CIEB STUDIES #2

OPEN INNOVATION IN EDUCATION

CONCEPTS AND BUSINESS MODELS

CIEB
CENTRO DE INOVAÇÃO PARA A EDUCAÇÃO BRASILEIRA

CIEB STUDIES

CIEB Studies is a series of publications that aims to provide the basis for discussion of issues central to innovation in Brazilian public education. To stimulate a productive ecosystem of innovation in education and the creation of public policies that improve the country's educational system, it is necessary to understand the status quo and how we can move forward.

The goal of CIEB Studies is to systematize and analyze information and national and international experiences related to ecosystems of innovation in education and, based on these findings, suggest strategies and recommendations for Brazilian public policies.

These studies are funded by CIEB and conducted by independent researchers. The views expressed in these publications are responsibility of the authors and do not necessarily reflect the position of CIEB on the issues discussed.

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CIEB FOREWORD

The concepts of innovation and new technologies have resulted in significant changes in various sectors of society. Over the last few decades, the ways of producing and accessing knowledge, communicating and interacting, and organizing the world of work have expanded exponentially.

The Center of Innovation for Brazilian Education (CIEB) believes that the changes brought by new technologies, though challenging, are also great opportunities for education. Therefore, we invited the experts, Priscila Gonsales and Debora Sebriam, from the Educadigital Institute, to discuss how the concepts of innovation and new technologies have impacted the world of education.

The study discusses various concepts and technologies, but it highlights the implications of the concept of Open Educational Resources (OER) for both pedagogic and productivity aspects of new business in education.

The authors argue that OER does not mean a barrier to entrepreneurship in education, but an opportunity for the creation of new businesses based on open innovation.

This study is part of a series of studies and technical guides produced by CIEB with the aim of stimulating and framing discussion about the role of innovation and educational technology in Brazil. We hope that this set of technical resources contribute to the formation of new innovation and technology policies that put Brazilian education at the level needed to form 21st century citizens.

Enjoy reading!

Lucia Dellagnelo, Ed.D.
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INSTITUTO EDUCADIGITAL

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POSSESSION OR ACCESS: OPENING FOR THE COMMON GOOD

If you have an apple and I have an apple, and we exchange these apples then you and I will still each have one apple. But if you have an idea and I have an idea and we exchange these ideas, each of us will have two ideas
Bernard Shaw

This famous quotation, attributed to the Irish playwright Bernard Shaw[1], demonstrates the value of the intangible in the context of the digital culture in which we are immersed. With the advent of digital technologies, we have seen the expansion of our needs beyond what is physical or material. The more we share our ideas, the more ideas we generate, and digital networks will only potentiate this process. The terms used are various - information society, knowledge, networking - and everything converges to the idea of replacing an industry standard for serial production in which the model was predictable, linear, controlled, hierarchical and scarce, since it was based on a physical support, for a new model increasingly guided by flexibility, uncertainty, network connections, customization, interdependence and, especially, for the countless opportunities to be exploited.

Mediated by digital networks, we mobilize people, produce information, knowledge and culture, promoting circulation and expanding access. The logic of products and material objects, based on the concept of scarcity, has been losing space for the growing appreciation of human talent, interpersonal relations and cooperation, something that is inexhaustible if we know the best way to boost its development.

Customarily, our mental model was based on predictability. We used to create from the expected, from what was known by our repertoire, whether in the business world or in the educational system.

However, increasingly, innovation is linked to the possibility of experimenting, testing, refining. This study brings together a series of concepts and attitudes that suggest possible, but not predetermined paths that need to be considered by those seeking to innovate in education. “Open Innovation” is a concept related to what we know as “collective intelligence”, “crowdsourcing”, “crowd learning”, “service

1 To learn more about Bernard Shaw, visit: http://educacao.uol.com.br/biografias/george-bernard-shaw.htm

design", among others. But the "Economy for the Common Good" movement emphasizes that we must evolve from a capitalist model based solely on the generation of monetary wealth to another that

In what way can the "Open Innovation" scenario contribute to the disruptive changes that we want to make for education?

What does it mean and what are the implications of implementing the principle of "access is more important than owning" in the education market?

What is the responsibility of the business world to defend the guarantee of education as a social right?

has as a goal the quality of people´s life. Chapter 1 traces an overview of the opportunities that the internet

and digital technologies create for the processes of teaching and learning. In chapter 2 we present the concept of open innovation and its relation with the context of the economy of the common good, increasingly emerging on the capitalist scenario. Chapter 3 registers the history and characteristics of the global movement around Open Education and Open Educational Resources (OER), with examples of Brazilian and international initiatives. Some existing open business models are presented in chapter 4, and in chapter 5, we propose an analysis about the possibilities of more entrepreneurship focused on education and guided by open innovation and new approaches that privilege the collaboration and the emphatic processes.

Enjoy reading!

Priscila Gonsales

Educadigital's Executive Director

1. THE INTERNET AND OPPORTUNITIES FOR EDUCATION

We must be willing to let go the life we have planned, to accept the one that is waiting for us.
Joseph Campbell

Inclusive, equitable and quality education for all is one of the main global commitments established by the United Nations (UN), with the participation of representatives of governments around the world. The Millennium Development Goals[2], which were intended to be achieved in 15 years (a period which expired in 2015), highlighted that all children should have access to basic education. Most of the countries have made progress in this area, including Brazil, which managed to universalize access to school, although educational quality remains a challenge.

The new commitment, called the 2030 Agenda for Sustainable Development[3], was signed in September 2015 (Figure 1) and maintains education (inclusive, equitable and quality)[4] as a key element towards the sustainability of the planet. It also highlights technology in the process of advancing human progress, eliminating the digital divide, and fostering the development of knowledge societies.

Fig 1. Sustainable Development Goals

2 http://www.portalodm.com.br/publicacao/606/relatorio-dos-objetivos-de-desenvolvimento-do-milenio-2015
3 https://nacoesunidas.org/pos2015/agenda2030/
4 https://nacoesunidas.org/pos2015/ods4/

The need to use digital technologies to improve the quality of education is a topic increasingly present in testimonials from teachers, researchers and specialists around the world. And such, quality involves not only the processes of teaching and learning, but also a paradigm shift in schools. Digital culture, so present in society, can stimulate innovation spaces, times and forms of communication in the educational environment.

Ubiquitous and mobile learning have been points of focus for organizations such as the United Nations Organization for Education, Science and Culture (UNESCO), which launched in 2014 a publication with guidelines[5] for the formulators of public policies to transform mobile devices into tools of education. Developed in collaboration with specialists from more than 20 countries, the guidelines aim to strengthen the specific benefits of mobile learning and articulate strategies to develop policies that will improve the way people learn.

Several countries are betting on the integration of Information and Communication Technologies (ICT) in education as an area of knowledge rather than simply a way to learn content. Invariably, we still see some cases of simple transposition from analogue to digital, reinforcing the traditional method of education - from one to many - and with little incentive to build collaborative knowledge.

In 2015, CIEB conducted a survey[6] about the adoption of innovation and technology in public systems of education in countries such as Chile, Estonia, South Korea, Singapore, Australia, United Kingdom and the United States, with examples of frameworks, common lines of action, and case studies, highlighting the importance of articulating different stakeholders and resources for actions to be implemented.

Australia, the UK and our neighbor Chile are examples of a change of design in how digital technologies are integrated into education. The skills required in this context go beyond the simple technical knowledge or capacity to use the technologies and consume information. They

5 http://www.unesco.org/new/pt/brasilia/about-this-office/single-view/news/diretrizes_de_politicas_da_unesco_para_a_aprendizagem_movel_pdf_only/#.V_lc4yMrLFc

6 http://www.cieb.net.br/estudo-cieb-a-importancia-de-politicas-nacionais-e-centros-de-inovacao-em-educacao/

involve digital literacy, skills development, such as critical thinking and creative thinking, problem solving, Design Thinking, teamwork, project management, the ability to create, reuse and review digital content to suit a specific audience or need.

How to integrate Information and Communication Technologies (ICT) into the curriculum in a qualitative way to bring the school closer to digital culture is a global challenge. This challenge is, first and foremost, about the initial and continuous training of teachers and, no less importantly, the incorporation of trends that are already part of daily life in networked society, such as customization, collaborative practices in digital networks, gamification, active methodologies of learning, use of cell phones and other mobile devices, and adoption of free software and open content.

These facets allow the actors of the educational system - teachers, students, pedagogical managers, public managers and developers of solutions and technology products - to engage in projects which are more interesting and aligned with the current context of the knowledge society, seeking to generate a positive impact by stimulating the solution of complex problems, communication, critical evaluation, and, finally, innovation.

1.1 OPENNESS AND DIGITAL COMPETENCES

Research and international reports have also drawn attention to how practices driven by digital culture can be a disruptive technology in education, going beyond the educational products readily offered by companies to schools to introduce the possibility of creation and authorship by teachers and students. One of the most prestigious is the Horizon Report (HR)[7], which focuses on the use of the internet in education and is carried out annually by the New Media Consortium, a community of specialists in technology in education in various countries, including Brazil. Approaches based on collaborative

7 http://www.nmc.org/nmc-horizon/

environments and mobile devices will significantly affect education in the coming years according to the HR.

SOME KEY TRENDS

- **Open Education.** Often confused with free education, the Open Education is replicable, "remixable" and without barriers of access and reuse.
- **Open and free courses.** With the popularization of MOOC (Massive Open Online Courses), online, open and free courses begin to strengthen as an alternative to traditional study, especially for those who are outside of schools.
- **Real-world skills.** The job market demands abilities from new graduates that are most often acquired in informal learning situations, such as problem solving, resilience and other emotional skills, and schools are not yet prepared to meet such demands.
- **Personalization and new sources of evaluation.** Tools for analysis of online activities can be used as tools for assessment and to create learning tracks according to each student's profile.

The Innovation Unit, an organization based in London that studies innovation, released in 2011 the report "10 Ideas for Education in the 21st[8] nCentury." The report brings together both new desired skills and new methodological strategies that call into question traditional practices in education, such as "50-minute classes", "students should learn in the classroom" or "mobile phones must be switched off at school", which no longer meet the profile of children and young adults. Among the proposals are: learning in an open manner, thinking outside the box of the classroom, personalization, using the digital skills students already have, promoting more collaboration between students and teachers by working on projects.

One international organization that stands out in the area of digital skills in teaching and learning through open content is the European Commission (EC), the executive body of the European Union. Released

8 http://www.innovationunit.org/sites/default/files/10%20Ideas%20for%2021st%20Century%20Education.pdf

in August 2016, the EC's Opening up Education[9] initiative presents ten dimensions of Open Education (Figure 2), which are being considered by major educational institutions in member countries of the European Union: access, content, pedagogy, recognition, collaboration, research, strategy, technology, quality and leadership.

Since the 1970s, Open Education has been marked by new practices of teaching and learning for children and young adults. It was in this period that the "deschooling society" movement arose, with the publication of the book on the subject by Ivan Illich[10], which suggests the possibility of access to resources for all who want to learn in any period of life. In the same period, the Open University in the United Kingdom was the first institution to offer completely remote teaching. Today, Open Education is largely used in the understanding of Open Educational Resources (OER). These, in turn, highlight the educational practices with technologies that stimulate authorship by users.

To the EC, Open Education is closely related to innovation and the use

Fig 2.
Ten dimensions of Open Education. Source: Openning up Education

9 http://publications.jrc.ec.europa.eu/repository/handle/JRC101436
10 https://pt.wikipedia.org/wiki/Ivan_Illich

of educational technologies, whether in basic or higher education. “This innovation refers to public and private institutions and is structured per the characteristics and laws of each country, but as a mark, the dimensions can serve as a basis for other countries in the world,” explained Andreia Inamorato dos Santos, Brazilian researcher of EC in an interview for this study.

Another important point in the document is to set an agenda to promote new skills, aiming to improve the employability of citizens in the context of the region’s economic and financial crisis. Open Education, in the view of the EC, would meet that goal, in addition to boosting cooperation between training institutions themselves.

For the World Economic Forum[11], the digital content that children consume and the time they spend connected are factors that will influence their overall development. The use of technologies and the established dynamics between children and adolescents and the virtual world are, often, different from those used by adults, which makes it difficult for parents and educators to understand the risks and threats that children could face online, and the integration of these resources in the classroom that develops autonomy and leadership in students.

The challenge for educators is to not think about technology as a tool that simply replaces analog devices. It is necessary to go beyond: educators should think about how to cultivate creativity, independence, entrepreneurship and the confidence of students. And to foster reflection on how to act responsibly in a world permeated by digital media where you can create new opportunities for engagement and learning.

Given this scenario, the World Economic Forum highlights the importance of Digital Intelligence[12], a set of social, emotional and cognitive abilities that allow people to adapt to the demands of networked society. The acquisition of these abilities must be rooted in values, such as respect and empathy. Note the following chart (Figure 3):

11 http://www3.weforum.org/docs/WEFUSA_DigitalMediaAndSociety_Report2016.pdf

12 https://www.weforum.org/agenda/2016/06/8-digital-skills-we-must-teach-our-children/

What will facilitate the rational and responsible use of technology will be holding a set of values, an attribute that will mark the leaders of the future. Digital Intelligence is defined by a set of skills[13] divided generically into eight linked areas:

- **Digital Identity:** the ability to create and manage your online identity and reputation.
- **Digital Use:** the ability to use devices and digital media, including the ability to establish a healthy balance between the online and offline life.
- **Digital Risk:** the ability to avoid or limit the risks online (for example, cyberbullying, radicalization), as well as problematic content (e.g., the violence and obscenity).

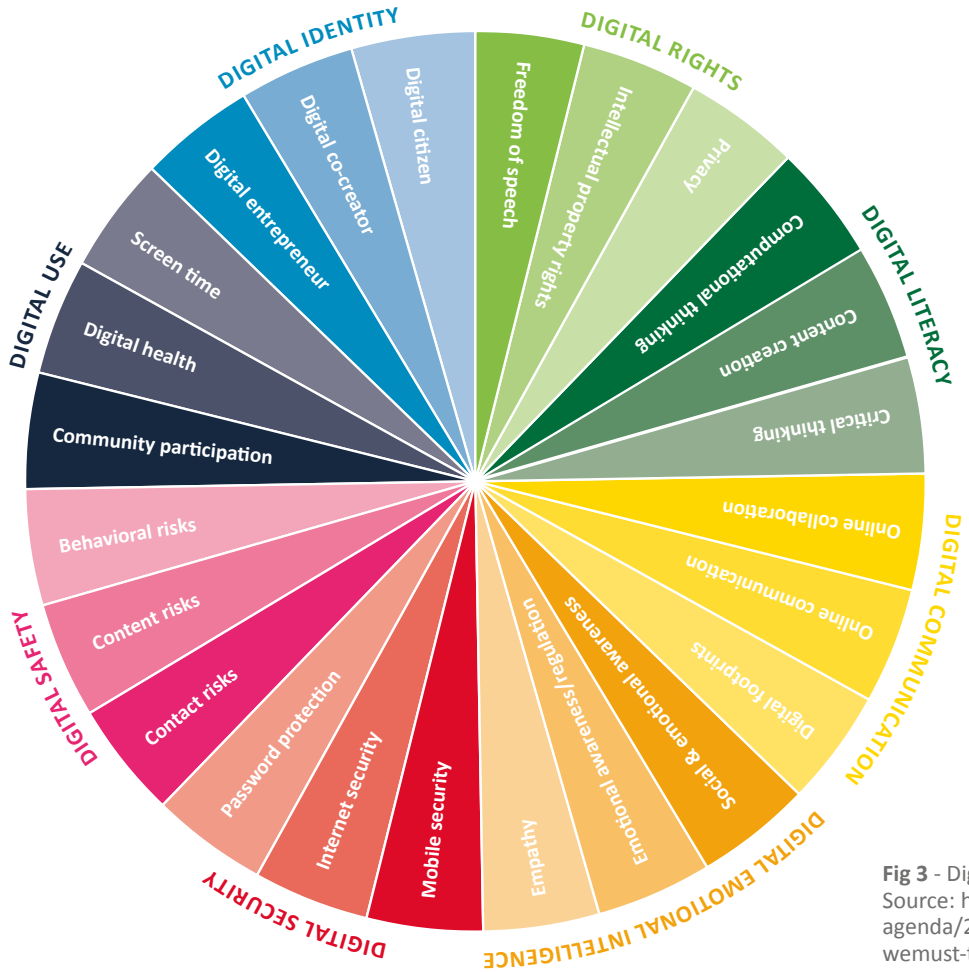

Fig 3 - Digital Intelligence.
Source: https://www.weforum.org/agenda/2016/06/8-digital-skills-wemust-teach-our-children/

13 http://www.dqproject.org/

• **Digital Security:** the ability to detect virtual threats (e.g. piracy, fraud, malware), to understand the best practices and to use appropriate security tools for data protection.
• **Digital Emotional Intelligence:** the ability to be understanding and build good relations with other internet users.
• **Intelligence of Communication:** the ability to communicate and collaborate with other internet users using technologies and digital media.
• **Digital Literacy:** the ability to find, evaluate, use, share and create content, as well as competence in computational thinking.
• **Digital Rights:** the ability to understand and defend the individual and collective rights, especially the rights to privacy, intellectual property, freedom of expression and protection from hate speech.

