

# **Pilot evaluation of the Mexican Model of Dual TVET in the State of Mexico**

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## Introduction

Since the first public announcement of the Mexican Model of Dual TVET (MMFD) in June 2013, more than 5,000 apprentices have enrolled in the programme and around 2,000 already graduated. The Ministry of Education (SEP and CONALEP), the Chambers of Commerce (i.e. COPARMEX) and the German Cooperation Agencies (i.e. CAMEXA) have been collaborating with state authorities, families, schools and companies to turn this initial idea into a significant and sustainable initiative. Although the numbers are still small, it seemed necessary to undertake a pilot evaluation study of the implementation and impact of this program on its participants to inform those responsible for this policy. We decided to focus our study on the State of Mexico because of the higher number of apprentices in this state and because of the access that the CONALEP authorities gave us to the informants.

The report that you are about to read is structured in four main sections. In the first one we reviewed the international evidence on the experiences of policy transfer of Dual TVET. Transferring international good practice in TVET is always a complex process that requires careful attention to the experiences and lessons from those that tried to do it before. In the second section, we present the main characteristics of the Mexican Model of Dual TVET and the specificities of its implementation in the State of Mexico. In a federal country like Mexico, it is important to understand that national policies may largely vary across states in terms of design and implementation. The third section outlines the methodology of the study, which is inspired by the realist evaluation principles. Realist evaluation, not only tries to measure the impact of interventions on beneficiaries, but also to understand the causal mechanisms that explain why this policy is more effective in certain contexts and with certain beneficiary populations than in others. In the final section, the results of the interviews and the survey with 25 apprentices that completed their studies under the MMFD in the State of Mexico are presented. Obviously, the reduced sample of the study limits the representativeness of our findings but it will offer some expected and unexpected results that should not be ignored by those involved in this policy in the State of Mexico and nationally.

We would like to thank CONALEP in the State of Mexico, as well as the people responsible for the programme at national level in SEP, COPARMEX and CAMEXA for making this research possible. We hope that this pilot study will contribute to set the analytical and methodological bases for a wider national evaluation of this policy in the upcoming years.

## Literature review

### International organisations and the Dual Model of TVET

TVET policies, and apprenticeships in particular, have gained increased attention worldwide, and the main reason seems to be the high levels of youth unemployment internationally. German, Switzerland, and Austria, represent nations that consistently have low (youth) unemployment rates, are considered to provide high quality of vocational training, and, are often asked for their assistance in transferring their dual models of provision abroad. These countries employ an approach which requires that the training delivered is a combination of company-based training, and a part-time vocational school for apprentices; which is compulsory (Berufsschule). Thus, apprenticeship training is also referred to as "dual vocational training system" or as "dual system". One of the major advantages of this system,

both for the apprentice as well as the company, is that apprentices may be employed as fully qualified skilled workers right upon completion of apprenticeship training. The apprenticeship or dual TVET system is highly recognized worldwide due to its combination of theory and practice embedded in a real-life work environment.

There are many examples where the benefits of apprenticeship and dual TVET system are publicly acknowledged. After several decades of focusing on academic education and the ratio of college and university graduates as the sole indicator of the success of a national educational system (pushed by the OECD Education at a Glance publications), it appears that the tides have turned, with widespread praise for apprenticeship training now being at stake (Lanthaler, 2015; Gonon, 2014). Having said that, it is also important to notice that dual TVET embody policies that international academic and comparative education scholars have defined as being a "traveling policy" (Ozga and Jones, 2006) or a "global education policy" (Verger et al, 2012). In general, these travel policies are the result of the successful globalization of a particular localism (Dale & Robertson, 2004). These policies have strong historical, political and economic roots in specific countries, and commentators suggest that they have become global export successes due to the action of international organizations, cooperation agencies, governments of other countries and a wide range of entrepreneurship policies (Halpin and Troyna, 1995). In the first decades of international development cooperation, TVET was one of the major education sub-sectors to be invested in alongside higher education. In the 1960s and 1970s, the World Bank granted about 40% of all education loans in Sub-Saharan Africa for TVET (Tikly 2013). TVET was considered to be a major component of manpower forecasting in order to serve the needs of industrialization (Heyneman 2003: 317). UNESCO's focus was on fundamental education (Chabbott 2003), i.e. the basic education sector, but this also contained a lot of skills development components, as did its later functional literacy policy. A number of bilateral donors, primarily but not exclusively the German-speaking ones, supported TVET as a priority sector (King and Palmer, 2010).

