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An Initiative of the Brazilian
National Confederation of Industry - CNI

INTERNATIONAL OVERVIEW OF VOCATIONAL EDUCATION

Challenges and Replies

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SUMÁRIO

EXECUTIVE SUMMARY

1. **Organization of this essay:** This research aims to identify major problems and solutions, as well as outstanding issues in vocational education and training, in 23 countries selected from five continents, including Brazil. This study first presents a history of vocational education and describes three historical models created by the Industrial Revolution: a) the **Anglo-Saxon** model, a market-oriented model, initially performed through in-company apprenticeship, which was later associated with educational background b) the **French** model, a school-based model controlled by the government; and c) the **dual** model, initially characterized by in-company apprenticeship, socially controlled and established by Germany. As those types have become increasingly hybrid, this research study also reviews other types, culminating in a proposal that integrates the countries under focus. Subsequently, for each one of those countries that have been grouped according to the model adopted, this study addresses the organization and functioning of vocational education, highlighting major challenges and answers, including assessed innovations.

   After this analytical part, this research paper prepares a summary of the main aspects verified, of the status of such aspects, of the alternatives tested and of the relevant lessons. Consequently, this part is divided into transversal topics, starting with a summary of the most frequent challenges and answers. Afterwards, this research addresses vocational education management and reforms, curricula and methodologies, attractiveness of vocational education, qualification of educators, information and communication technologies, in-company apprenticeship and converging trends detected during the analysis, indicating the paths followed by vocational education and training around the world. This paper also summarizes challenges and answers, as well as the paths that have been outlined or explained.

2. **Frailty of elementary education:** Whether related to average school performance (mainly assessed by PISA), or to considerable performance differences, several countries face difficulties, use programs to recover and reduce the loss of students, and take other measures. This reflects in increased professionalization costs to bridge the gaps found in elementary education. Thus, these countries can frequently create an acceptable platform for vocational education characterized by general skills.

Please note that high national averages are necessary, but not sufficient: school achievement must be equitably distributed, assuring satisfactory performance, including by those students that are more likely to seek vocational education.

3. **Weak attractiveness of vocational education:** Vocational education must attract good students because of its historical origins and because of the stigma attached to it. Therefore, main solutions usually include increasing the quality of vocational education so that it is not considered a second-class alternative; planning curricula to facilitate educational continuity, and not to lead students to dead-end alleys; promoting, by means of work bounds, great economic and social rewards due to academic education; launching media campaigns on the press and vocational competitions.

4. **Gap between professional qualification and job requirements:** To provide students with education, several national systems give priority to school curriculum in detriment of in-company apprenticeship. To overcome this challenge, it is necessary to expand apprenticeship and internships, to establish rotation of experiences, and to create a continuous and dynamic connection between curricula, educators, methodologies, general resources and the labor world. Those are essential relations to leverage the rewards of vocational education. In addition, research studies on labor market perspectives and vocational mentoring throughout life are ways to enhance vocational education and, under certain aspects, reduce its costs.

5. **Lack of agreement among social partners:** Cooperation among social partners by means of consultations, plans and projects in common, and participation in boards is an essential factor for effective vocational education. It is not possible to avoid conflicts, but these partners must have mechanisms in force and must be interested in finding a systematic solution.

6. **Lack of transparency and understanding on opportunities for vocational preparedness and development:** Such opportunities must be organized, controlled (when in excess), and, above all, transparent for students, families, businessleaders and other players. Socially disadvantaged population groups face the greatest difficulties regarding information; therefore, vocational information followed by guidance is essential.

7. **Wide range of specific vocational skills, with limited capacity to transfer competencies:** Differently from traditional models, broader curricula are normally used, focusing on general competencies, thus limiting skills and reducing costs. This strategy gives emphasis to general education.

8. **More skills and professional updating are needed in order to respond to competitiveness challenges:** The economic dynamics of global competitiveness, fast knowledge changes, and workers with longer active lives require higher levels of educational background and qualification. For this reason, curricula must assure educational continuity. In addition to initial education, continuing education has become increasingly necessary.

9. **Development of teachers and tutors:** Educators working with academic and vocational education must comply with the same requirements and have the same rewards for high-quality and effective vocational education. Several educators seek pedagogical qualification and professional updating in workplace scenarios, which are addressed by several programs. These include costs that potentially increase both efficiency and effectiveness.

10. **Aging of the teaching staff:** Several countries with aging populations must increase the general attractiveness of the teaching profession and, more specifically, of vocational education. As already known, aging can lead to local and sector-wide shortage of workers. Consequently, program curricula and programs themselves have to be more flexible, agile and dynamic. The informal and non-formal branches of education must be tackled and discussed.

11. **Globalization turns the world into an interdependent and more competitive place:** Quality, efficiency, safety, and sustainable development standards are increasingly higher. Countries that choose to withdraw their economies and societies are making a suicidal move. Therefore, it is necessary to keep doors and windows permanently open to what is happening out there in the world.

12. **School and business growing demands:** In view of this scenario, there is increased demand; and setting up elite groups is no longer enough as it used to be. In order to avoid more severe damages, it is necessary to provide everyone with equal and quality education. As we are all on the same

boat, societies with high social exclusion rates will face the consequences, and the price is much higher than that of equitable quality education. School success continues to be on the spotlight. It is no use to be granted important and highly prestigious certificates and diplomas, what really matters is their intrinsic quality.

13. **Balance between general and specific competencies, between meeting immediate needs and transferring competencies, between schools and companies, between initial and continuing education throughout life:** Decision making about reforms, planning, financing and (internal and external) evaluation should be pursued by experienced people in order to guarantee reasonable balance over time and to avoid instabilities in different places and times.

14. **Flexibility and plasticity of education:** External and internal evaluation, accountability, relative autonomy of educational institutions and integration between the parts of educational systems as wholes tend to be more and more required. However, external evaluation is quite limited, including by curriculum distortions and interfering variables, such as exam fear by students and teachers, etc. In addition, publicity usually hides the fact that evaluation results are not used to enhance school practices, classrooms, workshops and companies. Making high-cost evaluations and not using the results to reformulate practices lead to a highly unfavorable cost-benefit ratio. It is a paradox that education is traditionally aimed at maintaining social order, while today it needs to change fast and, if possible, take the lead, anticipating social and economic needs. Therefore, evaluation can contribute to prospective studies, although, not rarely, it is underused.

1 INTRODUCTION

Where is vocational education heading to? How do other countries overcome their obstacles considering they have unique contexts? These questions are associated with the challenges verified in changing societies and economies and with existing alternatives used for decision-making processes in different situations. Such challenges generate answers that, on their turn, give rise to new challenges. It is worth mentioning these challenges transversally cover, above all, curricula, management, teacher and tutor qualification, vocational guidance, attractiveness of vocational education, evaluation processes, and the indispensable bonds between vocational education and general education, and between education and work. In fact, *in fieri,* the future is shaped on a continuous basis, usually involving some difficult situations. Frequently contradictory expectations and needs create obstacles whose lessons can help people see different horizons and trends.

Moving from individual to general, this work initially focuses on several countries that were used as basis for a brief description of existing problems and proposed solutions and, not rarely, the arising of new problems. It is clear that educational systems are not doing well despite being implemented in a globalized scenario, where interdependency is increased by time and space pressure. Conditioned by their own historical and cultural roots, only part of their experience can be transferred to other spheres and times. The dual system adopted by Germany and other countries is a classic example. Efforts are endeavored to take the experience gained with this system to other regions, frequently with difficulties, because its historical, economic and social assumptions are not verified in other realities. However, such fact has not prevented it from serving as inspiration for SENAI. Another example is the United States comprehensive school as a solution to make secondary education democratic. In fact, there are three schools in the same location: a preparatory school for college, a vocational school, and a general school, which is less selective and, depending on the circumstances, can serve the majority of the school population. Repeated attempts have been made to reproduce this type of school, but outside the United States people still believe in a comprehensive approach in certain dimensions, i.e., to postpone the segregation of students groups targeting one or other purpose in secondary education, academic education or vocational education, most of the times. Concerning the general characteristics of the educational systems of most of those countries, we can consider past studies (GOMES, 2008, 2009), which have analyzed in more detail the context, the regulatory milestones in education, organization, forms of financing, and the relations with vocational education and training.

1.1 THE HISTORY-GEOGRAPHY OF VOCATIONAL EDUCATION

Grouping countries according to their vocational education trends involves searching for their historical grounds, which are associated with consecutive waves of the Industrial Revolution and the increased need for workers' education and training, with implications for the political-economic power and the military performance of the national States. In fact, after the 1st Industrial Revolution characterized by the invention of the steam engine, countries created three basic historical models to tackle the issue of qualification of workers (GREINERT, 2005; MACLEAN; WILSON, 2009; HANSEN, 2009):

- *The English liberal model:* centered on in-company apprenticeship, based on the old tradition of incorporating low-income classes to the society through compulsory training of children in household work and agriculture. With the increasing demand for personnel, children were prematurely taken to work in the industries as "apprentices" and earned low salaries, generating the drastic social and educational conditions narrated by History. A liberal market tradition prevailed, where the agreement between the parties should not be interfered by the laws of the State: *laissez-faire* and *laissez-passer.* Yet, learning repetitive tasks inside companies proved to be insufficient, leading to creation and expansion of evening and Sunday schools for the poor. Compulsory education was gradually imposed, as well as protection against child and juvenile labor (GOMES, 2013).

- *The French State model:* The French Revolution and the State Napoleonic reforms generated consistent and long-lasting state actions also in vocational education. The universal public school for citizenship development was the basis for a system that included *Écoles d'Arts et Métiers, Écoles Nationales Professionnelles* and *Écoles Pratiques.* The law, not the market, like in England, governed social and labor relations, with the presence of not only work inspectors, but also school inspectors. That tradition of state school preparation was a great inspiration for offering vocational education at school, including, for instance, in Brazil (with federal technical schools created by Nilo Peçanha) and in Mexico.

- *The dual model:* In Germany, production relations are perceived as community responsibility and mutual responsibility, which are based on the Middle Ages corporate system. Guilds fostered vocational pride and kept the prestige of hand skills at high levels. This is because the dual system combines in-school and in-company preparation for work, with a strong inclination towards the latter, where apprenticeship is effectively attained.

> The paradigm of civil law prevailed, with private autonomy and judicial control, mainly in case of disputes.

Although it is hard to summarize centuries of history and the wide range of trends, these initial models still affect the present time. In an increasingly globalized world, the boundaries between these three models were first crossed as early as the nineteenth century, as new countries became industrialized and sought different sources of inspiration, adapting them to their reality, and also innovated, substantially building upon what they considered to be most useful in the three models. In the first wave, the Austro-Hungarian Empire of the Habsburgs inclined itself towards the dual model, as it is in Austria until the present day, but not in today's Hungary. Imperial Russia directed school education towards the French state model, but its workshops developed admirable techniques and graduated a large number of skilled professionals based on apprenticeship. Della Vos (1820-90), Principal at Moscow Technical College, gave origin to the task analysis method, a principle of vocational education based on competencies, that, on its turn, as stated by the same historians, reached SENAI occupational methodic series, with Ricardo Mange (GREINERT, 2005). Finally, the United States, Canada and Australia pursued the liberal model, counting on the private initiative to meet the needs of the market. However, the Unites States advanced in terms of production and labor organization, first with Taylorism, then with Fordism. Nevertheless, that would not be quantitative and qualitatively enough to train the personnel required for industrialization, in a period of more advanced technologies, as it was not in England. That is why, a strong movement was verified in the United States in favor of vocational education in the nineteenth century, leading to creation of a comprehensive school, with different branches, including the vocational one, in the same physical location. Political forces, with great union participation, rejected separate vocational schools, as in Europe, so that the country would not have a 'second-class' school branch. Thus, vocational education and training were separated, the former under the responsibility of the school and the latter of in-company apprenticeship, today not very expressive. In addition, according to the liberal disruption, several proprietary schools were created, which target different market niches. On its turn, Japan opened its doors to the world and sheltered contributions to create a business culture, as it did not have an occupational culture. Training within a specific field of labor is still less relevant than the social context of the activity, i.e., the capacity of working in cooperation within the company. The understanding is that today apprenticeship is almost inexistent, and initial and continuing training is offered within companies. Schools tend to be inclined towards broad vocational education: specialization is put in second place.

Over time, different countries seemed to increase educational background and qualification levels, taking the complexity of markets, technologies and management into account, giving origin to technical education, non-college post-secondary education, short-duration higher degree programs and other alternatives that are extended to post-graduate education. This is maybe the most important common aspect: the school became an almost universal institution for vocational education, including through elementary education, an increasingly relevant principle of vocational education and training. It is not by chance that different paths followed by general education (academic and preparatory education for college studies) and by vocational education became more frequently connected, thus ensuring uninterrupted progress for students. Not only educational continuity needs are important to qualify and provide workers with updated knowledge, but also the attractiveness of vocational education depends on open pathways and not on dead-end alleys (CEDEFOP, 2012).

With social, economic and technological changes, the three historical models change and are likely to blend with one another. Developing countries sometimes 'borrow' elements from the three models.

First, when designing the vocational education landscape nowadays, one has to consider that the historical models indicated above have changed and that countries pragmatically make combinations and new interpretations, many times after receiving technical and financial help from external partners. Instead of unchanged and unique models, a wide range of combinations is verified. For instance, costs, complexity and other factors have led countries to jointly consider in-company apprenticeship and schooling, at higher or lower levels.

Second, this landscape is shaped by economic, technological and social differences worldwide, with consecutive new international divisions of work, resulting from several waves of the Industrial Revolution and the post-industrial economy (BELL, 1973). The most recent division represents, in general terms, the separation between knowledge economies and industrial "executing" economies, with a large number of low-qualified workers and low salaries. Despite some exceptions, knowledge economies and societies are concentrated in the North Hemisphere, where the Industrial Revolution first occurred, while others tend to spread across the South Hemisphere. Despite controversial points, some countries can be grouped as follows:

1. *Countries aligned with the dual model:* Germany, Austria, Denmark and German-speaking Switzerland. Due to their cultural and historical characteristics, dual model implementation is a difficult process, such as the case of USA comprehensive schools. Therefore, an experienced British comparatist (PIDGEON, 1969) considered that educational systems were not doing well, i.e., beliefs routed in a social-cultural scenario cannot prosper in other landscapes. That is why parts of the model can be adopted more easily than the model as a whole.

2. *Countries predominantly aligned with the French state model:* France, French-speaking Switzerland, Spain, Greece, Italy, Mexico and Portugal.

3. *Countries predominantly aligned with the Anglo-Saxon liberal model:* United Kingdom (with internal variations), the United States, Canada and Australia. In those countries, schooling has taken on a crucial role due to economic and social changes.

It is further worth including another typology, developed by Sabates et al. (2010), which introduces some variations (chart 1).

Chart 1. Typology of 15 European countries

VOCATIONAL EDUCATION SYSTEM	COUNTRIES
Apprenticeship-based	Germany, Austria, Denmark, Luxemburg
Continental European, school-based	Belgium, France, Holland
Market-driven	Ireland, United Kingdom
General education	Spain, Italy, Greece, Portugal
School-based, equalitarian	Finland, Sweden

Source: Sabates et al. (2010).

Although limited to part of current Europe, this typology distinguishes the role of the school, highlighting four Latin countries from the South of the continent, whose school system has a predominance of general education, i.e., Spain, Italy, Greece and Portugal. In fact, these countries have a long tradition for academic school, while school-based systems, in Belgium, France and Holland, are more driven to vocational education, getting closer to the French state model mentioned above. Two Scandinavian countries, Finland and Sweden, also are based on school, but with an equalitarian approach, leading them to have a social democracy in the post-war period. Despite the fact they share the same train of thought after the Second World War, Germany, Austria, Denmark and Luxemburg use school-company relations as basis, i.e., the dual system mentioned above. Finally, Ireland and the United Kingdom reflect the English liberal model.

Crossing the boundaries of Europe, one can see eclecticism is found in several countries, such as Brazil, which adopted the French state school model, and captured, through SENAI, important traces of Germany's in-company education. Some special situations are also observed in East Asia (GOMES, 2009): Japan has a different business culture, associated with schools that pursue high general vocational education content; Republic of Korea is strongly influenced by the United States, but it preserves its cultural bases and it has not implemented comprehensive secondary schools; China, with the so called market socialist economy, has vocational, technical and qualification schools for workers, in addition to higher vocational education and regular institutions that underwent reforms, but its estimated capacity is only 10% of total employed people (in more advanced economies, this number corresponds to 30-40%). Hence, the ultimate formal responsibility is held by companies, not disregarding the huge informal sector. As for India, despite the British dominance, it is not aligned with the liberal model. There is a small number of apprentices, while secondary and higher education institutions offering vocational education have very limited capacity to meet the needs. Vocational education attractiveness is strongly limited by people's prejudice against manual labor, originated in the caste system. Anyway, Asia is characterized by low percentages of students in vocational education in view of the total number in each level.

On the other hand, it is important to mention qualification in Sub-Saharan Africa's broad informal sector, which follows traditional processes (SINGH, 2009), but where vocational education lacks institutional support and unfairly competes with academic education, both at secondary and higher education levels. Similarly, vocational education has weak presence in the Middle

East and North Africa because of the low return rate when compared to the academic field, among other factors. It lacks governance and decentralized coordination, not centralization. In post-socialist Russia, and in economies undergoing transition, a trend towards vocational education moving away from companies to schools has been observed, making work bonds weaker. Finally, national institutions and vocational schools are predominant in Latin America, with variable results (EICHHORST et al., 2012).

In summary, Sabates et al. (2010) highlight three important variables for country typologies in the relevant literature: 1) ***school*** *or* ***workplace*** *focus* (types of apprenticeship)***;*** 2) ***type of vocational education regulation****,* whose categories include the ***labor market, the social and business consensus*** and the State (respectively connected to the historical matrixes of the Anglo-Saxon, dual and French state models); 3) the ***labor market model,*** with three categories, ***occupational labor market, internal labor market****,* i.e., career inside companies, and a ***blend of both.*** In the latter case, the first category includes Germany, the second one includes the United Kingdom and the United vStates, and the third one includes Japan and France.

In the attempt to organize a typology for the countries selected herein and based on the study conducted by Sabates et al. (2010), the variables 'type of professional regulation' and 'qualification focused on the workplace or school' have been cross-referenced. Considering that hybridism has led to a blend of categories, it is necessary to reduce their number to two in each variable, and stress the fact that category predominance, not exclusivity, is taken into account for the cases addressed. Thus, chart 2 represents an alternative for discussion, instead of a closed typology.

Chart 2. Distribution of countries selected according to their historical trends towards vocational education and training

PREDOMINANT FOCUS	PREDOMINANT TYPE OF REGULATION	
	LABOR MARKET	STATE
WORKPLACE	Republic of Ireland, the Netherlands, United Kingdom, the United States, Canada, Australia	Germany, Austria, Denmark, German-speaking Swiss Cantons, Czech Republic
EDUCATIONAL INSTITUTION	Italy	Belgium, France, French-speaking Swiss Cantons, Finland, Norway, Sweden, Hungary, Portugal, Spain, Japan (with participation of the society and companies), Argentina, Brazil, Chile, Mexico, Israel, India, Republic of Korea, China (with restrictions (1))

Source: Elaborated by author

[1] The official Chinese literature states that some principles of the dual system have been implemented, with technical support from external partners, but little is known about the obstacles and extension thereof. However, schools, as informed below, are responsible for vocational education, although they cannot cope with the demand.

In face of this simplified range of diversities, it is clear that compared education has to observe the historical-social-cultural context of each national and sub-national educational system. This is necessary because moving from one model to another or from one category to another is extremely difficult. However, some authors in specialized literature argue about the efficacy of the different types. Which type would be better for a certain country (or region) considering its characteristics? What combinations would help countries and regions offer successful vocational education and training?

In fact, in an important comparative study, Eichhorst et al. (2012) distinguish three types of education and analyze their advantages and limitations based on research studies:

- *The dual model tends to be more effective than the school-based one*, it is high flexible and can adjust to work and technological changes; it also counts on fully engaged social partners. The school segment is provided by public bodies. However, it is impaired when there are flaws in general education and training, resulting in higher costs.

- *The school-based model ensures curriculum relevance when several stakeholders are involved,* but it depends on their level of influence. It is capable of ensuring high-quality education, encouraging providers to offer training, and fostering competition among them. However, as it is not so close to the world of labor, employers become less interested. Benefits are higher when the work connection is stronger. Social development expectations and each occupation being accorded different levels of prestige favor the academic field, and vocational education potentially loses part of the best talents available.

- *Informal training tends to be effective,* however; little is known about its advantages and disadvantages in relation to other alternatives.

What is the most effective model? Research studies show that the dual model is more effective than the school-based one. However, educational systems usually do not do well because of their historical and cultural roots. The school-based model guarantees relevant curricula when those interested in vocational education are involved. Informal training tends to be effective, but little is known about it.

Considering the value of such conclusions, one should be cautious when generalizing about the advantages and disadvantages of each alternative. Opportunities to innovate and improve access, quality, efficiency and equality are frequently reported. However, there are too many historical-social limitations if a country decides to change from one model to another. Certain characteristics are so deep rooted in the context where the model was designed that it is very difficult to transfer it from one historical-cultural environment to another. In other words, the models usually do not 'do' so well. In this sense, it is usually more effective to adapt the model according to some elements part of the country's reality, which can be assimilated more easily. The pragmatic experimentation of several alternatives and the pursuit of an optimal combination can lead to profitable eclecticism. Yet, a broad area of consensus is currently found in international literature: *workplace education is the most effective one.* This leads decision makers and consultants to suggest increased apprenticeship opportunities, whenever possible.

Taking several countries as a starting point, which have been organized according to their historical matrixes and their positioning, reaffirmed questions and proposals are verified, going beyond their realities, whose connections will be

resumed and will serve to create the second part of this essay. The second part of this study will address topics part of the reality of each country to identify prospective trends and learn from different experiences. Chart 2 above lists the countries that will be analyzed according to their historical trends, and contemporary modifications and combinations, as an anticipation of the next section.

Successive Industrial Revolutions contributed to increasing worldwide interdependency and fostering economic and cultural changes. Therefore, there are no pure types or models, but compositions and blends, as observed earlier, so the inclusion of countries into one or another model tends to be based on the predominance of one of them, and it is subject to discussions, including about diversities within the same territory. After universal and unpaid elementary schools were disseminated, they became the basis for vocational education, and were vertically expanded and rendered more complex up to the higher vocational education level. The teaching and learning system used in Western Middle Age and still used today by some countries became incomplete due to the large number of skills to be developed. Then, schools, more usually state-funded schools, are generally the most used sphere for vocational qualification. On the other hand, in-company training has high costs and implications for production, causing it to be limited. Therefore, several countries engage companies through diversified manners and at different levels, although it is not possible to state that they are framed in the dual system. Simultaneously, it is strongly agreed that in-company education should be used and broadened as an alternative to make vocational education more effective. Schooling is indispensable, but not sufficient.

For all those reasons, chart 1 should be considered carefully, having flexible boundaries in mind for the organization of this essay. Twenty-five countries will be briefly analyzed, grouped according to their historical roots and today's predominant alignment with a certain model.

2 OVERVIEW OF SELECTED COUNTRIES

Countries which have been more clearly included in the dual system will be analyzed first, although with differences among them: Germany, Austria, Switzerland (in the German-speaking cantons) and Denmark.

2.1 GERMANY

By historical reasons, inspiration from medieval guilds, an association of artisans or merchants, served as basis for the dual system. Splitting their time between their in-company jobs and school, or spending full time in a vocational school, students seek to acquire skills in a place where occupations not only have high social prestige, but also yield relatively high social and economic return (GOMES, 2008). That is why countries like Germany have a high percentage of students in secondary vocational school (in 2010, 51% of the total, including school and apprenticeship (CEDEFOP, 2012 f) and, because of quality and prestige, reach high return rates, encouraging higher education students to enroll in technical courses to better fill the gaps between theory and practice, and between education and labor. *This is one piece of evidence of how Germany effectively solves its issues: matching education to concrete labor.*

In brief words, the German educational system selects students who are between 11 and 12 years old according to academic, integrated, intermediary and *Hauptschule* schools. Except for the first, the other schools are vocational oriented, and when students complete the curriculum proposed they can follow directly to in-company apprenticeship (associated with part-time vocational school) or to full-time vocational education, which is a step to apprenticeship. One problem is that not all companies can offer apprenticeship, which is partially resolved with the use of business associations that join efforts to reduce costs. Another problem is that demand for apprenticeship is higher than the number of vacancies, and the number of vacancies depends on companies' needs. Therefore, applicants with favorable skills are required for selection. Such selection is justifiable because companies incur significant costs with apprenticeship and they do not want to qualify people they cannot hire. Populist escapes are not considered (HOECKEL; SCHWARTZ, 2010; CEDEFOP, 2012 f). However, the number of apprenticeship vacancies and the number of participating companies have declined after the 2008 economic crisis. Hence, several applicants are not hired despite the fact there has been an increase both in the number of unfilled vacancies and in the lack of interest for apprenticeship by young adults, which confirms the need for proper coordination (ALEMANHA, 2014).