In an interview granted for this study, Carolina Rossini, a Brazilian lawyer named young global leader of the World Economic Forum in 2015, draws attention to the pioneering spirit of the initiative of the Forum to contemplate, in this set of skills, knowledge of digital law as a relevant skill today. "The internet is, without doubt, the main instrument of access to knowledge today, not only in relation to digital inclusion, which is a former flag and even crucial, but also to the management of intellectual property in a more flexible way, protecting the author, but ensuring the population the ease in obtaining educational resources, especially those that are purchased by governments of countries," she says.

1.2 USE AND APROPRIATION IN BRAZIL

To draw a picture of the use of Information and Communication Technologies (ICT) in education in Brazil, the Managing Committee of Internet in Brazil (CGI.br) has done an annual study since 2010 evaluating the infrastructure of ICTs available in schools and the appropriation of the internet by students and teachers in the educational processes in Brazilian schools. Since 2013, they also collected data about the use of materials and content obtained on the internet and the understanding of the copyrights involved.

The ICT Education[14] 2015 reveals that the internet has the potential to democratize access to information, facilitate the production, the use and the publication of content and digital resources, in addition to foster collaboration between people, generating more innovative educational scenarios.

According the study, using the internet to prepare lessons or student activities is a common activity among public school teachers: 97% of them reported that they had used some type of content obtained on the internet for this purpose; among these resources, the data indicate a greater emphasis on instructional materials, for presenting content or completing assessments. Regular use of fragments of content available on the internet (such as pictures, videos, sounds), is cited with greater frequency in relation to the use of complete materials, such as video classes or ready presentations. In addition, only 19% of teachers said they do not make modifications in the content obtained on the internet. In other words, the majority has altered the resources in some way, either by modifying them after downloading or by copying the file from the internet (87%), or by creating new materials from the combination of various resources obtained on the internet (79%), indicating authorship and leadership in relation to their teaching practice.

Teachers point out that the main way they learn how to use ICTs pedagogically is not the training courses offered by education departments, but the so-called “informal exchanges” among educators, cited by 70% of public school teachers. What are these informal exchanges? Moments between classes? Planned meetings? The research does not clarify this information, but, in any case, it is evident that teachers want and like to know the work of their colleagues, with whom they share similar challenges. It is an important signal to public policymakers to take advantage in a more efficient way of the moments of exchange and cooperation already established between teachers.

14 http://cetic.br/media/docs/publicacoes/2/TIC_Edu_2015_LIVRO_ELETRONICO.pdf

If search and the use of these resources have already become habit, to publish and share copyrighted works on the internet is still a rare activity. The ICT Education 2015 study indicates that 30% of teachers are in the practice of publishing materials they produce on the internet. This percentage remained stable in relation to previous editions of the survey. Lack of time (13%), low internet connection speed (12%), obsolescence of equipment used (11%), fear of being exposed (8%) and copyright infringement (7%) were cited as the greatest challenges to publication of content produced by teachers.[15] The concern about copyright is real, since most of the contents available on the internet are protected by copyright law (Law 9.610/1996[16]),), which prevents the modification of a work without the prior permission of the author.

Encouraging the availability of educational content and resources on the internet under a flexible copyright license has been a global movement of educators started by UNESCO in 2002. This is the movement for Open Education and, more specifically, Open Educational Resources (OER), which we will see in Chapter 3.

15 http://cetic.br/media/docs/publicacoes/2/TIC_Edu_2015_LIVRO_ELETRONICO.pdf

16 http://www.planalto.gov.br/ccivil_03/leis/L9610.htm

2. OPEN INNOVATION, COLLABORATION NETWORKING AND GENERATING VALUE

The first condition to modify reality consists in knowing it.
Eduardo Galeano

Various actors are emerging in the educational scene in Brazil, with the aim of improving the quality of education by offering digital solutions for education. The entry of entrepreneurs and investors into the world of education is welcome, but it is essential that these new players understand education as a public good; that is, that they can build a different kind of market in which the expectation of profit should be combined with the pursuit of social impact in the sector.

The traditional market, driven only by profit and competitiveness, has been transformed, in the sense of expanding perspectives towards an open, collaborative economy, in which the user's perception of value is fundamental. There are examples of companies that have shifted their innovation area, previously restricted to Research and Development (R&D), to more open and collaborative formats, action that has generated not only income but also value-added results for society.

The Innovative Education and Education for Innovation Report[17], published by the Organization for Economic Co-operation and Development (OECD) in September 2016 sets two considerations for the call of the "emerging market of technological devices." The first is whether the public sector is ready to exploit the opportunities offered, and the second is if the business models are based only on closed intellectual property licenses, which limit the possibilities of use.

Innovation in education around the world is starting to be strongly influenced by the concepts of Open Education and Open Educational Resources (OER), which are both based on digital technology to facilitate the culture of sharing[18]. The challenge is to build a business model that considers the culture of sharing, collaboration, and generation of public good, and at the same time ensures sustainability for companies. Providing free access to content while offering associated services can be one path.

17 http://www.oecd.org/innovation/innovating-education-and-educating-for-innovation-9789264265097-en.htm
18 Há várias políticas públicas em andamento que explicitam essa cultura, como veremos no capítulo 3.

Open Education Resources (OER) have started to appear on the agenda of discussions in the education business world, such as the Global Education Industry Summit[19], held for the first time in 2015. Meeting report[20] notes that the adoption of OER is growing with magnitude. In this sense, it is critical to understand that "open" does not necessarily mean "without cost," so that the market can find ways to build OER in cooperation with governments and social organizations.

We will expand on the meaning of OER in chapter 3. Before that, we discuss the concept of open innovation, which is very widespread in the productive sector, to then correlate this with Open Education.

2.1 CENTRAL CONCEPTS FOR OPEN INNOVATION

Open Innovation is a concept that appears at the beginning of the 2000s, from studies by Professor Henry Chesbrough, PhD in Business Administration and director of the Center for Open Innovation[21] at the University of California, Berkeley. Chesbrough seeks to confront the traditional and widely applied concept in enterprises in the 19th and 20th centuries that to innovate it is necessary to control. Control the people involved internally in the generation, development and implementation of ideas for a new product, and then, once complete, the release to the consumer market would be enough.

For a long time, the areas of research and development (R&D) received considerable investment to structure and take care of the process of producing innovation, always hiring renowned, skilled and well-trained professionals to guarantee high profits, and also the total control of intellectual property.

The studies of Chesbrough[22], which are currently the main global reference on the subject, indicate that maintaining high investments

19 http://www.oecd.org/education-industry-summit/

20 http://migre.me/vpqeU

21 http://corporateinnovation.berkeley.edu/

22 https://scholar.google.com.br/citations?user=_HyypBAAAAAJ&hl=pt-PT&oi=ao

in R&D proved unhelpful to companies, due to an increasing transformation in the market related to increased competitiveness, reducing the lifetime of products and the mobility of qualified professionals.

Open Innovation is, therefore, a concept that changes the outlook of the traditional model, because it gives the user, the public, the perception of value. In other words, it will only be an innovation if it in fact leads to an improvement in the lives of the people involved in that product or service. The concept also encompasses changes within a company's own enclosed areas of R&D, suggesting that they open up to hear their colleagues from other areas.

Another possibility is to establish partnerships and co-operations with research institutions, universities, suppliers and, of course, with the users of their products and services. Chesbrough speaks of a new "approach", in which a company starts to sell both its own ideas and those of other companies, starting to act on network and seeking both internal and external pathways in the innovation process. There is also the possibility for companies to create the so-called "spin-offs", smaller companies, designed usually in partnership with other institutions for the development of prototypes that can generate innovation more quickly.

CONTRASTING PRINCIPLES OF CLOSED INNOVATION AND OPEN INNOVATION

Closed Innovation	Open Innovation
The smart people in our field work for us.	Not all of the smart people work for us, so we must find and tap into the knowledge and expertise of bright individuals inside and outside our company.
To profit from R&D, we must discover, develop and ship it ourselves.	External R&D can create significant value: internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to market first.	We don't have to originate the research in order to profit from it
If we are the first to commercialize an innovation, we will win	Building a better business model is better than getting to market first.
If we create the most and best ideas in the industry, we will win	If we make the best use of internal and external ideas, we will win.
We should control our IP so that our competitors don't profit from our ideas.	We should profit from others' use of our IP, and we should try to buy others' IP whenever it advances our own business model.

The culture of Open Innovation - Source: Chesbrough (2003)

BMuch of the implementation of the open model began with less than 1,000 employees[23]. With scarce resources for investment in R&D, they began to establish external partnerships and to open diverse channels of generating innovation (Figure 4). Some characteristics of small companies that promote the adaptability to changing scenarios would be: focus on a specific market, specialization, smaller cost of expansion and, especially, a strong presence on the internet, so they can be more globally competitive. Not to mention that the ease of decision-making and speed of application generate faster results, something that invariably takes considerable time in large companies.

An example in Brazil is the company Braskem, from the chemical and petrochemical industry, that created in 2005 an online bank of ideas open to anyone willing to suggest new lines of research. A quarter of the company's researchers are external partners. The significant participation led the company to launch in 2015 a project of its own to directly support external ideas, the Braskem Labs[24], encouraging small entrepreneurs.

COLLECTIVE INTELLIGENCE AND COLLABORATION

With the growing advancement of information and communication technologies and with the advent of social digital media and the concept of collective intelligence[25], twe have observed an increasing appearance of products and services based on collaboration, which naturally impacts the forms of management and organization of companies and institutions.

Networked society favors companies who better know the motivations and behaviors of their audiences. Furthermore, the model of open innovation facilitates new technologies entering the market through

23 http://migre.me/vFY59

24 http://www.braskemlabs.com/

25 Inteligência Coletiva é um conceito que reconhece que todo ser humano tem algum conhecimento, mas nenhum tem conhecimento sobre tudo. Um dos nomes da atualidade a usar o termo é o filósofo Pierre Levy.

collaboration with the consumer public, i.e., in alignment to the real needs and wishes of users who participate in the process. “The simple idea is that by taking a smaller role in the project, you reduce your costs and your risks”, Chesbrough says.

Fiat, with its project Fiat Mio, was one of the first automakers to implement a collaborative action with its users. In 2009, the company invited users to create a future car concept, including design, operation and other features. The initiative was made on a platform with a Creative Commons[26] open license, with the participation of more than 17,000 people from 160 countries. The researcher from UnB, Andressa Abreu, produced a monograph[27] in 2013 about the impacts of the initiative, highlighting the campaign and value it added to the brand.

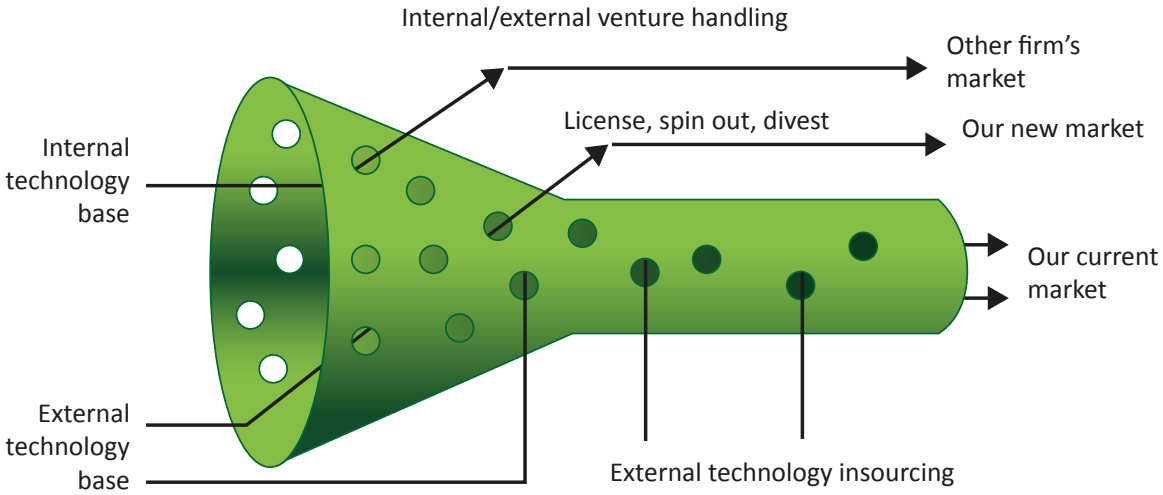

Fig. 4 - The figure illustrates the concept of Chesbrough, according to which a porous funnel takes in external opportunities and remains open to exploring internal technology alongside external company resources. It is a model in which the knowledge to promote innovation is distributed throughout the organization’s network of relationships.

Fonte: http://www.eoi.es/blogs/alfonsomedal/2012/02/12/open-innovation-from-why-to-what/

26 See more about the license in chapter 3.

27 http://bdm.unb.br/bitstream/10483/7585/1/2013_AndressaAbreuScheidemantel.pdf

In an interview for this study, professor Newton Campos, from Getulio Vargas Foundation (FGV) and Coordinator of the Edtech Startups committee for the Brazilian Association of Startups, which gathers startups focused on the education sector, pointed out that there is vast potential for collaboration to be explored in the edtech startup sector, which has been untapped because we are still beholden to the myth that a single person must be responsible for a brilliant idea. “When you have more people thinking about how to solve a problem and testing more solutions, the you gain more productivity and a greater chance of solving the problem,” he says.

INTELLECTUAL PROPERTY

Another relevant aspect of Chesbrough´s work involves the issue of intellectual property, specifically how the patents could be seen in a new way. Instead of worrying about protecting all their inventions, companies could make different choices:

> **Chesbrough Interview - Excerpt**
> *“If you protect yourself and I don’t, you win and I lose. If, instead, we can create a positive sum, a contest in which both of us have earnings, we will learn together. When I investigate companies, their ideas, their intellectual property, I usually see three different categories. The first concerns to things that are actually important, unique and special for the company and deserve its care. The third category includes other things that companies have protected but do not use, because they are neither unique to them nor represent a differential. In my view, companies should simply abandon the idea of intellectual property rights and share in a more openly as possible way. This leads us to the middle category, which is perhaps the most interesting conceptually, because it involves things that have some value for the company but are not as important as the special items from the first category. My advice for things that are in this middle category is to share in a selective way with key suppliers, key customers, key partners, because one is not just necessarily looking for money, but for ways to create better*

relationships in business and more collaborative arrangements. If you do share some things, you might encourage your partners to do the same."

EXAMPLES OF OPENNESS IN RELATION TO INTELLECTUAL PROPERTY

GOOGLE	Opened up the code for its Android operating system, allowing external partners to suggest improvements and create applications that are compatible with the platform.
IBM	Since 2006, the company has mobilized more than 150,000 people in 104 countries open innovation initiatives backed by more than $100 million in investments. The company reinvented itself through partnerships and licensing patents outside of its core business. In 2007, the company opened up 500 patents for developers to create solutions for its users.
Catarse	As a crowdfunding pioneer in Brazil, it opened up the code for its collective crowdfunding plaform and offers value-added services and support to users, as well as credibility in the market.
Microsoft	The company that became a giant in the industry by selling proprietary software has started to signal open source culture by opening up the code for its software bulding engine MSBuild in 2015.