Whereas the primary focus in the 1960s and 1970s was on promoting school-based training models, since the 1980s this shifted to the promotion of dual or collaborative forms of vocational training. Today, considerable sums of money are invested in international vocational training collaborations that presume the existence of a market which is to be opened up with new business models (cf. Lippuner 2012; Jonda 2012). Accordingly, numerous collaborations, projects and initiatives exist and are being promoted politically from national agencies (as it will be seen on the next section) but also by private and international organizations.

*To understand the public perceptions of international organizations to the dual/apprenticeship system* some of the key policies, documents or reports that bring testimony of it and foster the expansion of the National Dual Training System are:

- United Nations. The UN Summit (2015) developed a sustainable development agenda with a broad range of priorities, including the importance of skills development and raising the profile of TVET.
- UNESCO's first Recommendation in the field of TVET was adopted in 1962 and it was also revised in 1974 and 2001: to 'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' (UNESCO, 2001). UNESCO's global 2016–2021 strategy feeds into this and is consistent with UN general guidelines and with the Sustainable Development Goal 4 (SDG4). It uses a broader concept of TVET and has a stronger focus on lifelong learning and sustainable development, strengthening the

alignment of initial and continuing TVET, to practically related models with the involvement of partners<sup>1</sup>.

- *The European Centre for Development of Vocational Training (CEDEFOP). The CEDEFOP launched a call in 2016 for financing apprenticeships / dual TVET in the European Union. With this project, CEDEFOP announced that the aim was to collect and analyse detailed information on financing apprenticeships/dual TVET in 28 EU Member States*<sup>2</sup>.

- *European eCommission, "Work-based Learning in Europe - Practices and Policy Pointers" (2013). This policy handbook is one of the European Commission contributions to strengthen work-based learning (WBL) and Initial Vocational Education and Training (IVET). The aim of the Commission was to produce policy guidance illustrated by concrete practices from the Member States which can be used by policymakers and practitioners to introduce or reinforce work based learning elements in vocational education and training (VET).*

- *European Trade Union Confederation (ETUC) (2013), "Towards a European quality framework for apprenticeships and work-based learning: Best practices and trade union contributions" This study primarily illustrates the contribution that trade unions are making throughout Europe to the success of apprenticeship systems. It attempts to shed some light on the ways in which apprenticeships are defined at the national and European levels and the benefits of those for the national systems.*

- *OECD, Better Skills, Better Jobs, Better Lives: Apprenticeships and workplace learning (2013). This provides arguments to support workplace learning due to the benefits that it causes on smoothing the transition from school to work.*

- *International Labour Organisation (ILO), "Overcoming the work-inexperience gap through quality apprenticeships – the ILO's contribution" (2013) The ILO highlights that apprenticeship systems in the formal and informal economy are important as they aim to smooth the transition from education to industry, and provide high quality skills that are of relevance to labour markets. that apprenticeship systems in the formal and informal economy are important means to smooth transitions and provide quality skills that are of relevance to labour markets.*

The reasons for the revival of TVET as noted above should be dates back to the 2008/2009 financial crisis. Rising unemployment rates led to growing attention for TVET as an education tool able to improve job opportunities. In international development, this was accompanied by a second factor. Rapid expansion of enrolment rates in primary education in developing countries had resulted in an increased demand for secondary schooling, could not be met (McGrath, 2010).