The job, for its technical and complex nature, demands initial and continuing education that is increasingly more extensive in duration, which can be attained in

higher education institutions, as upper secondary education is no longer enough. Consequently, students who have completed vocational education are offered tools that prevent their limitation and enable them to enter higher education, which is diversified and flexible, and includes universities, polytechnic schools, technological universities and vocational universities. This is the alternative chosen to increase economic competitiveness with duly qualified workers.

Germany's dual system is based on the early segregation of those who will receive higher education or vocational education. Occupations have considerable prestige, but the costs of apprenticeship are high. Not everyone is able to attain it.

By emphasizing vocational education, it might seem that general education should be considered as a second option. This is not the case. Vocational skills can be transferred in higher or lower degrees, but *academic or general education skills are the ones with the greatest transfer range and capacity.* Hence, vocational careers are subject to significant changes in time and space, many of them not very predictable, creating a need for personnel updating and reconversion throughout life. Therefore, *acquiring deeper knowledge on general education and broader vocational education is a key aspect for the necessary changes.* Changes should happen in two directions: longer period of time spent in educational institutions and returning to those institutions several times throughout one's working age period in life. These changes are necessary because individual and collective costs are higher when young adults or adults drop out school and/or complete any level of education without acquiring minimum skills. In case of Germany, in 2008, 7.5% of students left compulsory school without receiving a minimum certificate, most of them are male and descent from immigrants (FAZEKAS; FIELD, 2013), and find it difficult to achieve language integration.

General education is the most easily transferrable. Therefore, costs incurred with a student that quits school are very high.

One of the alternatives adopted to solve these problems includes a *coordination commission for vocational education and training transition* in each state *(Land)* to improve cooperation among interested players, assess the cost-effectiveness of transition measures, highlight the country's most attractive initiatives and provide external assessment based on clear standards.

On the other hand, the vocational guidance system needs to be reformulated and offer professionalization support in order to mitigate option errors and avoid waste, whose costs are largely incurred by the community. Socially and economically disadvantaged groups, in special, need more information and transparency, as they have less access to information.

Literacy and arithmetic skills, in particular, should be given priority before and after students enter vocational education. Such skills should be *diagnosed in all students entering the transition system and apprenticeship*, mainly in those students that do not have a certificate of lower secondary education. Therefore, the alternatives proposed include observing the apprenticeship preferences of those students, in the sense that training should be more applied and less abstract. In addition, final school exams must include a clear diagnosis of those skills, and school exams and business chamber exams should be blended into one.

Other measures include *overcoming obstacles to entering higher education.* Granting financial support and guidance to potential students, including to those who are less academically prepared; promoting dual universities and dual programs in regular universities, with greater flexibility, part-time schedules, recognition of prior skills, formally and informally acquired; and offering credit transfers are some of the other alternatives. As for general teachers and tutors, it is worth emphasizing pedagogical qualification and periodical updating requirements (HOECKEL; SCHWARTZ, 2010; FAZEKAS; FIELD, 2013).

Thus, some challenges and proposals are highlighted, among others:

- Besides technical education, returning to educational programs several times throughout life is, at least in part, a consequence of the complexity and flow of labor changes. Therefore, participation in continuing vocational education has increased not only for companies, but also for people (ALEMANHA, 2014).

- Therefore, new approaches, institutions and programs have to address training more deeply, while providing remediation education, if needed, for those that do not meet minimum standards.

- The ongoing relations between educational processes and companies represent favorable conditions for vocational training to accomplish its purposes.

2.2 AUSTRIA

In addition to adopting the dual system, Austria also segregates students at the end of elementary school, selecting the best ones for the first stage of academic secondary education. According to recommendations made by international agencies, which constantly advise countries about risks that early student selection might increase social and educational inequalities, Austria has created a comprehensive secondary school, as part of a reform under implementation. Students are formally free to visit the several options available, including regarding the possibility to apply for higher education, however; requirement levels vary.

At upper secondary education, in addition to the second stage of academic school, there are other options for vocational school, and one of them is a combination of in-company apprenticeship with part-time attendance at a vocational course. Students who are over 18 years have a wide range of higher education, academic and vocational options, and once attending university, they can achieve the highest post-graduate education levels. *Fachhochschulen* is a non-academic option at this level, of an applied nature, and offers undergraduate and Master's Degree programs.

As one of the countries where young adults most frequently show to be interested in vocational education, in Austria, approximately 80% of students that complete compulsory education choose vocational options, with near 40% going to in-company apprenticeship, 15% to vocational schools and 27% attending a five-year program also in secondary education institutions. As in Germany, in-company apprenticeship vacancies are limited and apprentices are carefully selected, i.e., they can be proud of their achievement.

One relevant aspect is the *set of requirements from teachers and tutors*. Few years ago, colleges offering teacher education became educational colleges within universities. Schools frequently require teachers to hold a *Master's degree, which is granted once the national teachers' exam is successfully completed, in addition to experience acquired during teacher training and experience acquired in the teaching profession. In apprenticeship schools, relevant experience in teaching experiential subjects and professional practice are also required for the corresponding technical course and pedagogical qualification at higher level.* Finally, teachers must have at least six years of relevant professional practice, a title of master tradesman, and must have attended a course or passed an exam assessing pedagogical skills and applicable legislation. Therefore, *the relation between the teaching profession, education and company is emphasized*.

However, observers have found some problems. The first one is a bottleneck for access to apprenticeship, as in Germany and other countries. Austria has added one more year of education (year 9) as a form of waiting period. Year 9 represents a double transition process, while students should be sent to the right program and receive proper training to enter apprenticeship or a full-time vocational school. Nevertheless, students with special needs and those with a negative certificate from lower secondary education represent a challenge. If they cannot find a vacancy in academic or vocational education, these students can end up wandering about and creating problems for themselves and the society. *Offering apprenticeship in simulated companies* was one of the alternatives proposed for the issue. *About half of the students that participate are hired by a real company* in their first year of training, which suggests this experience has a positive impact.

Austria also does not have apprenticeship positions for many students. Like other immigration countries, sound general education is a basic pre-requisite for vocational and higher education.

Nevertheless, *the fact that some qualification courses tend to be too specific,* especially for access to a first job, is even a more serious matter. In fact, alternatives are distributed in 245 types of apprenticeship and more than 600 courses in full-time vocational schools. One of the recommendations is *to use broader and more common modules that are also more flexible.* Under certain conditions, it might be useful to qualify workers in a 'tailored' manner; and in general, flexibility is the buzzword here, with a *basic platform that allows one to move from one occupation and field of expertise to another,* like in Denmark, which will be addressed later in this essay. In other words, decision making concerning vocational education requires one to be attentive and to find balance.

Another reaffirmed trend is the fact that *students are seeking post-secondary education* because of the incentives offered by companies and by the society. Although this is a federal-controlled sector, post-secondary education has heterogenic and uncoordinated institutions which, despite the advantages of diversity, require great articulation efforts. *Fachhofschulen,* non-traditional higher education institutions, represent an interesting experience and, to a certain extent, are similar to the technological courses offered in Brazil. Apprenticeship environments, which are different from those of traditional universities, and greater support offered to students result in a lower dropout rate than in universities (TRITSCHER-ARCHAN; NOWAK, 2011; MUSSET et al., 2013).

In summary, challenges and answers involve:

- Better educational background and diversified institutions with flexible programs to meet different demands.

- The wide range of vocational options requires balance between amplitude and specialization, which must be adjusted on a continuous basis to maximize the individual and collective benefits offered by vocational education and training.

- Bridging literacy and arithmetic skill gaps in elementary education continues to be necessary and is the basis for effectiveness. Due to the linguistic and cultural difficulties verified, this is an important point for countries that receive immigrants on a continuous basis.

2.3 SWITZERLAND

In Switzerland and in some other countries, companies and labor market orientation through apprenticeship are significant aspects. After compulsory education, usually from 6 to 16 years old, with variations across cantons, students have several options and vocational education prevails with one particularity: the existence of two levels of upper secondary education, immediately after secondary education (compulsory), level 1 and level 2. In fact, by placing emphasis on the diversity of post-secondary and higher education, Switzerland articulates them so as to facilitate educational continuity. In 2010, at level 1 of upper secondary education, immediately after and following compulsory education, 48.1% of students enrolled in vocational education, including 2-year in-company apprenticeship programs; 26.9% in general (academic) education, at first in the form of preparatory courses for higher education; and 14.5% in transitional options. In the same year, at level 2 of upper secondary education, 73.5% of students enrolled in vocational education, and, out of which 87.2% were in the dual system (within companies), and the other 12.8% in full-time vocational education schools (SUÍÇA, s/d.). In usual apprenticeship programs, students attend one day of school and go to the company the other four days, or two at school and three in the company. Please observe that German-speaking cantons have a higher participation rate in the dual system because of their historical background. *The number of students attending vocational courses is explained, in great part, by the high economic and social return when compared to general education. Non-university higher vocational education, which is quite popular in Switzerland, offers more benefits than both mentioned above, but universities and other tertiary institutions still achieve the highest yielding* (HOECKEL; FIELD; GRUBB, 2009).

Vocational education is attractive in Switzerland, as in other countries, because its social and economic rewards can be compared to those of academic education. It is of good-quality, not second-class education.

From a management perspective, there are three players involved, with clearly defined roles and satisfactory agreement: Confederation governments, canton governments, and companies. One third of these companies adopt the dual system. Hence, *well-prepared teachers and managers are attracted and equipment is constantly updated.* Company self-assessment conducted on a periodic basis is one simple option among the different assessment tools available (HOECKEL; FIELD; GRUBB, 2009).

Improving English language teaching was one of the aspects discussed. English skills are necessary to keep the doors open to the world, where economic activities rely on foreign trade and high competitiveness. Students that drop out school are at a high-risk situation as they lack the necessary qualifications and can be marginalized: dropout students account for 11% of all students in each group that completes compulsory education.

Therefore, observers recommend better equality policies to reduce the dropout rate and offer support to students that quit education. The same is true for higher vocational education, which is quite flexible in order to meet diversified needs. A contingency plan is also necessary to tackle the risks of the dual system, both due to economic weakening and arrival of companies alien to that culture (HOECKEL; FIELD; GRUBB, 2009; FAZEKAS; FIELD, 2013).

It is also worth mentioning *continuing education and training* activities, which offer a *wide range of programs and support methods*. Usually, this area is open to private initiative and adults themselves finance their studies. State incentives are allocated to immigration, integration, illiteracy and certain areas of professionalization. People with better educational background and people who have a job are more likely to seek these activities. Also, the participation rate is high, with *50% to 80% of part-time employees involved in those activities* (EURYDICE, 2014).

In summary, the major aspects considered include:

- Vocational education is elected by a large part of young adults because it has advantages over other alternatives for its quality and consequent employability.

- Quality strongly depends on well-prepared teaching and tutoring staff, and on equipment being constantly modernized within a school-company interaction framework.

- Advancements in education, as required by economic activities, are enabled by post-secondary institutions offering higher or non-higher degrees, and by education throughout life.

2.4 DENMARK

Denmark, which also adopts the dual system with its own characteristics, keeps two educational systems: the so-called regular system and a continuing education and training system for adults. In addition to placing emphasis on second-opportunity education and education throughout life, Denmark offers comprehensive schools within regular education, characterized by compulsory education, with nine annual grades, from 6 to 16 years old. *Folkeskole,* literally meaning 'people's school', is the community's municipal school that had a relevant role in the country's educational democratization. Differently from the previous countries, students choose their educational path once this level is completed, in upper secondary education, when it is split into general (preparatory for higher studies) and vocational education. Before offering vocational education itself, the secondary school system provides students with professional guidance, but around 80% of them start attending some type of vocational program as soon as grades 9 and 10 are completed (CEDEFOP, 2012 c, CEDEFOP, 2012 l; EURYDICE, 2014).

Thus, upper secondary vocational education includes agricultural, trade, technical, social, and health programs, *starting with a 20 to 60-week basic course from which different specializations are possible to ensure vocational education is not too specific.* However, despite the interest shown by students, young adults traditionally withdraw for some time. In this sense, transition to vocational education takes longer than to academic school, as evidenced by the fact that students are 17 years old in average when they enter academic education compared to 21 years old when they enter vocational education. Young adults and their parents report they are likely to withdraw from their studies once or more times to perform out-of-school activities as a way to promote contact with life and the world, contributing to their maturity. Notwithstanding their respect towards schooling, part of the population considers out-of-school experiences to be profitable, including for promising students who will certainly enter higher education.

In addition to universities (of academic nature), *higher education includes short- and medium-term vocational courses. These courses are predominantly characterized by hands-on activities and intermediary degrees are granted*. Most of these options were originated after vocational education reforms conducted in the 90's and onwards. Changes were gradual, but significant, and have *decentralized management, introduced goal-oriented management*, *semi-privatized institutions*, partially established free choice of schools (creation of a quasi-market in education), established *competency-based curricula, included modules and created 12 fundamental courses as the axis of vocational education, avoiding fragmenting and premature specializations*. Besides that, the reforms offered greater practical relevance to curricula, targeted *general education subjects more carefully, and expanded opportunities for partial qualification and consequent return to the educational system.* The dual principle was also developed, where social partners play a key role in vocational education, engaged in commissions and councils, both at the national and school levels. At first, deep changes cannot be made before the State and partners reach an agreement. Schools are funded by the government, and on-the-job training and apprenticeship are funded by companies. As for the first, the 'taximeter principle' has been used more extensively recently and is based on different variables, such as the number of students corresponding to full time. A fixed allowance for wages and building maintenance is offered in addition to funding. In recent years, 92% of funding correspond to taximeter funds (FIELD et al., 2012).

Denmark has grouped some areas of vocational education to avoid excessive specialization. No drastic changes are made before the State and social partners reach an agreement.

Based on such reforms, vocational programs start with in-company training, for which students should apply when there are open positions. The first difficult challenge of filling a job position is also seen as a bottleneck, subject to employment fluctuations. If a certain area does not have any job positions available, students are offered positions in other areas, but they should keep looking for vacancies in companies (CINTERFOR, 2012 l).

A *new and alternative apprenticeship approach* was created in the light of such restrictions and to assist young students that are not able to find a job, including because of educational background requirements. Through this new approach, *students that struggle to learn theoretical concepts are directly selected to work in the company,* but government incentives help pay for the costs. Production schools are also a possibility for young adults who are under 25 years old and did not complete upper secondary education.

As for personnel, teachers and tutors working with vocational education, they do not need to be initially qualified in pedagogy, but they must be qualified for service provision. Companies are more flexible and they generally require occupational experience only. Vocational mentors receive university training to work in a system with a virtual center and guidance centers for young adults and adults.

Today's challenges include poor vocational certification and conflicts generated by the intent to merge post-secondary programs with higher education academic institutions in 2015. Social partners oppose to the project because such programs could lose their experiential character and be absorbed by a more academic environment (FIELD et al., 2012).

In summary, Denmark, like other countries, has adapted the dual system, and the following aspects should be considered:

- Concern about not limiting vocational education.
- Flexible rules, such as decentralization and creation of new options.
- Closer relationship between educators and the dynamic reality of companies. Use of competency-based curricula.

2.5 OTHER SCANDINAVIAN COUNTRIES

In addition to Denmark that uses the dual system, three Scandinavian countries have greater or lower participation of schools and companies. As discussed later in this essay, Sweden is inclined towards school education, while in Norway and Finland, companies participate more actively.

2.5.1 Sweden

Differently from its neighbors and from dual system countries, Sweden's vocational education and training system is strongly school based. In the last decades, management was decentralized, offering greater flexibility, and the educational system became comprehensive, i.e., fluid, with no secondary education divisions between the academic and vocational fields, which has helped vocational education gain considerable reputation. The large number of vocational qualifications has also been reduced (GOMES, 2008). However, curricula differ from one another, as some target general education and others vocational education, while higher education

– and preparatory courses therefor – is in fierce competition with vocational qualification. Anyway, Sweden's great triumphs are the high performance rate in elementary school, as shown by PISA, and the low school dropout rate.

Being highly dependent on foreign trade and on keeping/expanding its good positioning, Sweden needs professional qualification that can keep up with fast changes, and this requires continuing education for young adults and adults. General and vocational education should not fight for space; as in a ballet performance, they should perform a *pas de deux* dance duet, where one depends on the other, especially vocational education in relation to the basis offered by general education, which has to advance and offer updates, enabling the latter type to be addressed more deeply. Some of today's problems include: *unemployment among the youth* (the exclusion of young adults has led to a recent riot in the suburbs of Stockholm and other cities), *aging of the population* (despite immigration), *older tutors and teachers working in vocational education, the need to increase the number of young adults in secondary vocational education, low education levels of some social groups and, moreover, in the case of upper secondary school, the need to bridge the gaps between the contents taught at school and job requirements*. In part, these problems are a result of *little agreement among social players, including companies. Wider range of skills and better status of those students who completed vocational education*, consequently increasing the number of young adults applying for job positions during upper secondary education, are also challenges that need to be tackled. In general, economic competitiveness demands a *broader and wealthier educational background, with students going back to school for more education throughout life* (to update the general education basis and vocational skills). *Unemployment among youth is seen as mainly resulting from the gap between qualification and job requirements*. This calls for greater dynamics and educational institutions seeking update approaches (KUCZERA et al., 2008 a; BJURULF, 2012; CEDEFOP, 2012 j, CEDEFOP, 2012, m).

Among the recommendations made to overcome the challenges, the following is given special emphasis: the *advantages of in-company apprenticeship compared to the school curriculum, the former requiring strengthening and quality improvement*, with respective follow-up and assessment. *All social players involved should indispensably achieve better agreement.*

Concerning the policies in force to resolve the problems, Sweden's priorities include (UNEVOC, 2014):

- Better qualified teachers and tutors working in vocational education, including apprenticeship.

- Improve the quality of labor-based apprenticeship, including providing companies with funding so that they open more apprenticeship positions.

- Expand and improve the quality of upper secondary education offered to young adults and adults, with the federal government transferring funds to municipalities in order to improve educational conditions in the labor world.

In Sweden, as in other countries, labor has become more demanding and complex. That is why students should constantly pursue higher studies and go back to school throughout life. Therefore, vocational education cannot be a dead-end alley. It should strike a balance between completion and continuity.

The *innovative model of post-secondary vocational education*, used to tackle the increase in job requirements, should also be discussed. Characterized by strong engagement of social players and proximity with the labor market, this model is usually offered by universities, *combining schooling and labor-based apprenticeship,* the latter corresponding to at least 25% of the curriculum. There is great flexibility, and programs last from six months to two years. Yet, analysts recommend *better adaptability to different students' needs,* including with the availability of part-time courses, as students find it difficult to move from secondary vocational education to post-secondary education. Obviously, better adaptability increases the attractiveness of this sector compared to academic higher education. Also, *opportunities for direct in-the-job training* should also be increased for greater compatibility between qualification and requirements to be met (ALLEN et al., 2012; KUCZERA, 2013).

In summary, the following accomplishments are worth noticing:

- Reduced number of vocational skills to avoid hyper-specialization.

- A shift from school education policies to direct in-the-job education, mainly through apprenticeship, conferring a more concrete character to education and bringing it closer to existing requirements.

- Increased attractiveness of vocational education based on the inexistence of gaps between it and higher education, which has to be attended by many to keep improving.

- A flexible post-secondary educational system, resulting from greater proximity of social players, so that it becomes more relevant for employment.

2.5.2 Norway

Differently from Sweden, Norway tends to place greater emphasis on in-company apprenticeship than school education, having cooperation between both types as the cornerstone. The government funds education and management is decentralized by municipalities. The country's educational system has a *high level of equality,* with the least divisions possible in curriculum, and *high performance in PISA*. This is supported by minor income variations and by the large number of students who completed higher education (above OECD average), where wage differences are small compared to the secondary level. By the end of lower secondary education, two branches are presented: general and vocational education, the former with three programs and the latter with nine, attracting one of the highest percentages of students among OECD member countries. Teachers must meet the same requirements, i.e., three-year Bachelor's Degree in addition to a Master's Degree. *For young adults in secondary school, emphasis is placed on learning basic skills, in a result-oriented manner. In vocational education, changes are made every year* upon request of the Ministry of Education, parents, students, employers, unions and other social players.

Apprenticeship frequently follows the 2+2-year model. As there are no apprenticeship opportunities for everyone, municipalities offer one more year of education, leading students to the same exams. Post-secondary (non-higher) vocational educational institutions offer six-month to two year-courses, with great flexibility. At higher level, all courses and programs are offered without distinction from academics. A recognized tradition of cooperation between formal and informal education, and training, with social players, provides great opportunities for adult education, including throughout life, and opportunities for new training offered to unemployed individuals (CEDEFOP, 2012 h; OECD, 2013).

> **In Norway, cooperation between educational institutions, State and social partners is well-established and helps in challenge resolution.**

However, the country has several other issues such as *high apprenticeship and vocational school program dropout rate,* despite local services that follow up students

that are not enrolled and that give up studying; lack of qualification requirement for tutors working within companies, who are getting older and older; and, despite that general and vocational education are equally esteemed, *students that enter secondary vocational education have poor PISA performance.*

Therefore, some policy recommendations include improving the quality of vocational guidance offered to students; preventing loss of students; and improving the quality of apprenticeship, considering that companies are offered heavy state subsides. Following a global trend, a national system to assess the experiential skills of apprentices has been established. In addition, compulsory training for company supervisors and tutors has been proposed as well (KUCZERA et al., 2008).

In fact, a new version of the Articles of Incorporation for Vocational Education and Training has been agreed upon, signed in 2012 by competent ministries, social partners and regional authorities. Its main purposes are:

- Increase the number of apprenticeship vacancies in 20% by 2015, with substantial increase for those who passed final exams.

- Increased number of adults holding a formal certificate for an occupation.

The signatories agreed to increase financial support, including for international competitions, which grant visibility and promote the attractiveness of vocational education; to produce statistical data on the future skills required in the job; to create guidelines for in-company apprenticeship; to encourage employees to formalize their skills and train others, in addition to recruiting other young adults into vocational education. In the light of the chronic shortage of apprenticeship vacancies, the government has created a national financing arrangement as an incentive to be offered to companies, with equal allocation by apprentice (UNEVOC, 2014).

The following aspects should be considered:

- The dynamic nature of vocational education, with cooperation among social partners.

- Emphasis on basic, result-oriented skills for the youth.

- Offer more apprenticeship opportunities based on financial incentives, but with strict assessment.

2.5.3 Finland

Finland is also inclined towards *in-company training and valorization of secondary vocational education*, from 16 to 19 years old, and higher vocational education taught at polytechnic colleges, with great possibilities for moving from academic to vocational educational options. Likewise, Finland has been constantly achieving *high performance in PISA* (GOMES, 2008). *The teaching profession is notably attractive* (in spring 2012 only 31% of the applicants were admitted), although salaries are near the average. Requirements are the same for teachers of the general and vocational fields, while their compensation and work conditions are similar. From the first years of elementary education, curricula place a higher value on social-emotional capacities (creativity, criticism, discussion, leadership, teamwork, problem solving, etc.) than on subject contents.

In Finland, the number of young adults has been decreasing and there is shortage of qualified workers. One important aspect is to lower the student dropout rate to reduce social exclusion.

However, the *lack of qualified workers, in quantity and quality,* is a persisting bottleneck, forcing companies to expand abroad. In contrast, *unemployment among young adults is relatively high*, suggesting a gap between education and job requirements. To get the situation worse, *the number of young people in the population has been gradually reduced over time,* i.e., the population is aging. The risks of social exclusion among young people are significant, with a 9.8% (2011) student loss rate*, which is higher in vocational education,* although only 9.0% of the students attend vocational schools, while others are engaged in apprenticeship. In the attempt to contain student dropout, institutions and educational levels, including general and vocational education schools, make vertical and horizontal cooperation efforts. *Investments are allocated to flexibility, with students attending more than one institution and being able to attain module certifications.* On the other hand, many positions are filled by already qualified students, while many dropout students and unqualified young adults compete for the same opportunities (CEDEFOP, 2013). In order to respond to those challenges, Finland has made the following decisions:

- During the 2008 education reform, *increase and define qualifications for secondary and post-secondary students* and emphasize education competencies throughout life. Annual surveys are used to monitor performance.

- Offer guarantee of qualification for young adults, according to regional targets.

- Develop anticipated and tailored procedures for *guidance and advisory, mainly for the youth*, and create solutions and pedagogical practices to favor study course completion, as well as job-centered learning environments (UNEVOC, 2014).

- It is also worth mentioning that Finland places emphasis on social-emotional capacities, in detriment of contents that become outdated.

2.6 COUNTRIES OF CENTRAL AND NORTHERN EUROPE

In this section, this essay broadly analyzes Belgium (Flanders), Czech Republic and Hungary, but has no intention of being exhaustive. All of these countries count on full support to school education and, in the case of Belgium (Flanders) and Czech Republic, vocational education has relatively high prestige. In Hungary, however, its prestige is lower and companies have reduced participation.