MAKERS: THE NEW INDUSTRIAL REVOLUTION

In this book, the American entrepreneur Chris Anderson, recognized today as a culture maker celebrity (based on the idea that anyone can build, repair or modify different types of objects), exposes how a new generation of professionals is emerging due to the ease of communication and cooperation afforded by the internet, as well as the development of 3D printers. Through an online social network, he connected people from various places who started out making electronic gadgets as a hobby, and later built home businesses. Nowadays, there

are multiple publications and events for makers to promote the culture of collaboration and exchange of ideas. It is a field of the economy where it is easy to find partners with whom to collaborate on developing a new product, both in technical and financial terms, the latter especially via crowdfunding sites.

2.2 *DESIGN THINKING* AND *SERVICE DESIGN*

Design is now too important to be left to designers.
Tim Brown

Hand in hand with the concept of open innovation, we have observed the business sector's increasing search for innovation in internal processes. Not only in terms of the direct delivery to consumers or the market, but also the way in which this delivery is conceived and developed. Design studies and practices have been meeting this demand for the last decade.

The term Design Thinking (DT), which is difficult to translate into Portuguese, emerged from theoretical studies in Design at the Bauhaus School[28], founded in Germany at the height of the Industrial Revolution. Bauhaus has gained worldwide recognition for its pioneering studies and methodologies, which sought to combine the innovations brought by industry with the empathic stance of the pre-industrial area, in which craftsmen produced tailor-made products for small groups of users.

As a definition, DT can be understood as a new way of thinking and approaching problems—a model of thinking that puts people at the center of solving a problem. This is because the designers think not only about the aesthetic beauty of the product or service, but also about its functionality to the user. Being a new model of thinking, DT is based on three pillars: empathy, collaboration and experimentation. Globally, the term DT began to gain visibility in the 2000s with IDEO[29],

28 http://migre.me/vFYaf

a consultancy for Innovation in Silicon Valley, California, which advises companies to create more participatory and collaborative internal processes to generate innovation. Such processes, in line with the open innovation of Chesbrough, are fully flexible, adjustable and not restricted to a specific area of business.

The directors and founders of IDEO along with teachers from Stanford University, also in California, helped to create the D School, one of the most renowned faculties of DT in the world, famous for its bold and innovative look at the timing and organization of traditional academic learning. Over the 2000's, DT gained coverage and endorsements in international business magazines such as the Harvard Business Review, and recognition at renowned international events such as the World Economic Forum in Davos.

DESIGN THINKING IN BRAZIL

In Brazil, DT started to become widespread in 2010, driven by Tenny Pinheiro and Luis Alt, founders of the Live.work consultancy, who started the first course in DT at Escola Superior de Propaganda e Marketing (ESPM) in São Paulo. A year later, the term was publicly quoted on the first TED event held in the country, organized in Rio de Janeiro by the designers Rique Nitzsche and Paulo Reis.

In 2012, IDEO published the Design Thinking for Educators material, composed of a guide book and series of activities for educators to use DT in a variety of contexts. In 2014, the Educadigital Institute launched the first remix of the material, a Portuguese version adapted to the Brazilian context.

INNOVATE: BASIC REQUIREMENT?

Lately, "Innovation" is one of the most-used words in the world of business and education. Seeking to innovate in your area of professional

29 www.ideo.com

activity has become a basic requirement in today´s society.
But, what exactly is innovation?

Normally, we talk about two types of innovation:

- complementary innovation, which is when it improves a product or service that already exists and;
- disruptive innovation, which marks the emergence of something completely unexpected, which breaks established paradigms or offers an unknown possibility.

The difference that DT's approach brings to the debate on innovation, in addition to the concept of open innovation that we saw in the previous chapter, is the importance of perceived value. You can only consider something innovative when the user (the audience, the people involved) in fact perceives a change for the better when using a specific product or service. To put it in another way, the product or service must be useful and appreciated by those who will take advantage of it. Without this, there is no innovation.
When we apply the concept of DT in the services sector, there is what is called Design Services (DS). It is a series of activities to plan and organize the people, components, materials, infrastructure and communication of a service to improve the quality of interactions between a company and its users.
DS comprises the ecosystem of people involved in a specific product or service, not only the consumer, as UX design[30] (Design of the User Experience) traditionally does.

However, both the DS and UX approaches are complementary because you need to understand the final user to take care of the entire production chain. The approach usually uses a roadmap to guide its implementation, as for example:

- What should be the user experience while using the service?
- What should be the experience of the collaborator/employee to provide the service?
- How do you remain faithful to your mission and at the same

30 UX *Design* - ver mais em http://uxdesign.com/ux-defined

time relevant to the user?

We can conclude that such questions are not new, but important to the proper performance of a service. However, with the changes that information and communication technologies have instigated in society, the way people interact with a variety of products and services has also changed.

We can point to examples such as apps for making medical appointments that allow patients to directly access their medical records, such as the Boa Consulta, or mobile apps that allow the user to buy data and call packages on demand, such as the Vivo Easy. The evolution of increasingly more digital and functional services led companies to seek solutions that focus on technological development.

2.3 ECONOMY OF THE COMMON GOOD: CREATIVE, COLLABORATIVE AND SHARED

The internet we use, the world-wide web (www), emerged in the 1990s, created and delivered to the world as a public good by the English computer scientist Tim Berners-Lee and his staff[31]. Berners-Lee decided that his idea would not be a proprietary solution locked down under copyright or patents, but free for all and without cost, enabling the creation of websites without the need for any type of licensing.

O pesquisador fez questão de disponibilizar os protocolos em domínio público. Hoje diretor do *World Wide Web* Consortium (W3C), Berners-Lee recebeu o prêmio Millenium Technology Prize[32], in 2004, and has became one of the most requested personalities at digital technology events around the world. According to him, the primary function of the web is to empower users to create and collaborate among themselves. His vision is that the web was not designed to be a merely technical tool, but to support and improve human existence.

In recent years, we have been following the emergence of initiatives

31 https://www.w3.org/People/Berners-Lee/Weaving/Overview.html
32 https://www.w3.org/People/Berners-Lee/

along the same lines as the researcher´s: the movement we know today as the sharing economy, or more recently, as the Economy for the Common Goods[33] whose most known spokesman is the Austrian Christian Felber[34], professor of Economics at the University of Vienna, Austria. It is a question of the traditional focus of the capitalist economy on competition, and that the profit motive is not proving able to solve the major problems today, such as having less war, more democracy and sustainable development.

According to Felber, in lecture at TEDx Vienna[35], there is a growing public desire for a more social, ecological and fair economy. And a desire that companies should cultivate values not only in addition to monetary indicators, but also indicators related to human development, such as trust, honesty, solidarity, inclusion, collaboration, and compassion.

Felder's concept is closely related to what is conventionally called the paradigm of abundance versus the paradigm of scarcity. Note the image below (Figure 5):

SCARCITY	vs	ABUNDANT
Not enough to go round		More than enough to go round
I need to make sure I look good if I am to succeed		If I succeed and you succeed, we all succeed
I can't afford to do "x"		I can afford to do instead
Reluctant to contribute and share information, resources, time		Open to collaborating and sharing what is required
I have all the answers		Willing to learn from others
Promotes only self and accomplishments		Promotes others and their achievements
Dictates and micromanages		Openness and trust

Figure 5 - Paradigm Of Scarcity. Source: http://thecareerdiplomat.com/the-abundance-mindset/

33 https://old.ecogood.org/en

34 http://www.christian-felber.at/english.php

35 https://www.youtube.com/watch?v=dsO-b0_r-5Y

The concepts of open innovation and Design Thinking speak of the need to imagine new business models drawn from and around the human being, drawing on various points of view. If we used to create projects based on what was predictable or known, now the challenge is to act with dreams and possibilities. The collaborative potential offered by digital technologies and the popularization of the "www", favors this path.

COMMONS TRANSITION

After a sabbatical year shortly after leaving the business world, the Belgian national Michel Bawens[36] moved to the USA and became a theoretical researcher, activist and international speaker after founding the Peer-to-Peer Foundation[37], (P2P). Also, aligned with the Economy of the Common Good, his objective is to show that distributed networks, which is the basis of the internet, can encourage other configurations of nonhierarchical economy and social relations, contributing to innovations in economic, political and governmental fields. Currently, P2P is a global network of researchers, activists and entrepreneurs who are committed to the transition to a society based on the common good and the achievement of self-organized and globally distributed activities.

One of the initiatives of P2P is the Commons Transition[38], created shortly after an experiment carried out in 2014 with the Government of Ecuador. Through Free/Libre Open Knowledge (FLOK)[39] , the first Commons Transition Plan[40] was developed. It is a "common good" that brings together an online database of policy experiences on how to develop a more humane and cost-effective and social order that is committed to the sustainability of the planet. The platform provides documents to inspire people to create their own initiatives[41].

36 https://pt.wikipedia.org/wiki/Michel_Bauwens
37 https://p2pfoundation.net/
38 http://commonstransition.org/what-is-commons-transition/
39 http://floksociety.org/
40 http://en.wiki.floksociety.org/w/Research_Plan
41 Ver entrevista de Michel Bawens traduzida pelo Ministério da Cultura em 2011.

BRAZIL ON THE CREATIVE ECONOMY

Among the countries of Latin America, Brazil is the leader in collaborative economy initiatives, according to a study carried out by IE Business School[42], in partnership with the Inter-American Development Bank (IDB) and the Spanish Ministry of Economy. Some argue that the logic of collaboration and sharing is the key to sustainability in the future, given the amount of tangible goods that no longer need to be taken as possessions to become accessible. "Access is better than ownership"[43] is the slogan of the moment.

One scholar of this topic, who calls herself futuristic, is Lala Deheinzelin[44], Brazilian, author of the concept called Fluxonomy 4D, which combines new economies (creative, shared, collaborative, and multi-currency) to generate wealth in four dimensions of sustainability (cultural, social, environmental and financial). Lala proposes a shift in vision from a world of scarcity to one of exponential growth through the creation and optimization of processes and tools supported by new technologies. It is based on the understanding that money is not the only kind of resource and that we can leverage funding alongside other and other kinds of resources, including cultural (knowledge, processes), environmental (infrastructure), social (partnerships and access to networks) and solidarity (time).

42 http://economia.uol.com.br/noticias/efe/2016/04/28/brasil-e-lider-latino-americano-em-iniciativas-de-economia-colaborativa.htm

43 http://exame.abril.com.br/rede-de-blogs/cabeca-de-lider/2013/08/29/liberdade-e-nao-possuir-mas-ter-acesso/

44 http://www.desejavelmundonovo.com.br/

EMERGING ECONOMIES WITH COMPLEMENTARY CONCEPTS

Types	Description	Some examples
SHARED	Use of technology to empower people to do business with each other in a more cost-effective way	• **Airbnb –** a person chooses what is available • **Fleety –** car renting directly by owners • **Bla bla blá –** organizing carpools
COLLABORATIVE	Very close to the shared economy, this consists of consuming in a more intelligent way, providing connections and more meaningful relations	• **Airbnb –** time to get to know the reputation of the host and of the user • **Wikipedia** • **Co-working offices** • **Crowdsourcing initiatives** such as Innocentive, a platform that brings together individuals from businesses to propose solutions
SOLIDARY	Activities of production, consumption, distribution, savings and credit organized under self-management, including fair trade, co-operatives, social inclusion	• **Duolingo –** when learning another language, translates phrases that will be learned by other people • **Doghero –** petsitting exchange • **Tem Açúcar –** loans between neighbors • **Bilive –** exchange of knowledge and learning
CREATIVE	Production processes based on the generation of knowledge and creativity	• **Colab –** denouncing problems of the city • **Local Friend –** residents as tourist guides • **Cabe na mala –** people offer space in their luggage to carry parcels

CROWDSOURCING

Quite related to the model of open innovation, crowdsourcing refers to something that must be solved or co-created by many people from different areas of knowledge. In this way, Web 2.0 tools, including social media and other online spaces are used for collaboration and the exchange of ideas. Today we see these kind of strategies being implemented by companies seeking to know their users better, such as the initiative Itsnoon[45], initiative, which awards the best ideas of a creative call. NASA's Innocentive[46], initiative connects professionals who can offer solutions for companies. We have also seen online consortia that arise from communities of users working on the same kind of activity, as Wedologos[47].

The growing trend of the "crowd" can be explained by the emergence of a creative, collaborative and shared economy that is inextricably linked to the concept of open innovation. Networking is a concept much older than the internet and computers, but it is without any doubt enhanced by these elements.

The Brazilian public and government sector has focused on this open and collaborative position in the case of the Civil Internet Framework[48] approved in 2014, which includes the public call of MEC for innovative education initiatives and the suggestion of the National Basis Common Curriculum[49].

B COMPANIES

Created in the USA in 2006, the B System[50] became a global movement of companies that have committed to revise their business models, to take strong action to support human development, reduce poverty in the world, or address climate change. It expanded into Brazil in 2013,

45 https://www.itsnoon.net/
46 https://www.innocentive.com/nasa-pavilion/
47 https://www.wedologos.com.br/?utm_source=indexanetwork
48 http://pensando.mj.gov.br/marcocivil/
49 http://basenacionalcomum.mec.gov.br/#/*site*/inicio
50 http://www.bcorporation.net/

and it has already gained 30 companies as members of the network. To participate, each company must comply with a range of practices in all areas of the company, including employees, community, suppliers, government, and transparency practices. Once approved, you must contractually commit to generating benefits for the community, and not only for shareholders.
See more at: www.sistemab.org/portugues/inicio

BITCOIN AND BLOCKCHAIN[51]

We have heard a lot of the virtual currency Bitcoin[52], which does not require a monetary system issuing center to operate, because it is based on the concept of "peer-to-peer", i.e., any person can generate money. This is a revolutionary idea compared to conventional currency, which takes advantage of the potential of buying online.

Additionally, Bitcoin is open source, meaning its design is public and nobody owns or controls it. In the USA, has been possible to carry out transactions of purchase and sale with Bitcoins since 2013. Blockchain is the technology and data structure that supports the operation of Bitcoin. Or, in other words, it is the software engineering behind the idea. There is no central project, because it is a network of people or businesses that do not require a license, only electricity and compatible hardware. The members of this network are called "miners", who are independent and can compete to see who will process the next block of information. This is starting to grow In Brazil, and according to Ronaldo Lemos, co-founder and director of the Institute of Technology and Society[53], it may even help even in combating corruption[54]. The network itself must ensure the reliability of transactions. Large companies in the financial sector are beginning to enter the network, including creating their own projects.

51 https://bitcoin.org/pt_BR/
52 https://bitcoin.org/pt_BR/comecando
53 http://www.itsrio.org
54 http://migre.me/vFYea

3. OPEN EDUCATION AND OPEN EDUCATIONAL RESOURCES

Imagine a world in which every single person on the planet is given free access to the sum of all human knowledge.
Jimmy Wales

How does the concept of open innovation apply in education? How do the processes of teaching and learning relate to the principles of shared, collaborative and common good economy? Many people still talk about innovation as synonymous with any new product or solution, or to demonstrate a certain result obtained in official assessments from the use of a specific product. However, as we have seen, open innovation and approaches of design intend to improve people´s lives, and this does not depend on centralized providers but on the empowerment of people.

The changes that have enabled citizens to create, modify and try out new ideas, composing an ecosystem that has been reinventing and adapting itself to the new context facilitated by the Internet, could not fail to reverberate in the field of education. Although education is traditionally one of the most slow and bureaucratic sectors when it comes to concrete changes, it doesn't fall outside the scope of the debate, because it is through education that we facilitate the continuous emergence of new ideas.

Over the last decade, Open Education gained strength in different sectors of society by generating access to knowledge, innovation in teaching practices, a culture of sharing, and a new demand for resources and services that strengthen this exchange toward the construction of collaborative knowledge.