Several research findings point to inverted rates of return to investments in education with higher education offering the highest returns (Colclough et al. 2010; Aslam et al. 2010) as well as the over inflation of university students and the need for a more skilled workforce. Alongside the OECD and EU indicators that trigger the international organizations' fostering of the dual system, there is numerous empirical research that shows that apprenticeship training provides comparatively high incomes with high certainty (e.g. Tuor/Backes-Gellner 2010, Balestra/Backes-Gellner 2013). Tuorand Backes-Gellner (2010) illustrates this point in a in a study in Switzerland which shows that the internal rate of return for individuals with tertiary education is around 12% if they had chosen a pure vocational path, and only 10% if they chose a pure academic path. At the same time the earnings risk (measured by the

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<sup>1</sup> <http://unesdoc.unesco.org/images/0024/002451/245118M.pdf> (retrieved: 04.08.2016)

<sup>2</sup> <http://www.cedefop.europa.eu/en/about-cedefop/public-procurement/financing-apprenticeships-dual-vet-eu>



variation coefficient) is 14% for individuals who chose academic path and only 13% for those who opted for an vocational path. This suggests that there are less risks associated with vocational education, and that the internal rate of return higher is higher than for academic education. Results of Balestra and Backes-Gellner (2013) indicate that although there is significantly higher wage for academic education than for vocational education in the upper part of the wage distribution, there are significantly lower wage returns for academic education than for vocational education in the lower part of the distribution.

Going beyond the most quantitative data, a study of the German Institute of Labour Economics (IZA) presents a comparative table where the dual apprenticeship model can be seen as the best solution for guaranteeing a smoother transition from school to work as well as lower unemployment:

Table 1. The Dual Vocational Training versus School based training and on the job training

School based training	On the job training	Dual vocational training
Follows a formal curriculum and combines general with occupation specific training.	Better pay in the short run	Combines general, transferable skills (class based) and structured learning on the job
Does not convey practical occupation specific skills within a company	Acquisition of skills restricted to learning on the job and done in a rather informal way, this type of learning is likely to be of less value when moving jobs.	Due to general skills acquired, graduates are employable by the training company and other employers
	Due to the lack of general occupation skills, employability is limited	During vocational training, apprentices have a fixed term employment contract with an employer at a reduced wage level

Source: extracted from the German Institute of Labour Economics (IZA), 2013

In conclusion, the discursive logic of international organizations coincides with the benefits of promoting TVET and in particular the apprenticeships/dual model as a mechanism to face economic and social challenges. International indicators or economic comparative studies, which have investigated the link between education and readiness to innovate and compete among companies and economies, consistently conclude that countries with a dual apprenticeship training system enjoy a competitive advantage when compared internationally (Rauner 2007, p. 5). The relevance of professional qualifications and especially of a well-established apprenticeship system for lowering the rate of youth unemployment seems to be evident. Consequently, as the next sections presents, there is a strategy coming from Switzerland, Austria and Germany to transfer or assist on the implementation of their apprenticeship/dual models.

## Bilateral cooperation to export the Dual Model of TVET

Whilst Germany, Switzerland and Austria receive international interest in its dual system of apprenticeship, there are differences in terms of seniority or experience transferring those. Langthaler (2015), was commissioned by the Austrian Foundation for Development Research (ÖFSE), has done an analysis concerning the transfer of the Austrian dual system. In her study she positions Austria as a new player on the transferring of the apprenticeship system as part of its development cooperation strategy. This is unlike 'German Development Cooperation', who rely on transferring the dual model over a number of decades, or Swiss Cooperation Office that have a more nuanced approach to it.

A brief look into the main institutions in each of those countries in charge of providing and leading consulting services regarding dual TVET system helps to understand the broad scope of actions and geographical expansion. In Germany there are three main actors responsible for promoting, evaluating and/or carrying the transferring of the German TVET dual system to other countries. Those are:

- The Federal Institute for Vocational Training (BIBB) was established in 1970 as part of the German Federal Ministry of Education and Research (BMBF). The BIBB and the German Office for International Cooperation in TVET (GOVET) are responsible for research and development in workplace vocational training. Their activities range, from that of an advisory capacity (legal aspects, training, pre-evaluations) to a main player (establishing alliances to implement the dual system in the respective country). For more than forty years, the BIBB has been offering advice and support on the reform of the TVETs of other countries. In this process, consultancy is viewed in the context of an external impetus for systemic processes of change on the part of BIBB. A brief analysis of the activities undertaken throughout 2016 highlights the dynamism and high level of compromise in that regard. In a descending order its archive says that in November the BIBB launched brochures available in a multilingual format presenting eight vocational education and training success stories of German and international partners and made "Developing Skills for Employability with German Partners" brochures. In October 2017, the 7th Arab-German Education and Vocational Training Forum took place, and the topic of transferring dual TVET was discussed. In September, the BIBB presented in Spain and published in Spanish a report to show how the different stakeholders shape and drive Dual TVET at the key "joints" of a vocational training system (legal framework, standards, implementation and assessment/certification). In August, they published a report "Modernisation of Vocational Education and Training - The International Consultancy Adopted By BIBB". In this, the BIBB noted that the main regions on which BIBB's international advisory service is focused are Asia and Latin America and have their basis in bilateral agreements concluded with partner institutions (2016, p.22). In Latin America, BIBB advises Brazil, Chile, Colombia and Mexico on issues relating to TVET and supports reforms in the educational systems of these countries. In Asia, BIBB has bilateral cooperation agreements in place with China, Thailand, Vietnam and the Philippines to advise partner institutions on issues relating to TVET. It also supports reform processes within these countries' educational systems. In 2016, 30 cooperation agreements were in place between BIBB and their partner institutions in 26 countries. These include 14 agreements with partners outside Europe, being the main focuses in this regard on Latin America (Brazil, Chile, Colombia, Mexico) and on Asia (China, South Korea, Philippines, Singapore, Thailand, Vietnam) (BIBB, 2016 p.7).

- The German Agency for International Cooperation (GIZ) is part of the German Federal Ministry for Economic Cooperation and Development (BMZ) and works in conjunction with the BIBB. For instance, BIBB and GIZ have been providing joint advice to the National Institute of Vocational Training (NIVT) in Vietnam since 2010. The aim is to support NIVT in the



sustainable establishment of a Vietnamese TVET reporting system. The advisory process led to the production of yearly reports. It focuses mainly on developing countries.

- The Bertelsmann Stiftung. Through events, publications and lectures, this foundation provides information on Germany's dual system, and on mechanisms and controls for ensuring a smooth transferring of the model. The publication "The German TVET System: Exportable Blueprint or Food for Thought?" (Euler and Wieland, 2015) written jointly by a University Professor and the Senior Project Manager of the Foundation, is representative of the work of the Bertelsmann Foundation and its interest on being the intellectual and political providers of a model that ensures the transferring of dual TVET.

In Austria the picture of the activities done is more difficult to obtain. As noted earlier, the transfer of the Austrian dual TVET system is incipient and therefore the literature is still scarce. According to Lanthaler (2015) the national agencies have decided to join the growing international enthusiasm for the dual system as an adequate vehicle to enhance the international reputation of Austrian business and Austrian (vocational) education services (p.24). Based on interviews to relevant stakeholders, the author conclude that main target countries of transfer activities are located in Central and Eastern as well as South Eastern Europe (CEE and SEE), this is traditionally the central region of Austrian influence and economic investment. However, there is also an increasing interest of transferring this approach to transfer to Turkey, Asian countries, mainly China, North Africa and Latin America. Hardly any transfer projects are implemented in Sub-Saharan Africa or in the least developed countries (LDCs). Having briefly noted some peculiarities, and the areas of influence, in descending order the main players are:

- The Austrian Federal Economic Chamber (WKO - Wirtschaftskammer Österreich) – WKÖ most relevant strategy paper dates from 2014 and is about the internationalization of TVET and education export. This paper sets out WKÖ's three main goals in this area, and the first is the struggle against youth unemployment in Europe and beyond. Second, support for Austrian companies in securing qualified labor and, third securing the WKÖ's role as a competent body for apprenticeship education. Counselling on the system level and support for companies involved in pilot projects are stated as major activities. Through the Institute of Economic Promotion (WIFI) and its international branch (WIFI International), the WKÖ provides adult and further education. WIFI International plays an active role in many target countries both as a provider of educational services and as a supporting organization for companies intending to set up (dual) training facilities. The WKÖ administers the BMWFW-owned fund: Go International, which offers financial support to exporting companies.