2.6.1 Czech Republic

In Czech Republic, *vocational education, especially the one based on schooling, is highly esteemed by society and maintains a high-quality tradition.* Therefore, 79% of upper secondary students were enrolled in vocational programs in 2006 (CEDEFOP, 2009, 2013). *PISA general results are among the best,* indicating a satisfactory basis. The country's educational system requires students to choose a direction at the age of 15, when they must decide to attend general secondary schools, technical schools or vocational schools. While general schools are academic and preparatory, technical ones prepare students over four years for secondary-level careers and/or higher-level education. Vocational schools prepare young students over two to three years for manual labor and similar activities, with a final specific exam. After this level, students of preparatory schools can attend short-term courses, from one to two years in duration, which lead to *maturita* exam, a pre-requisite for higher education, both in universities and vocational schools. Students from technical schools can follow that option or enroll in short-term courses, from one to one and half year in duration, with a vocational certificate. After all, students that complete vocational schools can attend follow-up courses, which last two years. All the courses taken after upper secondary education are equivalent and allow students to take *maturita.* However, it is clear that students from the academic area tend to be better prepared.

The main problems identified (KUCZERA, 2010; CEDEFOP, 2009, 2012 b, 2013) are:

- *Reduced participation of companies, with variable-quality apprenticeship,* usually lower than that of schools. This reaffirms the prestige of schooling.

- Governance problems in higher vocational education at a regional level, characterized by the *lack of transparency and accountability* to assure greater connection between job needs and students' choices.

- *More pedagogical and psychological guidance is offered to students instead of vocational guidance,* which is divided into two ministries, the Ministry of Education, Youth and Sports, and the Ministry of Labor and Social Affairs.

Still implementing an educational reform started in 2001, Czech Republic tends to comply with several recommendations made (UNEVOC, 2014), such *as dividing curricula into two tiers, a national tier and a school decentralized tier* to assure compliance with regional needs and to satisfy the requirements of the labor market, in addition to students' interests and capacities.

It is worth highlighting that the *attractiveness of vocational education is largely a result of its quality,* although the relationship with companies has to improve, with an assessment structure and accountability for the results achieved.

Czech Republic is one country where vocational education prestige is largely a result of its quality. However, it has to bring vocational education closer to job requirements.

2.6.2 Hungary

Vocational education in Hungary is largely dependent on schools, but prestige of vocational education is not relatively high. In fact, in 2010/11 only 10% of the students from secondary vocational schools had apprenticeship contracts (HUNGRIA, 2012). Students are required to choose a type of study at a younger age, at 14 years old. The country's national framework of skills has a good reputation and, based on successive reforms since 1989, a *quasi-tax was created, paid by employers to finance professionalization, constituting a stable and guaranteed source.* However, schools and jobs need to be more closely connected, and the attractiveness of vocational education needs to be improved: the return offered by academic education is higher; however, unemployment among higher education

graduates is also high. In general, Hungary has one of the highest rates of inactivity among European Union countries, mainly during adolescence (KIS et al., 2008; WATTS; BORBÉLY-PECZE, 2011; CEDEFOP, 2012 g, 2013; UNEVOC, 2014).

Since last year, and after its large educational reform, Hungary *has been offering vocational education in parallel with general education as of grade 9.* The system and its organization are considered to be complex. At upper secondary education, in addition to the academic field, which gathers only one third of total students, the other two thirds are distributed between: 1) secondary vocational schools that address, over four years, the theoretical and experiential aspects of a common content in a skills sector. Upon completion, students take a completion exam and may be awarded a certificate, which enables them to work in at least one occupation of the sector; 2) vocational schools over the period of three years, with general and vocational education, and training (which is offered more frequently than before), in addition to two *support* methods offered to students with lower achievement, including the ones that cannot complete elementary school. The first method helps students under 16 years old to acquire basic skills and competencies to continue their studies, while the second method is intended at eliminating learning difficulties and increasing motivation of students who cannot complete elementary schools before the age of 16 to pursue vocational training.

Students then follow to higher education, which currently includes vocational programs that prepare students to perform high-quality jobs. These programs also help in the transition from vocational education to higher education through credit transfer. They are indicated to students holding a certificate of secondary school completion. As observed, *fluidity and equivalence between levels is smaller than in other countries.*

Hungary created a tax to finance vocational education and to bring it closer to job requirements, and designed processes to enable greater engagement of social partners.

Hungary has implemented different policies to tackle challenges, and the following aspects are emphasized:

- *Social partners are engaged in three national councils* to improve communication between education and work, besides several other committees.

- Local and integrated vocational centers to bring work preparatory courses closer to current and future requirements.

- *A governance model that is more vocational education-centered*, in the opposite direction to that of Czech Republic, to strengthen its relationship with the labor world. This model would be under the responsibility of the Ministry of National Economy, which shares it with other ministries.

- *A career and professional development plan for teachers,* whose average age is increasingly higher, leading part of the teaching staff to retire, which then demands increased attractiveness. The plan includes teaching practice, with monitoring of graduate students.

- *Better guidance services offered to the youth and general workers throughout life,* according to the services first provided in 1890. In addition to a national council, a network of advisors was created. These advisors assist other advisors with the help of a core team composed of 20 members.

- Measures to *anticipate skill needs and to leverage school-company cooperation* to help reduce high unemployment rates among young people. These measures include increased number of scholarships, especially for socially disadvantaged students (to increase attractiveness of vocational education), and a higher number of apprenticeship contracts. The Economic Chamber has established criteria and standards for in-the-job training and respective monitoring in order to ensure quality (HUNGRIA, 2012).

2.6.3 Belgium (Flanders)

The Flemish region of Belgium offers compulsory education until the age of 18 years. In general terms, primary education goes from 6 to 12 years old, and students are required to choose a type of study at the age of 12-14 years, which European Union educational policies consider to be too early. On its turn, secondary education is comprised of three 2-year stages each. The first stage is divided into two branches, A and B. The first one represents comprehensive education, with all options of secondary education. The second one helps students in their first year to enter branch A. However, few students are able to move to other type of education and remain in secondary vocational education (BSO), in part-time vocational education (DBSO) and in apprenticeship offered by the Flemish Agency for Employment and Vocational Training Services (SYNTRA). In the 2010-11 academic year, at upper secondary education, 43.4% of the students were in the academic field and 4.0% in apprenticeship. Considering that the contingent of students included 144,325 students, more than 28,924 of them attended renowned vocational courses offered by SYNTRA and 87,679 attended vocational training

and in-the-job training programs. Post-secondary vocational education served more than 114,887 students. Regarding financing and management, secondary schools and adult education centers can be government owned or government funded and privately managed (KIS, 2010; CEDEFOP, 2012 a; MUSSET, 2013).

> The literature outlines *decentralization,* with an innovative and business approach, *initiatives for greater internal coherence within the system, and recognition of previously* acquired *know-how* and skills as the great advantages of the Flemish region.

The performance attained in PISA by a special group of students still represents an obstacle to the region. The region has high PISA performance average, but different levels of achievement. This requires caution due to the difficulties caused to professional education and training, and due to general losses incurred by individuals and the society. Except for that, some programs lack greater connection with job positions, and *higher participation of employees and general social partners* is recommended. In-the-job training is not sufficiently integrated and, at large, the number of students attending apprenticeship programs represents a lower percentage compared to school education.

> **Like other countries, Belgium (Flanders) faces a challenge of poor PISA performance by a certain group of students. Once more, the importance of offering sound general education for everyone is a very widely held belief**.

As for teachers and tutors, *qualification requirements do not sufficiently build upon in-company experience*. Thus, most of the problems would be solved by greater proximity between schools, governments and social partners, placing more emphasis on the role of in-company training, which is more effective. These are some of the recurrent difficulties encountered by different countries, which primarily focus on schools more than on companies when the subject is vocational education. As school exams result in students being awarded certificates and diplomas, academic accreditation can be frequently overrated and seen as a launch pad for better jobs. Collins (1979) called that phenomenon credentialism, a condition by which the certificate or diploma serves several purposes. When systems are primarily focused on companies, they are more specific and less general than schools.

On the other hand, the high student dropout rate, among other reasons, outlines a *need for good-quality vocational guidance,* offered to students on an equitable

basis. Vocational guidance has been faded into the background by psychological guidance, as in several other countries. Considering the difficulties encountered during adolescence and youth, the solution does not include minimizing psychological guidance in favor of vocational guidance because discussing adolescents' issues is indeed necessary to help them participate in the labor market and in work preparatory activities.

Therefore, concerning the Flemish region of Belgium, the following aspects are highlighted:

- Better engagement among partners, especially the government, schools and companies, as the basis for resolution of several problems.

- A significant sector with renowned vocational courses, vocational training programs, and in-the-job training. Quality improves attractiveness and the status of such alternatives, while the opposite is also true.

- Advantages of decentralization, better internal coherence of the system, and skill certification.

2.7 THE STATE SCHOOL MODEL

This part of the essay is focused on the countries that tend to base themselves on schools and state-funded vocational education, although at different levels and with distinct characteristics. However, it does not mean these countries were predominantly and clearly inspired by the French experience, first acquired during the 1st Industrial Revolution. Additionally, it does not mean these countries have not been influenced by the sectorial or geographic aspects of other models. These countries are so historically, culturally and economically diverse as France, Spain, the Republic of Ireland, Israel and selected Latin-American countries, considering that highly-esteemed school education is considered to be a common denominator.

2.7.1 France

As already mentioned, France developed one of the vocational education historical matrixes, which had broad repercussions around the world, including in Brazil. This is a *centralized, state model, incorporated to the educational system,* with roots in Napoleonic and other reforms. A common school system is pursued until the age

of 14 and, from 15 to 18 years old, students attend upper secondary school, with several options of general and vocational education, culminating in a completion exam, the *baccalauréat.* About 37% of lower secondary education students enroll in a professional option as the result of a guidance process where the choice made by students and their families tends to be less important than students' performance at school and than the decision made by advisors (CEDEFOP, 2012 d). In this sense, as in other countries, educational guidance is pointed as a kind of school and social selection process, reflecting the strong influence of students' social origins. Students and their parents have the right to choose, but admittance is determined by the school in the light of student performance and other characteristics. 'Persuasion' used by advisors plays a decisive role in leading lower achievers to pursue vocational fields. Thus, the prestige of general education and, nowadays, of the choice to attend science and technology programs (previously referred to philosophy and humanities) is a challenge to vocational education.

In a broader view, everyone is legally entitled to receive vocational education and training. Initial vocational education is incorporated into the school system, under the responsibility of the National Ministry of Education. As for *continuing vocational education, it targets adults* who need to find a job or keep their current jobs, and it is under the *responsibility of the Labor agenda.* Therefore, there are three qualification levels: a) diplomas, bearing academic and professional value, under the responsibility of the National Ministry of Education; b) *titres* or, literally, titles, under the responsibility of the Ministry of Labor, and c) certificates, granted by private entities. Despite having a predominantly school character, policies recognize formal education, non-formal education, and informal education. For this reason, *skills certification* has enabled several people to have their experiences recognized since 2002 (GOMES, 2008; OGUNLEYE, 2011; CEDEFOP, 2012 d). More recently, however, a *large increase in individualization and in the use of self-qualification* has been reported in continuing vocational education, as if it were merely people's individual problem. Educational processes for adults previously had an equalitarian approach as a result of negotiations between companies, workers receiving salaries and the State. Today, these processes tend to be assigned to each individual, also as a way to reduce costs (ENEAU, 2011). Not by chance, France is one of the countries in the European Union that has the *lower proportion of adults participating in continuing education* (CEDEFOP, 2012 d).

In a broader view, several challenges are encountered when it comes to improving the quality of vocational education, starting with the fact that the *French economy has lost productivity and competitiveness,* and has been suffering some downgrades in the contemporary scenario. Additionally, *chronic unemployment*, especially among the young ones, has been increasing in part because of the gap

between workers' needs and their educational background, and because of the slight increase in the number of job positions. This scenario gives rise to studies and discussions about *descending social mobility, extension of the youth period until 34-35 years old*, and a potential breach of an intergenerational contract *(*for instance, CHAUVEL, 2006, 2010). Although the current generation has longer and probably better school preparation, their occupational opportunities are disappointing, forcing them to study more, with poor results, in a process of *educational inflation*: diplomas are worth less and less in the light of long unemployment queues. Despite the fact this situation is not exclusive of France, apparently, such uneasiness has been growing and has caused public policies to oscillate, still not being able to deal with structural problems.

Therefore, many analysts repeat, as a recommendation, the three-word expression '*decentralization, privatization and competition'*, the latter enabled by the creation of quasi-markets in vocational education and training. As for the first word, vocational guidance throughout life at least tends to be regionalized in an attempt to make it broader and better. France has funded hundreds of experimental projects since 2009, which were designed to fight the loss of students in the course of education and to lower the high unemployment rate among young people, and these projects confirm the measures are effective (CEDEFOP, 2012 d). Similarly, the country also implements projects to bring schools closer to companies, in addition to internship. A recent example was performed by three vocational lyceums, selected in a bid, whose students, some of them socially disadvantaged students, find it hard to adapt to the culture and rules of the companies, with severe consequences to their careers. Actions taken to solve this problem included visits to companies and contact between company staff and students to provide students with information on the reality of each occupation and on work conditions. These actions were successful and cost-effective. They also included familiarization with the rules enforced by companies, familiarization with intermediation processes between job applicants and companies, techniques for job search success, coaching for selection processes and other aspects. Students placed higher value on the contact they established with the company staff, to which they listened more attentively than their teachers (FOURIER; LEGAY, 2014).

The French project indicates that lyceums and companies need to get closer. Certain experiences are strategic for students, such as being in contact with the business reality, job search techniques, training, and others.

In addition, if school education plays the most prominent role, the *giant character of the public educational system*, in which vocational education is included, requires improved efficiency, a problem that is not exclusive of France, which has excessive government bureaucracies. The most recent self-assessment conducted by the Ministry indicates, among other problems, reduced attractiveness of the teaching area and the need to use the teaching time more effectively and to reduce the absenteeism rate (FRANÇA, 2013).

Thus, the French experience highlights the following aspects:

- The fundamental role, historically played by school and higher level institutions, bearing academic and vocational character. Despite wars and other critical periods, these institutions keep a high quality level, confirming that formal educational institutions, in their context, reach high national and international relevance.

- On the other hand, centralization and excessive government bureaucracies represent a permanent challenge in the sense of efficiency and effectiveness. If this is valid for France, it will certainly be for countries with larger territories and population.

2.7.2 Spain

This country, like France and others, gives *priority to school education for work purposes.* Comprehensive education of primary and lower secondary levels is mandatory until the age of 16 years, but about *30% of the group are not awarded a certificate to enter upper secondary education*. These students are sent to vocational initiation programs, partially organized in modules so that, according to official expectations, all students attain competencies at least corresponding to the basic level of professional skills and have the opportunity to enter the labor market. In the last year of compulsory education students have to choose (and simultaneously be chosen, according to their performance and conduct) between two general education programs (sciences and technology or humanities and social sciences) and pre-professional studies, which lead only to higher secondary vocational education. About half of students enroll to attend programs in the academic field. The others attend 2-year vocational programs while in high school, totalizing 2000 class hours, and are awarded a diploma of technician. On its turn, this diploma gives access to higher level vocational programs, which grant the title of higher technician.

However, the country faces significant challenges in a scenario of high unemployment rate among young adults, one of the highest in the world, worsened by the 2008 crisis (41.6% in 2010 (FIELD, KIS, KUCZERA, 2012). *Certain groups have poor academic competencies*, impairing subsequent studies and training. Therefore, more attention should be given to basic know-how and skills in vocational education. As for teachers and tutors, professionals who are getting older, there are no formal requirements, including a priority one that is having work experience in their field of expertise. Also regarding teaching, their career has to be structured in higher vocational education.

Spain also reveals the need to bring school closer to work, which also depends on the quality of teachers and tutors, and equipment, as well as vocational guidance.

Another challenge is that *vocational guidance is often on the background of* psychological counseling. A reform is necessary also to integrate at-school vocational guidance to employment services. Therefore, it is necessary to adequately qualify vocational advisors. In addition, *vocational education* is frequently found in the international literature to *include mandatory in-the-job training, but the effects thereof are less substantial than apprenticeship.* In this sense, the school education area highlights the need to have updated personnel and equipment. Nevertheless, *high rates of student dropout* are reported, requiring more intense actions. Finally, a public and transparent *assessment system* of vocational education at its various levels should be created for the benefit of quality, efficiency and equality. (FIELD; KIS; KUCZERA, 2012; CEDEFOP, 2012 i, 2014).

Spain's strengths that might inspire educational policies include:

- Engagement of social partners and attainment of mutual understanding by consultation to different governmental levels and partners;

- Reforms that facilitated *permeability between education and vocational training, post-secondary studies,* alignment between diplomas and competencies, and the vocational initiation programs mentioned above to cover effective students that have quit after enrolling.

2.7.3 Republic Of Ireland

Like France, *vocational education is school centered* and the State is the main provider and funder. While initial vocational education and training are under the responsibility of the Ministry of Education, both, in a continuing process, are under the responsibility of the Ministry of Business and Employment. *Apprenticeship is well developed*, and apprentices are offered training to work in a company or in an accredited training center in order to receive a national certificate (OGUNLEYE, 2011).

The educational system includes compulsory education from 6 to 16 years old, and students complete lower secondary education at the age of 15 or 16 years. After that, students follow to a transition year, which is optional, and are offered the opportunity to learn a wide range of know-how and skills, and gain work experience. Upper secondary education is attended over two years, and three types of completion certificates are possible: a) *academic certificate*, as in several other counties, the first path for access to higher education; b) *professional certificate,* bearing a broad character, which also allows continuity of studies at higher level, although at lower competitive conditions; c) *applied certificate,* which prepares students for adult and work life, based on a cross-curricular approach, and not on the division of subjects. The applied certificate only allows students to follow to programs after a certificate has been awarded. Thus, there is a wide range of opportunities for vocational preparation, mainly provided by a non-commercial and semi-state agency, the Training and Employment Agency, and by vocational education commissions, which are municipal public agencies. Cooperation among social partners is well established.

Non-higher, post-secondary vocational programs are divided into apprenticeship, training programs, short-term training courses, and courses attended after the certificate mentioned above is awarded. At higher level, technology institutes and, at lower proportion, universities and other higher education institutions focus on experiential, technical or vocational skills, especially on business, science and technology skills (CEDEFOP, 2011, 2013).

> **In Ireland, the national qualification framework conferred greater transparency to education and its routes. Workers and businessmen began to better understand what is offered and how it can be modified.**

The most frequently reported challenges include *poor basic know-how and skills by some of the students; and relatively high student dropout rate and high unemploy-*

ment rate, especially among young adults, with higher burden to the less-educated and qualified population. Vocational guidance is considered to be fragmented and fragile. Meanwhile, *training in the workplace is insufficiently used* by many vocational education programs. Concerning education throughout life, Ireland's participation is below the regional average.

How is Ireland facing these challenges? It is worth highlighting that:

- *Recent reforms increased transparency and opportunities for continuing vocational education*, and such opportunities have been adjusted to the national framework of qualifications. Hence, both workers and employers have a clearer understanding of what is offered and how it can be changed.

- *Reforms also improve relevance of vocational education* due to the labor needs. The broad offer in the area, which used to be duplicated and confused, is about to be restructured to offer greater coherence and integration. Therefore, vocational education commissions would be reduced from 33 to 16, while the *Training and Employment Agency was to be replaced with another agency*, in charge of funding post-secondary education and training, and monitoring the efficacy of the courses provided by those commissions.

- *Different apprenticeship structure*, so as to make better use of workplaces and render apprenticeship more significant in face of market needs.

Other measures include making *pedagogical qualification mandatory for teachers, tutors and supervisors,* and *bridging the gaps on basic know-how and skills* that schools were not capable of eliminating (KIS, 2010 a).

2.7.4 Israel

Despite its relatively reduced territory and population, education and labor in Israel are very complex. With children who are immigrants from over 70 countries, *plurality and diversity are frequent challenges*. School is mandatory from 6 to 16 years old, and unpaid until 18 years old. Typically, at the age of 15, students enter upper secondary education: about 60% of them in general education, about 33% in technological programs, and only 3% in apprenticeship programs. However, when students complete their apprenticeship programs, they do not have access to higher education admittance exams. Young people that do not attend secondary school are obliged by the Apprenticeship Act to prepare themselves for a trade in an accredited vocational school. Since the 1970's, the system advanced

towards comprehensiveness, moving away from the two-option approach for educational continuity and vocational education, as different options ran the risk of being associated with population distribution by ethnic groups (ISRAEL, 2010; FIELD; KUCZERA, 2012). Yet, four 'subsystems' are verified in education: state, state-religious, Arab, and ultra-orthodox (WOLFF; BREIT, 2012). Performance in international tests does not reach one of the highest averages and is highly variable. Hence, *several groups have basic know-how and skills below the desired level.* At higher education, several vocational programs are offered with the same Bachelor's Degree level, i.e., they bear the same legal and academic status.

One of Israel's particularities includes *practical engineering programs,* which can be comparable, to a certain extent, to short-term higher level careers in other countries. These are full-time, 2-year programs or part-time, 3-year programs and students are awarded a non-higher, post-secondary diploma. After that, students can continue with a Bachelor's Degree in university. These programs are offered by approximately 73 technical institutions and students take national exams at the end, and are given national qualification. Students must have attended 12 years of school and take a mathematics exam in order to be admitted. For people older than 30 years, these programs require eight years of relevant professional experience, in addition to 12 years of school attendance. In this case, programs have shorter duration.

Programs are largely funded by the state, but students pay about 50% of the costs at the post-secondary level. The Ministry of Labor, in addition to private centers, offers several programs which are directly subsidized; others financed by the State, but privately managed; and a voucher scheme that reimburses up to 80% of the expenses or 90% in case of students that receive social benefits. Employers that *offer training in workplace receive government incentives:* employers that meet trainee targets are fully reimbursed. Quality control involves external supervision, internal audit and accreditation. In the case of higher level vocational courses, supervision is under the responsibility of the Training Office (KING; EYAL, 2012).

However, the key challenge faced is the *need to have more engaged social partners,* with specific governmental agencies for them to meet and debate. On the other hand, although with quality school education, *the role of in-the-job training is limited in post-secondary programs.* For instance, practical engineering programs did not require mandatory internship programs. Other issues are: a) the need for *more accessible and effective vocational guidance* to be offered by occupational psychologists; b) create ways to anticipate personnel supply and demand; c) *improved teacher quality,* which is becoming scare due to aging of the group and little competitive salaries. Observe that pedagogical qualification is required for teachers to begin exercising the

profession, but not to continue therein; d) the need for *greater fluidity among different training modalities* to avoid duplication of students' efforts and to avoid students are stuck in dead-end alleys (FIELD; KUCZERA, 2012; KING; EYAL, 2012).

Successful solutions include:

- The *wide range of educational options* at secondary, (higher/non-higher) post-secondary and university levels;
- *Employers and unions being quite willing to participate* in vocational education and training;
- A *system of exams created by the Ministry of Labor*, in which near 70,000 people enroll per year, and which is an effective means for vocational enhancement.
- However, besides that, the most relevant and profitable aspect for economic development is the *high percentage of personnel employed in research and development* jobs in seven universities, dozens of research institutes and hundreds of companies. Investments are centered on industrial (mainly electronics) and agricultural sectors. Hence, research is not limited to state agencies and universities, but it significantly includes private companies that fund research and development because they are aware of their returns.

Israel is a special case of research generation and application towards technological and economic development.

2.8 THE LIBERAL MODEL

The liberal model, with significant changes, is more likely to be adopted by Anglo-Saxon countries for historical-cultural reasons. The countries addressed in this paper include the United Kingdom, the United States and Australia.

2.8.1 United Kingdom

By the historical and socio-economic complexity and heterogeneity, this text will focus on England (GOMES, 2008). Faced with the challenges of globalized

economy and competitiveness, the United Kingdom and, specially, England has taken considerable steps to improve vocational education since the 1980's. Large reforms, with substantial resources, created a flexible, quasi-market system, with lower participation of the State as funder, thus generating a large number of solutions for labor market needs. As part of this flexibility, further education colleges, among other institutions, with business autonomy and management, are part of a wide range of *offers, starting at upper secondary education and going until university, and also involving distance education.* As in other countries, it was discovered that work and technological complexity required education to be expanded in an innovative manner. Compulsory education started being offered until the age of 18, with greater responsibilities. Meanwhile, *apprenticeship has been growing, including at more sophisticated levels,* inserting education to the work environment itself. In addition, *assessment processes tend to be stricter,* offering data and information that could increase people's understanding on vocational options. Adult education integrates the formal educational system, although informal and non-formal training options are also offered.

England has taken considerable steps to improve vocational education, conferring more flexibility, autonomy and business-like management to it. It also expanded compulsory education, despite the fact that social and educational differences still remain a challenge.

Challenges partially involve a large variety of offers, with *a certain level of bureaucratic inflexibility and several regulation agencies,* which former reforms tried to avoid. Hence, *part of the education offered to students aged 16 years and more is considered to be of low quality and offers few benefits* to a great number of these students, with heavy burden to the socially disadvantaged ones. The large number of options offered is not sufficiently transparent either for employers or especially for those young people that most need information. Thus, it is not enough to have vocational guidance itself, according to Wolf Report (2011). Even worse, according to the same document, competition among entities that offer vocational education and training, through external assessment criteria, tends to lead low achievers to less interesting and almost ineffective options. Observe that unemployment among the youth and social inequalities are serious issues in the United Kingdom.