Tel Amiel, coordinator of the UNESCO Cathedra of Open Education at UNICAMP, said in an interview for this study that the movement for an Open Education is an attempt to find sustainable alternatives to some of the barriers holding back the right to a quality education. "From this perspective, the concept of 'openness' is not necessarily dependent on technological developments, and precedes the popularization of digital devices, of the internet and web, but can be strengthened by new media", he explains.

According to the Cape Town Declaration[55], created in 2007, Open Education combines the tradition of sharing of good ideas among

55 Ver a declaração da Cidade do Cabo em: http://www.capetowndeclaration.org/translations/portuguese-translation

educators and the culture of the internet, marked by collaboration and interactivity. This methodology of education is built on the belief that everyone should have the freedom to use, customize, improve and redistribute the educational resources, without restrictions.

This context of openness encompasses many facets of observation and study, and in the field of Education we can cite open educational resources, open textbooks, open curriculum, open source technologies, open science and open public data.

Part of this concept of Open Education are Open Educational Resources (OER), a global movement that began in 2002, when UNESCO made the first event on the theme and coined the term. According to one of the most accepted definitions, Open Educational Resources are "teaching, learning and research materials in any medium that reside in the public domain and have been released under an open licence that permits access, use, repurposing, reuse and redistribution by others with no or limited restrictions. The use of open technical standards improves access and reuse potential.
"(UNESCO/Commonwealth of Learning, 2011)[56].

Awareness of this movement has increased over the past few years. In 2012, during the World Congress of Open Educational Resources Paris, organized by UNESCO, specialists from all over the world have joined forces to write the Paris OER Declaration[57] to help governments to adopt public policies that relate to OER. Two years later, in 2015, the subject is reaffirmed at the International Conference on Information and Communication Technologies[58], held in China.

The concept of OER is focused on three basic principles: learning content, licenses to use that allow greater flexibility and the legal use of didactic resources, and the use of technical formats that are easy to modify with common software. In

56 Unesco/Commonwealth of Learning http://oerworkshop.weebly.com/

57 Ver a declaração REA de Paris em: http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/WPFD2009/Portuguese_Declaration.html

58 http://www.unesco.org/new/en/education/resources/in-focus-articles/qingdao-declaration

this way, granting access to a resource alone is not enough to make it an Open Educational Resource. OER must have certain freedoms (Figure 6) granted by the author of the work to the final user. The freedoms are known as 5Rs:

Figure 6 - 5Rs

- **REUSE:** includes the freedom to use works in various contexts.

- **REVISE:** includes the freedom to adapt and improve the OER to suit to user's needs.

- **REMIX:** includes the freedom to combine and make mashups and collections of multiple resources to create new OER.

- **REDISTRIBUTE:** includes the freedom to freely share OER and any adapted versions created by the user.

- **RETAIN:** includes the freedom to make a copy and save resources in any personal device.

LEGAL ISSUES AND COPYRIGHT

Open Educational Resources preserve the copyright and right of attribution of authors, while at the same time allowing certain freedoms to users that can generate new uses, new teaching resources, new ideas and new business models.

Copyright in Brazil is regulated by Law no. 9610 of 1998[59] and has as its prerogative to protect the relationship between the creator and those who use his artistic, literary or scientific works, such as texts, books, paintings, sculptures, music, photos, etc. Such rights may be divided into two parts: moral rights and economic rights. In Brazil, the moral right ensures attribution to the author of the intellectual work and it is considered non-transferable and non-voidable. On the other hand, the economic right gives the copyright holder the exlusive right to use the work commercially, and this right can be transferred or ceded to other people. By default, it is necessary to request permission from the author or copyright holder before using works protected by copyright.

Open Education and OERs offer new opportunities for copyright management, allowing the author to choose which freedoms he would like to provide to end users of the work, and express this desire by using licenses and flexible terms of use.

One of the most widely used copyright licenses are those of Creative Commons[60] (CC), a nonprofit organization that has created a standard system of legal tools that are easy to use. The CC licensing system offers flexible options that ensure protection and freedom to artists, authors, entrepreneurs and users. These licenses are in contrast to the idea of "all rights reserved" of traditional copyright, instead allowing the author to declare only "some rights reserved."

Creative Commons has legal support from lawyers from the Institute of Technology and Society (ITS) and the Getulio Vargas Foundation (FGV-Rio). It is possible to apply CC licenses directly to business and personal websites using HTML code, which allows search engines to index the license and also clearly signals the license to users through an intuitive badge with a short summary explaining the terms and conditions. This type of licensing has also been adopted by internet companies that host user-created content, such as Youtube, Vimeo, Slideshare, Google, etc. It is a new form of management of copyright that fosters the collaborative culture of the internet, even inspiring

59 http://www.planalto.gov.br/ccivil_03/leis/L9610.htm
60 https://br.creativecommons.org/

new business models, as we shall see in chapter 4.

The Creative Commons License is based on a simple idea: when people share their creativity and knowledge with others, amazing things can happen. It is not a new idea. People have adapted and built on the work of others for centuries. Musicians use beats from the music from other composers, artists create new works from images taken by other people, teachers exchange activities and lesson plans among themselves. The idea behind Creative Commons is that sharing is one of the ways that society can evolve, it´s how culture develops and how innovation happens.

The CC licenses are combinations of four basic conditions: attribution of authorship, non-commercial use, sharing derivatives under the same license, and no derivative works. These licenses go from more open to more restrictive, and everything depends on the decision of the author or copyright owner.

WHAT ARE THE LICENSES, AFTER ALL?

	**Attribution / CC-BY** This license allows others to distribute, remix, adapt, and build from a work, even for commercial purposes, so long as they credit the original creator. It is the most flexible of the CC licenses. It is recommended to maximize the dissemination and use of openly licensed materials.
	**Attribution-Share Alike / CC BY-SA** This license allows others to remix, adapt, and build from a work, even for commercial purposes, so long as they credit the original creator and license their new creations under identical terms. This license is often compared to the licenses of free and "copyleft" open source software. All new works based on yours will have the same license, so any derivatives will also allow commercial use.
	**Attribution-No Derivatives / CC BY-ND** This license allows others to freely redistribute an original work, including for commercial purposes, so long as they credit the original creator and do not make any changes.
	**Attribution-NonCommercial / CC-BY-NC** This license lets others remix, adapt and build from your work for non-commercial purposes so long as they credit the original creator. Although derivative works must always give proper credit and may not be used for commercial purposes, users do not have to license these derivative works under identical terms as the original.
	**Attribution-NonCommercial-Share Alike / CC-BY-NC-SA** This license lets others remix, tweak, and build from your work for non-commercial purposes, as long as they credit the original creator and license their new creations under identical terms.
	**Attribution-NonCommercial-No Derivatives / CC BY-NC-ND** This is the most restrictive of the six main CC licenses, only allowing others to download works and share them, so long as they give proper credit to the creator, but without changing them in any way or using them for commercial purposes.

Fonte: https://br.creativecommons.org/licencas/

The use of an open license not only distinguishes whether a resource is an OER or not, but also allows clearly communicates to others how they can use a licensed work. According to the global definition of free culture[61], between the six possible licenses, we can only consider four of them as OER (CC-BY, CC-BY-SA, CC-BY-NC CC-BY-NC-SA), because they allow mixing, revision, adaptation and distribution.

The report The State of the Commons[62] (Figure 7) shows an increase in the use of flexible licenses for publication of images, videos, scientific articles, music, texts, etc. Despite the difficulty of precisely pintpointing how many works are CC licensed, which is hard because there is no central repository or catalog, these numbers are impressive. In the last 5 years, the number of CC licensed works licensed tripled and, in 2015, exceeded the mark of one billion. In addition, more and more people are choosing to use the free culture licenses (CC-BY and CC-BY-SA). The data reveal that 61% of worldwide CC licensed works have this type of license.

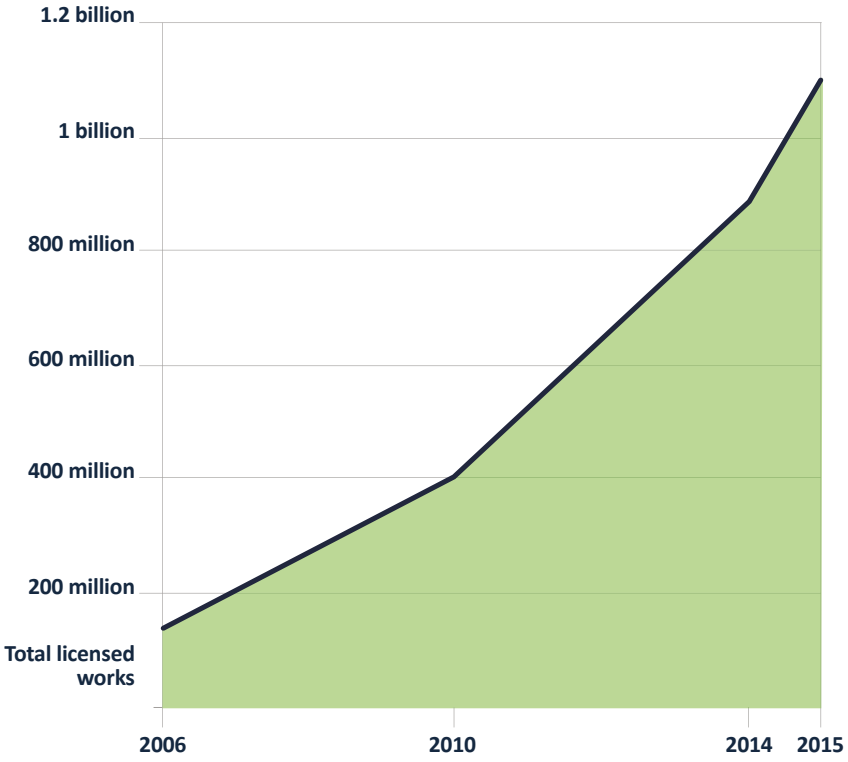

Figure 7 - Total of licensed works

source: https://stateof.creativecommons.org/2015/ CC-BY

61 https://creativecommons.org/share-your-work/public-domain/freeworks/

62 https://stateof.creativecommons.org/2015/

Governments, non-governmental organizations and civil society are adopting open licensing. In 2015, important institutions adopted institutional open policies, such as the Ford Foundation, Bill and Melinda Gates Foundation and The William and Flora Hewlett Foundation. The movement for opening up works of cultural heritage has also grown, with some museums recently changing their policies to openly share their collections, such as the cases of the Ruks Museum[63], Brooklyn Museum[64], MoMa - Museum of Modern Art[65], York Museums Trust[66], Europeana[67].

PEDAGOGICAL ISSUES AND TEACHER TRAINING

To change the traditional dynamics of the classroom, to integrate active methodologies for use of technologies and digital media, to make students responsible for their own learning pathways, to strengthen the mediation role of teachers, to encourage the active participation students and enhance the reality in which they are placed. This is the educational dream of most teachers and specialists in the field of education.

Creating policies for teacher training that value the agency and initiative of teachers in preparing lesson plans and pedagogic materials is a key principle of the Open Educational Resources. OER are identified by UNESCO[68] as a way to increase access to teaching and learning materials freely and lawfully, to promote distance learning, and to change the logic from consumption of information to a knowledge production culture.

One of the most important aspects of OER is the potential for teachers and students to be creators. The creation of content during the learning processes is not typically recognized as authorship. Traditionally, there is thought to be a large gap between the "specialist who knows" and

63 https://www.rijksmuseum.nl/en

64 https://www.brooklynmuseum.org/

65 http://www.moma.org/

66 http://www.yorkmuseumstrust.org.uk/

67 http://www.europeana.eu/portal/pt

68 http://www.unesco.org/new/pt/brasilia/communication-and-information/access-to-knowledge/ict-in-education/open-educational-resources/

teachers and students, who are “mere consumers of information”. Open Educational Resources may decrease this distance.

How? Encouraging the publication and sharing of contributions, modifications and mixing by users, which expands the information available and allows for regional diversification of both content and perpectives, and valuing the information produced at the top.

Finally, the initial and continuous training of teachers should no longer be linked to products, solutions and specific software. This separation is necessary to encourage academic freedom, so that the teacher can choose the best resource to achieve learning objectives.

3.1 MAJOR PUBLIC POLICIES IN BRAZIL AND AROUND THE WORLD

Public and educational policies of Open Education and Open Educational Resources have multiplied in recent years, driven by various treaties and international initiatives such as the Paris OER Declaration[69], the significant investment from the U.S. government in open textbooks, and the commitment signed by the European Union to make scientific publications open access to the public by 2020.

BRAZIL

Brazil has been a globally recognized leader over the past five years due to the strong performance of the OER-Brazil Community and the advocacy work of OER.br[70], coordinated by the Educadigital Institute with funding from the Open Society Foundation. Since 2011, a series of actions and events, as well as the proposition of Law Projects which aim to guarantee the opening of knowledge when financed with public funds and the insertion of Open Educational Resources in some

69 http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/Events/Portuguese_Paris_OER_Declaration.pdf
70 www.rea.net.br

goals of the National Education Plan (see table) are strengthening the debate around the issue.

The Brazilian Public Policy Scenario of Open Educational Resources	
APPROVED	
National Education Plan Law no. 13,005	**Objective 5:** literate all children up to the end of the 3rd (third) year of basic education. 5.3) Select, certify and disseminate educational technologies for literacy for children, ensured the diversity of methods and pedagogical proposals, as well as monitoring the results in the education systems in which they are applied, and should be made available, preferably, as open educational resources; **Objective 7:** enhance the quality of basic education at all stages and modalities, with the improvement of the school flow and learning to achieve the following national averages for the IDEB. 7.12) to encourage the development, select, certify and disseminate educational technologies for early childhood education, elementary and middle school and encourage pedagogical practices that ensure the improvement of the school flow and learning, ensured the diversity of methods and pedagogical proposals, with a preference for free software and open educational resources, as well as monitoring the results in the education systems in which they are applied.
Federal District Law n°5592/2015	Establishes policy for the provision of Educational Resources purchased or developed by a grant of direct and indirect state administration. Access: http://legislacao.cl.df.gov.br/Legislacao/buscarLeiPeloLegis-21960!buscarNormaJuridicaPeloLegis.action;jsessionid=4F377CA3209929C8715C3253202048E4
Municipal Decree of the City of São Paulo	Features on the compulsory licensing of intellectual works produced with educational, pedagogical and related services, in the context of municipal public school network. Access: http://camaramunicipalsp.qaplaweb.com.br/iah/fulltext/decretos/D52681.pdf

IN COURSE UNTIL THE DATE OF PUBLICATION OF THIS STUDY	
The Federal Law Plan n° 1513/2011	Features on the recruitment policy and licensing of intellectual works subsidized by the Public Power and the Private Law bodies under the stock control of federal public administration. Access: http://www.camara.gov.br/proposicoesWeb/fichadetramitacao?idProposicao=505535
FILED	
Project Law of the State of Paraná n° 185/2014	Establishes policy of providing free form of educational resources purchased or developed by a grant of direct and indirect state administration. Access: http://www.alep.pr.gov.br/atividade_parlamentar/pesquisa_legislativa
VETOED	
Project Law of the State of São Paulo n° 989/2011	Establishes policy for the provision of Educational Resources purchased or developed by a grant of direct and indirect state administration. Access: http://www.al.sp.gov.br/spl_consultas/consultaDetalhesProposicao.do?idDocumento=1040323#inicio

As part of the commitments for the 3rd National Action Plan for Open Government, within the framework of the Open Government Partnership (OGP), representatives of civil society who are working with "educational digital resources", met in April and May 2016. The purpose of the meeting[71], which should be continued in 2017, was to co-create commitments on one of the five most voted topics in a public consultation held at the beginning of the year: Innovation and Open Government in Education.

