the words construct and constructionism already hints at two of these multiple facets--one seemingly "serious" and one seemingly "playful." The serious facet will be familiar to psychologists as a tenet of the kindred, but less specific, family of psychological theories that call themselves constructivist. Constructionism--the N word as opposed to the V word--shares constructivism's connotation of learning as "building knowledge structures" irrespective of the circumstances of the learning. It then adds the idea that this happens especially felicitously in a context where the learner is consciously engaged in constructing a public entity…*(Seymur Papert and Harel 1991)*.*

*To best serve the OLPC cause, wherever the laptops are distributed, there are five core principals that must be respected:*

* ***Child Ownership:*** *Children should stay with the laptops. They should be free to take them home and use at the time they wish. When children have their own machine, they will not treat the laptop as government property, but as a personal medium and a valuable gift that needs to be protected. Taking the machines home generates additional opportunities to have the children devoting time to read and write more, and to acquire a more positive view of their potential. Learning becomes a focal point in their lives.*
* ***Low Ages:*** *The XO is designed for use by children between the ages of 6-12 years, covering the years of primary school, but nothing prevents its use earlier or later stages. Children do not need to read or write in order to play with the XO and we know that playing is an essential foundation of human learning (ADD CITATION). In addition, these digital activities help acquiring mathematical skills, scientific, reasonable thinking, reading and writing. Early learning experiences are critical to children's developing a passion for learning; easily boredom leads to the loss of this passion.*
* ***Saturation:*** *To achieve a significant improvement in education, access to a means of personal expression and knowledge should be a right rather than a prize. Therefore, provide equal opportunity to all citizens of the state/country is a key point of the project. “Nobody is left out” (Video OLPC Mission). The saturation also helps in the issue of security. As each child has their own laptop and communities feel part of this initiative, there is less envy, therefore less incentive for theft.*
* ***Connection:*** *The XO has been designed to provide the most effective wireless network, even without local Internet. Children in any neighbourhood are inter-connected in a wireless mesh to chat, to share information, join videoconferences and work together to create music, edit papers, read books and play games online. The connectivity removes artificial barriers for learning and development. Children can communicate across borders in a way that years ago there were not thought possible.*
* ***Free and Open Source:*** *By choosing free and Open Source platform, there is no inherent external dependency or restrictions on redistribution, software choice, licensing costs, upgrades, localization of the software into the local language and repurpose to fit their needs. The children and their communities should be free to choose.*

# The OLPC project and the PLE

*To attain the five OLPC’s principles, the project fundamentally reconsidered personal computer architecture—hardware, software, and display – to develop an innovative computer at the lowest cost and best quality available, respecting a set of design goals (OLPC n.d.) identified in order as safety, low power consumption, low cost, robustness and high performance.*

## The XO laptop

*The resulting machine, says its creator Yves Behar (Behar 2007), is a green and small laptop called XO that can operate in the harshest conditions, where each part that makes up it is strategically planned to give the best performance, robustness and quality. For economy and efficiency purposes, every part of the XO laptop has two, three or more different functions. Such characteristics make the XO laptop very effective to work with children that usually walk to and from school every day; where the weather is unpredictable and rain, dirt and dust are part of their daily routine. Yves also observes that the XO is not a cost-reduced version of today's laptop, which is normally second-rate, second-hand and low quality, it is a whole new concept for children laptop.*

*Among the XO’s features are the two Wi-Fi antennas, that provide the ability to connect the laptops to chain together to form a mesh network to connect to distant Internet signal and relay it to the others laptops. The screen made to operate both indoors and outdoors can flip around and be operated to some extent by side buttons, allowing for its use as an e-reader or a touchscreen[[8]](#footnote-8) tablet without a keyboard. The battery that consumes ten times less energy that a standard laptop (it should last the entire school day without requiring charging) and can be charged by hand with a separate crank charger (this feature is only possible because the XO consumes very little energy). The colour, shape and size of the laptop, bright and playful with a tiny keyboard, not intended to mark it as a toy, but instead emphasize its ownership by children and help detour theft. The XO also carry a webcam, microphone, two speakers, SD card reader, three USB ports and multiple types of game console buttons*

*By given children they very ‘own’ and ‘connected’ laptop (OLPC principals), the project also furnishes these children with a cognitive artefact (Papert 1980), which not only fits perfectly with the concept of a PLE but also enhance its domain, adding flexibility for learning.*

## The OLPC Laptop as PLE

*As suggested previously in this document, an ideal PLE aggregates a collection of interoperating applications for learning in a single and personalized dashboard. Children involved in the OLPC project have access to a learning dashboard in which case is called Sugar platform.*

*One of the objectives of Sugar platform is to encourage each child to become a creative force within the community and its own culture. Papert* (Seymour Papert 1980) *suggests that learning is not a passive service such as watching television but rather an active and self-direct service. Hence, the creativity, fluidity, innovation and problem solving involve personal expression and interaction. Together, the XO laptop and the Sugar platform put the tools of expression to the reach of children and promote collaborative learning that can be shared between children with a single click.*

## The Sugar Platform

*One of the original notions behind Sugar was that child learners could reprogram it, a reflection of the constructivist approach embodied in this platform.*

*There are three experiences that characterize the Sugar learning platform: collaboration/sharing, guided discovery and reflection.*