Additionally, *English and Mathematics teaching-learning problems* are so great that only 4% of the students with 16-18 years old master the necessary skills. Mastering the necessary skills continues to be the most valued and useful vocational

capacity. Therefore, it is necessary to bridge the gaps by implementing more adequate programs, according to students' difficulties (WOLF, 2011).

As employers continue to place more value on work experience than on credentials, the country should *expand general competencies* instead of offering to many qualifications so as to facilitate transition from one activity to another and changes in each activity (WOLF, 2011).

Yet, according to international evidence, another challenge is having *more engaged employers in a strong apprenticeship system*, which still has to be broadened. In post-secondary vocational education, where innovative institutions and programs are given priority, *supply is small compared to the demand,* below the countries of the European Union and OECD (HOECKEL et al., 2009; CEDEFOP, 2011; MUSSET; FIELD, 2013).

After all, *teachers represent another great challenge* because, differently from Continental Europe, there are competitiveness and budget pressures to make teaching a secondary and poorly compensated activity, to be performed by a higher number of part-time professionals (AVIS et al., 2012).

England, therefore, offers some important contributions to the contemporary history of vocational education, with the following being highlighted (cf. HOECKEL et al., 2009; MUSSET; FIELD, 2013):

- Creation of innovative higher/non-higher post-secondary institutions characterized by agility and dynamism.

- *Structural changes were made to governance and assessment,* in the sense of decentralization, flexibility, autonomy and accountability.

- However, the reforms made have some limitations based on their accumulative set of changes, which include too many offers and constant changes. Assessment has harmful effects, as observed above, placing an even heavier burden on "low achievers", who are socially disadvantaged. In this case, analysts recommend creating a national vocational education and training institution that will assure greater stability to the system.

Other challenges still include, as in other countries, *to improve elementary education,* mainly regarding English language and Mathematics, and improve remedial education in order to prevent people from having difficulties that compromise work. Like other nations, *company engagement* is also important, associated with a sounder apprenticeship system.

2.8.2 Australia

Australia has a federative, three-dimensional model considered to be unique, where State and Commonwealth jurisdictions are partially overlapped, representing one of the challenges of vocational education offered by public and private entities. This modality of education enjoys benefits in terms of funding and supply brought by increasingly frequent interventions of the central government into local government, as markets became national and global, with more requirements (KLATT; POLESEL, 2013). Several legal instruments have resulted from this vertical action, such as the National Agreement for Qualification and Development of the Workforce, the Vocational Education and Training Regulatory Act, and other instruments. As a result thereof, maybe the country has an excessive number of councils, including the Economic Skills Councils, which are independent and gather economic agents, educators and governments to decide about the sector's agenda. *Employers have active participation, showing their satisfaction with the services.*

For adults, vocational education starts, more usually, at the post-secondary level, but upper secondary students can already review their options, more frequently from grades 10 to 12. *The Australian Qualification Framework is well accepted and guides both vocational education and certification of competencies,* although it is too limited (WHEELAHAN, s/d). Remember that Australia has good PISA performance.

The government is still the main funder of education, but its role is increasingly focused on coordinating, providing incentives and regulating, thus leading to increased resources from private entities. The supply of vocational education and training has been characterized by quasi-market processes. Therefore, public agencies also have to compete in terms of cost and quality when state financing lines are opened. Concomitantly, to increase the total volume of resources, Australia has broadened the role of employers and students, the latter having to pay for part of their studies. Nevertheless, the government provides subsidies for companies to offer apprenticeship programs. Consequently, the amount of resources provided by employers was about the same as the one provided by public authorities. Equality is pursued by keeping annual fees at a relatively low level, and low-income students are exempted from payment. However, it is observed that for about ten years the equality level of the system has not increased. While seeking a balance between supply and demand, every year, thousands of applicants for vocational education are not able to get a position. In order to fill existing positions, applicants have to pay for the total cost (BURKE; SMITH, 2009). In this generation of reforms, initial and continuing education of teachers and tutors was first considered to be an individual initiative (SMITH, 2009). Leveraging

and improvement of vocational education depended on greater resources and flexibilizing reforms for better use of such resources.

Australia has leveraged and improved vocational education with flexibilizing reforms that have introduced a quasi-market concept, where service providers have to compete for the available resources.

Due to the peculiarities of Australian federalism, the *lack of clarity about the roles across governments and modalities of professional education* is a very important challenge nowadays. *Apprenticeship is strict* and should be more oriented to skill qualification. Another point, shared by many countries and which reflects the international demographic profile, is that *teachers are getting old*, although, from a qualification perspective, there is a wide range of educational programs. Another challenge is the conduction of a survey to anticipate job requirements, with the production of corresponding data. Obviously, if a vocational education system is guided by job requirements, such requirements must be quantitatively and qualitatively anticipated, at least in the short and medium terms. Therefore, adequate data must be obtained, including on the placement of students completing the educational cycle.

Similarly, recommendations indicate an *intergovernmental agreement about financing and offer, and discussion and use of education.* In this sense, Australia is heading towards the creation of a tertiary education system, where university and vocational education sectors will be better connected. *An apprenticeship reform is underway and such reform covers* previously approved *competencies*.

Additionally, students in general should rely on *greater transparency and information* about the sector, and those who pay for education themselves should be able to choose the institutions where they will be studying. Regarding transparency, vocational education is included into a broader governmental agenda, which was expanded to several modalities of education and to other sectors (HOECKEL et al., 2008; PAEZ et al., 2011; UNEVOC, 2014).

Therefore, reforms conducted to meet new economic needs:

- Were leveraged by the federal government, in cooperation with the States, and with the use of private resources.

- Vocational education is guided by the needs of the economy, while apprenticeship has received incentives to develop and work with the development of competencies.

- The introduction of quasi-market mechanisms forces public and private providers to compete with one another, both in costs and quality.

2.8.3 United States

The United States has the *tradition of fostering vocational education since the nineteenth century*, following the country's industrial development. For already explained reasons, a comprehensive school prevails where, in the same location, three 'schools' coexist: academic school, which is preparatory for higher education; vocational school, which also grants access to higher studies, but, due to emphasis on professionalization, provides students with academic conditions that are inferior to the ones provided by academic education; and general school, which tends to gather students with lower performance to study less demanding curricula. Hence, the country facilitates secondary school completion, trying to assure universal schooling to everyone, until grade 12. Today, this is an essential condition for employability.

In the United States, such as in France and other countries, counseling has a more or less mild role in selecting students according to the curriculum, sending best performers to the academic area and low achievers (after all, politely, for their lower merit and effort) to other fields. Once more, secondary vocational curricula tend to work for 'someone else's child'. With *highly decentralized management,* educational policies may have considerable variation according to the school state and district. In addition, in a market economy that stimulates free initiative, vocational schools and programs appear and are adapted to meet the most varied needs, both in the public and private sectors. This is one of the positive consequences of the historical decentralization of the federative regime (KUCZERA; FIELD, 2013). Higher education also has the same *flexibility and dynamism,* with a wide variation of programs and institutions, several purposes, levels and focuses of requirement. In addition to education throughout life, which is more frequently included in the activities of extension in favor of the community, higher education institutions offer from short-term careers (in which the United States is a pioneer with community colleges) to the most sophisticated post-graduate education programs, generators of discoveries, innovations and inventions (cf. GOMES, 2008). Hence, *professional qualification is predominantly under the responsibility of educational institutions. Apprenticeship fades into the background*:

considering a federal stimulus program, there were only 287,750 active apprentices in 2013, in a historical series with declining figures. Nevertheless, the federal government and part of the state governments have been investing in the area (U.S. DEPARTMENT OF LABOR, 2014). The Registered Apprenticeship College Consortium is an example. It is a network of higher education institutions and registered apprenticeship programs to facilitate access of apprentices to short and long-term higher careers.

The challenges faced by the country include *frailty of regular education performance,* as shown by PISA, as well by the basic skills of adults (OEDC, 2013). The latter survey found that, in the United States, *one out of six adults had poor language skills, and almost one out of three had poor arithmetic skills.* The higher performance range was below the average of surveyed countries. Confirming the concerns that are periodically disclosed in the press, such as the *A Nation at Risk* report*,* (U.S. DEPARTMENT OF EDUCATION, 1983), the referred to survey shows that, although the population has a high number of school years, deficiencies are a result, among other factors, of flaws in regular education, non-improvement of students' performance over time, and the average skills of some populations including, but not limited to, migrants and ethnic minorities. In a certain way, some statistical data on education are very beautiful on the outside, but ugly on the inside.

Out of a total of 36 million adults with poor skills, more than half were African Americans and Hispanics. *Social-economic origins have a strong impact,* which was certainly worsened with the 2008 economic crisis and the respective income concentration. It is important to note that other countries are improving at a fast pace, which puts the United States at a potential disadvantage. The report recommends a *centered action in favor of elementary education*, *focused on inequalities*; effective educational opportunities for young adults; a connection between basic skills improvement efforts and employability; solid CTE – career and technical education programs*,* related to apprenticeship in the workplace; adult education programs adapted to diversities, so that educational processes are significant; and ongoing awareness promotion of this serious problem.

Considering profound differences between states, OCDE collected CTE information in Texas (KIS, 2011), one of the leading states in terms of development. The document recognizes a *strong and well-articulated system that goes from secondary to post-secondary education*. It also mentions the participation of Texas government and its initiatives, with recognition of the benefits of contextualized apprenticeship, and integration of general education with CTE. However, among the challenges found, there is a *need for closer attention devoted to vocational quality*

and vocational guidance, the latter marginalized by counseling at schools. Similar to other countries, the proposal is *shifting the focus to workplaces,* including the type of vocational education previously mentioned: in-company apprenticeship, more effective than having a school focus. Once more, the main aspect is: *a great part of the population does not have basic skills.*

Correspondently, recommendations include creating a framework for CTE quality assurance; strengthening vocational education; increasing the use of workplaces by secondary schools; expanding CTE to everyone; and continuing with the efforts to improve literacy and arithmetic skills. In a broader scenario, out of six states, Hawley and Montrichard (2009) highlighted CTE great efforts in the sense of assuring accountability. The largest obstacle was found in the subtleness of internal and external assessment, and in creation of valid, reliable indicators, sufficiently sensitive to reflect the performance of institutions and systems. Nevertheless, a conflict of organizational objectives was verified: if, by one side, CTE aims at offering grounds for employment, it is also aimed at preparing students to continue pursuing their studies at higher education level, which is necessary to leverage workers' qualification. Neither too much, nor too little: finding balance is way too hard. As usual, when one responds to a challenge, others appear.

Concerns about the future of the United States, as mentioned in the referred to report, tend repeat themselves for over half a century, inspiring *somehow disseminated experiences of relations between schools and companies to render education more attractive in order to retain and lead to employment opportunities, especially for ethnic minorities.* As job requirements tend to increase, *two interesting experiences initiated in the 1990's include TechPrep and Career Academies. TechPrep* establishes a connection between general education and life, offering technical education and leading students to short-term higher vocation courses. *Career Academies* offer technical education during the three years of senior high school, corresponding to medium level education in Brazil, with a strict organizational environment, according to regional job requirements. Assessments, however, tend not to be clearly conclusive (GOMES, 2008). In the same sense, relatively recent projects use, as example, a move favoring academic subjects of science, technology, engineering, and mathematics (for instance, STEM Education Coalition, www.stemedcolation.org). Largely thanks to the 2013 Presidential Message to the Congress, the *P-TECH Model was designed based on a pilot experience in Brooklyn, with the New York School District, the City University of New York and IBM, creating a three-sided structure to lead students, mainly from under-represented groups in the pupil population, from technical courses to short-term higher vocational courses in computing and engineering. This model has spread across the United States with strong excitement, involving large companies.* Increasing the United States competitiveness is the best

way to preserve its well-being and prosperity (WATKINS, 2014). The fact that the country lags behind both in terms of achievement and choice made by students attending science, technology, engineering, and mathematics is a major concern. The idea is a Columbus' egg, but in the United States public policies tend to be strictly assessed. Until now, there is only one reference to an initial favorable assessment of the Brooklyn experience. Therefore, research projects are proposed to understand what P-TECH schools really are, how they work and if they are effective. Hypothetically, applicants' critical components include: 1) a curriculum centered on sciences, technology, engineering, and mathematics; 2) integrated use of innovative technology; 3) combination of formal/informal apprenticeship beyond the school day, week and year; 4) partnerships with the real world; 5) a flexible curriculum, with the possibility of attending on-site or distance higher education subjects; 6) a well-prepared teaching staff; 7) an inclusive mission, in the sense of identifying under-represented groups in the students population; 8) support to under-represented groups (a job position is necessary, but not enough); 9) a favorable administrative structure (LYINCH et al., 2013; SAUNDERS; DEL RAZO (2014). That hypothesis is consistent with the results obtained from surveys (MISHRA et al., 2013). Hence, deeper understanding and assessment of this experience are necessary.

Therefore, the United States:

- In its successive Industrial Revolutions increasingly moved personnel qualification from in-company apprenticeship to general school and educational institutions. The pioneer role of schools since the colonization period and their quality have contributed to that. Today, however, work-based apprenticeship needs to be expanded (KUCZERA; FIELD, 2013).

- Highly decentralized vocational education tends to be longer and more complex, and the requirements to be satisfied by elementary education tend to be in a larger number. Analysts insist on saying that the quality of vocational and elementary education must be improved. Elementary education is a constant limiting factor and is frequently discussed due to controversial reform proposals that boldly intend to implement educational revolutions, and which, due to such intent, are not fully brought forward.

- By having a decentralized approach, the United States fosters innovative niches in vocational education, also using it to improve general education (GOMES, 2008).

2.9 ASIAN COUNTRIES

Although relying on a school qualification tradition, strong state influence and modest pursuit of vocational education, the Asian countries analyzed in this essay have their own peculiarities. Therefore, this section addresses China, India, the Republic of Korea and Japan. Japan, the first one to become an industrialized country, has its own characteristics for deep historical reasons and is addressed differently, as shown in chart 2.

2.9.1 China

The People's Republic of China, with great territorial, population, and economic proportions, which are higher than in Brazil, has traditions that are contrary to vocational education, as in Asia. In a scenario where manual labor is considered to be inferior, a Confucian belief says that whoever performs manual tasks obeys the ones who performs mental work. On the other hand, a problem that also reaches Asia and the Pacific Ocean is that vocational education is usually from three to four times more expensive than academic education (SIRIWARDENE; QURESHI, 2009). Thus, when weighing costs and benefits, academic education is usually more profitable. Depending on government budgets, access to and quality of vocational education tend to be impaired. In China, both access and quality are limited, as the entire set of institutions is only able to meet some of the country's labor needs, despite the fact that institutions have increased at lower pace in recent years. Nevertheless, government and private efforts were able to increase enrollment in vocational education in upper secondary school and in tertiary education to almost half of the total (UNESCO, 2014). *Such results are partially derived from an interest, since the 1990's, to use the dual system, combining in-the-job and in-the-company education, as the latter option is considered to be more effective* (MI; WU, 2009; SUN; LU; LI, 2009; ZHAO; LU, 2009; LAI; NI, 2012).

The vocational education has expanded and has reach secondary education level with polytechnic, technical and vocational schools, and post-secondary level, with higher technological institutions (2 to 3-year programs), institutions that offer 3 to 5-year programs, and universities that provide higher vocational education. Additionally, there are non-governmental institutions offering several of short-term courses and they have autonomy to meet ever-changing labor needs: 1) non-profit institutions, such as sectorial, social and professional companies and associations, unions, and NGOs; 2) trade institutions, mainly engaged in secondary education activities (GOMES, 2009; PARK, 2009; UNEVOC, 2014).

To cope with the economic growth, China prioritizes vocational education and adopts *three political approaches involving decentralized decision-making and privatization: 1) general guidelines of vocational education must reflect labor market trends; 2) redefine supply according to market demand; 3) offer flexible school management to serve the needs of companies.* With such basic changes, four trends are observed: 1) establish and enhance administrative hierarchy under the control of local governments, involving the general public; 2) adjust curricula according to job requirements, streamlining the resources available. In this sense, a new system of credits, part-time programs, in-the-job training and trainee programs were established; 3) improve the quality of teachers, with public selection and competitive admission system; 4) require stricter certification from newly hired staff that will be trained before they start working. On its turn, *in higher vocational education, new approaches are heading to: 1) reformulated and autonomous colleges for adults; 2) experimental higher education units in five-year technical colleges; 3) new standards of direct relation between secondary and higher education; 4) maintenance of five types of school systems, full and part time, by mail and self-study, e-learning and regular higher education institutions* (MIN, 2013).

China has improved and increased the quality of vocational education. One of its challenges is that teachers only meet approximately 50% of the needs.

Several difficulties persist, such as the relation with the market, compliance with the principle of flexibility, sending applicants with not so good academic performance to vocational schools, the lack and variation of financial resources available between province and local governments, in addition to quantitative and qualitative shortage of teachers. Therefore, several initiatives have been implemented, such as a decision made by the State Council to massively launch vocational education in rural areas in order to cope with public services and infrastructure works; efforts endeavored by the National Reform and Development Commission and the Finances Department to promote vocational education among unemployed people, a project of the Asian Development Bank; and other actions of international cooperation, in addition to a training program on vocational education leadership, which includes the construction of model vocational colleges (UNEVOC, 2014).

As for teachers who are attracted by other alternatives where compensation and prestige are higher, a normative profile has been defined, which still does not reach everyone: 1) teachers need to master theoretical and specialized con-

tents of their field of expertise; 2) educational processes must be analyzed and assessed in relation to the job so that new curricula are developed; 3) teachers must master practical vocational skills and gain corresponding professional experience; 4) teachers must master and apply the basic theories of vocational education, being able to analyze, assess, plan and implement teaching processes; 5) teachers must be able to engage in school management and public relations; 6) teachers must be able to teach and guide students according to the requirements of their vocational option; 7) teachers must manage their own careers. Although major accomplishments include providing teachers with pedagogical education, and having educational credentials and courses enforced by law, the teaching staff is only able to meet half of existing needs. Although it is possible for teachers to receive education in regular colleges, and in other colleges and universities, only six vocational institutes for teacher training are reported in China (MI; WU, 2009; SUN; LU; LI, 2009; ZHAO; LU, 2009). One positive aspect is that each teacher must spend one month inside a company every year. This is facilitated by the fact that many schools employ part-time teachers who have a job in their field of expertise (KUCZERA; FIELD, 2010).

Recent developments include strengthening the basis of general education, with creation of school grade 9; a simple technical level vocational education model, with significant participation of general academic skills; reduction in the loss of students in secondary education; and expansion of general and higher vocational education in special. Concerning democratization, financial support is granted to students receiving technical education and this type of education is offered free of charge.

The following challenges are highlighted, among the several ones presented:

- The need to improve cooperation between schools and employers.

- Establish standards for in-the-job training, apprenticeship and internship programs, as well as minimum standards for equipment, teachers and other aspects for vocational schools and put them into practice. Therefore, it is not only necessary to increase financial resources, but also reduce geographic disparities.

- Increase system coordination between the central and province governments, and within the range of each one of them (KUCZERA; FIELD, 2010).

2.9.2 India

Within the same context, and also with fast economic growth, India faces huge challenges to qualify professionals, fighting the low prestige of vocational education. In fact, besides the student dropout rate and poor-quality elementary education, most of India's working population is unemployed because of poor health conditions and lack of qualifications, especially in rural areas. Less than 2% of workers are formally qualified and only 2.4% have some technical education. It is estimated that India will have to train almost 291 million workers by 2022 to become a world leading economy (MEHROTRA et al., 2014). However, more than 60% of students graduated in vocational education continue to be unemployed for about three years, which is a result of the lack of connection between acquired and required skills, of ineffective financing, of low quality and inequalities (AGRAWAL, 2013), of a gap between formal education and development of capacities, between theoretical and practical concepts, and other factors (AKRAM, 2012).

In the light of such considerable challenges, the government created, in 1989, the Secondary School Professionalization Arrangement, which is being reviewed to improve employability of young adults based on modular courses that focus on development of competencies. Vocational education was introduced in schools as of grade 9, i.e., in the beginning of lower secondary education, when students are almost 14 years old (GOMES, 2009; ÍNDIA, 2014, 2014 a). The government set targets to qualify 500 million technical-level workers by 2020, and, in its 11th Five-Year Plan, to create 70 million new jobs and qualify 10 million people per year, according to job requirements (BERLIA, 2014). The major difficulty is to perform actions and achieve those targets when economic expansion has slowed down, when there are infrastructure deficits, institutional frailty and governance problems, such as engagement of several ministries bound to the central government and state ministries. *Among the solutions identified (for instance, MEHROTRA et al., 2014), at least for the most advanced industrial sector, where employers beg for qualified personnel, one proposal is to adopt elements of the German dual model, combining theoretical and experiential training, school education and in-company training, and to start professionalization earlier,* today occurring for most students at the age of 15. In addition, *other national planning solutions involve greater proximity between public and private sectors, with educational institutions that can rely on greater flexibility and autonomy.* National Qualification Development, Qualification Development Coordination and Qualification Development Corporate Councils were created, the latter aimed at fostering actions with the private sector.

India has a large number of individuals who have completed vocational education but are unemployed. The solution would be bringing schools closer to companies, and offering curricula that cover effective job requirements.

The country is expected to create 1,600 new industrial technological and polytechnic institutes (ITIs), which will be government funded, private funded and funded by public-private partnerships, in addition to 50,000 new qualification and vocational education development centers in 10,000 secondary schools. *Those institutes are clusters of excellence for teaching and research on engineering and technology, bearing international level, offering graduate and post-graduate programs. They also cover education, basic sciences and humanities.*

Besides the ITIs, the higher education excellence area also includes Management Institutes, with short-term post-graduate programs, management organization and development programs, and consulting and research, in cooperation with companies. In addition, these institutes undertake research for extra-business and less qualified sectors, such as agriculture, rural development, governments, energy, education for health, and housing (ÍNDIA, 2014, 2014 b).

Among the best practices, we can mention the cooperation efforts between LG Electronics and ITIs in Mumbai, where the company selects students and pays for their education, while the Institutes pay for the scholarships and train the tutors. Bharat Forge adopted an ITI in Khed, identifying the educational needs, selecting a team and paying for the capital costs. Maruti Suzuki India transforms ITIs into excellence centers, with comprehensive curricula, student training, in-company tutor training, equipment funding and granting of awards to students and teachers. Infosys Campus Connect initially made a deal with 60 institutions to qualify engineers and, after the successful experience, expanded it to cover 500 in 11 cities. One of the main aspects is teachers and students' access to the reality of the industry. The lessons learned from such practices include development and exercise of leadership by ITIs and companies, as well as by teachers, with coverage of graduated students. Likewise, aspects such as teacher training inside companies and the institutional commitment to student development through career counseling, induction programs and tutorship should also be taken into account (BERLIA, 2014).

Beyond the industrial sector, there is a broad informal sector, where qualification needs are also considerable. The alternatives found include volunteer initiatives, including comprehensive programs to meet the local needs evidenced and detected during a consultation to the local population. Additionally, efforts to raise

community awareness, to create a community heritage, and non-formal actions on education, health and training have also been made. Such actions focus on informal and simple industries, agricultural activities, sewing, device repair, such as diesel and manual pumps, carpentry, and saddler and smith services.

Open apprenticeship systems are also an option. This type of apprenticeship program takes place outside the school walls and has as milestone the National Open School in 1989, later changed to the National Institute of Open Schooling. The Institute teaches professional courses on agriculture, technology, health, business and other subjects. It is based on a well-organized network of regional centers and accredited schools/institutions. It focuses on students that quit school and offers professionalizing courses with academic subjects. It also involves polytechnic institutes, whose number is intended to increase, and community polytechnic institutes that offer non-formal programs of vocational training, lasting from three to six months, in extension centers in surrounding villages (RAJPUT, 2009).

Also worth noticing is Jan Shikshan Sansthan (JSS), which focuses on the education and training needs of illiterate and newly-literate youth and adults, in rural and urban areas. The actions are performed by volunteer agencies that receive financial assistance (ÍNDIA, 2014, 2014 a).

In distance education, Indira Gandhi National Open University (created in 1985) occupies a prominent position, offering about 80 distance vocational education programs for people over 14 years old. The institution does not focus on the pre-qualification requirements of the school system and it has relations with open universities from most of the provinces.

Due to poor-quality regular education, India has been implementing broad adult education programs, initially only for literacy, then for the development of more complex skills. The initiatives include the Jana Shikshan Sansthan, which offers vocational education in courses with different durations.

Women's empowerment projects have also been implemented, including their preparation for income generation. There is a large number of training centers associated to employment and production, mainly in the areas of electronics, watch assembly, sewing and clothes making, spinning and weaving. Among others, they offer condensed general education and vocational training courses, especially indicated for students who left school before completing their studies (RAJPUT, 2009). As observed, the country's needs include from simplest activities, where vocational preparation can significantly increase income and productivity, and get people out of misery or poverty conditions, up to the more

complex technological sectors. And it includes clusters of excellence, which offer more sophisticated education for the country's economic and technological competitiveness. Thus, it comprises a set of highly diversified challenges that require dynamic and flexible solutions, usually hard to implement due to scarcity of resources and bureaucratic rigidity.