71 http://www.educadigital.org.br/***site***/ogp-brasil-reune-sociedade-civil-para-cocriar-plano-de-acao/

UNITED STATES

The United States has various policies at the federal and state levels that seek to give access to education and to quality educational resources for all citizens. At the federal level, the Trade Adjustment Assistance Community College and Career Training[7273] (TAACCCT) program was implemented in 2011 with an initial budget of 2 billion dollars in grants for community colleges working with industry partners (employers and the labor force). It was the first federal program to leverage the benfits of OER to support the development of a new generation of educational programs in higher education, aiming to help workers enter the labor market. All grantees of the program have the obligation to publish their material under the Creative Commons CC-BY 4.0 license.

California has several laws relating to the use and production of OER. It established two laws[7475] in the year of 2012 that aimed to provide free access to openly licensed digital textbooks in free formats for 50 high-enrollment courses offered by colleges in the state. This action was globally recognized, serving as inspiration for various countries. In 2014, California also passed the first state-level law[76] of the country which guarantees free access to articles reporting on scientific research funded with public money. It requires these articles to be deposited in an open access repository within twelve months of publication. The law applies specifically to recipients of research funds from the Department of Public Health, and they are responsible for ensuring that all agreements for publication or copyright relating to articles comply with the law, although open licensing is not required.

Other states also have laws that support the creation of open educational resources to universities and basic education, the creation of digital resources and the obligation to provide public access to scientific articles and open data. They are: Washington[77],

72 https://www.doleta.gov/taaccct/

73 http://profiles.open4us.org/taaccct/

74 http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120SB1052

75 http://leginfo.ca.gov/pub/11-12/bill/sen/sb_1051-1100/sb_1053_bill_20120905_enrolled.html

76 http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB609

77 https://www.congress.gov/bill/114th-congress/senate-bill/779

Connecticut[78], Minnesota[79], North Dakota[80], Oregon[8182] , Utah[8384].

POLAND

Launched in 2012, the Digital School Program[85] aims to increase Information and Communication Technologies (ICTs) skills in schools. One of the four segments of the program is "e-resources", which aims to create open books, a national OER platform, and the production of technological tools for the management of schools. This is the first national program that supports the creation and adoption of resources and open books, making it possible to update it year after year and giving teachers the autonomy to use the content in innovative ways, remixing, adapting and sharing the material freely.

ARGENTINA

In 2013, Argentina approved the Law of the Open Access[86] which requires the institutions of the National System of Science and Technology that receive public funding to facilitate open access to scientific research with the creation of institutional repositories. Technical and scientific works, academic theses, articles, and other outputs of publicly funded research should be made available through their researchers, technicians, teachers, doctors, masters and students. The Law also requires the publication of research data within five years, so that it can be used by other researchers.

URUGUAY

Uruguay was the first country in Latin America to deliver laptops for each of the 300,000 students of primary and secondary education in public schools. The Plan Ceibal is autonomous from the Ministry of Education, but maintained as a public program. It is run by a management team and an advisory committee with representatives from public agencies, such as the Councils of Education. It is entirely publicly funded, but the team manager has autonomy to

78 https://www.cga.ct.gov/2015/fc/2015HB-06117-R000823-FC.htm

79 https://www.revisor.mn.gov/bills/text.php?number=SF1236&session_year=2013&session_number=0&version=latest

80 https://legiscan.com/ND/text/3009/id/800319

81 https://olis.leg.state.or.us/liz/2015R1/***Download***s/MeasureDocument/HB2871/Enrolled

82 http://openoregon.org/

83 http://www.schools.utah.gov/main/INFORMATION/***Online***-newsroom/DOCS/01252012OpenTextbook.aspx

84 Ver tabela detalhada no ***site*** do estudo.

85 http://men.gov.pl/pl/jakosc-edukacji/edukacja-informatyczna/cyfrowa-szkola-aktualnosci

86 http://www.senado.gov.ar/parlamentario/comisiones/verExp/26.12/CD/PL

hire employees, service providers and advisors, and to purchase equipment and educational materials, including licenses, and use them as needed. There is a core curriculum, but the educational resources are not inspected by the government, and the strategies and pedagogical methodologies are controlled by teachers, who are constantly encouraged by RedOERs[87] to create and share resources[88] and projects openly online.

COUNTRIES THAT RECOMMEND AND INCENTIVIZE OER

UNITED STATES AND #GOOPEN: A PIONEERING CAMPAIGN

In October 2015, the U.S. Department of Education[89] launched the #GoOpen is a campaign[90] to encourage states, school districts, and educators to use openly licensed educational resources. To coordinate the campaign, the Obama Administration appointed an OER Advisor, Andrew Marcinek, to work directly with school districts, platforms for education and civil society to raise awareness about the adoption of OER.

District and state leaders across the USA are working in cooperation with educational technology companies and nonprofits to share strategies and ideas that are effective in creating new tools that provide opportunities for educators to find, adapt, create, and share digital resources.

The annoucment of the #GoOpen campaign also included the following commitments:

1. Creative Commons will organize OER workshops across the country for thousands of district leaders to expand the use of these resources, replacing the expensive and outdated printed books. Workshops will be offered to empower teachers to create, share, customize and improve OER.

87 http://migre.me/vKYkq

88 http://blogs.ceibal.edu.uy/formacion/proyectos-de-formacion/redes/

89 http://tech.ed.gov/open-education/

90 http://tech.ed.gov/files/2014/06/National-Press-Release-Open-Education-Symposium-102815-1PM2.pdf

2. Open Licensing Policy: The U.S. Department of Education proposed a regulatory change requiring that recipients of Department grants must openly license materials created with the public funds. The use of open licenses will allow the public to access and use resources for any purpose, provided the user gives attribution to the creator.
3. Adoption of Creative Common licenses (CC) in new platforms to facilitate the sharing and reuse of digital resources. Educational technology companies that already have established platforms have joined the campaign, and are creating new business models in a context of openness of knowledge.

• Amazon will employ its technology and expertise in the distribution of content - and integrate CC licenses into a new platform for sharing digital resources to support OER initiatives in basic education (K-12). The company will provide infrastructure and support to the Department of Education by hosting the Learning Registry[91] on the cloud for two years to serve the 15,000 school districts in the country;
• Microsoft announced new features for *Docs.com*, *Sway* and *OneNote Classe Notebook* to help educators to create, discover, classify and share OER. These products are integrated with Microsoft Office 365, which would allow curation of tailored collections of resources and encourage reuse, support the adoption of CC licenses, and sharing of metadata. In addition, Microsoft will index the content of the Learning Registry, creating a new app so that educators can search and access OER by means of compatible learning management systems (LMS);
• Edmodo has announced an update to its resource sharing platform, Edmodo Spotlight, to enable the discovery, curatorship and sharing of OER using CC licenses and the Learning Registry. Edmodo will also provide advanced resources to districts to curate, organize and share OER in Spotlight;
• The Illinois Shared Learning Environment has launched a redesigned version of its platform IOER[92], which makes it easier for teachers and school leaders to find openly licensed educational

91 http://learningregistry.org/
92 http://ioer.ilsharedlearning.org/

resources. In addition, the platform code is available as open source for other states interested in implementing a similar program;

• Follett[93] announced the introduction of research and access to the Learning Learning Registry on its platform. This new feature will make it easier for librarians and teachers to work together to find and use OER in basic education (K-12).

Currently, 17 States, 56 Districts and 11 Ambassador Districts have joined the campaign and are implementing strategies, fostering communities of practice, creating repositories and training of teachers.

#GoOpen States[94] are committed to:

• Adopt/Implement a statewide technology strategy that includes the use of openly licensed resources as a central component.

• Develop and maintain a statewide repository solution for openly licensed resources.

• Develop the technical capability to publish OER to the Learning Registry.

• Participate in a community of practice with other #GoOpen states and districts to share learning resources and professional development resources.

• Create a webpage to share the commitment to #GoOpen and document the state's progress.

#GoOpen Districts[95] are committed to:

• Identify a district #GoOpen team who will work to develop a strategy for the implementation of openly-licensed educational materials.

• Commit to replace at least one textbook with openly-licensed educational materials in the next year.

• Document and share their implementation process.

#GoOpen Ambassador Districts will mentor new districts as they design and implement their strategy for transitioning to openly

93 https://www.follett.com/

94 http://tech.ed.gov/open-education/states/

95 http://tech.ed.gov/open-education/go-open-districts/

licensed educational resources, and also sharing the openly licensed materials they have created.

And finally, the Association for Supervision and Curriculum Development[96] (ASCD) will provide courses and webinars for school districts, with a commitment to help educators transition to OER.

The #GoOpen campaign stands out as a landmark policy to incentivize the adoption and creation of OER, as well as and government use of open licenses. It also foments partnerships and new models for companies that develop solutions for education and technology.

NEW ZEALAND

The New Zealand government supports the adoption of OER and the use of open licensing via the New Zealand Government's Open Access and Licensing Framework[97]. The country is a world leader in adoption of OER from basic education to university. With the adoption of these practices, the government hopes that people can reuse open resources for economic, creative or cultural purposes, so long as it can be done legally. Open access policies and licenses increase democratic participation in the formation of public policies. They also allow the public to build businesses around content and use data in innovative ways. New businesses and services can thrive when these materials are made available for reuse.

AUSTRALIA

AusGOAL[98] (Australian Governments Open Access and Licensing Framework) provides support and guidance to government and related sectors to facilitate open access to publicly funded information. AusGOAL makes it possible for organisations to manage their risks when publishing information and data in a way that drives innovation and entrepreneurial activities; providing enhanced economic and social benefits to the wider community.

96 http://www.ascd.org/

97 ict.govt.nz/guidance-and-resources/information-and-data/nzgoal

98 http://www.ausgoal.gov.au/

PORTUGAL

In the only European country which also has the Portuguese as official language, the Ministry of Education supports and develops initiatives to encourage Open Education and free sharing of resources, even though some of them have licenses that are more restrictive. GeoRede[99], eduScratch[100] and Banco de Itens[101] stand out as examples. Another important topic in the country is the movement for open access to research, which strengthens the partnership between government and some universities.

UNITED KINGDOM

The United Kingdom funded an OER program from 2009 to 2013, led by the Joint Information Systems Committee[102] and the Higher Education Academy[103]. Pilot projects were created and a survey on the use of OER was conducted. Currently, the Open University[104] occupies a prominent place towards the creation and use of OER.

SOUTH AFRICA

OER África[105] is a pioneering initiative established by the South African Institute for Distance Education (SAIDE). The initiative plays a dominant role in supporting higher education institutions across Africa in the development and use of OER to improve teaching and learning.

CANADA

British Columbia is the first Canadian province to announce support for the creation of open textbooks, initially focusing on the 40 most popular courses in the public higher education system. The B.C. Open Textbook Project[106] offers open textbooks that are free online or low-cost in print to around 200,000 students. BCcampus[107] is charged with engaging faculty, institutions and publishers to implement the Open Textbook Project through a request for proposal process. The

99 http://geored.dgidc.min-edu.pt/
100 http://www.dge.mec.pt/eduscratch
101 http://bi.gave.min-edu.pt/bi/
102 https://www.jisc.ac.uk/
103 https://www.international.heacademy.ac.uk/
104 http://www.open.ac.uk/about/open-educational-resources
105 http://www.oerafrica.org/
106 https://bccampus.ca/open-textbook-project/
107 http://www.bccampus.ca/

textbooks produced are made available in the BCOpenEd[108] repository under a CCBY license, and the impact has the potential to spread far beyond North America, since the books can be reused and adapted by educators from around the world.

EUROPEAN UNION

The European Commission has outlined measures[109] to improve access to scientific research literature produced in Europe. Broader and more rapid access to scientific articles and data makes it easier for researchers and businesses to take advantage of new discoveries from publicly funded research. This will boost the European capacity of innovation, and enable citizens faster access to the benefits of scientific discoveries. This way, Europe will get a better return for its annual investment of 87 billion euros in research and development.

As a first step, the Commission will open up access to scientific publications to the public as a general requirement of Horizon 2020, the EU program on research and innovation for the period 2014-2020. Since 2014, all articles produced with Horizon 2020 funding to be made available to the public in one of the following ways:

• articles can be published in an open access journal or a subscription journal that makes the article available immediately online, with the possibility of reimbursement of the initial costs of publication by the European Commission; or
• researchers can deposit their articles in an open access repository no later than six months after publication (12 months for articles in the fields of social sciences and humanities).

The Commission also recommended that Member States adopt a similar approach to the research publications funded through their own national programs. The aim is to ensure that by 2016, 60% of the research articles funded by public investment in Europe are open access.

108 https://open.bccampus.ca/

109 http://europa.eu/rapid/press-release_IP-12-790_pt.htm?locale=en

3.2 BRAZILIAN INITIATIVES IN THE PUBLIC SPHERE AND CIVIL SOCIETY

In Brazil, there are already education policy projects that contribute to the advancement of OER, although they still do not guarantee the continuation of Open Education if managers or priorities change. Likewise, civil society organizations and Brazilian public universities have sought to implement efforts in the area.

PUBLIC UNIVERSITIES

REA Paraná. The Paranaense Open Educational Practices and Resources Program (OER PARANÁ) is the first institutional OER policy at a Brazilian university. The objective of the project is to disseminate the Open Educational Practices (OEP) and encourage the production of Open Educational Resources (OER) in Paraná. Recently the program has announced its expansion to new institutions, such as the Federal Institute of Paraná, State University of Ponta Grossa, State University of Maringá, State University of Londrina and University of Latin American Integration.
http://reaparana.com.br

UFRGS. The Department of Educational Psychology in the College of Education held the first Brazilian effort to map more than 300 free software programs and mobile apps for education, with attention to the different disciplines and areas of knowledge.
http://migre.me/vpG8e

UNESCO Cathedra of Open Education. Launched in November 2014 at UNICAMP, Cathedra is focused on developing projects, research and training on Open Education and OER, particularly around basic education and teacher training, along with maintaining an academic reference website in this area.
http://www.educacaoaberta.org

Ciensação. Established in 2015 with the support of UNESCO Brazil, this platform promotes a culture of practical experiments

in Brazilian public schools. Through “hands-on” activities, students reinforce skills, essential competences and experience a fascination with scientific research. The platform is open for anyone to submit experiments, which are published after being reviewed by editors and translated into Portuguese, Spanish and English. Currently, more than 100 experiments have been published where teachers throughout Latin America can benefit from this work.
https://www.ciensacao.org/

GOVERNMENT

Ambiente Educacional Web. A pedagogical multidisciplinary space where students and teachers can access, share and build knowledge by means of new ICTs. The repository has a collection of digital resources produced through structural projects of the State Department of Education of Bahia and the Anísio Teixeira Institute.
http://ambiente.educacao.ba.gov.br

Rede Aprender. Social network for the Federal District public school system, where they share projects, opinions, photos, texts, graphics and educational material in general, as well as information about events, debates and other activities conducted in schools or by the Federal District Secretary of Education. The platform was developed using free software, and the entire content of the network is openly licensed.
http://aprender.se.df.gov.br

Educação Financeira na Escola Program. Coordinated by AEF-Brazil, this program is part of the National Strategy for Financial Education. Its objective is to help develop a culture of planning, prevention, saving, investment and consumer awareness. The open virtual platform offers detailed materials and all content can be downloaded free of charge. http://www.edufinanceiranaescola.gov.br

Educopedia. Online collaborative platform for digital lessons. The activities include videos, animations, images, texts, podcasts, mini-tests and games, all of which follow a predefined

methodology based on metacognition theory. Classes are created and revised by teachers in Rio de Janeiro public schools. http://www.educopedia.com.br/

Folhas. Pioneering project for continuing education for teachers implemented by the Secretary of Education of the State of Paraná between 2003 and 2010. It included the production of educational resources by teachers from the public school system. One of the results of the Folhas Project was the Livro Didático Público (Public School Book), geared toward high school students. All books have a public license for use. http://www.diaadiaeducacao.pr.gov.br/portals/folhas/frm_buscaFolhas.php

Capes Recursos Educacionais Abertos Course. Partnership signed between the CAPES, UNESCO Cathedra in Open Education (UNICAMP), Paranaense Open Educational Practices and Resources Program (UFPR) and Educadigital Institute to prepare a course on Open Educational Resources (OER) and Open Educational Practices (OEP) aiming at free, open, online education that meets the needs of the Open University of Brazil (UAB).