1. *The collaboration is a first class experience in Sugar. The interface shows the presence of other students available for collaboration. Sugar users converse with each other, support each other, critique and share ideas. The user interface differs from the traditional Desktop metaphor. It uses a "zooming" metaphor —each view represents a different scale of interaction. Users move between a view of the network "neighbourhood", group or "friends", "home page" where the user is at the centre and, the currently open application "Activity". Children can also share their results with others, either his school or in a public forum on the net. The activities that use and related data are stored in the log. Then, at school, library or at home, using Sugar, updates its data through the "Neighbourhood" Sugar. With the Sugar interface can continue to share and collaborate with other students at any time and anywhere - from home or school. There are more details in the Neighbourhood and more daring students can build their own home sensors, i.e., can build their own weather lab connected to Sugar and share their data in the Neighbourhood. They can even modify the activity. With Sugar, children can share their favourite books, book summaries collaboratively edit, create community newsletters, etc. The Neighbourhood is used to create book clubs geared to any age, level or interest.*
2. *Sugar is suitable for a variety of users with different levels of skills in terms of reading comprehension and computer experience. Sugar is easy to use, while not imposing a barrier to personal growth or expression. The student is discovering layer after layer, deepening and unobstructed. This allows direct internalization of ideas in any area that is exploring whether music, reading, writing, programming or graphic design. Imagine a science lab in a school, with instruments to measure wind speed, temperature, barometric pressure, humidity, etc. Many of these instruments, probably all, can be constructed by the same children using materials available in the community - a humidity sensor can be made of cardboard and a little aluminium foil, for example. Children use Sugar activities that let them to interact with the instruments. Along with the classmates, they explore various hypotheses about the relationship between their measurements and the weather, for example, between the temperature, barometric pressure and dew point. The activity "Measure" allowed to read data streams in real time and overlay instruments from different places in the same display. The activity "Turtle Art" provides an introduction to programming tool (a graphical logo) where children can program different data visualizations. "Memorize" is used to design and play games using the vocabulary they are studying. "Portfolio" allows them to create presentations of their work. The teacher provides suggestions and activities custom Sugar, guiding students in their exploration and discussion of the medium. The "Book Reports" are shared on public computers in the library or on the Internet Neighbourhood.*
3. *The "journal" records the activity of each student, so the things that makes as created. It is a place of reflection and evaluation of progress. The Journal of Sugar meets what you do and make every student. Every action you make is recorded automatically. The Portfolio is an assessment tool that uses the contents of the Journal. Students reflect on their work: what they did, how they did and how their efforts have been successful. Students (1) selected key learning achievements, whether reading, writing, arithmetic, art, music, physical education, history and social sciences, etc. answering questions such as: "I chose this because..." (2) create a multimedia narrative presentation of their selections (including voice and video), reflecting that there are multiple ways to learn and (3) share your presentation with colleagues , teachers and parents, so to celebrate they have learned, and to engage in a critical dialogue about their work. Sugar innovation in this type of activity in three ways: (1) allows to construct a diary of all learning activities that are automatically collected, (2) is programmable in a fun and accessible even to younger elementary school children, the interesting and exciting time for kids in middle grade education, and (3) provides collaboration tools for both the construction of the portfolio to be shared with others.*

## How children can create their own PLEs with their OLPC laptops

# Conclusion and ideas for the future

Inserir images tais como:

* Evolução da VLE -> PLE
* Diagrama de constructivism X constructionism
* *--Link entre o conceito de PLE e o OLPC –*
* *the fact that a possibility of building a PLE was given to those children is still there.*
* ***The first six years of learning in our lives are very interactive and based on the game. We learn how to walk, how to talk and have a lot of common sense without formal teaching. Aspects of that learning style can and should continue in subsequent years. Start during the primary is the best way to improve the entire school system. When young children experience the joy of learning, will never want to withdraw.***
* ***We all learn best by doing and reflecting on what we do. Children learn best when working with passionate and committed experts. We are no longer limited by physical locations, where if there is no mathematical talent, we will be able to develop our own mathematical excellence. Through the connectivity can work and learn with experts from either side.***
* The child with an XO is not just a passive consumer of knowledge, but an active participant in a learning community. As children grow and pursue new ideas, software, content, resources and tools they need to grow. The nature of OLPC is that growth will be led locally, mostly by the children themselves. Each child with an XO can balance the learning of others. Children are taught each other, share ideas, and through the social nature of interface, support their intellectual growth. The children become students and teachers.
* *This feature follows one of the principles upon which this computer was created: connect/integrate children into a constructionist experience.*

1. One Laptop per Child (OLPC) is a project supported by the Miami-based One Laptop per Child Association (OLPCA) and the Cambridge-based OLPC Foundation (OLPCF), two non-profit organizations (Wikipedia n.d.), established in January 2005 by Nicholas Negroponte. [↑](#footnote-ref-1)
2. The next generation of Internet applications and the underlying technologies that enable conversations and contribution to the online community. Examples of Web 2.0 include content sharing (video, photo, etc), social networking sites, blogs, wikis and mashups (Wikipedia n.d.). [↑](#footnote-ref-2)
3. Virtual Learning Environment [↑](#footnote-ref-3)
4. Jerome Seymour Bruner (born October 1, 1915) is a psychologist who has made significant contributions to human cognitive psychology and cognitive learning theory in educational psychology (Wikipedia n.d.). [↑](#footnote-ref-4)
5. Seymour Papert (born February 29, 1928) is an MIT mathematician, computer scientist, and educator. He is one of the pioneers of artificial intelligence, inventor of the Logo programming language and the developer of an original and highly influential theory on learning called constructionism (Wikipedia n.d.). [↑](#footnote-ref-5)
6. The Education for All (EFA) movement is a global commitment to provide quality basic education for all children, youth and adults (UNESCO n.d.). [↑](#footnote-ref-6)
7. Constructivism is a theory to explain how knowledge is constructed in the human being when information comes into contact with existing knowledge that had been developed by experiences (Wikipedia n.d.). [↑](#footnote-ref-7)
8. *Following prototype XO-2 will include a touchscreen* [↑](#footnote-ref-8)