2.9.3 Republic Of Korea

As in Japan, vocational education and training in the Republic of Korea are largely influenced internal historical roots but, also like China and India, academic education has strong magnetism, attracting the best talents in bitter disputes for university admission. In the case of Japan and the Republic of Korea, expansion of higher education was quite accelerated, including as a response to valorization of general and higher education, mainly by students and their families (GOMES, 2009; GOODMAN; KIM; HATAKENAKA, 2009).

With vocational education and training separated and under the responsibility of different ministries, the country selects students early, at the end of elementary school: at the age of 12 they are already chosen for lower secondary education (academic), lower secondary education bound to industrial firms, trade school, or another option. After a three-year cycle, at the age of 15, they follow one of the following paths: upper secondary school, upper secondary school bound to industrial firms, distance school, or another field. At the age of 18, young adults follow to higher education and are able to enter, among several alternatives, academic colleges or universities, which take from four to six years; institutions that offer 2 to 3-year programs for short careers; or industrial universities, which offer 4-year undergraduate programs, and students may or may not follow to post-graduate programs (UNEVOC, 2014). For others students, they can choose non-formal vocational training, provided by the Ministry of Labor. About 20% of the students directly find a job, while about 70% attend some higher education course (AGRAWAL, 2013). Out of those students, about 32% enroll in short-term courses and polytechnic colleges (KUCZERA; KIS; WURZBURG, 2009). School possibilities are vigorously pursued with proficiency in mind, as shown by PISA, characterized by heavy demands and fierce competition. On its turn, the country is included into the context of global economy competitiveness, and needs to stay in the forefront to guarantee its exports.

Despite the educational and economic revolution after the end of the war, the Republic of Korea faces unemployment among young workers and shortage of technicians for the industry. This results not only from the lack of a closer re-

lationship between workers' qualification and job requirements, but also from the moderate quality of vocational education, partially derived from the level of funding. Vocational education and training institutions have a strong academic orientation, while the economy demands workers who are prepared to take the job. This contrast puts the country in a delicate situation because it is not able to fulfill neither one nor the other purpose. Employer engagement, which is usually scarce in initial vocational education, is reflected on the lack of in-the-job training. When in fact there is employer engagement, it frequently focuses on students' preparation to meet the needs of local companies. Hence, education is narrowed and, without a broad basis, it hinders skill transparency, the possibility to move from one occupation and company to another, and education throughout life (KUCZERA; KIS; WURZBURG, 2009), with both collective and individual losses. Teachers are well trained, with a strong academic and pedagogical basis, such as their peers in general education, but they have little work experience, which should precede their entrance in the career, and frequent updating throughout it.

What has the country been doing to face these challenges? The burst of the Asian economic crisis in 1997 and aging of the economically active population are significant drivers for changes. In 1999, the Ministry of Labor and Employment introduced a new labor culture, supported by three principles for the 21st century: mutual trust and esteem (among employers, government and workers), cooperation and engagement, and autonomy and respect. With austerity policies due to the crisis, the new paradigm of labor relations tried to reduce wages, increase competitiveness, assess performance and link payment to work productivity. Hence, vocational education curricula were also changed and emphasis was given to continuing education throughout life. However, most of the plans were not put forward (MOORE, 2009).

In Korea, the high prestige of vocational education is a result of its high quality and proximity with work. That is the only way to attract more qualified students, who usually prefer academic education.

In vocational education, development of vocational skills is under reformulation, and an innovation system and with its own structure was created. Middle age and elder groups, women, non-regular workers, disabled people, and employees of small and medium-sized enterprises are also targeted, which are all relatively underprivileged. Likewise, partnerships between the public and private sectors are encouraged, and workers' skills and job requirements are adjusted to reduce unemployment (CHANG, 2009).

Meister high schools (from the German word 'Master'), secondary vocational schools that offer 'tailored' qualification to young Meisters *in state-of-the-art technologies, are also among the initiatives implemented. Students who complete education are employed by leading companies and have the opportunity to participate in several school-work programs and higher education.* On its turn, out of the 80 junior colleges supported by the government, 21 were selected and converted into World Class Colleges. These colleges choose the areas in which they are more competitive (such as automotive repair, physiotherapy, and radio and television) to qualify professionals and make them ready for the labor market (REPÚBLICA DA COREIA, 2014; UNEVOC, 2014). It is interesting to question if such effective initiatives are able to solve the problem of having vocational qualification that is excessively specific.

In continuing education throughout life, universities have been encouraged to admit adults and regional learning networks have been created to offer opportunities for residents. In the area of skill certification, the academic credits bank is an open system of education throughout life, where higher education institutions recognize extra-school experiences (REPÚBLICA DA COREIA, 2014 a).

In the employment and labor area, the country targets several political lines, supporting the entrance of young workers into the labor market, generation of decent work, strengthening of social companies (organizations that produce goods and render services in cooperation with local communities to identify and meet the needs that are not effectively detected by the national government), programs that help create local jobs, and 'tailored' qualification, in addition to support to several vulnerable groups. One of those programs is the so called Vouchers System, to develop skills of unemployed individuals and those employed in small-sized companies. Another program includes the Being Successful in the Job Package, for integrated support to training and guidance of disadvantaged groups looking for jobs (REPÚBLICA DA COREIA, 2014; UNEVOC, 2014).

Some improvement needs have been identified, such as:

- Improved coordination of governmental actions and negotiation with companies.

- Expansion of in-company training in vocational education, as well as teachers' contact with this type of education.

- Broader vocational training scope, such as to make it less specific and immediate (KUCZERA; KIS, WURZBURG, 2014).

2.9.4 Japan

Japan has its peculiarities, although it shares a modest status of vocational education with other Asian countries (GOMES, 2008). Great part of the know-how and skills are found in companies and workers learn them inside companies, throughout their careers, while they are assimilated into the culture of the company based on peer-to-peer cooperation. Hence, specific education is not that relevant. On the other hand, education and training are largely separated, the former under the responsibility of the Ministry of Education, and the later under the responsibility of the Ministry of Labor. However, the conditions of labor relations have changed: not only the country is included into a global competitive context, but also unemployment has been increasing. In addition, changes to the traditional culture give rise to new forms of employment and career, mainly with the growth of the service sector (typical whole-life careers are more frequent in the industrial sector, whose economic share has been declining (GOODMAN; KIM; HATAKENAKA, 2009).

As for education, the competent Ministry has implemented the Second Basic Plan for Promotion of Education (2013-17), based on the White Paper. Among the problems being targeted, population aging, the severe earthquake and seaquake in East Japan, violence in schools, including bullying, and better achievement of those students below the average of PISA are also identified. The core purpose is to build a society of continuing education throughout life, based on the values of independency, collaboration and creativity. In terms of education, it is clear that it is grounded on defined values, from which attitudes and behaviors are shaped, and from which know-how and skills are acquired. Thus, the actions taken include support to schools, extra classes after the regular school schedule, measures to improve the performance of university students (in average, they do not study much outside classes), the creation of safety networks for learning (including reduced costs with education incurred by households, and increased building resistance to earthquakes), improved English proficiency for elementary and higher education students, better governance, and university education funding. These actions implicate in clearer governmental and private competencies, more responsibility towards the society, and a closer relationship with the community (JAPÃO, 2014 a, 2014 b). Observe that *social and cultural changes have been the object of concern for educators in relation to children's behavior at home and at school, school absenteeism, loss of students during secondary education (although being compulsory) and increased violence at school. Another matter of concern is the fact that teenagers and young adults lack real life experience,* and they consequently have immature attitudes towards work, with implications for vocational guidance (e.g., MIMURA, 2013).

Among the accomplishments made prior to the Plan, public secondary school has been unpaid since 2010, and a system of vouchers is in force for private schools. As of 2008, local governments are obliged to hire teachers to train other teachers whose teaching practices are considered to be inadequate. *From the following year onwards, at every ten years teachers have to acquire more advanced knowledge and skills to continue in their careers.* Among the persisting trends of the public educational policy, it is possible to mention the *internationalization of universities, their external assessment to improve quality, and financial support to students.* Regarding science and technology, a shift of focus onto science, technology and innovation policies has been verified. Therefore, regional innovation systems were created (JAPÃO, 2014, 2014 a; UNESCO, 2014).

Although incentives to public-private partnerships are constantly reiterated in policies and reports, Japanese characteristics are mainly verified in the employment of students that have completed higher education. A compared and international survey revealed that less than half of those students that completed higher education reported a clear connection between qualification and employment, especially in the administrative area. Although this is a usual phenomenon when higher education assumes massive proportions, Japan occupies a prominent position in the international scenario. *Employers tend to value personal growth potential, so that employees develop within the company's internal labor market. That is why the country has 'specific human capital': the most required know-how refers to the organization or products, or to the relation with other departments or, also, with other companies.* However, contemporary modifications have changed the scenario, including by increasing temporary jobs, especially among young workers. The connection between education and work requires a closer dialogue and shows that vocational guidance throughout life is an increasing need (KANEKO, 2014; MATUSUBARA, 2013).

Despite the changes, Japanese companies, mainly in the industrial sector, have become agents of vocational education.

That is why training, under the responsibility of the Ministry of Labor, targets experiential and more immediate learning for job success. Training more frequently targets young people and women wanting to have stable jobs, unemployed individuals, employed individuals who need training, newly-graduate students, and individuals with special needs. A central government agency subsidizes training courses with different durations (from three months to one year in case of unemployment, from two to five days in case of those who already have a job, from one

to two years for those who graduated), hiring directly or by means of local governments, schools, colleges, polytechnic centers and universities, and polytechnic schools for people with special needs. Most frequently, subsides cover training and personal maintenance, or the salary during training. The services encompass guidance, vocational qualification from three months to two years, and financial support until a stable job is found.

"Job card" is another program offered, as 'card' meaning a business cover letter. Targeting young adults and women seeking a stable job, this program combines career consulting, practical vocational training, skills assessment after training, and matching applicants with company needs. Therefore, the purpose of the card is providing the applicant with a government-certified cover letter. *The program involves the so called dual system in the Japanese style, which associates a course in a vocational education institution, training in partner companies, and lectures.* By February 2013, 837,758 people got a "Job card", corresponding to the average of almost two per person. The employment rate in 17,170 partner companies ranged from 68.2% to 94.9% (JAPÃO, 2014 b).

Hence, Japan's social, economic and cultural changes, affecting societies organized in global networks, require, among other responses, the following:

- Closer proximity between vocational qualification and more or less specific requirements of employers, which already includes in-company training, such as in the case above. Therefore, it is possible to reduce costs and increase benefits, both for groups as a whole and individuals.

- Higher status of secondary and higher vocational education in order to attract more talents.

- Better general and specialized skills to be covered in the curriculum to meet job requirements and to facilitate adaptation to the flow of changes.

2.10 LATIN-AMERICAN COUNTRIES

2.10.1 Mexico

Mexico's secondary vocational education was created in 1867, according to French education, which is similar. The system, which is in need of greater internal consistence, involves federal central units administered by the Public Education Secretariat, decentralized state units with federal participation, and decentralized units within each federative unit (GOMES, 2009; WEISS; BERNAL, 2013). The several options have a fixed hierarchy: *bachillerato general [general Bachelor's Degree]* or academic field has a higher status; *bivalente [bivalent education]; profesional técnico [technical-vocational education];* and *tecnológico [technological education].* As a major democratization challenge, the average public expenditure per student/year in *bachillerato general,* in 2009, was USD 1,454, compared to only USD 1,012, in *technical-vocational education,* which is offered in low-income neighborhoods, mainly due to difference in teacher compensation (WEISS, 2012). Itinerant units target socially disadvantage students, but secondary school stratification is still an important issue despite a transversal phenomenon: increased enrollment of female students (KIS; HOECKEL; SANTIAGO, 2009).

Competency-based education was introduced in the 1990's, and is related to a system involving job skills certification, CONOCER – Consejo Nacional de Normalización y Certificación (National Council for Regulation and Certification). This type of education was first introduced to the curriculum in work-related components, in 2000, and in others components after 2006. *Relevant changes to improve effectiveness and governance were verified in the last ten years, including the incorporation of a specific agency in the Public Education Secretariat - SEP, separated from higher education; decentralization of financing and public employees' labor regime not following SEP and union rules; implementation of new technical education tools and their relation to work, e.g. internship programs and professional practices with curricular value.* Before that, in 1978, we can mention Colégio Nacional de Educación Profesional Técnica - CONALEP (National College of Technical Vocational Education), a decentralized public body, with national scope, which offers a large number of upper secondary vocational courses in the industrial and service sectors (MÉXICO, 2014). The 2012 graduated students census counted 57,397 former students. *Upon agreement with Germany in 2009, the 'Mexican dual education model' was put into practice, in experimental mode, covering theoretical and experiential education, and combining school and workplace education.* With six school semesters in total, students have two options: at least two years of dual in-company education after the third semester, or at least one year of dual in-company education after the

fifth semester (MÉXICO, 2014 a, 2014 b). *Bachillerato tecnológico* is given special care, and it includes scholarships to students. However, the number of courses available is very large, as well as quality variations. In this field, *Observatorio Laboral (Labor Observatory), a vocational guidance site, deserves a closer look* (KIS; HOECKEL; SANTIAGO, 2009; MÉXICO, 2014). There is a large amount of publicly available and well-organized data on occupations and educational opportunities. Although insufficient from the perspective of vocational guidance, such data offer substantial help.

Similarly to other countries, Mexico finds inspiration in the dual system, and also tries to improve vocational education governance, increasing its decentralization and flexibility.

Although the country has taken considerable steps towards connecting school and labor, the bonds are still too weak. Analysts also mentioned the need to create quality standards for in-the-job training, and a trainee contract. On the other hand, some teachers and tutors need to receive pedagogical training before working with vocational education or right after entering it (based on the cost differences mentioned above, it is possible to see a disparity in teachers' income and status between academic and vocational education. These teachers still carry the stigma of manual labor). Greater articulation among the several vocational education subsystems at the upper secondary level is also recommended (KIS, HOECKEL; SANTIAGO, 2009).

Despite Mexico's considerable efforts, some challenges still remain:

- The number of enrollments in upper secondary vocational education has declined: from 11.4% in 2002 to only 8.8% in 2012. On its turn, the percentage of enrollment in higher vocational education, i.e., technological institutes and universities, increased from a small figure of 2.9% in 2002, to 3.8% ten years later (UNESCO, 2014). Therefore, its attractiveness capacity continues to be obscured by academic education, both at secondary and higher education levels.

- The Federal government's leadership role is remarkable, but the current framework of work-centered school education is a result of historical contradictions across the State, professional groups and students, whose ties have not been loosen yet. The business sector makes indirect and very limited interventions, while school institutions have a high degree of sta-

bility. Interests and motivations of students and their families are mainly directed to academic education (IBARROLA, 2009).

- The closer proximity between school and work has been targeted by effective initiatives, but a lot still needs to be done, including because vocational education continues to be almost exclusively offered in schools until the present day.

- Observatorio Laboral should be used as example and could be a valuable instrument for vocational education at elementary school levels.

2.10.2 Chile

Chile prepares its population for work especially through secondary and higher education, while the Ministry of Labor develops several programs and projects for more vulnerable groups, including women and young people. In-company education is not one of the country's strengths. Consequently, secondary education is comprised of two regular years, and two additional years divided into academic and vocational education. On its turn, higher education, besides universities, is comprised of technical education centers and professional institutes that cover several careers, and have the theoretical purpose of taking students closer to the world of work. *Some initiatives were implemented recently to bring partners closer to one another through the intermediation of national boards. One of these boards targets innovation and competitiveness, as the country is largely dependent on the export of products which are increasingly sophisticated* (GOMES, 2009; KIS; FIELD, 2009; UNEVOC, 2014).

In secondary education, to which it has broad access, Chile has shown relatively good results in 2012 PISA, ranking above other Latin American participating countries, and made improvements. Its 2012 average in mathematics was 423 (participants' overall average is 500), 441 in reading, and 445 in sciences. However, there are great disparities, such as in mathematics, where 51.5% of the students showed low performance (OECD, 2014). These students are, in part, the ones that have chosen technical-vocational education, corresponding to 45% of secondary education students and more than 60% of less economically favored students. Therefore, this is a large group that is highly relevant for education and income democratization, although they have more moderate academic background, reflected in their studies, including in their limited chances to attend higher education programs, also a result of a poor connection between both levels. Students can choose from near fifty specialties that have their curricula defined based on the profiles of graduate students, including 480 to 960-hour professional practice. However, a large number of

students quits before starting it. Despite the fact that additional 22% in resources are allocated per student in the academic field, 2008 employability indicators for the group showed better results for students in vocational education (KIS; FIELD, 2009; ORTIZ, 2011; SEVILLA; BUITRÓN, 2013; SOLÍS; CASTILLO; UNDURRAGA, 2013). In the 2003 group, the participation of students in vocational education was higher than that of their peers in academic education and, for most of the categories, the average remuneration of both groups of young students was equivalent. In this sense, vocational education was attenuating salary differences between young workers from different social backgrounds. However, students and those completing vocational education had less academic success and higher dropout rates, including in higher education. Some challenges include the need for assessment criteria and processes, including to verify the impact of the measures taken, such as increased actions for pedagogical training of vocational education teachers (LARRAÑAGA; CABEZAS; DUSSAILLANT, 2013; SEVILLA; BUITRÓN, 2013).

On its turn, higher education has been expanding quickly, and is divided into universities (in 2009, 64.1% of the total enrollments), professional institutes (22.7%) and technical training centers (13.2% of that total). Characterized by a low degree of equality, higher education has been marked by unbalance between job requirements and employability levels. About 60% of university level professionals did not work in their field of expertise. Vocational institutes and technical training centers proportionally gather more low-income students. Such institutions are subjected to quality assessment (differently from secondary vocational education), but assessment is shared with more than one entity, the National Accreditation Commission and Quality Accreditation Agencies. As this is a volunteer process, smaller units with less financial resources tend not to be quality assessed. Regarding employability during the first year after course completion, universities reached 83.6%, while centers reached only 70.6% and institutes 75.9%. However, when considering only 20% of the careers with higher employability offered in higher vocational education institutions, such careers had an employability rate equal to or higher than the average of the universities. By the end of four years, wage levels of workers graduated from universities were also higher, but once again it was possible to see an advantage when considering 20% of the careers with higher employability offered in centers and institutes (ESPINOZA; GONZÁLEZ, 2012; SEVILLA; BUITRÓN, 2013).

Programa Chile Joven (Young Chile Program) was a notorious initiative among all promising practices. This program mainly focused on people with low educational backgrounds, unemployed or underemployed people from medium or low social-economic classes, offering them training and intermediation services for internship programs or jobs. It included training courses for less qualified occupations, training on social-emotional skills, and in-service training. It involved two stages: about

200 class hours followed by full-time, in-company service training, from three to six months. Well assessed based on its impacts, and compared to control groups, the program was replicated in several Latin American countries (UNEVOC, 2014).

Programa Chile Joven (Young Chile Program) targeted people with low educational backgrounds and offered training courses for less qualified occupations, training on social-emotional skills, and in-service training. It was replicated across the Continent.

Some challenges still remain to improve ongoing solutions:

- Develop a chart of skills to be used as basis to articulate work-centered education, with skills certification, and to renew curricula.
- Place greater emphasis on in-company training, with partnerships between trainers and employers.
- Improve the literacy and arithmetic skills of students in general, mainly for vocational education.

Chilean teenagers and young adults, in secondary education and in higher level education, have been reported to participate in intensive campaigns in favor of an educational reform that could offer them unpaid public education. In fact, dividing students into public (unpaid) schools, charter schools (where parents use vouchers and have to pay any outstanding amounts, which are usually reasonable considering their family budget), and private schools (without vouchers and more expensive) has created huge differences across educational results, which are linked to students' social backgrounds. Several reforms have been proposed, but no agreement was reached, especially among beneficiaries who continue with their campaigns.

2.10.3 Argentina

Vocational education has followed different paths in the last decades, in the middle of a battle between general, preparatory and vocational education (GOMES, 2009). Based on an Enlightenment view of education in the nineteenth century, which was considered to be the architect of a country and its society, analysts consider that information on vocational education is seen to assign individuals

and educational organizations the responsibility to qualify workers for social and economic development, including to solve social issues, like violence. Therefore, other social players should be considered in a broader perspective (SPINOSA; TESTA, 2009). The Vocational-Technical Education Act, no. 26,058, from 2005, partially addresses such need. This Act regulates and comprehensively frames this type of education, although it is still necessary to redefine financial resources and necessary institutional assets. In collaboration with federal units, the Act encompasses secondary technical-vocational education institutions, higher education institutions, and vocational education institutions, such as professional training centers; labor qualification schools; agricultural education centers; mono-technic missions; arts and crafts schools (from where vocational education was partially originated in the country); secondary or poly-modal level schools that offer vocational training and/or complete itineraries; and school for adults with vocational training, or equivalent schools that award professional certificates. *Instituto Nacional de Educação Tecnológica (National Technological Education Institute) - INET is the executive agency that coordinates and implements national and federal programs of different levels, and that cooperates with governmental and non-governmental entities in this field. Two boards, "bodies for consultation and agreement", were set up to bring partners closer to one another: the Federal Commission for Technical-Vocational Education and the National Board on Education, Labor and Production, bearing Inter-sectorial character. There are also sectorial and regional forums. Educational approaches have also been defined to grant titles and certifications, in addition to benchmarking according to the area of higher education* (ARGENTINA, 2014).

According to recently published data, the federal network covers: 1) at secondary level, 1,578 institutions, out of which 87% are state run, with 610,899 students enrolled; 2) at higher education level, 820 institutions, out of which 57% are state run, with 176,817 enrollments; 3) 1,082 technical-vocational information centers, out of which 93% are state run, with 236,656 students enrolled (ARGENTINA, 2014). The actions taken within the network include a *Fund for Continuous Improvement of Technical-Vocational Education Quality, whose resources are distributed to projects submitted by institutions and selected by INET*. Hence, the school system bears the heaviest responsibility. However, the secondary academic field and traditional higher education continue to have strong attractiveness. In 2011, the professional field of secondary education covered only 17.6% of total enrollments, a figure that has been slightly decreased. Higher vocational education, however, reached 32.3% of total students, but was likely to stabilize in the last three years (UNESCO, 2014). Thus, despite the fact an education reform would solve certain issues and problems, shedding light on vocational technical education itself, it does not seem to be especially exciting for teenagers and their families.

Among other measures, Argentina tries to put vocational education under the spotlight by enforcing a specific legislation, setting up a specific federal administrative agency, and creating a financing fund, whose resources are allocated according to project competition.

In the area of the Ministry of Labor (ARGENTINA, 2014), relevant activities are verified, including *Jóvenes con Más y Mejor Trabajo (Young Workers With More and Better Job Opportunities program), which includes a labor guidance course. Programa de Trabajo Decente (Decent Job Program), in cooperation with ILO, created Sistema Nacional de Formación Continua y de Certificación de Competencias Laborales (National System for Continuing Education and Labor Skills Certification). Therefore, three-sided sectorial boards have been set up for continuing qualification and certification of competencies, in a dialogue process that reaches 40 business sectors. These boards define which educational needs will be addressed, which equipment will be used, and which educational institutions need improvement.* The actions provided more than 900 institutions with equipment, improved the management capacity of 90 institutions, and qualified 6,000 teachers. *An assessment made shows significant advantages for beneficiaries compared to non-beneficiaries.* However, sustainable financing remains a challenge.

In the Jóvenes con Más o Mejor Trabajo program, the Ministry also offers or supports competency-based courses in partnerships with unions, business chambers, companies from each production sector, social organizations and public institutions. The quality and sector economic relevance of these courses is often a topic of disagreement between the lines supporting curriculum and teaching material design, teacher qualification and improvement plans, and teaching certification (ARGENTINA, 2013, 2014).

Therefore, Argentina:

- Began (or resumed) recognizing and strategically strengthening vocational education at its several different levels after several changes to its course of action.

- While the school system is accountable for initial vocational education, the Ministry of Labor is responsible for the fields of continuing education and certification of competencies.

- The attractiveness of academic education, at secondary and higher education levels, continues to be high. Observe that the number of students attending higher education programs, per 100,000 inhabitants, is among the highest in the world (UNESCO, 2014).

2.10.4 BRAZIL

Brazil's approach requires specific characteristics, as the perspective of those who take a closer look differs from that of those who have an overview of the matter. From a historical point of view, it is worth recalling that vocational education and training in Brazil have two sources: the French public school, originated from apprenticeship schools from the early twentieth century; and non-formal education, mainly represented by quasi-state systems created after the Second World War. Industrialization in substitution of imports became a non-postponable challenge (FURTADO, 2009), mainly after the Brazil-United States Political-Military Agreement (Washington Accords), when Brazil entered the war economy as a supplier of food and raw-material, including strategic ones. SENAI is a pioneer in this field, inspired by the dual system and maintaining close relations with industrial companies without, however, disregarding its social role. After SENAI, the National Service of Commercial Apprenticeship (SENAC), the National Service of Rural Apprenticeship (SENAR), the National Service of Transportation Apprenticeship (SENAT), the Brazilian Micro and Small Business Support Service (SEBRAE), and the National Service of Cooperativism Apprenticeship (SESCOOP) were created. Part of non-formal education, as indicated in the dual system analysis, has been formalized as technical and technological courses. In several countries, including in Brazil, a large number of occupations became dependent on greater scientific and technological know-how, having schools as the best learning environments. Thus, schooling requirements have increased, not only because professional roles have become more complex, but also because the rush to get a diploma and a certificate contributes to an increased demand. Therefore, time in school and time in a company were addressed through a pedagogical and budgetary perspective, among others, as it is clear that the cost of school education is lower than that of in-company training.