Unasus. The Open University System of Public Health System was created to meet the training and continuing education needs of health professionals who work at SUS. The System consists of a collaborative network of higher education institutions, the Collection of Educational Resources in Health and the Arouca Platform. The Collection of Educational Resources in Health offers videos, texts, images, among other content, to meet the training and capacity building needs of these workers, and has an open access policy, so that anyone can read, download, copy, distribute, print, search or reference for free. http://www.unasus.gov.br/

FioCruz. Linked to the Ministry of Health, the Oswaldo Cruz Foundation aims to promote health and social development, generating and disseminating scientific and technological knowledge, as an agent of citizenship. The institution adopted an

open policy out of its strong commitment to the democratization of knowledge and access to scientific information. Its Institutional Repository (Arca) is the main instrument for implementing this policy, and serves to gather, host, preserve, make available, and give visibility to the institution's scientific outputs.
http://portal.fiocruz.br/pt-br/acessoaberto

CIVIL SOCIETY

In Brazil, the initiatives that emerge from foundations and private institutes, NGOs, and startups are still not fully aligned with the logic of promoting authorship and open sharing on the web. Despite frequently talking about collaborative philosophy, in practice, few projects and initiatives can in fact be considered open. The reason for this is not clear.
A survey[110] conducted in 2014 by the Wikimedia Foundation and Educational Action fouond that social institutions have considerable difficulty expressing their intent to make their copyrighted material more flexible, coupled with a lack of sufficient knowledge about licensing, and perhaps a preference for offering ready-to-use products.

Edukatu. Learning network that aims to promote the exchange of knowledge and practices about conscious consumption among teachers and students throughout Brazil. The participants undertake activities through learning circuits. This guided navigation is an innovative experiment that leads users to solve research and study challenges; to make comments and discuss with peers; to share creations about the topic; to promote practical interventions in their communities. The platform uses a Creative Commons license that allows use, distribution, remix, revision and adaptation for noncommercial purposes, on the condition that derivatives are licensed the same way.
http://edukatu.org.br/

Faz sentido. Platform that aims to support education networks,

110 http://www.acaoeducativa.org/images/stories/pdfs/EmQuestao11_*site*.pdf

schools and teachers to better connect basic education more with the characteristics, context, needs and interests of adolescents in the 21st century. It offers concrete proposals (available under CC licenses) to connect education to the specificities of adolescence, organized into eight themes: *Adolescence, Curriculum, Pedagogical Practices, Management, Teacher Training, Family and Community, Assessment and Environment of the School.*
http://fazsentido.org.br/sobre-o-projeto/

Escola Digital. Platform for searching for free digital learning resources available on the internet. The tool offers various search filters, among them the option to search by license, so that users can identify content they can use and share openly. The platform works only as an index, and the metadata has CC licenses. It enables municipal departments of education to create custom search pages.
http://escoladigital.org.br/

Escolas particulares. TPrivate Schools also begin to create their own OER platforms, which enhances collaboration by stimulating creation and sharing of materials produced by teachers and students. In São Paulo, the first initiatives emerged in the Dante Alighieri, Porto Seguro and Centro Educacional Pioneiro Schools, which offer digital resources created by their respective academic communities under flexible CC licenses.
https://www2.colegiodante.com.br/rea/
http://oec.portoseguro.org.br/
http://www.pioneiro.com.br/pioneirodigital/

4. OPEN BUSINESS MODELS

One of the necessary conditions to think right is
not to be too certain of our certainties
Paulo Freire

Katja Mayer[111] is a researcher in Science, Technology and Society at the University of Vienna and fellow of the Institute for Open Leadership[112]. She is developing a survey about best practices for the creation of common goods, beyond the basic concept of open innovation. Her focus is analyzing how these practices also generate new markets and new opportunities. Mayer wants to launch a platform with basic information about projects that expand our understanding of what is possible in support of open innovation, in addition to a database in which these best practices will be stored. This will create an overview of the ecosystem of open innovation today for politicians, managers and scientists.

Mayer wants to show the multiple dimensions of the open movement, considering the various areas represented in the graphic below (Figure 8):

Figure 8.
Dimensions of the open movement.

https://creativecommons.org/2016/06/21/open-innovation-creation-commons/ CC-BY

111 https://creativecommons.org/2016/06/21/open-innovation-creation-commons/
112 https://openpolicynetwork.org/iol/

Creative Commons, Inc. is a NGO created in 2001 by then MIT professor Lawrence Lessig[113] and his team to give the world a new model for managing copyright. It is now present in more than 80 countries through a network of affiliates[114]. The organization's most recent project involved a 2015 crowdfunding campaign on Kickstarter[115] to produce a book about business models that use open practices and CC licenses. The publication is scheduled for 2017.

A series of articles providing a preview of the book, *Made with Creative Commons*: *a book on open business models*[116], have been published on Medium. Paul Stacey, project director, affirms that there is no single business model, but a variety that differ between sectors. In the clear majority of the projects we reviewed, the process of building the model has been experimental, emergent and organic, instead of carefully plotted and planned.

Open business models, according to Stacey, are not always suited for those who are solely focused on generating revenue and getting rich. "If this is your only interest, an open business model may not be right for you", he observes in an article. Open business models are multi-faceted, involving other objectives besides money. A tool commonly used by startups to craft their business plans, Canvas, was also developed through an open process over 9 years, involving 470 co-authors from 45 countries. It was presented in the Business Model Generation[117] manual and licensed under CC BY-SA, allowing numerous adaptations since then.

We list below some examples inspired in the concept of open innovation across different sectors. It is worth noting that many of them appear as a way to adapt to new legal requirements. Only a few of them are born from a disruptive design in the mode of operation.

113 http://hls.harvard.edu/faculty/directory/10519/Lessig

114 http://www.slideshare.net/cgreen/goopen-with-creative-commons?next_slideshow=1

115 http://migre.me/vFYjg

116 https://medium.com/made-with-creative-commons

117 http://www.businessmodelgeneration.com/book

Health

The Human Genome Project[118] was the first experience of intense international scientific collaboration. The project's objective was to sequence human DNA, in order to map all the genes that constitute the core of the human cell. This knowledge has opened the way for new treatments for incurable diseases. The Genome Project lasted from 1990 to 2003 and included the participation of research centers around the world. It was funded by public resources from the U.S. Government, and during the Administration of the President Bill Clinton, it was determined that the human genome could not be patented. The full results[119] are available online.

At the same time, parallel to the official project, the Celera Genomics[120] company also conducted a similar effort aiming to patent the human genome, once sequenced. When the government determined the ethical implications would make it impossible to register this patent, the company decided to provide their data for free, but began to sell a service around interpreting it. Out of this, the possibility of new business model for the area was born.

Music

One of the first sectors to face the changes caused by the expansion of digital culture was the music market[121]. People began to see and use the physical recording device, such as a CD, as separate from the music itself. The ability to access music directly over the internet, without the need for a CD, revealed that the most important thing is the content and not the container. In 1999, Napster arose, the first platform to allow users to download music for free and share their collections on the web. Two years later, with 8 million users, Napster[122] closed in response to legal action by record companies. Sometime later, however, realizing that practice was in fact a phenomenon of digital culture, the music industry reinvented itself. Services that could stream music over the web emerged and became increasingly popular,

118 http://migre.me/vFYnY
119 http://www.ncbi.nlm.nih.gov/Genbank/GenbankOverview.html
120 https://en.wikipedia.org/wiki/Celera_Corporation
121 https://rccs.revues.org/6296
122 http://migre.me/vFYwh

and created opportunities for several companies including Napster, which returned to the market. Many of these servies can be accessed for free, in exchange for advertising or a signature. For example, Spotify[123] the market leader, already has 30 million paying users.

In Brazil, many artists are experimenting with new formats to adapt to the current market while generating revenue from their works. The Magic Theater[124], group, created in 2003, operates without a record company or advertising, using just the internet to record and disseminate of songs. They make their songs available to download[125] and use free of charge, to further spread the reach of their work. Furthermore, the group encourages co-creation with the internet community, which can be involved from the composition of a song to the recording of shows made available on the site. Even though the public has access to all of the songs, the live shows still sell out. Criolo, Pato Fu and Gabi Amarantos also make available songs on the web.

Entrepreneurship

Created in 2010, the company Catarse opened the crowdfunding market in Brazil. Founded by a group of friends around 25 years old, it is still the benchmark in the sector, in terms of funding raised (more than R$ 20 million[126] invested in published projects) and in their business model, since all of the platform code is open and available to anyone who wants to use and create other similar platforms[127].

Red Hat is an American company famous for its pioneering business model to provide enterprise solutions built on open source software. It distributes a version of the open source operating system Linux, called Red Hat Linux, and has today one of the largest incomes in the world using only Linux technology.

The Brazilian architect Denis Fuzii, owner of Studio Dlux[128], is one of the pioneers of Open Design in Brazil. Three years ago, he created a

123 http://migre.me/vqCji
124 http://oteatromagico.mus.br/2016/
125 https://www.palcomp3.com/oteatromagico/musicas.htm
126 http://projetodraft.com/catarse/
127 See the interview with Diego, founder of Catarse, on the site of the study.
128 http://www.studiodlux.com.br/

design of a chair made of cardboard boxes and distributed it on social networks. The idea was that the customer could customize the chair at an affordable price, opting, for example, for a padded seat or even the seatback, among other details. Open to collaboration, Studio Dlux wants people to share their own customizations and contribute with suggestions and ideas for the project. To make the initiative a reality accessible to all users, the project experimented with a new business model, being made available with a free Creative Commons License. Denis boasted a network of designers, producers and consumers in which anyone can download and adapt the furniture design. The studio also uses digital files to reduce the cost of production. With headquarters in São Paulo, Dlux sends the designs electronically to clients in other cities, where local producers can build the furniture.

The Garoa Hacker Clube[129], founded in 2009, was one of the first hackerspaces of Brazil. Located in São Paulo, it offers space and infrastructure to technology enthusiasts to carry out projects in various areas, such as security, hardware, electronics, robotics, space modeling, software, biology, music, visual arts or whatever else creativity allows. Their intention is to be a community laboratory that fosters the exchange of knowledge and experiences, and a site where users can meet, socialize, share and collaborate.

4.1 OPEN BUSINESS IN EDUCATION: PERSPECTIVES

In order to also present possibilities for open business models for the field of education, we conducted a survey of some of the existing experiences in Brazil and in the world.

What we found is that there are four models that commonly recur in the field of education: private sponsorship; public investment in purchasing and/or acquisition; encouraging community-driven creation and use, which leads to a network of sharing and exchange around a service; and, finally, the provision of value-added services, which has proved strongest in terms of sustainability.

129 https://garoa.net.br/wiki/Garoa_Hacker_Clube:Sobre

Each of the following examples are different in terms of design, implementation and use of Creative Commons licenses. The diversity of possibilities seems to act as an opportunity for those who are interested in open business models. However, it is crucial to consider specific challenges of implementation, maintenance, sustainability and evaluation of results, as we shall see in chapter 5.

EXAMPLES OF FOREIGN MODELS

Siyavula

http://www.siyavula.com/work-oer.html

Based in South Africa, Siyavula is a publishing company launched in 2008 with the objective of providing open curriculular resources to teachers across many subjects, topics and areas of learning. Its products include a comprehensive set of books and teacher guides in English and African languages. The project aims to facilitate the involvement of teachers, providing workshops for professional development and social networking tools.

Financing. Purchases by the Department of Education of South Africa, sponsorship by companies and private foundations, and fees in exchange for learning management services.

Alison

https://pt.alison.com/

Founded in 2007, ALISON is one of the first MOOC providers created in the world, with more than 300 free online courses. With an audience of more than 1.5 million low-income students worldwide, especially in developing countries, it has already issued 250,000 certificates. Created by the Irish entrepreneur and Ashoka[130], fellow Mike Feerick, who has a background of working with startups, ALISON offers a large set of courses specially created from available OER content, which are reviewed and adapted by a team of curators.

Financing. Advertising, and fees for printed certifications and services. Companies can instantly assess the skill level of future employees

130 https://www.ashoka.org/fellow/michael-feerick

through tests offered by the platform or order courses. The biggest user is the Department of Labor of the United States, which offers an online free training to unemployed workers.

Udacity
https://br.udacity.com/
Startup founded by Sebastian Thrun at Stanford University to offer online courses on technology and programming in the "micro-credential" format. Some are free, but all contents are at least licensed under CC BY-NC-ND, allowing users to retain, copy, and distribute for non-commercial purposes. More than 160,000 students from 190 countries have signed up individually.
Financing. Courses are offered directly to the user, and in partnership with major IT companies as Google, Facebook, Twitter, Autodesk, etc. For companies, it also offers coaching on demand for future workers.

Teachers pay teachers
https://www.teacherspayteachers.com/
Online market founded in 2006 by Paul Edelman, a former public school teacher. Through the platform, teachers sell their original lessons plans and other contents to other teachers, and may also share them free of charge. In March 2014, the website attracted more than three million registered users and 900,000 original teaching resources. Many teachers are generating supplemental income on the website. It is up to the seller to decide what type of CC license to be associated with his/her learning content, if any.
Financing. The website was acquired by Scholastic Inc., a commercial publisher, months after its launch. In March 2009, the founder Edelman[131] repurchased the website and keeps it as a private business, offering direct marketing services for a fee.

Do It Yourself
https://diy.org/about
Iniciativa da DIY Co, startup criada por Zach Klein[132], cofounder of Vimeo. It is a free social network for children up to 13 years focused on generating abilities associated with maker culture. Participants

131 https://www.edsurge.com/news/2013-06-05-teacherspayteachers-gets-new-ceo
132 http://migre.me/vFYwJ

learn from each other how to create various projects, and can share their productions. Each participant can create an individual portfolio and choose mentors; and all user-created works are under a Creative Commons Attribution Share Alike license (CC BY-SA).
Financing. Philanthropy of the founder and selling products such as t-shirts, bags, embroidery and miscellaneous items.

Lumen Learning
http://lumenlearning.com/
Company created by the researcher David Wiley, one of the most renowned experts in Open Educational Resources. One of the company's main services is Candela, which offers a series of expertly-created online courses at an extremely low cost, and open textbooks that can be used in place of traditional textbooks in higher education courses. Designed using OER, the courses can be accessed for free in the Candela environment. The idea is to eliminate the barrier between students and their assigned materials.
Financing. Service fee of $10 per student enrolled in a course, which covers the cost of integrating courses into learning management systems, as well as technical support to students and teachers.

My open Math
https://www.myopenmath.com
Open source platform that provides free hosted use of the IMathAS platform in support of free, open textbooks. The intent is to provide classroom use of the platform, without any required cost to students, for schools wanting a managed install of the IMathAS platform, and to provide students self-study opportunities. MyOpenMath was developed by David Lippman, a community college mathematics professor in Washington state, with his own resources.
Financing. In 2011, Lippman joined Lumen Learning to maintain a free and open version of MyOpenMath without ads. It also implemented a "freemium" model, in which the base service remains free, but access is paid for additional services, which include instructor support, content support, and administrative services.

Open Data Institute
http://opendata.institute/
Independent non-profit organization based in London co-founded

by Tim Berners-Lee, creator of the WWW, which brings together members of various sectors of society, government, and incubated startups. Connects, equips and inspires people around the world to innovate with open data, i.e. information that anyone can access, use, interpret or share. When large companies or governments release de-personalized data, it can empower small businesses, citizens and researchers to develop resources that generate crucial improvements to their communities. The data are usually provided openly through a CC license or dedication.
Financing. Conducts research and provides support for the adoption of business models based on the development and implementation of open standards, licensing, tools and technology for data processing, and techniques to meet these needs.

Fig Share
https://figshare.com
Repository for academics and other users to make their research outputs available in a citable, shareable and discoverable manner. The service is free of charge for uploading, storing and sharing of academic research under a CC BY license, and data under a CC0 license.
Financing. Offers paid services and customizations for publishers and institutions, which can obtain their own repository branded with their visual identity. Extra features include reporting and data management (public or private storage), data dissemination, and user group management.