In the case of Brazil, excluding information found in other countries, it is important to highlight the demographic scenario and general school education. The latter represents a bottleneck in professionalization, while the former is frequently unnoticed because it is characterized by slow, but continuous, changes. That is why the country needs to protect itself in the short, medium and long terms. A simplified view of the population is described in chart 3. Based on United Nations projections, the chart shows the world's total population is likely to decrease as of 2100, while in Latin America, the Caribbean and Brazil, it will start to decline in 2050. This is basically due to a gradual reduction in birth, fecundity and mortality rates. Brazil, part of Latin America and the Caribbean are still reported to experience a golden period of demographic bonus, i.e., the number of adults (people from 15 to 64 years) tends to increase. For the time being, two

groups theoretically considered to be economically dependent on adults have been decreasing: children and the elderly. Please note that the average in South America is still influenced by countries with a younger population, and Brazil, Argentina and Chile (countries addressed in this paper) are some of the 'oldest' nations. Also, not only the child population is decreasing, but also the elderly population is expanding. In 2000, the percentage of population 65 years and over was 5.5% in the continent. Fifty years later, this percentage will increase almost fourfold: 18.2%, and expected to reach 29.8% in 2200. The percentages in Brazil are very close to the figures above: respectively 5.2%, 19.8% and 29.7%. Calculations show that today there is still a long road to travel, and the number of those depending on adults in working age has been decreasing. The situation will be different in 2050 or earlier in Brazil.

Chart 3. World, latin america and the caribbean, and brazil:The changing age profile of the population, 2000-2200

Age range groups	2000	2050	2100	2150	2200
World					
15-64	63,0	64,0	59,2	56,0	54,7
65+	6,9	15,9	24,4	27,5	28,8
Total	100,0	100,0	100,0	100,0	100,0
Million	6.071	8.919	9.064	8.494	8.596
Latin America and the Caribbean					
0-14	31,9	18,1	15,5	16,5	16,3
15-64	62,6	63,7	57,0	54,4	53,9
65+	5,5	18,2	27,5	29,1	29,8
Total	100,0	100,0	100,0	100,0	100,0
Million	520,2	767,7	732,5	675,0	680,8
Brazil					
0-14	29,3	17,3	15,9	16,9	16,3
15-64	65,5	62,9	57,0	55,2	54,0
65+	5,2	19,8	27,1	27,9	29,7
Total	100,0	100,0	100,0	100,0	100,0
Million	171,8	233,1	212,5	202,2	208,8

Source: The United Nations (2004). Subsequent reviews may lead to changes.

Forecasts: average variant. As of 2050, international migrations were considered equal to zero for simplification purposes.

The total dependency relation in Brazil (the population aged 0-14 years plus the population aged 65 years old and over divided by the population aged 15-64 years) in 2007 was 64.6, i.e., in average, 64.6 people were theoretically responsible for supporting the dependent population. In 2012 that number was reduced to 49.5. These are not estimates, but actual, [1] public data. Also considering 2007 and 2012, but only the economically occupied population; in formal and informal work sectors, relations rise to 92.1 and 77.3, in five years. In other words, the theoretical relation shows that the weight is heavier upon the occupied population. When considering only the group that pays social security contribution or that plans for their future when they become inactive, relations jump to 193.2 and 181.3. In fact, only part of the population effectively works and a smaller part pays social security contribution. What scenario can be considered based on such data?

- A situation characterized by a temporary increase in income and consumption, as there are relatively few elderly and children.

- Subsequently, a larger volume of social security and healthcare expenses to be split between a group of people.

- As the population gets old, teachers and tutors also get old and are reduced in number, including due to general attractiveness issues of the teaching profession.

- *Concomitantly, Brazil will have its total economically active population proportionally reduced, as well as the children who will become part of the same population in the future. In other words, the number of potential workers tends to be reduced.*

- *From an economic perspective, when there are fewer workers, their productivity has to increase to maintain, or improve, the value of production, and be able to support their dependents. Productivity is largely increased with new production and management technologies, and better vocational education and training.*

- *If productivity does not increase, there might be reduced consumption, especially when the total population starts to decrease.*

1 Sources of original data: IBGE, PNADs 2007 and 2012. Available at: <http://www.sidra.ibge.gov.br/>. Visited on October 26, 2013. Taxpayers of the social security system had their age group limits modified in the light of PNADs data. In the case of primarily dependent groups (0-14, 0-19 and 60+), a decision was made to subtract the number of taxpayers.

- Public policies and expenses necessarily change in face of new population profiles. The same is likely to happen with private expenditures (GOMES; VASCONCELOS, 2014).

Hence, how is school education distributed today?

- In 2011, 20.7% of people aged 15 and over had less than four years of study. These people can be considered functionally illiterate and low achievers at school as, in principle, they should have been attending the first year of high school. In 2010, 9.4% of that population self-reported to be illiterate (BRASIL, 2012, 2013).

- The average number of formal education received by the population aged 15 years and over increased from 6.4 in 2001 to 7.5 in 2009. Yet, this population had not completed middle education.

- The population aged 18 to 24 years showed slightly better results: 7.9 years, in average, in 2001, and 9.4 years in 2009.

- In principle, people with lower educational background are socially excluded, forming clusters of poverty: they are less willing to enter vocational education, have low productivity, low income, do not consume much, and contribute little to the government tax revenue. This group of people may receive social benefits from the government.

If elementary education is the basis for professionalization, how is elementary education doing today? High school education, essential for students who will take technical courses, will also be briefly discussed here (COELHO; ARAUJO; SILVA, 2014; ALENCAR; OLIVEIRA; NEVES, 2014):

- Between 2006 and 2013, the number of enrollments decreased 6.7%, but the 15 to 17-year old group was reduced only from 10,739 thousand to 10,445 thousand. The number of enrollments should have increased, however, the opposite was verified and, even worse, less privileged populations sought high school education less frequently: enrollment in young adult and adult education courses had the sharpest decline (24.3%), followed by high school evening classes. Young students who lag slightly behind in school are likely to continue studying in daytime classes. Groups that are relatively more vulnerable (male students enrolled in public schools, who lag badly behind in school, and who live in less developed regions and rural areas) are the ones that less frequently advance from

middle to high school (LIMA; GOMES, 2013). Yet, 29.5% of the students enrolled in high school in 2012 were older than they should be, indicating increased cost of opportunity to be in school.

- The high rates of failure and school dropout, originated in elementary and middle school, are also present in high school in the same proportions, and create a bottleneck, which reduces the number of students who graduate from high school and follow to higher education. However, the greatest bottleneck is not in high school, but in the sixth grade of middle school, where a 30.8% age/grade incompatibility is reported, when students move from 'one teacher per class' curricular structure to 'one teacher per school subject' structure.

- As the demand for education increases due to employability, the number of people aged 15 - 17 years old declines within the economically occupied population (from 40.4% in 2004 to 32.0% in 2012), which includes those who want to work, but have great difficulties in taking up an occupation (from 31.2% to 25.3% in the same period).

If access, quality and equity of basic education are below expectation, how can vocational education be developed from it?

At technical education level, which requires students to have attended high school, chart 4 shows a promising expansion that, however, has been slowing down recently. Nevertheless, in 2013, vocational education integrated with high school corresponded to 4.1% of total enrollments (high school, regular and integrated), depicting moderate interest in technical courses. Student concentration in subsequent vocational education suggests not only the high cost of the opportunity to study, but also excessive curricula based on encyclopedia contents in high school, which has a class load of long hours. A significant milestone was reached in 2011: the National Program for Access to Technical Education and Employment (Pronatec), with resources from the Ministry of Education and Culture (MEC), Worker's Support Fund, BNDES, and others. However, the inter-annual variation in the number of enrollments decreased in 2012-13.

In 2013, 10.1% of enrollments in technical vocational education had been originated from the federal network, 27.8% from the state network, 1.8% from the municipal network, and the absolute majority, 60.3%, from the private network, which includes the so called S System. Despite the accelerated growth of federal administrative dependency, the private sector continues to be predominant. Leading vocational areas were health and safety, with 21.8%; control and indus-

Chart 4. Brazil: enrollment distribution for vocational education concomitant with, subsequent to and integrated with high school (in thousands of enrollments), 2007-2013

YEARS	INTEGRATED TO HIGH SCHOOL	CONCOMITANT	SUBSEQUENT	TOTAL	INTER-ANNUAL VARIATION (%)
2007	86	312	372	770	-
2008	132	377	414	923	19,9
2009	176	306	555	1.037	12,4
2010	216	217	526	959	- 7,5
2011	258	189	805	1.252	30,6
2012	299	240	823	1.362	8,8
2013	338	310	793	1.441	5,8

Sources of original data: Ministry of Education.

trial processes, with 20.2%; management and business, with 18.9%; information and communication, with 12.5%; occupational safety, with 8.0% and industrial production, with 1.6%, totalizing more than four-fifths of the enrollments. Possibly, diversification could have been greater, and concentration in the service sector is already clear.

What if Brazil got inspiration from one of the North American experiences mentioned above, like P-TECH, and created a shortcut from technical vocational education to the technological qualification level that, in part, is similar to the short-term higher course? Despite the provisory character of some figures, as observed, enrollments in technological courses represented 944.9 thousand students, or 20.1% of total enrollments in Bachelor's degree programs. Nevertheless, increasingly greater acceptance is suggested due to clear growth. Those 944.9 thousand students in technological education in the same year got near to the overall total of students in technical education, 1,362 thousand. Considering the social-educational bottleneck, a shortcut from one level to another would not seem unfeasible, provided that applicable laws and regulations are observed.

3 STRATEGIC MATTERS

This section addresses some of the most relevant challenges and responses concerning vocational education and training in the countries covered, for a more detailed analysis compared to the previous section. Responses and solutions are used in the plural, as no singular path is considered, inasmuch as, despite globalization, Brazilian settings remain diversified. Without acceptance and feasibility, an excellent solution suggested for one country in a certain historical period can turn out to be too exotic when implemented in a different period, and therefore, will not survive.

3.1 ASPECTS OF VOCATIONAL EDUCATION ORGANIZATION

3.2 MANAGEMENT AND REFORMS

Combining these transversal topics of strategic relevance to vocational education, a common and broader area is identified, which includes management and reforms in vocational education, to be conducted in the near future. The decline of extensive industrialization and the end of preparation for simple and repetitive tasks at the end of the 1970's, starting with developed countries, were identified as major turning points. Technological development, increased globalization, and urgent international competitiveness have led to *two common basic trends: incorporation of vocational education into local and regional development, and a new balance between local development and innovations, based on national quality standards.* Attention to students and teachers as agents of change instead of bystanders was gradually increasing. *Reforms tend to be exhausted from top to bottom, being "school and classroom proof".* The last reforms have focused on:

- *Governance:* more engagement of social partners;
- *Administration:* decentralization, more accountability of vocational education institutions, and greater capacity of such institutions to talk to one another and cooperating with other entities;
- *Financing:* involvement of the private sector, students and their parents;
- *Assessment:* more careful attention to students' apprenticeship results, and separation of external general assessment from teaching-learning assessment. Teachers and tutors defend the use of formative assessment, in different steps of the curriculum, as it enables them to diagnose and tackle students' difficulties, while external assessment is too broad and late;

- *Quality and transparency:* creation of skill standards and charts;
- *Mobility and opening:* acknowledgment of prior learning and restructuring of educational subsystems;
- *Curricula:* more flexibility and a competency-based character;
- *Comprehensiveness of the reform vision* for the entire system, requiring more resources, space and time. In fact, isolated and partial measures can have undesirable results (ATCHOARENA; GROOTINGS, 2009).

Management of vocational education involves general guidance and articulation of its parts as a whole. Reforms are different according to the needs, but some common trends include quality standards, external assessment, curriculum flexibility, and engagement of social partners, in a broad and integrated view. It is risky to change individual parts only.

The same authors list three types of reforms in response to globalization and say that each country has different motivations. They also warn for the risk of copying other country's reforms:

- *Competitiveness-oriented reforms:* they target higher performance standards. They typically involve decentralization, privatization and more efficient administration of resources.
- *Financing-oriented reforms:* they target reduced use of public resources and increased efficiency.
- *Reforms that promote equity:* not frequently implemented nowadays, they are aimed at reducing social exclusion and poverty by placing higher emphasis on quality and basic education.

More specifically in Latin America, Jacinto (2009) emphasizes that education is only one of the variables influencing transition from school to work, and that employment policies cannot be limited to providing more education. Social characteristics, such as ethnic origin, gender, social-economic status, and rural background have considerable impact. The young population that does not study and work (which is also expanding to other geographical locations) is object of greater

concern because they can eventually turn to crime, adolescent pregnancy and drug abuse. It has been possible to overcome the trend of creating courses directed to supply, instead of demand, but preparation for work is still used as a way to remove children and teenagers from the streets. School education, therefore, should be open to both continuity and completion.

Although in a different context, in the United States, Career Technical Education (CTE) also has to deal with these frequently contradictory objectives. As accountability places emphasis on policy, one persistent matter is how to measure results such as to result in educational process improvement. *For this reason, a formative assessment is proposed* (HAWLEY; DE MONTRICHARD, 2009).

Finally, it is worth mentioning that, according to evidence, either nationwide or non-nationwide qualification frameworks can make relationship between qualifications clearer, offer greater transparency, and open potential paths to students. This would be a focus point for reforms, around which other changes gravitate (COLES; WERQUIN, 2009).

In summary, *curricular changes, relationship with companies and social partners, allocation of different types of resources, and general policy directions all depend on management. Management enables parties to articulate issues as a whole, and this whole is an integrated set of parties, tuned in time and in space.*

3.3 HOW TO MAKE VOCATIONAL EDUCATION ATTRACTIVE

How to increase attractiveness of vocational education such as to receive more and better talents? This is a basic problem for several countries due to the historical background of vocational education relating to manual labor, low-income people, and to those who are potential or effective offenders. Abbreviated data on countries and international statistics show that there is high variation in the percentage of individuals enrolled in vocational education, either in secondary or higher/non-higher post-secondary school. In some nations, such as those using the dual system, this type of education has high prestige and (economic and non-economic) return, attracting a high number of students. The opposite frequently occurs in Asia and Africa, where, not rarely, class and caste lines value certain types of work by their 'nobility', 'neatness' or, in general, social prestige. Even with economic and technological changes, the types of work, in their social categories, 'contaminate' the respective qualification, its teachers, tutors and managers. Not by chance, the percentage of individuals enrolled in vocational education is low and, despite the changes, when it is increases, it increases slowly. As this is the last option for families, quality tends to be low, creating a vicious

cycle: as vocational education is an alternative for less favored people, quality is reduced and, thus, it only attracts the less privileged ones (OKETCH, 2009).

Likewise, prejudice against manual labor has been an obstacle to vocational education in Latin American and Caribbean societies, where indigenous and African slavery, as well as "encomiendas", left 'undignified' jobs to slaves and semi-slaves, which require repetition and physical strength. However, attractiveness is not the only issue preventing students from choosing vocational education, but also educational systems, as observed, develop more or less subtle mechanisms to select the best students to follow to academic areas, leading the best talents to economy and the society. Hence, vocational education carries the historical symbol of being an alternative for less capable individuals, poor people, orphans, and disabled people, and also to correct criminals.

In the light of such historical and social aspects, a highly attractive feature of vocational education is its cost-benefit ratio, in the short and long term, for individuals and groups. If this ratio is favorable compared to other options, such as secondary or higher academic education, attractiveness of vocational education tends to increase. The economy has a certain degree of influence, as different times, places, sectors, and investigation methodologies are likely to lead to different results. For instance, in a time unfavorable to employment, vocational education might not be as attractive as academic education, but it becomes attractive once again when the economy recovers. Or vocational education might be favorable only in certain sectors and occupations, but not in others, because jobs created are in a different level, different from the ones created in the past.

3.4 CURRICULA AND METHODOLOGIES IN INTERACTION

Position of vocational education in educational systems, due to the previously analyzed difficulties, is broadly dependent on curricula. In brief words, what is curriculum? It is a set of experiences lived by students (together with their teachers, tutors and supervisors) in general education and, in particular, vocational education. The concept does not apply only to schools, but also to simulated or real in-company apprenticeship, and other experiences in work, although planning, performance and assessment are different. This set of experiences, concerning their formal character (as there is a specific curriculum for the streets, the school yard, the school cafeteria, the school corridors and other sites where students live, socially interact and learn), is often mistakenly reduced (and simplified) by means of a curricular structure, divided into individual subjects with specific class hours, distributed in school terms. Although

literature does not present broad assessment results, one issue is the failure of students in vocational education, expressed by student dropout and failure. According to the classical Bernstein (1977), *the overlapped type of curriculum, with strict borders across contents, and between contents and daily routine*, in addition to a low level of control by teachers and students (frequently, centrally standardized), *tends to increase students' difficulty.* With content segmentation, students are solely responsible for discussing knowledge, which tends to be harder for those less socially and economically privileged. In contrast, *flexible boundaries between subjects and greater curricular plasticity facilitate educational success, and can be, in part, modified by teachers and students.*

If vocational education involves learning how to do, curricula clearly have to be connected with professional life. That is why another classical paper, Young (2011), distinguishes three types of future: Future 1, with a prescriptive curriculum divided into established subjects that determine the knowledge to be transferred by the school and that is committed to the elitist past of the latter; b) Future 2, which sees knowledge as social construction, in response to social and economic changes, rejecting frontiers across subjects, and between subjects and daily life; c) Future 3, with a curriculum that must define the concepts associated with different subjects. Then, in the foreground, we do not see a grid of subjects, but articulated concepts. These concepts must have conceptual and contextual coherence, i.e., conceptual coherence because it is based on scientific subjects and contextual coherence because it is grounded on occupational and labor needs.

The experience of several countries shows the advantages of competency-based education, but it is necessary to fulfill its prior conditions, at it involves paradigmatic changes. The stronger the connection between curricula, life and work, more likely students are to be successful.

These observations are aimed at encouraging reflection on the paths of vocational education in connection with modern times. New wine is being poured into old wineskins, suggesting the need to change established viewpoints and actions. If vocational education deals, on a daily and successful basis, with the challenge of integrating knowledge and action, theory and practice, it is important to consider perspectives about complexity of knowledge, interdisciplinarity, and new forms of developing curriculum (MORIN, 2000; MORAES, 2010). In fact, the reality of work is not only cross-disciplinary, but also trans-disciplinary, involving multiple connections, also with practice and, mainly, if realism and effectiveness is wanted, between school and

labor. Necessarily, students' roles become active and not passive roles. They can no longer act as a sponge, only absorbing programmatic contents, from top to bottom.

That is why competency-based education, especially from the experience of the European Union, has been a much-valued curricular approach, according to the literature. Donoso D. and Corvalán V. (2012) observe that the concept of competency has been evolving since its behaviorist roots, adjusting to today's more plastic and complex conditions. Especially in Latin America, two risks are, however, prominent: excessive professional specialization and reductionism when the 'know how to do' aspect is privileged. However, *there are great advantages: assessment flexibility and adaptability; convalidation of studies; strengthening of student's autonomy as the manager of their own learning; opportunity for interdisciplinarity, among others. Additionally, students' achievement and potential gaps in relation to targets can be identified.* In the Latin American continent, Brazil and Colombia are prominent, respectively through SENAI and SENA, and are one step ahead for counting on sound educational institutions. However, *some critical points relating to competency-based education in* Latin America are*: 1) many countries need to develop a strategic view of sustainable development within the vocational education and training system; 2) it is necessary to articulate institutions within a network so that the isolated perspective of each one of them is eliminated; 3) it is necessary to define public orientation for the system, as well as provide greater support to competency-based program design, execution, and assessment; 4) it is necessary to meet the academic success expectations of the population at higher social risk due to inequality.*

Taking those changes into account, this part of the essay addresses several matters relating to the international experience with curriculum, starting with the connection between general and professional education.

3.5 GENERAL VERSUS VOCATIONAL EDUCATION?

When considering the essential links between school and work, and across several types of school, the didactic concepts of general and vocational education are once again taken into account. *General and vocational education are traditionally seen as different and opposing, sometimes as competitors and enemies, but, in fact, a large part of these types of education share a grey zone,* illustrated by Wolf's statement (2011): "*Vocational education could not be more useful than literacy and arithmetic skills."* In fact, learning to know and learning to do need to be continuously and intimately connected, one contributing to the other. Knowledge realization itself within the reality of the doing, such as in mathematics, physics, chemistry, biology and other sciences, strongly contributes to students having difficulties in

terms of motivation and abstraction to successfully learn, according to experiences of the United States, such as the Career Academies and P-TECH (GOMES, 2008).

As differently from before, vocational education can no longer be a dead-end alley (it cannot be an option for someone else's children). It has to progress and expand in face of economic competitiveness challenges. The originating value of general education is so high that it must be used as basis not only for post-secondary studies, but also for education throughout life. Therefore, countries of the European Union have been intensely dedicated to bridge the gaps in the key competencies and basic skills of their pupil and worker population, including learning of English, which would be provided by general education (CEDEFOP, 2012 k).

Regarding the relations between general and vocational education, the international experience illustrates an arch, whose ends go from high specificity of professionalization, with the minimum of general education, up to such a high general education dose that vocational education might not be able to develop specific capacities. To find balance, the gradual combination of general and vocational programs has been recommended and carried out, sometimes sharing up to 75% of the content. In this sense, curricula are reconstructed around a mutual core that incorporates a set of general skills directed to work, such as critical thinking, transfer of learning, creativity, esthetics, social responsibility, cooperation skills, etc. (MACLEAN; PAVLOVA, 2013). That is also the reason for recommending greater permeability of qualification routes, applicable to employment and educational continuity, as well as in-company apprenticeship arrangements, with a strong element of educational and personal development (WINCH, 2013).

General and vocational education, depending on the situation, need to find delicate balance. Literacy and arithmetic skills are essential, but globalization also points out to English.

Another subject of higher importance, occurring in several countries, is *apprenticeship recovery,* mainly in native language and mathematics, both in general education and vocational education. In the case of the former, it is aimed at remediating the difficulties of students who are below a certain level of performance, so that they reach curricular goals before the end of the school year, grade, term or educational level. In case of the latter, it is aimed at eliminating deficits originated in elementary education, which still have not been overcome. A large part of recovery programs are part of the so called shadow educational system, with tutors for groups of students and individuals, onsite or distance self-study programs,

tasks with tutors in apprenticeship centers, tuition for groups smaller than regular classes, parallel courses, recovery centers for certain school subjects, consultation to online or telephone tutors at any time or day etc. A large portion of these remediation actions is offered in a broad international, national or local market (according to AURINI; DAVIES; DIERKES, 2013; VENTURA; GOMES, 2013; BRAY, 2014). Obviously, a large part of these opportunities is only accessible to students and families that can afford them and who are concerned with learning deficits. It is clear that one part of students who enter professional education does not belong to that group. However, strategies tend to be identical, both in general and in vocational education, including in higher education. *A basic condition to apprenticeship recovery is assessing students' performance at each step with the purpose to diagnose their difficulties, instead of using a generic instrument to approve or apply sanctions.* In order to have a diagnostic purpose; assessment has to follow corresponding scientific guidelines. Competency-based learning can be used, including as a refreshing focus. *Recovery programs must have teachers, tutors, methodologies and materials that are different from the ones used in regular teaching, where students fail* (e.g., ROEGIERS, 2012; CORTES; GOODMAN; NOMI, 2014).

When establishing a connection between curriculum and attractiveness of vocational education, the status of the latter compared to that of academic education depends on adjustment of curricula in secondary education. The characteristics of each possibility and the options offered at the end of common basic education greatly influence young students, encouraging and discouraging them to take one or other option. Literature accumulates several research studies on secondary education curricula that have been selected and summarized in chart 5.

Chart 5. Basic Types Of Secondary Education Curricula

TYPES	EXAMPLES	SOME EFFECTS
Dual curriculum: a kind of early student selection according to two basic fields: general and vocational. The former field places higher value on abstract knowledge, tending to impair access of those students with not so privileged social backgrounds.	Countries adopting the dual vocational education system: Germany, Austria, Holland, Switzerland, post-socialist countries in Central and Eastern Europe.	This system is grounded on the assumption that different paths meet pedagogical and social-economic needs more effectively. The lower the number of links across the fields, the lower the attractiveness of vocational education. The fainter the possibilities of continuing to higher education, the lower the attractiveness.

TYPES	EXAMPLES	SOME EFFECTS
Unit curriculum: characterized by comprehensiveness: different levels of integration between general and vocational education, with possibilities of mutual transit and coexistence of students. The academic and vocational fields are similar to two curricula that are partially mixed, in a 'conciliation'. In certain cases, there is basically one single path.	United States: comprehensive school. Norway, Sweden, Finland, Portugal and many others: different levels of comprehensiveness. Reforms that have meet pedagogical, social and political demands tend to increase comprehensiveness, as, for instance, in Israel.	Curriculum differentiation and, in certain cases, tracking differentiation in each institution, according to students' performance, by considering that it meets pedagogical and social-economic needs more effectively. The 'best' students are reserved to predominantly academic fields and preparatory programs for higher education. Academic and vocational education are legally equivalent, including regarding access to higher education. Critics allege that it disguises the social and educational differences of dualism. *It makes vocational education more attractive due to the links established and to the proportion of general education. It might, however, lead to less intense vocational preparation.*
Technical education in high school: it is a process to achieve comprehensiveness, where the content of general education is increased, or it is predominant in the vocational field to increase its status.	Argentina and Chile.	*With two strikes at different points, it is possible to increase attractiveness of vocational education, but it creates difficulties for it to reach any of its goals.* Argentina restored technical education in 2005.
Vocational education in high school: to obtain status parity, vocational education is introduced in all fields.	Brazil (1971), a generation of reforms in the 1970's in several developing countries, considering the results obtained in research studies, which were subsequently reviewed. According to these research studies, return of vocational education was higher than that of academic education (Colombia, Kenya, Sierra Leone, Tanzania, Trinidad-Tobago etc.)	*Reduction of general education can compromise the basis of vocational education. When mandatory, it can also cause social rejection, generating processes of accommodation and dissimulation.* Regulatory milestones that make vocational education compulsory or almost compulsory tend to fail. *High costs tend to compromise the relation with benefits.*

Source: Elaborated by the author

Chart 5 shows evidence in the sense that there is a *movement to avoid mutually exclusive school paths or with points of no return, which favors attractiveness of vocational education.* The more it becomes similar to an alley in the path of students, the lower is it attractiveness. Among the processes used to reduce the differences between the general or academic and professional fields, there is vocational education turned into secondary education and secondary education turned into vocational education. It is difficult to find balance and, thus, educational systems may not achieve conflicting goals. Hence, some aspects emerge, comparatively, from the studied countries and international specialized literature that might favor or not attractiveness of vocational education, as in chart 6 (GOMES, 2005, 2008, 2009).

The international experiences show that the possibilities of continuing with the studies increase attractiveness of vocational education. That is why paths and bridges are necessary. On its turn, vocational education tends to increasingly demand non-higher post-secondary studies and access to higher education, in short or full careers.

chart 6. Probable impacts of educational organization aspects on the attractiveness of vocational education

FACTOR	POSITIVE IMPACTS	POSITIVE IMPACTS
General Education	*It is the basis for vocational education, facilitating its performance*. *Favors transition between professional options throughout life,* as well as experimentation of different occupations by teenagers and young adults. *It enables educational continuity, at a higher or non -higher level,* which is increasingly required nowadays.	According to the curriculum, *vocational education might be converted into a simple shortcut for higher education,* with full or partial loss of professionalization efforts. According to research evidence, the higher the content of general education in the curriculum, more likely students are to immediately continue education.
Paths and shortcuts across fields and options	*It shows vocational education is not an alley* that confines individuals in an occupation or group of occupations, but opens paths for education throughout life and career progress.	*If the social and economic rewards of vocational education are not achievable, students might migrate to academic careers.*

FACTOR	POSITIVE IMPACTS	POSITIVE IMPACTS
High-quality vocational education, including with relevance to labor requirements	*Grants social prestige and comparably high performance.* It might become more interesting than general education.	In case of students quit the course or want to change their occupation after graduation, there is partial or total loss of individual and collective resources.
Reasonable number of occupations, according to effective and expected needs	*Facilitates understanding by employers, teachers and students; reduces costs; facilitates updating of knowledge and skills; enables occupational mobility and, thus, in principle, contributes to reducing unemployment.*	*When having a general character, with no proper level of specification, it might impair entrance into specific occupations.*
Presence of effective vocational guidance	*Makes labor opportunities, their needs, and qualification options clearer, so that students make informed choices.* Has higher relevance for less financially favored social groups, with limited access to information.	When the system lacks resources, educational guidance and counseling can suffer, and they are essential to several young students and schools, including as basis for vocational guidance.
Teachers with equally demanding carriers and qualifications	Suggests that vocational education has the same status and might reach quality which is identical, or sometimes better, than that of general education.	In the opposite case, it confirms the concept that vocational education is a second-class alternative, aimed at less capable students.
Teachers who are predominantly qualified based on academic education, in universities	Theoretical solidity and pedagogical qualification. Higher social prestige, depending on the university. Title adequate to the laws and rules of many countries.	Difficulties to connect with the world of work and make updates. Pedagogical qualification in certain cases places higher value on methods and techniques than on knowledge and relationship with students, especially those who are socially disadvantaged.
Teachers and tutors not graduated in universities or graduated in other areas but vocational education	*When in permanent contact with the reality of the labor market, management and scientific and technological developments, they enable higher connection between students and occupations.*	They know how to do it, but they often do not know how to teach students to know, to do, to live toghether and to be. No pedagogical qualification and understanding of students, and their adolescent and juvenile cultures.

FACTOR	POSITIVE IMPACTS	POSITIVE IMPACTS
Simulated or real work experiences	*Positive results were attained in the European Union once experiences were put into practice (CEDEFOP, 2012 k).* Tends to facilitate learning for students with abstraction difficulties and low levels of motivation.	If work experience contributes to making curriculum too specific, it reduces students' skill transfer capacity. If they are not well connected to school education, they might lose their meaning.

Source: Elaborated by the author

This summary confirms relevance of general education as a basis for other levels and modalities of education. No general education results in difficulties and additional costs for professional education. As education is attained throughout life, curricula have to open paths for educational continuity. Otherwise, part of graduated professionals might lose the pace, which means high individual and collective costs. Therefore, a wise decision maker will weigh both aspects to consider the immediate character of vocational education and long-term horizons. The immediate character increases individual achievement in the short term, while open curricula assure higher private and collective benefits in the long term, reducing costs incurred with updating. In addition, quality of vocational education depends on the meaning it has for students and on its suitability for the world of work, leading to vocational guidance as a basic condition. Relevance is also related to teacher's preparation, each one with his or her own limitations and possibilities, which also have to be balanced. Finally, in terms of meaningfulness and relevance, work experiences increase both individual and collective benefits when tackled in a pedagogical way. In this set of options, the success and failure of everyone: students, teachers, institutions, companies, workers, and the State itself, are at stake. The more successful vocational education is, the higher its attractiveness, thus, closing a virtuous circle.

Although without having extensively reviewed the international literature, some research studies deserve being highlighted. A study involving 27 countries of the European Union and Australia, Republic of Korea, Iceland, Norway and Switzerland, with consultation to coaches, teachers, tutors and employers, has shown that the public image of vocational education is more favorable to the general audience than to young people and employers (CEDEFOP, 2012 d, 2014). *Students' enrollment decision is largely dependent on the influence of their parents, relatives,*

people from the world of work and the media, which is the reason why they deserve special treatment as opinion leaders.

Parents and students use straightforward facts, such as the cost-benefit ratio and the social prestige of the occupations, when choosing from academic and vocational education. Arguments do not stand against facts.

There is a wide range of variations regarding the rewards offered by vocational courses, always subject to time and space: higher in relation to higher-level professionals in Slovakia, Poland and Czech Republic; less advantageous in Scandinavia and Belgium; with large variations in Hungary and some Baltic countries. Thus, the *individual and social benefits of vocational education are compared by the audience, for the election,* both with the field of general secondary education and higher level professionals. An essential factor is the possibility of vocational education granting higher or lower access to higher studies, vocational or not. Among the variables used, a *significant association between enrollment and average expenses per student in vocational education* has been reported*, suggesting that attractiveness is linked to quality.* On the other hand, unemployment among those who graduated from vocational courses is also significantly associated with enrollment, but in the opposite sense. In fact, findings emphasize the importance of quality in vocational education, according to the example of the quality assurance approach, stimulating the creation and enhancement of assessment systems by the European Union (CEDEFOP, 2012 k).

In this sense, *costs, employability and return (in terms of achievement) are straightforward and long-range goals, i.e.,* young students are unlikely to make random choices: they consider financial and non-financial efforts, compared to potential rewards. However, the information has to be spread, mainly to students of more modest social origins. In this sense, researchers show that general education, mainly for enabling largest number of students per class and use less equipment, might have lower costs than vocational education and offer higher performance, depending on the context (GOMES, 2005), i.e., its cost-benefit ratio might be favorable both for individuals and for the State. However, *when vocational education is relevant, i.e., when it meets relevant labor needs, it is reported to have high economic return.* A research study involving 18 countries (WOESSMANN, 2011), as well as a review on the member countries of the European Union (CEDEFOP, 2012 k), show the *advantages of vocational education remuneration, during the initial career period, but with disadvantages in the later period of professional life.* This tends to be as-

sociated with students continuing education at higher level by those who choose the academic field. In other words, if vocational education is not an alley, but allows educational continuity, this is considered to be a factor of attractiveness, as it tends to contribute to salary raises and improved status. Concerning short-term higher vocational courses, there are varied outcomes, but most of them are convergent. Bailey and Belfield (2011) verified expressive superiority of community college diplomas in relation to academic careers in the United States, even during the 2008 crisis. On the other hand, in Chile, Varghese (2014) found out that those who are qualified in such careers are under less favorable conditions than those qualified by academic institutions, in contrast with Malaysia, Nigeria and the Republic of Korea, where they have a higher employability rate than others. In France, those graduated by Technological University Institutes (IUTs) also have great rewards (GOMES, 2008).

However, in a broad view, it is worth considering that when young students make a choice they are not just looking at economic results with which they are familiarized. Social aspects, such as prestige and others things, are also taken into account. For instance, research by Breen, Werfhorst and Jaeger (2014), in Denmark, on the theory of aversion to risk, shows that such aversion prevents students from electing the secondary academic field, which is more challenging from an intellectual perspective and more economically rewarding, while students from favored social backgrounds are not affected by risk aversion in their educational decisions. This set of factors confirms the need to have *effective and democratic vocational guidance. In summary, vocational education has to show comparatively advantageous results and communicate such achievement in order to be attractive:* Caesar's wife must be above suspicion.

Another important aspect related to quality and attractiveness of vocational education lies on methodologies and teachers. Non-traditional, active, problem-based methods, partially defined by students and the individual or collective production of solutions can confer a meaningful purpose to schools and companies within students' experiences, avoiding the boring and troublesome characteristics of many regular schools. For this reason, in 2009, the European Creativity and Innovation Year (STACH; STÖGER, 2009) was established. Despite dedicated efforts, as the methodology area is somehow susceptible to changes, the collection of experiences was not very abundant. In the group of the surveyed countries, the highlights were social, cultural and corporate innovation, campaigns for awareness about innovation, new media and technologies projects, interchange of school students and apprentices across different countries, projects of corporate responsibility in one's own country and in other continents, arts projects (how to feel and see technology), youth, skills and employment fairs,

teachers, students and businessmen's reunions, cross-disciplinary projects, and others. New pathways lead to interdisciplinarity, project-based teaching, creation and invention, the active role of students and teachers, cooperation among social players, connections between theory and practice, and other aspects, verified at one or another point.

3.6 EDUCATORS: THERE IS NO CURRICULUM WITHOUT THEM

Vocational education teachers must have pedagogical qualification and always master the most updated concepts in their field of expertise. However, they deal with low social prestige, including within the teaching segment and, many times, relatively low salaries (BILLET, 2009). This situation is worsened by global scarcity of teachers, mainly due to abandonment of the profession. *Statistics show high withdrawal in all continents, with the most critical situation verified in Sub-Saharan Africa, in North America, Western Europe and in Arabian States.* Latin America and the Caribbean are not in a comfortable position, but the preliminary trend is global aggravation (UNESCO, 2014). By the specificities, *vocational education teachers might yet be under less favorable situation.*

The European Commission (2013) made important findings based on extensive research. *Shortage of teachers is basically due to decreased profession prestige, deterioration of work conditions (not disregarding violence), and relatively low salaries.* Mainly in countries such as Germany, Italy and Sweden, aging of teachers leads to their imminent scarcity. In many countries, increasing needs generate palliative measures, such as more working hours for teachers, more crowded classes, and older retirement age. In addition, schools, regions and countries fiercely compete for qualified educators.

The research study gives the following recommendations, among other points:

- Diversify criteria for selecting applicants from other fields, without making such criteria less strict.

- Promote contact with experiential aspects as early as teachers' initial training.

- Promote comprehensive and mandatory support programs for new teachers, beyond their first year of activities.

- To focus on teachers experiencing difficulties, with assistance programs.
- Offer real and unpaid, but mandatory, programs for professional development within schools or in their vicinities.
- Define transparent salary criteria for professional excellence.
- Stimulate faster salary raises for more effective teachers.

The number of teachers tends to be short in several areas and continents. In the case of vocational education, teachers are even considered to be a species on the verge of extinction.

Specifically focusing on vocational education, there are four teacher preparation models, which vary from addition to integration of formative areas:

- *Recruiting staff with vocational experience for additional courses* on teaching and training. Some examples would be the United Kingdom and Denmark;
- *Sequence of studies in a professional field,* with Bachelor's Degree, *followed by pedagogical qualification* (similar to a Teaching License in Brazil) to a certain extent, like the regular Brazilian arrangement: 3 years + 1 year. The United States and Turkey are examples of this model;
- *Simultaneous learning of a professional field and educational sciences* at undergraduate level or Master degree program or, in certain cases, at undergraduate and then postgraduate levels. In principle, Holland and Russia are use this model;
- *Integrated design of vocational subjects, based on the world of work and on the competencies development model.* Germany, Norway and some Chinese institutions are examples thereof (GROLLMAN; RAUNER, 2007; GROLLMAN, 2009).

Although there is no sound literature on the compared results of each model, Grollman and Rauner (2007) have reported greater flexibility and plurality of situations in countries such as Brazil, Denmark and the United Kingdom. In comparison, in countries such as France and Germany, teachers tend to be stable employees, working full time. *Meanwhile, in countries that are more flexible, such as Brazil, Den-*

mark and the United Kingdom, there is also closer proximity with experiential aspects, in those predominantly having stable employees. The challenge, however, is adjusting the pace to cope with more sophisticated and fast-changing technologies. In those countries, such as France and Germany, emphasis placed on theory also gives a chance to market and labor alienation. Anyway, a risk also shared by vocational education is the somehow radical segregation between theory and practice.

Among the models mentioned above, China tries to find balance. In principle, teachers are employees of companies working as part-time teachers but, due to reduced number of professionals available, the training system disregards this characteristic and, consequently, young teachers have little or no work experience in a company. On its turn, it is important to highlight that Denmark uses a constructivist perspective, where learning is totally assigned to students. Thus, the role of teachers is that of a consultant, mentor and stimulator, in the sense of coaching.

International experiences show there are several alternatives for the qualification of vocational education teachers. In any case, it is necessary to gain specific and updated knowledge through pedagogical qualification. Tutors should also be given special attention. They play a central role in the relation with practices.

Little concern about the relations between teachers and companies, both in initial and continuing education, is one of the gaps verified. Another fault is to consider tutors second best compared to teachers in the pursuit of quality. However, Germany, Austria and Denmark keep comparable requirements and qualifications for both groups, while in England and Scotland, for instance, tutors play a limited role (CHOY; HAUKKA, 2009).

Some national examples are illustrative thereof. In the Russian Federation, a specific system to qualify vocational education teachers includes curricular clusters of 1) humanities and economic and social studies; 2) mathematics and sciences; 3) general vocational studies; 4) educational and psychological studies, including practical training and probation periods; 5) specialized vocational studies, also including practical works and probation periods.

A more advanced level, five years in total, can be added to a four-year bachelor degree program, so that teachers can also work in short-term higher education careers (KOSYREV; KUBRUSHKO; KOUZNETSOV, 2009). However, despite this interesting concept, teachers of vocational education face low levels of

social prestige and payment. Hence, the country suffers from low attractiveness of the profession and withdrawal of graduated students (OLEYNIKOVA; MURAVYEVA, 2009).

In Finland, in-service training for teachers and tutors is mandatory over five days per year. Continuing education centers offer refreshment and development courses for teachers to advance in their career. Tekkä is a work-based development and training program that involves, among other components, planning of the in-service training period; and two months at work, forming teams of teachers-workers, with training of one or two tutors in the workplace.

In the United Kingdom, placement of teachers and tutors in the company typically involves paid work over a period of up to four weeks, in the facilities attained by interested parties. *Although those experiences are deemed to be very effective, they are not among the most widespread ones, as consequence of the lack of opportunities and growing demands in teachers' duties.*

In India, two models are verified: in the first one, engineering teachers spend three months in a company; in the second one, teachers spend one month in a company and, after one semester, repeat training in another facility.

In Australia, both teachers and tutors must have the Certificate IV (composed of 12 core and two elective units, totalizing approximately 300 hours) and demonstrate professional competencies at least at the level of their teaching. Updating is assured by their return to companies, private practice, participation in congresses, internal training activities, personal development workshops or individual study. Periodical placement within a company is deemed to be critical for updating, however, there is a lack of consistent approach and formal coordination (CHOY; HAUKKA, 2009; SMITH, 2009).

In summary, *knowingly effective resources are not easy to accomplish.* There is plenty of evidence showing teachers certified according to assessment standards are more effective. However, attention is necessary so as not to exaggerate. A relatively common phenomenon is the temptation to adopt highly prescriptive and centralized curricula that are supposedly called 'teacher proof' curricula. Hence, contributions of teachers are lost through their experience and skillfulness (BEVEN, 2009). For these reasons, *the following are international trends: a) teachers are freer to make decisions; b) flexible and reversible relations between learning and work for teachers, based on modular curricula for initial and in-service qualification, usually based on standards; c) generalization of education, regrouping specializations and highlighting transversal skills* (GERDS, 2009).

3.7 TECHNOLOGIES: SOLUTIONS, NOT PANACEAS

To plan, execute and assess curricula, information and communication technologies (ICTs) are powerful means to improve access, efficiency, quality and democratization of vocational education. They are means to support students, teachers and tutors with their experience in the age of information. This implies in having a knowledge infrastructure (schools, laboratories, radio, television, the Internet, workshops, museums), with teachers acting as facilitators, which is a groundbreaking role change. But they are not sovereign remedies: vocational education requires 'hands on' experiences and needs face-to-face contacts. However, ICTs reduce the need for fixed education and installations, but add costs incurred with faster updating of software and hardware, as the economic life span of these tools is measured in months (ZARINI et al., 2009).

Mobile learning is also a possibility, and it has minor impact in schooling, but a much greater impact on informal education. It is a type of continuing education, where there are no disruptions across different environments, including in formal and informal contexts. Student uses several technologies as opportunities open up. Materials include digital didactic books and electronic readers, implicating in changes to methodology and assessment. Despite high equipment acquisition and maintenance costs, as well as training of teachers and students, three experiences in developing countries are highlighted: in India, Barefoot College uses cheap mobile telephones, radio and personal computers to help train women in solar engineering, healthcare services, water quality tests, and other areas. BBC Janala is a course of English as second language taught in Bangladesh. It includes low-cost mobile telephone subscriptions, soap operas and talk shows on TV, and classes in the main newspaper of the country. Finally, in South Africa, Nobia No Math program teaches content and offers assistance in mathematics to high school students. An assessment revealed a 14% increase in mathematics skills and 82% use outside school hours, including during holidays and weekends (UNESCO, 2014). This is one perspective for vocational education, although with limitations.

> **Information and communication technologies are necessary, but not enough in several circumstances. Mobile learning is one of the most promising alternatives, but it is necessary to meet prior conditions and keep them finely tuned**.

In addition to these experiences, other national experiences should be considered:

Australia: In 2000, an action plan was created which involves the Flexible Learning for the Information Economy[2] program, designed to respond to the fast entrance into information economy. This is an electronic learning network, which offers a wide range of tools and resources, including E-portfolios for Learner Pathways, so that people can follow educational paths throughout life, with accumulative records. The activities are based on quality standards defined by a work group. The 2002 assessment revealed higher progress in the development of knowledge, skills and confidence of vocational education players, besides increased number and variety of resources, and development of networks and communities. On its turn, the 2004 assessment verified that the highest budgetary priorities were 41% of the total for professional development goals and 42% for online contents (KEARNS, 2009).

India: The country offers several vocational education programs with open and distance education. Maybe the largest program is that of the Indira Gandhi National Open University, which does not offer only higher degree courses, as already indicated. In cooperation with the Construction Industry Development Council, it launched, during the 1990's, one program for each basic competency, according to the performance standards accepted by the industry. These programs, on their turn, are defined as results from work, functions and tasks. Students' certification is made by competencies. Another experience is that of itinerant training units, which work both with individuals and groups. Some of the most successful cases, implemented by NOGs and private companies, include training in organic agriculture for young leaders of rural communities, children care, sewing and drivers' training (MEHROTRA; SACHETI, 2009).

Considering the experiences in vocational education, what are the recommendations? Kotsik et al. (2009) emphasize the need to have, among other things:

- A comprehensive plan with view, mission, values, objectives, strategies, schedule, assessment scheme, and budget.

- Adequacy between ICTs and current teaching-learning practices, including technological proficiency of teachers and students.

- Engagement of teachers and development of their competencies.

2 http://flexiblelearning.net.au

- Proper infrastructure, including hardware, connectivity, educational software, software licenses, systems maintenance and team training.

The authors have also pointed out some common basic weaknesses:

- Allow decisions to be technology oriented.
- Ignore existing educational and ICTs systems.
- Not very clear purposes.
- Unreal expectations.
- Not keeping informed and engaged players.

The following threats are highlighted: resistance from the players, such as believing that the ITCs will replace teachers; no equipment and support, and costs of equipment, including for students.

On the other hand, research studies reveal that the most favorable alternatives for ICTs include school staff development and infrastructure. They recommend keeping or making curricula more significant, especially, of course, for students, as well as supporting curriculum development, enabling teachers to work on autonomous and cross-disciplinary research and key competency assessment. In this sense, teachers must be offered continuing qualification, in addition to support, as they are key players (BREČKO; KAMPYLIS; PUNIE, 2014).

3.8 IN-COMPANY APPRENTICESHIP: INTERNATIONAL EXPERIENCES

Apprenticeship is still confused with poor children and teenagers working in English factories in the eighteenth and nineteenth centuries. However, it has advanced to becoming a noble activity between 1880 and the early twentieth century, when, according to Gonon's interpretation (2009), the German dual system was reported to be an answer for social issues. However, how is apprenticeship currently defined? In Brazil, it is a legal type of vocational education limited to a certain age range. In the rest of the world, in-company experience, with hands-on tasks and connection between theory and practice, is a form of apprenticeship that is not restricted to an age group. First, the English landscape of the First Industrial Revolution is outdated. With the advance of compulsory schooling, in-company apprenticeship has been associated with

school attendance. In recent times, being an apprentice became a known alternative for vocational education, supported by knowledge offered at school (MOREAU, 2008). There is no in-company apprenticeship without schooling, including as a way to reduce costs. Integration between school institutions and apprenticeship is deemed to be an effective means for professional preparation, catalyzing knowledge and hands-on tasks. In fact, despite the difficulties of generalization, research studies such as that of Issehnane (2011) in France confirmed the positive impact of apprenticeship on employment and salary, especially in secondary education. Identification with fairer social backgrounds and school failure has also been denied, at least by Courtinat-Camps and Fourchard (2011), also in France. Moreover, considering continuing education (both general and vocational education) is indispensable nowadays in addition to initial vocational education, one person can acquire learning several times in life. Qualification can become outdated and work innovations may require new stages of learning, with hands-on activities throughout life, as life expectancy increases and morbidity decreases, i.e., people become able to work for longer periods while enjoying good health. Hence, in France, which has an alternation system, and in countries using the dual system, increased number of apprentices over 25 years has been reported (CAHUC; FERRACCI, 2014). Therefore, today's concept of apprenticeship has to be much more flexible.

Yet, apprenticeship faces contradictions and challenges which have been addressed in the literature, including:

1. *Specificity x generality:* According to the experience of several countries, it is necessary to find delicate balance between preparation for immediate needs and long term needs. Individual and collective rewards, when including short-term periods, can be higher, but they decrease over time and with technological and economic changes. For the benefit of competitiveness, it is necessary to include short, medium and long-time horizons, like the relations between general and vocational education.

2. *Tensions between schooling and apprenticeship:* As mentioned in the experience of several countries, strong connection among social players is key for them to join efforts and avoid contradictions that may cause individual and collective losses. From a curricular perspective, the set of experiences lived by apprentice students involves a challenge to integrate theory and practice in different cultures and codes, and to move across diversified environments. It is clear that, as schools become universal, not everybody attends them in a pleasant and successful way. Therefore, Favreau and Capdevielle-Mougnibos (2011) verified that apprentices and masters developed similar forms of school experience, centered on the

fact they were unhappy with the school form of transferring knowledge and skills. The positive side of this is that alternating pedagogy may offer young students new opportunities of reinvesting in knowledge, escaping from the vicious cycle of stigmatizing school failure.

On the other hand, however, after a long mandatory school period, apprentices can feel a shock when interacting in another type of organization, companies. In this sense, Fillietaz (2011) identified two coexisting models of qualification through apprenticeship: 1) progressive familiarization with professional practice aspects; 2) immediate confrontation with the realities of production. Despite the fact research results still need careful analysis in face of broader generalizations, both tend to coexist and follow one after the other. The logics of participation and the dynamics of in-company socialization result from local ways of performing tasks and interacting, where tutor or instructor qualification is very important. Some relatively consensual findings are:

- Apprenticeship should be triggered by a needs diagnosis. It should be planned, have well-defined goals and strategies, and be monitored and assessed. This process is incredibly more feasible in intelligent organizations, which learn from their mistakes and successful experiences, becoming more competitive in the society of knowledge.