Open Stax College
https://openstaxcollege.org/books
Nonprofit organization headquartered at Rice University, in the USA, which aims to improve access to education for students. It published its first open textbook in 2012, and currently has a collection of more than 25 books for university and Advanced Placement courses. It also uses adaptive learning technology, focusing on the improvement of learning outcomes through customized educational pathways, tested in university courses across the country. Provides high quality, peer-reviewed open textbooks for university courses under a CC BY license.
Financing. OpenStax provides online work tools that complement their free open textbooks for a fee. It has a partnership with companies and private foundations for philanthropic sponsorship, as Laura and John

Arnold Foundation, the Bill & Melinda Gates Foundation, Hewlett Foundation, Calvin K. Kazanjian Economics Foundation, Maxfield Foundation, among others.

OER Commons
https://www.oercommons.org/
Repository with about 50,000 digital objects, websites, lesson plans, simulations and other materials that are OER, maintained by the Institute for the Study of Knowledge Management in Education (ISKME), a non-governmental organization founded by Lisa Petrides in the early 2000s. The materials are available online under open licenses, and some are produced by educators through professional development workshops offered by the organization.
Financing. Sponsored by the Hewlett and Ford foundations, and also offers courses, workshops in open education and Design Thinking for schools, businesses and institutions.

Curriki
http://www.curriki.org/
Named for the combination of "curriculum" and "wiki," Curriki is a nonprofit global community organization that offers free learning resources focused on basic education for teachers, students and parents, as well as space for creation and collaborative development of resources. Curriki resources cover a wide range of subjects in the arts and sciences and offer more than 55,000 OER. The 400,000 members represent approximately 200 countries.
Financing. It has philanthropic sponsorship of companies like Oracle, AT&T and Chevron, and offers customized services for schools.

Shadow a student
http://schoolretool.org/
Professional development fellowship program that helps school leaders to redesign their school culture, using small experiments built on practices ("hacks") based on research that leads to a deeper learning, preparing students for life in the real world.
Financing. Partnership between CityBridge Foundation, the D School of Stanford and IDEO.

EXAMPLES OF BRAZILIAN MODELS

Design Thinking for Educators
www.dtparaeducadores.org.br
Initiative of the Educadigital Institute, civil society organization involved in the OER movement. Offers free-to-download material translated and adapted from original IDEO resources, which are available under a CC BY-NC SA license.
Financing. Paid services for the training of educators and students for the use of the approach, offered directly or via institutions, schools and universities. It also offers facilitation of co-created processes for the design and development of educational projects.

Olabi Maker Space
http://olabi.co/
Social enterprise focused on encouraging the learning of new technologies. Maintains a makerspace, a space for experimentation, in which people share tools, equipment and knowledge. Encourages the development of projects and prototypes with open licenses (free hardware) from the possibilities that digital fabrication, sensors and microcontrollers bring to the resolution of (old and new) local (and global) problems.
Financing. Offers consultancy, events and associated services.

Atina Educação
http://www.atinaedu.com.br/sobre-nos
A company that produces and sells educational materials tailored to cities and states, depending on physical, economic and social characteristics of each region. In addition to printed books, it offers direct training for educators to create methodologies for the use of materials, and produces content (lesson plans) that will be sold to departments of education. It offers online lesson plans authored by licensed teachers under a Creative Commons license.
Financing. Direct sales to departments of education.

Perestroika
http://www.perestroika.com.br/experiencelearning/
One of the most known Brazilian companies for its courses and disruptive methodology. Perestroika published a work about its

methodology under CC license. Its objective is to share the knowledge acquired through research on innovative forms of learning in institutions around the world.
Financiamento. Self-financed, aiming at the dissemination of its course services.

FGV *Online*
http://www5.fgv.br/fgv*online*/Cursos/Gratuitos/
The Fundação Getulio Vargas (Getulio Vargas Foundation), a traditional university of administration and law, is the first Brazilian institution to be a member of the Open Education Consortium (OEC), a consortium of educational institutions from various countries that provide free, online educational resources and courses. A member since July 2008, the FGV Online won the category of most innovative and cutting edge programs in the 2011 OCW People's Choice Awards, which recognizes the best initiatives within the consortium.
Financing. Self-financed, as part of its communication and social responsibility strategies.

Lernanto
http://www.lernanto.com/
Initiative that aims to provide a proprietary tool for the development of courses for educators interested in sharing content openly under a CC license.
Financing. It is still in the implementation phase. The intention is to offer a range of attractive services to both those who offer courses and those who participate, to compete with free software platforms such as Moodle.

Aprendizagem Aberta
http://www.aprendizagemaberta.com.br/
Virtual learning environment meaning "Open Learning" that allows access, authorship, sharing, remixing of educational resources, preferably under CC licenses.
Financing. Still in the implementation phase, the environment has both free and paid versions, and will offer customization services, group management, creation of interactive activities, interaction with other schools, evaluation activities with automatic correction and generation of performance reports, which all can be used for guiding

the educational process individually or collectively.

Analyzing the previous examples, we note the existence of many hybrid models, which combine non-profit services with for-profit ones, which seems to us a quite promising path. Or, to put it another way, the provision of services, products and content available under open licensing is supported by selling other services or products.

The structure of the funding model is essential for anyone who wants to create a product or service based on the principle of Open Education and OER. It is possible to start with self-financing or donations, and seek sustainability step by step through the creation of aggregator services, as often happens in the field of social enterprieses via angel investors or accelerators, as we shall see in chapter 5.

According to the report "Open Educational Resources: A Catalyst for Innovation"[133], published by OECD 2015, it is necessary to encourage the emergence of new models in which OER can be considered alongside more restrictive options. Investment funds can open calls and stimulate the emergence of new ideas around this theme.

David Wiley, researcher and one of the leading experts in open business models for education, states in an article[134] on this theme that we are seeing the emergence of a new type of organization, which is neither focused on preserving existing business models nor burdened with the enormous content creation, distribution and marketing infrastructures that a big publisher must bear. "The new breed of organization is only too happy to take the role of IBM or Red Hat and provide all the services necessary to make OER a viable alternative to commercial offerings," he says.

133 http://migre.me/vFYxG

134 http://opencontent.org/blog/archives/3462

5. CHANGES NEEDED TO EDUCATIONAL ENTERPRISES GUIDED BY OPEN INNOVATION

"Each time someone shows us something ancient in any kind of innovation we are appeased"
Nietzsche

Education is one of the most complex and debated themes today. Not only for its relevance as a human right, but also and - in particular - because it is a key factor toward the development of a country. The OECD report released in 2016 named "Low-performing Students: Why Fall Behind and How to help them?"[135], points out that Brazil is among the countries where students have the lowest academic performance, out of the 64 countries analyzed.

The Report on the Human Capital[136], published by the World Economic Forum in 2016, puts Brazil at 83rd out of 130 countries analyzed in terms of the ability to prepare people to generate economic value. The study systematizes indicators such as education, training and employment in five different age groups to generate the Human Capital Index, created in 2013. Brazil was also below the average in Latin America, and the number of unprepared people when leaving school was the most sensitive point. The report draws attention to the need for education systems today to go beyond cognitive skills, including the development of non-cognitive qualities such as collaboration, innovation, autonomy and problem solving.

In the face of the low rates in the world rankings and the constant transformation in society driven by technological developments, Brazilian education has been gaining increasing attention by the actors responsible for financing the sector: government, private corporations, impact investors, foundations and corporate institutions.

135 http://www.oecd.org/edu/low-performing-students-9789264250246-en.htm
136 https://www.weforum.org/reports/the-human-capital-report-2016/

5.1 FINANCIAMENTO DO SETOR

According to the 2015 School Census[137], Brazil has 38,682,720 student enrollments, covering nursery, pre-school, primary and secondary education, youth and adult education, and special education. The investment[138] of public resources in the educational sector comprises both the gross financial amounts given by the public sector to meet educational demands and the cost of goods and services, including the formulation of policy, maintenance and development of curriculum, expansion and improvement of schools, and various forms of student assistance programs, among others things.

In higher education, per data from the Census[139], oBrazil has 7.8 million student enrollments. Unlike basic education, higher education is dominated by private institutions[140], where growth was encouraged by the Law of Guidelines and Bases of 1996, to supply the demand for higher education courses unmet by public institutions. This is subsidized by the Student Financing Fund (FIES)[141], dof the Ministry of Education.

According to the 2015 OECD[142] study, Brazil had a proportionally higher growth in investment in public education among 30 countries analyzed. In 2012, 17.2% was earmarked for education, when in 2005 it was 13.3%. However, in the measure of cost per student, Brazil invested least among the others in the sampling. The Brazilian government is also the main buyer agent of educational material for basic education. As a matter of fact, the National Educational Book Program (PNLD)[143] of The Ministry of Education (MEC) invests R$ 1 billion yearly to provide printed books to more than 37 million students of 120,000 public schools in the country.

137 http://portal.inep.gov.br/c/journal/view_article_content?groupId=10157&articleId=164015&version=1.2
138 http://portal.inep.gov.br/indicadores-financeiros-educacionais
139 http://migre.me/vKmuz
140 http://convergenciacom.net/pdf/mapa-ensino-superior-brasil-2015.pdf
141 http://fiesselecao.mec.gov.br/
142 https://www.oecd.org/edu/EAG2014-Country-Note-Brazil.pdf
143 http://www.fnde.gov.br/programas/livro-didatico/livro-didatico-dados-estatisticos

A 2011 analysis[144] by the legislative advisory board of the Federal Senate shows that government programs for procuring educational books have enormous importance for the publishing market in Brazil, comprising about 54% of the national book industry. “Regarding the concentration of the market, it has been almost a monopsony on the demand side (in elementary school, for example, the State buys approximately 90% of the books published); on the supply side, it represents an oligopoly (a few publishers have been concentrating the largest volume of purchases over time)”, writes the author, Tatiana de Britto.

Even while receiving educational books from MEC, 339 Brazilian municipalities have adopted certified educational systems produced by private companies, most of which are already supplying books to the MEC. The conclusion is in the study[145] by Ação Educativa and of the Group for Studies and Research in Education Policies (GREPPE), which found that this investment will consume between 2% and 6% of the budget earmarked for education Entirely financed by the State or municipality that adopts these resources, funding is generally derived from programs that support the general maintenance and development of basic education and teacher professional development. These resources could be used in other ways to expansion of educational services or improve the quality of teaching, such as an increasing the pay and training of education professionals, installation of laboratories, and providing various equipment in schools.

Gustavo Paiva, co-author of the work, said in an interview to the newspaper Jornal da Unicamp[146] that “the advancement of private logic about the public sector affects the human right to education, tending to produce, in most cases, the increase of educational inequalities, with more loss to the population in vulnerable situations”. The new National Education Plan (PNE)[147], sanctioned in June of 2014, corroborates what Paiva warns about, since it provides for the formulation and revision of education plans by states and municipalities, based on broad

144 http://migre.me/vFYyU

145 http://www.observatoriodaeducacao.org.br/mapas/#/

146 https://www.fe.unicamp.br/lage/greppe/sistemas_privados.pt.pdf

147 http://www.deolhonosplanos.org.br/baixe-o-plano-nacional-de-educacao-aprovado-e-participe-da-construcao-dos-planos-municipais-e-estaduais-de-educacao/

participatory processes with the local community.

Another program of MEC, ProInfo (National Educational Technology Program) was established for the acquisition and distribution of educational technologies, especially equipment and infrastructure. In 2012 it transferred R$ 117 million[148] to states for the purchase of tablets for teachers. ProInfo teacher training, offered through an agreement with federal universities, has been shown little assertiveness in uptake or even adherence[149] by teachers.

A study conducted by InternetLab[150] for CIEB in 2015 punctuates the absence of a specific model for the acquisition of software or other digital technologies, adopting the same model applicable to basic inputs (electronic bidding). The lack of a defined objective for the acquisition of digital content also impacted the very traditional PNLD. In 2014, the public notice asked for the first time that publishers send a DVD containing complementary digital resources for the printed books. However, the digital resources were not purchased[151], causing a loss to the publishing companies which had invested in producing materials to answer the call.

SOCIAL INVESTMENT AND SOCIAL ENTERPRISES

Education has been a constant focus of private social investment. According to the 2014 GIFE Census[152], (Group of Institutions, Foundations and Companies), only 15% of their associate members said they were not active in the area of education. Most projects and programs developed by corporate foundations aim to influence public policies to ensure that the actions have continuity in the long term, regardless of the termination of funding, generating an impact on official indices of learning such as the IDEB. This, however, does not always happen, either by factors that involve creating technical dependency and/or maintenance, or by lack of public management

148 http://www.brasil.gov.br/educacao/2012/11/coordenadores-recebem-tablets-para-serem-usados-em-escolas
149 http://migre.me/vFYB8
150 http://www.internetlab.org.br/wp-content/uploads/2015/12/ILAB_CompraseInovacaoEduc_v6-1.pdf
151 http://migre.me/vFYCa
152 http://gife.org.br/20252/

in keeping the investments.

In addition to the social investment, as we saw in chapter 2, we observed a substantial growth of small businesses, the called edtech startups[153], aimed to create innovative solutions for the education sector using the potentiality of digital technology, and that seek to develop a social enterprise, i.e., combining social impact with financial return. Usually founded by young entrepreneurs, recent graduates, or migrants from traditional sectors of the economy, these companies are financed by impact investors - fund managers, banks, foundations and family businesses - which have education as one of their priorities, and which typically expect financial return[154] on their investment of between 10% and 35%.

Considering that the largest potential buyers of technology for education are governments (federal, state and municipal) and that there is no model with a clear purchasing objective or pro-innovation policies, we are faced with an uncertain and risky scenario. Some small startups can still be successful by selling to private education, but at the same time, they will be getting away from the desired mission of social impact. According to a study of the Dom Cabral Foundation[155], 25% of startups "die" within the first year of life, and 50% within four years.

The performance of private sectors in education, however, has been a focus of the UN Human Rights Council. In July 2016, by way of a resolution, it determined that member countries should recognize education as a right, prioritize investment in public education, and improve the regulation of private sector activities in education. The document[156] was signed by 21 civil society organizations, among them the Brazilian National Campaign for the Right to Education[157].

153 http://exame.abril.com.br/pme/o-que-e-uma-startup/

154 http://apreender.org.br/wp-content/uploads/2015/08/Mapa-do-setor-de-investimento-de-impacto-no-Brasil-ANDE.pdf

155 http://www.fdc.org.br/blogespacodialogo/Lists/Postagens/Post.aspx?ID=384

156 http://globalinitiative-escr.org/wp-content/uploads/2016/07/HRC-resolution-right-to-education-July-2016-final-esp.pdf

157 http://campanha.org.br/direitos-humanos/decisao-historica-da-onu-resgata-a-educacao-como-valor-humano/

If aligned to public policies that give autonomy to managers and teachers, the initiatives of the social sector or of social enterprises can bring satisfactory and innovative results. However, many educational products are being marketed for departments of education, which are associated with the strategies of mere instructional training. Programs, apps or platforms that impose a single form of use and do not allow adaptation because they are protected by copyright[158], reduce possibilities of methodological educational innovation by users, and often end up working as a simple replacement of analog devices by digital.

5.2 INNOVATION IN EDUCATION: RISK AND CONFIDENCE

The reality of Brazilian education, is still a distant horizon in terms of quality, and digital technology, viewed as isolated or restricted to equipment and devices, can offer little help. Even before entering the debate about the presence of technology in schools, it is essential to discuss how we provide higher quality education. Does it happen through goals? Does it happen through clear data, such as those established by the Index of Development of Basic Education - IDEB? It may even happen on its own. Undoubtedly, it happens through the student-teacher relationship in the classroom. It can also happen through established practices, accepted and validated by managers, by communities of parents, and by educators in general. And it is here, in this field full of opportunity for new processes and approaches, where open innovation in education can be incorporated.

The open movement is based on the principles growing out of networked society, such as sharing and collaboration, transparency and participation, recognition, and authorship.

Its focus is on the empowerment of diverse actors, with their skills and capacities to act collectively and inspire each other. As we have seen, an open ecosystem includes important elements, such as policies and use of open licenses, formats and standards, as well as more

158 https://pt.wikipedia.org/wiki/Direito_autoral

experimental strategies that may go beyond the traditional ones. In addition, open innovation has the potential to promote and shape the market, favoring the diversity and multiplicity of open business models, which can be designed and constantly adapted according to supply and demand. It´s about changing the mental model of the ready-made product prepared for a pre-determined use, to offer more opportunities for services and activities that have not been thought yet, which can be more flexible and customizable.

At first sight it seems complicated and sometimes unrealistic to disrupt market structures that are already established, as for example the public purchasing of content from publishers. At the same time, in this process of development and consolidation of the concept of open education, we have seen many companies raising awareness of the issue of innovation and of the opportunities brought by business models that can be profitable. We have seen with the #GoOpen campaign that various companies, which until recently might have been considered as blocks of resistance to the experiment such as Microsoft or Amazon, are interested in taking part in the initiative, understanding the importance of the theme in the public sphere.

No less challenging than opening the debate with the market, in the academic space, public universities were for a long time kept apart from the responsibility to create mechanisms for reviewing and updating their processes. Many lawyers specialized in intellectual property end up saying “no” because they fear the risk, and prefer to remain within the limits of their comfort zone, even if it is uncomfortable. “If we just consider the risk, we will not be able to innovate. The challenge is to think of the opening up of content as something positive and not restrictive. It is a turning point in how to think intellectual property”, says the lawyer specialized in intellectual property, Carolina Rossini, in an interview for this study.

PUBLIC POLICY

In Brazil, the intense advocacy work carried out by the OER-Brazil Communitysince 2008 has increased the consciousness among many public officials that educational material purchased with public

money should be handed over to taxpayers in an open and free form. However, there is still the need for training of leaders in practices of openness and collaboration, which go beyond the traditional format of purchase-and-sale and create spaces for dialog and participation with companies and civil society alike. The collaborative work done by OGP-Brazil in April 2016, as noted in chapter 2, walked in that direction by bringing together various sectors of society into the discussion of stronger proposals on the use of public resources seeking for more open teaching and learning processes.

It is essential that the public power strive to create policies that incorporate technological possibilities that meet pedagogical objectives, and not only the need for automation, digitization or efficiency gains in day-to-day operations. The greater the freedom for collaborative networking practices, the greater the creative potential of people. Hence the emergence of advancements in models of creation, development and distribution of educational resources whose quality is developed and analyzed among peers, and no longer only centers on the nucleus of experts in companies and public universities. The Folhas project, in Parana, documented in chapter 3, is an example of how it´s possible to work in partnership to generate innovation in education, encouraging autonomy and motivating teachers.

The study by InternetLab mentioned in the beginning of this chapter recommends that, in cases where the government purchases digital resources, the structure of the National Educational Book Program (PNLD) should be considered as a model: after the registration of proponents and the presentation of their products, approval is given to the adoption of a range of hardware, software and systems to be acquired by the Administration, as needed. Such a procedure, as suggested by InternetLab, would generate a guide, that would catalog the characteristics of products, and also follow up information on the deployment and effective use of the products by educational institutions. Just like National Program of Textbook (PNLD), depending on the manifestation of schools regarding the products, the purchase is made by distributing the cost of purchases done from then on.

It should be noted, however, that the solution to use a mechanism like PNLD does nothing to make the necessary and relevant changes

towards a more open and transparent process. The study of InternetLab ponders that the simple use of a known model just ends up keeping the structural status quo centralized without encouraging the participation of a plurality of actors in the process. It is not enough to maintain the guarantee of quality by the same entities traditionally assigned to this function (in this case, the federal universities). It is necessary to contemplate the purchase of materials with open licenses, as well as encourage the participation of small businesses and other sectors of civil society.

As we saw in the example of the Human Genome Project, which opened up science and knowledge for the common good, public education urgently needs to understand that you can work together with sectors of the education market to co-create solutions that lead to knowledge practices that benefit to the public. There is an urgent effort to achieve synergy in traditional commercial and alternative markets, and support new participatory forms of production and dissemination of knowledge. Open innovation in education must be at the service of the common good, to be even more collaborative and productive in the future.

CIVIL SOCIETY PARTICIPATION IN BRAZIL

Many organizations of civil society in Brazil today are willing to collaborate to improve the quality of education, whether small NGOs or robust business institutes, and are also putting into practice strategies to promote solutions based on digital technology, such as, adaptive platforms, flipped classrom methods, games and digital objects. The offers are many and usually free of charge to educational systems, but without concern about licenses and freedom of use and adaptation. Even after 14 years since the official start of the global movement for open educational resources by UNESCO during a congress in 2002, the social initiative in Brazil, with rare exceptions, remains outside the subject. Open education is often confounded with free education, as if the mere provision of educational solutions without cost would be enough.

Making knowledge possible and accessible to all and opening paths to

more collaborative processes is one of the challenges of the Brazilian private social sector, especially regarding the support initiatives aimed at OER, as is the case in several business models presented in this study. Something that is presented as “free”, but which maintains the copyright or the “All Rights Reserved”, limits the creation and expansion of knowledge and stifles creativity. In other words, it goes against innovation in education, what is the objective of most active corporate foundations.

Private social initiatives could come closer to this debate and begin to incorporate into methodologies and action strategies the focus on the use, production and sharing of resources by teachers and students. Teacher training begins to establish itself as one of the priority guidelines in these institutions. In this sense, it is important to consider processes inspired by the model of open innovation, enabling co-creation, knowledge about open licenses, and the incentive to collaborate.

Organizations in various countries of the world, led by UNESCO, are already beginning to document benefits that OER can offer for educators, students and education. Conferences, seminars and meetings on the theme take place every year, for example:

EVENT	SITE	LOCAL
OpenEducation Conference	http://openedconference.org/2016/	USA and Canada
OER School Conference	http://www.digilitleic.com/?p=652	United Kingdom
Big Ideas Fest	http://www.bigideasfest.org/	USA
OpenEducation Global	http://conference.oeconsortium.org/2017/	Various countries
OpenEducation Week	https://www.openeducationweek.org/	online
OER Policy Forum	http://oerpolicy.eu/oer-policy-forum/	Europe
Hewlett Foudation OER Meeting	Não tem	USA
Online Educa Berlin (OEB)	http://www.online-educa.com/	Germany

In addition to the events in the area, there are organizations that have strong commitments to open education such as the Hewlett Foundation, the Open Society Foundations, Bill and Melinda Gates Foundation, among others, with vast experience in the topic, with results and uptake in their own headquarter countries, and that could be invited to discuss in other forums in the sector. A very appropriate point would also be to analyze the financing dynamics of these institutions, which are focused on philanthropy and are mostly independent of commercial business. In other words, these large companies do not link the name of their respective trademarks to social actions. On the contrary, they maintain institutional independence in their actions and strategies to be able to adapt to their respective realities in which an initiative is focused, in support of their sustainability.

The Hewlett Foundation is the private enterprise institution that has made the greatest investment in Open Education and Open Educational Resources across the world. The foundation's director of OER, TJ Bliss, said in an interview for this study that we still have a long way to go before the concept of "open innovation" can in fact reach the educational sector. "Perhaps an aspirational approach of 'open innovation' would be to structure our educational systems to be based on challenges in large and global scale. For example, we could invite students for one year of studying and dedication for solving together a specific problem. Of course, OER and the Open Education would have to be at the center of this type of educational system where 'open innovation' is the model and OER ought to be the content," he suggests.

5.3 SUSTAINABILITY OF THE MARKET

As we move forward in the discoveries and possibilities of the knowledge society and its constant transformations, many uncertainties arise regarding the need to seek new ways of acting, since it was old business models that allowed many companies to be successful for years on end.

In the book "Zero Marginal Cost Society", published in 2015, Jeremy Rifkin, an American economist, declares that we are facing a new

economic system. The sharing economy, based on a community of common goods will transform the way we organize economic life, allowing dramatic reductions in income inequality, democratizing the global economy, and creating a more environmentally sustainable society. For the author, the internet strengthens productivity to the point that the marginal cost of goods and services (cost of production of an additional unit if fixed costs are not considered) to be almost equal to zero, making them practically free of cost, abundant, and independent of market forces.

As we saw in the previous chapters, digital culture and the distributed network provided by the internet has favored the emergence of new models in various sectors of the economy. In education, which is a sector naturally marked by slower change, there are already some initiatives, either in terms of products and services offered, or in formats of operation and function. Therefore, it is up to the education market to reinvent itself, considering the changing scenario we are experiencing, to reflect the perception of value that it wants to create in its public so that it can maintain customer loyalty and a prospect of renewal and constant adaptation to generate sustainability.

Paul Stacey, from Creative Commons, Inc., in his investigation of business models that use open licenses, reached some assumptions:

- The commons has been increasingly enclosed and commoditized by government and market forces for decades.
- Technology and the Internet have generated a distributed and participatory means of production and can store and distribute goods at near zero cost.
- Zero marginal cost creates abundance (or the potential for abundance) which traditional market economics has no model for.
- The commons has new relevance, particularly the digital commons, and is re-emerging as an important alternate means of achieving social and economic aims.
- The commons is not just a place with content and resources but a social process, enabled by technology, that involves people participating, co-operating, sharing, and collaborating.
- The social process of commons practice is affecting all sectors of society including education, manufacturing, health, energy,

work, and even money itself.

For Stacey, this emergent "commons" does not mean that businesses or jobs will be eliminated, but he points out that business and work will be conducted differently. "Commons-based ways of working and doing business are being invented right now and must co-exist and sometimes compete with existing models," considers Stacey.

In the award-winning book "The Living Company: Growth, Learning and Longevity in Business", of Arie de Geus, 1999, the author provides a study of Fortune 500 companies, about the reasons for the radical decline of longevity of companies in the past decades, the average of which in that period was between 20 to 30 years of existence. After almost two decades, the four factors De Geus attributes to the more lasting companies in contrast to those that do not are still highly relevant:

1. Sensitivity to the environment. Represents the ability of the company to learn to adapt. The more lasting companies in the study could adapt to changes in the world around them. As the wars, depressions, technologies and policies have come and gone, they always stand out for remaining connected, in line with what was happening.

2. Cohesion and identity. This refers to the innate ability of a company to build a community and a persona for itself. In the organizations most resistant to time, there is an awareness of their identity. The feeling of belonging to an organization and identifying with a purpose creates a sense of community that is essential to long-term survival.

3. Tolerance and decentralization. Both are symptoms of ecological awareness of the company: its ability to establish constructive relationships with other entities, both internally and externally. Longer-living companies are open to movements and experiments that appear on the margin of their "core business" as the experiences and 'eccentricities' that are beyond their understanding. They recognize that new initiatives may be totally unrelated to the core business of the company and that the act of starting a new business does not need to be controlled centrally.

4. Conservative finance. The ability to manage growth and development effectively is a critical corporate attribute. Long-lasting companies do not risk their capital freely. They understand the meaning of money in an old fashion; this liquidity allows them to seize opportunities that their competitors cannot.

The work of De Geus corroborates the perception that open business models are in line with the evolution of society. In an open model, the organization is not only sensitive to the environment, but is permeated by it. Also, when this business model is aligned with a strong identity, a relevant purpose to society, it is recognized and able to strengthen a community that shares their values in any circumstance. An open model also presupposes decentralization and space for the emergence of innovation that comes from the margins. Finally, open models are characterized by the de-bureaucratization of structures and controls, which lead to more intelligent and sustainable investments.

It is notable that the education market has been seeking to develop technologies that can enhance the teaching and learning processes, as for example, the various platforms based on adaptation to the student profile. But still, they were drawn from the most traditional perspective, either in the construction by a select group of programmer specialists, as is the focus of seizure of curriculum materials, or in good performance on the official examinations as the National High School Exam (ENEM). As Paulo Blikstein, professor of Stanford University, emphasized in an interview[159] to Educação Magazine, if we really want to democratize education, we need to focus on technologies that contribute to the formation of teachers.

Values such as competition, property and exclusivity are still very present in most business enterprises in education. It is a centralized conception – from one to many – that no longer matches with our networked society.

159 http://www.revistaeducacao.com.br/plataformas-adaptativas-nao-vao-revolucionar-a-educacao-diz-professor-de-stanford/

5.4 RECOMMENDATIONS

FOR PUBLIC POLICIES

• Stimulate creativity and innovation through the promotion of open innovation, to ensure products and services financed with public resources are made available under open licensing;
• Review the current legislation governing procurement and public bids to contemplate varied possibilities for services, activities, and not only ready-made products that are previously prepared by companies and external agents to the schools;
• Consider knowledge of digital technologies as a focus of the curriculum,not just a peripheral topic, as some countries cited in this study do (Chile, Australia and United Kingdom), and also as Digital Intelligence skills, as recommended by the World Economic Forum;
• Create Strategies for the promotion of meetings and events for the exchange and cooperation between educators with skills and common interests, taking advantage of the potential of the internet to facilitate connections;
• Share products and processes, and consider public opinions and contributions in the formulation of new products and services;
• Act under the logic of openness and transparency. Incorporate the assumptions and the methodology of the Open Government Partnership (OGP) in formulating policies.

FOR INSTITUTIONS AND FOUNDATIONS

• Incorporate into their project strategies, programs and practical actions bottom-up co-creation of projects or even directly support entrepreneurial initiatives by schools or officials at departments of education, offering support from their own experience with internal procedures for the evaluation of process and results;
• Financially support new business models in education based on the concepts of OER and open innovation, which are based on value creation via collaboration.
• Perform actions that engage educators and managers to

become educational entrepreneurs, bringing them closer to the universe of innovation to which startups interested in offering educational services tend to have more access;
• Participate in open education events and strengthen relationships with organizations with experience working in the sector;
• Use open licenses and free software for content and projects that are offered at no cost to departments of education, encouraging not only their sustainability, but also the ease of adaptation and customization.

FOR THE EDUCATION MARKET

• Create possibilities and opportunities to receive external ideas from other companies (competitors or not), networks of entrepreneurs, government officials, universities and research centers. Use co-creative approaches such as Design Thinking;
• Encourage contributions from people from within the organization itself, creating a culture of innovation through sustainable and long-term processes, instead of only worrying about launching unique products;
• Develop an empathic view of the needs of users and choose tools that enable flexible adaptation and customization of products or services, especially those intended for public education;
• Attend the discussions and events of the Open Education and OER movements that occur in various locations around the world, and seek to understand new possibilities of action in this scenario;
• Integrate groups, networks and associations focused on the establishment of cross-sector partnerships aimed at the transformation of educational policies. Renewing and updating public policies for current needs is a fundamental action;
• Create prototypes of open innovation solutions for education and let some schools, departments and educators try them out. Take more risks instead of avoiding them;
• Seek areas in education less affected by technological solutions, such as the initial training of teachers. There is a gap always cited by specialists, such as Bernadette Gatti[160], in relation to higher education courses that study pedagogy in relation to the lack of training in pedagogy for future teachers.

160 http://migre.me/vrqHW

6. WEBSITE OF THE STUDY

For the first time in Brazil, this study aimed to analyze the relations of the model of open innovation with the concept of Open Education and Open Educational Resources (OER). Far from establishing a definitive conclusion, the objective is to point out ways we can advance the necessary innovation in education, considering the context of constant transformations in contemporary society.

Our intention is also to bring in new actors from the business sector in education, such as EdtechStartups, and also to engage actors from the traditional publishing market in the debate on the economy of the common good and the increasing need to view education and knowledge as a universal right.

A web page with a collection of materials that were used in this study can be used as a reference for further study and analysis on this subject. There is also a timeline on Open Education and the complete interview transcripts with Henry Chesbrough, creator of the concept of open innovation; TJ Bliss, director of OER in the Hewlett Foundation; and Diego Borin Reeberg, founder of Catarse, the first crowdfunding platform in Brazil. All of this material is available under a Creative Commons Attribution License.

Go to: www.educadigital.org.br/estudocieb

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