- Attainment of competencies is possible if apprentices control their own processes. Some of the questions they might as themselves are strategic questions, such a) can I see how I do it?; b) why do I do it?; c) what level can I reach in this specific skill? (BARRERO; GONZÁLEZ, 2007).

Despite the differences, some convergences and divergences found in Germany, Australia, Austria, England, France, Ireland and Switzerland (STEEDMAN, 2010) were:

- Three-year duration, in Australia, four-year duration, with the system defined by law.

- Predominantly attracts young people younger than 25 years, but, in countries such as Australia, younger than 44 years.

- School-company relations vary in terms of organization: in the dual system, apprentice students split their time between school and company; in France, apprenticeship centers for employees; in Ireland, partner-

ships between employers and technical colleges; in England and Australia, public and private institutions qualify apprentices, while employers offer in-the-job training.

- Regarding the sector, in Germany, apprenticeship is divided between services and industry; in France, construction, transformation industries and engineering are predominant; in Australia, Austria, England and Switzerland services prevail.

- The highest conclusion rates occur in the dual system, where there are stricter exit exams.

- In the dual system, applicants are, in average, more qualified, with a smaller number of ex-apprentices following to higher studies. France, to attract better applicants, increments quality of apprenticeship and offers continuity of vocational education to the youth. *A general trend to attract better applicants is to raise quality of apprenticeship, separating it from the image of option for the less capable. Yet, there is still a connection between lower educational expectations and modest social origins with apprenticeship.*

- *It is difficult to adopt apprenticeship in large scale, despite its merits, due to costs and social-cultural conditions that favor establishment of partnerships and the modest status historically assigned to it* (SWEET, 2009; NIELSEN, 2009; VOS; ÜNLÜHISARCKLI, 2009), aspects that deserve to be carefully observed by countries under development.

Assessments converge towards a result: apprenticeship, as a type of in-company vocational education grants more effectiveness to vocational education. However, according to time and space, apprenticeship requires delicate decisions.

Some particular experiences are worth mentioning. Germany, in 1996 introduced apprenticeship centers or arenas in vocational schools *(Lernfelder),* instead of school subjects to facilitate connection with companies, following better work processes and enabling apprentices to understand what they can learn at work and at school. Well-tested and assessed tools were also built for development in the companies of training path, career maps, assessment and self-assessment systems and systems for support to tutors. Those deserve attention because they tend to be good ex-

perts in their work, but, in many cases, they need other skills such as to be coaches, tutors and promoter of autonomy in apprentices *(*empowerment*).* This is a special challenge to initial and continuing education of educators (LUDGER, 2010).

One experience assessed was the London Apprenticeship Campaign, in a country where offer of opportunities for apprentices is among the lowest in the European scenario (EVANS; BOSCH, 2012). The process was launched in 2010 to increase the number of apprentices, moreover with high level, and thus cope with the needs for personnel, mainly in non-traditional sectors, such as the financial sector. The campaign resulted into duplication in the number of apprentices from 2000-10 to 2010-11, exceeding the milestone of 40 thousand. The basic elements of the success were: partners' engagement in regulation; standardization of occupational profiles and curricula from two to four years; establishment of connections with work and, in private, organization of work in companies; dual training in schools and companies; commitment and responsibility of businessmen and high reputation of apprenticeship between employers, parents and youth. In addition to media campaigns for various audiences, effort was made in schools to convince the best students to participate, in order to raise the status of apprenticeship. The organization involved two boards of partners and a steering group, aimed at planning, monitoring and assessing activities.

A vulnerable area for its size is that of small and medium companies. According to the results from a survey performed with Canadian and international facilities, concerned with competitiveness, there is not only one successful technique or strategy: effective programs gather the needs of apprentices and of organizations, they are flexible and create partnerships across people. Some ways of lowering costs and increasing effectiveness were: engagement of employees, also considering the benefits of self-investment; dedication of employers, with leadership; good use of scholarships and professional training; well-planned use of the calendar, with specific times for apprenticeship; use of online resources; planning of apprenticeship in stages, verifying reaction of apprentices and team approach, and association between companies (CONSEIL CANADIEN SUR L'APPRENTISSAGE, 2009).

Searching for generalization about the conditions recommended for an apprenticeship model, Smith and Kennis (2013) studied 11 countries: South Africa, Germany, Australia, Canada, Egypt, United States, France, India, Indonesia, England and Turkey. Some traces of the model are:

- Engagement of the partners;
- Assessment of those offering apprenticeship;
- Support to the employers, more than punitive measures;
- Visible qualifications in the internet;
- External assessment of apprentices by the end of the process, with access to recognized skills;
- Engagement of the partners;
- Financial incentives for employers, with monitoring;
- Special incentive for the facilities that accept people bearing special needs;
- Payment of apprentices as a percentage of the salary earned by professionals, increasing during the period;
- Social security contribution of apprentices paid by the State;
- Opportunity for apprentices to know other companies.

Regarding the alternatives to increase effectiveness of vocational education and in-company apprenticeship, a selective view of the literature indicates resolution of positive results:

1. *Action-based apprenticeship, oriented to self-confident actions and apprenticeship:* The common denominator is learning by doing, i.e., the starting point of the curriculum does not lie on the theoretical elements, but in the necessary practices, connecting thinking and action, theories and practices, with a broad view for the quick technological and organizational changes that do not allow simplification and immediate action. The steps followed by students/trainees are the planning, the decision making process, the performance and monitoring and the assessment. For teachers and students, the method involves four steps: explain/listen, demonstrate/observe, correct/limit, assess/practice (HÖPFNER, 2009).

2. *Collaborative apprenticeship and apprenticeship expanded by technology:* The former, arising out of the assembly lines of the automotive and aeronautic industries, builds apprenticeship networks, by engagement towards joint resolution of problems. An example refers to the networks formed in the United Kingdom to support small and medium companies, hard accomplishable targets. An example refers to the networks formed in the United Kingdom to support small and medium companies, hard accomplishable targets. Inter-companies networks are formed, mediated by computers, for immediate improvement of the performance. Some implications for the future of vocational education involve the need to review the regular boundaries between higher education, continuing education throughout life, and training development. On its turn, apprenticeship expanded by technology seeks to assist students that create and use collaborative knowledge spaces where it is possible to access resources such as to stimulate the active, collaborative and reflexive apprenticeship. That is the case of the National Guidance Research Forum, also in the United Kingdom, an interesting example, moreover for contexts where the information and communication technologies are underused (BROWN; BIMROSE; BARNES, 2009).

3. *Work-based apprenticeship:* It takes into account that salary paid work is the adequate *locus* to development the knowledge and skills, so that the youth shall have access to other forms of knowledge, capable of adding new perspectives. In the United Kingdom, it was adopted as a professionalizing alternative for the age range from 14 to 19 years old, aiming to instruct highly educated and trained personnel, aimed at global competitiveness of the economy. Although seeking to reintegrate students that have quit and who are deluded with school, an issue verified is that this approach fails by ignoring the unqualified and semi-qualified people, in a process of polarization of vocational training (AVIS, 2009).

4. *Apprenticeship result-oriented curricula during initial vocational education:* A survey on European Union's policies and practices in 32 countries was carried out in the sense to implement those curricula, which used to be implemented at unequal levels. In Germany and France, they had been executed for years, while in other places, they were taking the first steps. Apprenticeship results were oriented by the European Qualifications Chart and benefited from the dialogue between social partners and curriculum decentralization. The main challenges detected were to establish and maintain the engagement of the employers; to conciliate the different concerned interests; to assure transparency of the process, with participation of partners and coherence across the results of apprenticeship (work practice) and

other curriculum components. The inquiry concluded that curricula have to be detailed in order to efficiently guide actions, but without exaggeration that would make them counterproductive, especially if they reduce teachers' autonomy and do not leave room for local adaptations. Also, it has been emphasized the need to have more effective feedback mechanisms and that professional development of teachers is the effective mean to implement this type of curriculum (CEDEFOP, 2012 k).

5. *Integration between school and apprenticeship:* As previously observed, apprenticeship is one type of vocational education performed within the company, included both in initial and continuing education, and associated is to schooling. In the case of several countries, *the surveys consider apprenticeship as a more effective process than school for in-company training* (e.g., LAUTERBACH, 2009). However, *apprenticeship bears higher costs than school, besides other difficulties, and, although being important, it is not enough, i.e., it is not nurtured without school education.* Hence, much effort is dedicated to increase the number of students engaged with it, converting it from the condition of ugly duckling into a swan. An example thereof is France, a country that bases vocational education in school, as previously considered, and where apprenticeship is subject to some exaggerated expectations, such as subtraction of youth to rebellion and crime and requiring enhancement (MOREAU, 2008). Although there are not only good points, *there are evidences that the experiences at work and in the educational institution, when effectively integrated, develop effective general, occupational and situational competencies.* The contributions from both means need to be understood and effectively performed when helping individuals to learn vocational practices. Each mean, work and school, has its own style, its advantages and limits, so it is necessary to improve and integrate them, under the leadership of employers and educators. *In this sense, the problems resolution strategies, based on work experiences used by teachers, are useful to develop skills, contents and principles* (BILLETT, 2009). It is important for students to start by understanding the concepts and relating new information to their prior knowledge. They prefer to formally learn at school because the work environment is stressful and even oppressive in its circumstances. *Experience recommends enabling students to actively reflect on the several situations and allow acting in the two contexts.* Teachers need to perform an axial role in such discussion, as they can emphasize and evoke prior knowledge, as well as raise students' awareness about the similarities and differences across tasks and situations, by critical and reflexive questions. However, it is not clear yet how students have to integrate several knowledge, skills and attitudes in a coherent set of competencies (SCHAP; BAARTMAN; BRUIJN, 2009).

6. *Competency-based curricula:* Confirming convergence of the previously emphasized literature, a comparison assessment by Deissinger and Hellwig (2011) shows, in general, good results from the adoption thereof in vocational education and places them as the solution for students' effective control of the capacities required at work. In countries such as Australia and the United Kingdom, competencies are defined according to the Qualification Charts. In Germany, a concern towards assuring broad basis of knowledge and attainment of basic techniques has been observed. Quality heterogeneous (partially dependent on assessment or lack/insufficiency of it), no methodological direction for teachers, excessive bureaucracy, and determination of competencies and social acceptance as, in this case, curricula are adequate for simple occupations, but not for higher education, are some of the problems identified. On its turn, an assessment conducted by Sturing et. al. (2011) in Holland revealed that the transition was hard, but the model, designed from a pilot experience, was deemed to be valid. They emphasized the need to review curriculum, adding the principle of flexibility of study progresses and emphasis on self-responsibility and self-reflection, with an active role played by professionals. Another obstacle was that teachers had not been trained and needed to have deeper changes in their conducts regarding the teaching-learning process. Therefore, it is a transformation that leads to effectiveness, but, by its characteristics, involves a set of mutually agreed actions for implementation, also by changing attitudes, knowledge and skills of teachers.

There are several alternatives for in-company apprenticeship as a type of vocational education, but common aspects are recommended: students need to have a work-based curriculum; have direct contact with work, integrating apprenticeship and school; students increasingly need to have active roles in educational processes, such as problems resolution.

It is possible to observe in the literature *a tend to increase students' active role,* using strategies such as problems resolution; design, performance and assessment of projects and case studies, which is coherent with the main role of contemporary youth, but not frequent in Latin America (QUINTANAR; MEDINA, 2014). Two illustrative experiences should be mentioned:

1. *Introduction of an apprenticeship area called design and technology in South Africa:* Inspired by United Kingdom's curricular experience, the country introduced and assessed this new area of apprenticeship in secondary

education. The research concluded that students are, in fact, innovative and capable of responding to challenges posed by real life problems, with cross-disciplinary knowledge and skills. Students responded to challenges in different ways, they were capable of analyzing the problems through local, national and international perspectives, and worked as individuals, in pairs and groups. However, there was no understanding of the learning potential and adequate learning contexts (JOHNSON, 2009).

2. *Web-based Teaching and Learning System:* The program was developed for distance technical education by the Colombo Plan Staff College, in Manila, for the Philippines and other Asian countries. Students receive a study guide, instead of class notes with general contents. Questions and topics for discussion are connected to the system, so that students have to engage and actively process the subject, interacting with peers and tutors. Assessment involves online exams, by means of tests, besides scores per tasks, for the prepared project and for the final exam. Notable pedagogical benefits were observed, with costs saving. The highlighted challenges were the system monitoring and its regular updating (KIM; PARK, 2009).

3.9 CONVERGING TRENDS: WHERE ARE WE HEADING TO?

Although in modern reality there are economic conditions ranging from the nineteenth to the twenty-first centuries, if not from the pre-industrial age, the combination of the puzzle pieces allows outlining the more or less clear profile of some trends, with obvious implications for vocational training and education.

First, it is worth drawing some basic conditions that they must necessarily bear:

- Even with large disparities, *the world is walking towards aging of the population, including the economically active population,* with reduction in the birth rate and urban concentration. At least four directions result from that:

    - In certain areas of the world there might be a lack of workers, which might be partially supplied by the immigrants.

    - Life as a whole and economically active life are heading to expansion. Therefore, people tend to not only live longer, but also work more before retiring. Therefore, vocational *education and training horizons need to be expanded, with eyes on fast and various changes. Within this context, promptness and flexibility are strategic virtues.*

- Considering mainly unemployment among young people, the extension of moratorium for the youth seems to be predominant, with more time for studying, probably late entrance in the labor market, and labor activities completed in a later time than today.

- In a world where conditions change apparently faster, people and societies will come across new circumstances in the form of challenges that they will have to cope with, with prior and simultaneous preparation in formal, non-formal and informal educational environments.

- From the economic perspective, it is necessary to take at least two fundamental trends in account:

  - Even if the world presents multiple concomitant landscapes, the so called network society is inclined to have larger interdependency, faster speed for circulation of knowledge, fashion, products, services, values, etc. and consequences of the historical and political facts.

  - The possibility of partial or total economic isolation is increasingly reduced. The economy involves more frequent and faster flows, so that global competitiveness is a recurrent subject for countries. Hence, costs, quality and safety of products and services have to be constantly revised to win and keep their places in the sun, in a game that frequently results in zero (if someone wins, someone else loses). In successive international new divisions of labor, there are, today, two fundamental 'classes' of countries: those who create, with very qualified personnel and add higher values, keeping competitive costs; and those that specialize themselves in low-cost products, counting on abundant manpower that receives low salaries.

- Regarding work, niches to be filled depend on the occupational structure that, on its turn, is tailored by technological, economic, social, and political forces. In the above example, a country inclined towards adding further value requires well-prepared workers while, in the case of light industry, less qualified crowds, with lower salaries, are more convenient.

- According to the circumstances, in general terms, *work tends to be increasingly technical, complex and dynamic, usually giving rise to:*

  - *Growing demands of schooling:* Compulsory elementary education is progressively longer, while complete secondary or high school be-

comes a mandatory prerequisite in several countries. Not having it probably results into falling into social exclusion. Frequently there is the requirement to have post-highs school, college or not, short-term higher education and subsequent levels of higher education up to the highest post-graduation levels. Initial and continuing vocational education tends to be increasingly demanding. Studying is useful for one's entire life, *but one should frequently return to educational institutions.* Schools with physical boundaries reduce their share in the whole. For all that, basic education has to be solid and effective.

- This does not mean that the school level and instruction must be infinitely increased. The pyramid of the occupational structure requires checking segments and necessities. *School level and qualification are no longer enough, requiring schooling and quality training, with reliable grounds, according to specific sectors.* Of course the occupational structure does not show up ready at a certain historical moment, on the contrary, it is built by political, technological, economic powers and others, in time. Strategic decisions might impose restriction. For instance, a society may decide to increase productivity, instructing highly qualified people and simplifying the tasks of the others so that those shall be performed by much less qualified and remunerated people. Thus, there is no necessary simultaneous and endless growth of education and income.

- Anyway, *a common denominator of productivity and competitiveness is longer education for everyone, more demanding, with more quality and with reduced unbalances, not in the processes, but in the results.* For example, if, in the past, manual labor only required arithmetic skills, trigonometry and other chapters of mathematics are also necessary now. The written and spoken language is essential for communication. English, in the quality of *universal language,* besides other languages, is essential in many parts of the world. Social-emotional skills undergoing changes are part of life and of the careers and they might be even more important than the cognitive skills

Therefore, both general and vocational educations have to be carefully considered, together with vocational guidance throughout life. If the costs seem high – and in fact they can increase – it is worth considering the benefits: education, guided by the necessities of life and of work, forms active citizens, with more knowledge about health and safety, more flexible for changes along a more extensive life cycle, which will reduce the expenses with health, assistance and social security, with justice and public safety, with unemployment insurance and with the wastes of economy, in the outlook of sustainable development. Effec-

tive vocational guidance will facilitate changes for individuals and groups: it will reduce unemployment and exclusion, reduce the risk of, due to a lack of expectation, unexpected needs arising, which lead to improvisation and delays in vocational preparation. Necessary education increases productivity and contribution of individuals to their countries' fiscal revenue. It does not generate miracles but, carefully planted, generates increasingly greater harvests. That is no magic nor does it only generate immediate returns: many of them come on the medium and long terms. The Improvement currently introduced in elementary education starts to show results now, with the children's, but projected in time. *If the educational costs are high, increasing efficiency is not enough, but actually improving individual and social benefits would be.*

The previously analyzed experiences also indicate that the necessary education depends on the delicate and vigilant hand that promotes balance of certain characteristics and dimensions, according to the circumstances under constant change. As in the traditional weight-scale of the goldsmith, the experienced and subtle hand of the decision-making people has to dose, in the horizontal and vertical dimensions of education:

- The composition and the synergy between general education and vocational education and among those and the continued education;

- *The meeting of the immediate needs and transfer of competencies, longer generality and the urgent specificities,* towards future scenarios which design is merely drafted;

- Vocational education and its proximity to work dynamics.

These are not antinomies, but inter-complementary terms, which also apply to excellence and democratization: one depends on the other, so that they shall add up and not be mutually excluding options.

Other matters of broad agreements are:

- *The closer to the world of work, the more effective vocational education will be. The highlight here is for quality* real and simulated *in-company* apprenticeship, which has, according to survey evidence, more effectiveness in vocational education;

- As a result, *it is essential to have environments and processes for continuous understanding between the public and private, educational, social and eco-*

nomic partners. Here, once more, the divided kingdom does not stand, but walks towards destruction, while management of conflicts and cooperation provided constructive results.

- *Curricula require flexibility and updating, proximity with the world of work and continuous linking between theory and practice, between generality and specificity.* This core matter is directly related to social separation of curricula and school success. Throughout History, the more abstract the knowledge, the greater is the tendency for its social prestige and also, frequently, the difficulties of students, mainly the younger ones (for bio-psycho-social reasons) and those from less favored social backgrounds. It is exactly that separation which has been assigning nobility, for centuries, to academic education, while vocational education is left to the 'less capable ones'. *Today, general and, particularly, vocational education require theoretical knowledge integrated to practice.* Poor mathematics achievement, almost universal and endemic in certain countries, is largely due to a curriculum that does not visit abstract and concrete concepts, that does not alternate between theory and practice, since childhood. There are also trips in rustic roads, which are one-way trips; they leave, but they do not arrive. However, this strategic tie, far from being limited to mathematics, is also verified in vocational education, when theory does not meet its applications, when the relations and associations are not made or are not evident from the students' perspective. Hence, *to integrate theory and practice, abstract and concrete tends to have effects on a more effective and democratic learning,* besides contributing to overcome stigma of vocational education (GOMES, 2005). Breaking such wall, more protected than those of famous battles, reflects on the attractiveness of vocational education.

- In this sense, academic education and vocational education, throughout History, tend to be divided between school for 'our children', the ones more skilled in abstract knowledge, and the school to 'other people's children', the ones 'aimed' for manual work, as if the hands were not guided by thinking and feeling.

Due to such split-off, *little will be attained if vocational education is reserved to the 'poor ones'. Instead, it requires quality, prominence, prestige and opening for continuity and deepening of the studies.* Besides, as already observed, tangible economic and social rewards that make it more interesting than other options in terms of cost-benefit ratio.

- Intertwined with these questions, *the evidences from research indicate the advantages of education by competencies.* This type, which integrates theory and practice, abstractions and realizations, facilitates proximity with work. There is no sense in knowing without doing or doing without knowing. *The education which is fruitful for many generations is the one where proposition of problems is continuously challenging children, teenagers, youth and adults, whose role in social life tends to grow more and more. Curricula need to be oriented in order to criticize, doubt, change and create, learn to know, learn to do, learn to coexist and learn to be* (DELORS et al., 2014). This is not an ethereal or romantic formulation, but a realistic result from the pathways of a person, citizen and worker who live at times of History acceleration. Should the opposite be done, productivity will have collective and individual losses resulting from people incapable of seeking new knowledge, responding to successive economic and social challenges, discovering new know-how and performance, not only knowing how but, moreover, why and what for.

- Coherent with the whole picture, in order to develop curriculum, vocational education needs teachers and instructors, where education control of corresponding basic and vocational competencies, renewed work experience and pedagogic training interact. Associating theory and practice, knowledge and performance, there is the need for continuous connection with the world of work.

- More or less global trends indicate that professional education, in management, walks towards the growing need to have external and internal assessment, accountability, relative autonomy of the facilities, quasi-market formation, in the assumption that competition incentives efficiency and quality. Likewise, it is recommended that, instead of isolated change of the parts, the whole has to be changed. However, certain traces common to several reforms prove to be ineffective, such as centralization, with standardized curricula and programs, and didactic material that are supposedly school- and teacher-proof. The lack of local identity and teacher know-how tends to make education poor, but that actually wants to be rich and attained by people.

- Finally, modernity is about fast changes and stable instability, it is necessary not only to follow up the present time of work and education, but also the future. Therefore, besides data transparency, essential for all the players, it is important to develop views in perspective and in prospective. Otherwise, the boat may be adrift.

3.9.1 Challenges & Responses

In summary, the countries analyzed here present, as common denominators, several recurrent challenges and responses, summarized in chart 5, which present different faces according to the national and social-economic-political circumstances. According to the available research literature, this roll of problems and solutions has also been handled as strategic questions in the former section. There is no need to emphasize that this is a selective approach, by its complexity and extension.

Since the space of work is limited, exhaustion is impossible and, hence, selectivity is an imposition. This is a static view of current international scenarios, with its main responses verified in the literature, favorably assessed by surveys. As the global and the local are separate, but need to get close in round trips, each challenge has to be included into the two levels, in order to know the exchanges and test the best possible solutions for such space and time. This is the role of compared education: to travel, to walk the pathways from local to global, and from global to local, to and from dynamics.

Chart 8. Most frequent challenges and responses of vocational education and training

CHALLENGES	RESPONSES
Frailty of basic education	Programs for remediation or recovery of apprenticeship, in general and vocational education Reduction of school evasion Increased quality of general basic education, reflected not only in the increment of performance averages, but also in reduction of its inequalities in the population, mainly the less financially favored group
Low attractiveness of vocational education	Media campaigns to reach the audience, families and youth Professional contests Fluidity of educational paths, such as to facilitate educational continuity and use of academic work Increased quality High economic and social return, including employment Realistic and dynamic bonds with the world of work
Distance between vocational training and labor requirements	Incentive, expansion and improvement of apprenticeship Creation of state financial incentives for the companies that develop apprenticeship programs Establishment or expansion of in-the-job training, work experiences in general and promotion of alternation of experiences, at school and at work Performance of surveys to foresee the necessities of work and employment, in quantity and quality, also in the long-term
No connection among social partners	Creation of boards and other meeting environments Interchange of data and information Significant changes cannot be made without relative agreement of the partners Decentralization, with greater participation of regional and local players

CHALLENGES	RESPONSES
Lack of transparency and understanding about preparation and updating opportunities	Opportunities organization, in the sense of reducing and matching them and diffusing data about their existence Promote vocational information, mainly for the less financially benefited social groups Promotion and improvement of vocational guidance services at school and in the society, throughout life
Array of various specific vocational qualifications, with low transfer of competencies	Reduction in the number of qualifications, aiming at offering training that is more compatible with long-term work and cost savings Use of a broader curriculum basis
Necessidade de mais qualificações e de atualização para atender à competitividade	Incremento e aperfeiçoamento de programas de educação de jovens e adultos, tanto geral quanto profissional. Acesso e expansão da educação pós-secundária, superior ou não.
Continuous changes in technologies, management and occupations, with extinction of the latter, as well as changes and emergence of new ones	Strengthening of general education, with more transferrable competencies Programs of vocational education for personnel updating and reconversion Vocational guidance throughout life
Improvement of teachers and instructors	Parity of requirements between general and vocational education Demand of pedagogic qualifications Requirement of contacts and periodical in-the-job training in the world of work Requirement of continued education
Aging of the teaching staff	Parity of work conditions and career with general education, when they are more advantageous Increased general attractiveness of the occupation

Source: Elaborated by the author

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