- The Austrian Development Agency (ADA) offers the major funding possibility for private companies in Austria. The ADC has only recently embarked on activities related to the dual system. The ADA does not have a particular strategy for dual system interventions. In its focal paper on TVET (Austrian Development Agency 2013), dual system interventions are mentioned as one instrument besides others. ADA's approach stresses demand orientation and context sensitivity among its main principles for TVET programs including dual system interventions

- The Ministries of Science, Research and Economy (BMWFW), and the Ministry of Education and Women's Affairs (BMBF). The BMWFW has endowed the Go International fund, which is administered by the WKÖ and opens to pilot projects aiming at the transfer of the dual system. In contrast to the ADA business partnerships, this fund is intended to support expertise transfer as well as conceptual and start-up activities rather than business investments themselves. The Austrian Federal Ministry of Education and Women's Affairs (BMBF) has a

long tradition of bilateral and multilateral cooperation in the field of education. These activities mainly focus on cooperation within the EU and on neighbouring countries.

Finally, Switzerland sits in between Austria and Germany regarding experiences on having a strategy about their role as consultors or promoters for transferring their dual TVET system abroad. In 2010, the Swiss Federal Council approved Switzerland's international strategy for education, research and innovation. Since then, and even more emphasized in the current 2016 Research and Innovation Strategy, TVET and apprenticeships are highlighted to be a priority. The report states that "University graduates are not the sole key drivers of corporate Switzerland's innovative and competitive leverage. Skilled workers who have completed a vocational apprenticeship (...) are also vital" (p.42). And continues, "(...) companies play a central role in aligning training to the labour market by integrating trainees into real work processes. Trainees are already productive during their apprenticeships" (2016, p.42).

Similar to the case of Austria, the report acknowledges the lack of indicators.

"Switzerland has decided to pursue a dual strategy in which vocational and professional education and training play an important role. It is difficult to find meaningful indicators for this area, but with respect to Switzerland's innovation performance, the importance of basic training and professional education cannot be emphasised enough" (p.70).

The main actors in Swiss transferring of apprenticeship TVET are:

- The State Secretariat for Education, Research and Innovation (SERI; German: SBFI). It is a key public player in internationalisation of TVET and a driving actor in the development of the Swiss internationalisation strategy. It actively implements pilot projects concerning the funding of research on vocational education and training.

- The Swiss Federal Institute for Vocational Education and Training (SFIVET). It is a centre of competence for the provision of tertiary-level basic, and continuing training to TVET actors, for the development of occupations and research, and the national contact point for international cooperation. Two main international projects are highlighted in its website: The introduction of the Dual-track principles in Bulgaria Vocational Education system (2014-2019) and the Swiss Vocational Education and Training Initiative India (SVETII) that started in 2015 and is a continuation of a previous program. The 'Swiss Vocational Education and Training Initiative India' is presented as the most prominent example of international cooperation in TVET and one that exemplifies the cooperation between public and private actors<sup>7</sup>. Launched in 2008 as a pilot project (supported by SERI), the Swiss TVET Initiative India sought to introduce Switzerland's dual-track approach to TVET for the first time in India, with the active participation of private companies. The success of the pilot project led to the formation of the SkillSonics Company in 2011 to continue the project on a long-term basis. In general and to grasp the high level of attention that the Swiss apprenticeship system generates the SFIVET received more than 12 foreign delegations received from January to May 2016<sup>3</sup>.

Whilst the information above is based on a review of the actors and the international agencies in each country, the economic ground for the relationship needs to be understood beyond a mere act of solidarity. The international interest of the dual TVET system has to be understood parallel to the economic interest of German, Swiss or Austrian if it is to expand abroad and facilitate for a skilled workforce. As pointed by Euler and Wieland (2015) "The export of German training and education services has a leverage effect for German industry, since the export of goods in the engineering or automotive industry, for instance, presupposes the existence of well-trained specialists abroad" (BMBF 2012: 74). The next section presents a

review of the different debates found in the literature and some key aspects to consider when transferring the dual TVET system.

### Research evidence on Dual TVET policy transfer

While there is a broad international consensus on the strengths of the dual TVET model in their countries of origin and the possible benefits of transferring this, there is also evidence brought by the hand of academics on the difficulty of transferring this model to other national contexts (Euler, 2015).

Indeed, the failure of most German development cooperation initiatives to transfer the dual vocational training system to countries has led to a shared agreement that the Model of TVET is not directly transferable to other national contexts (Euler, 2015; Silvestrini, Garcia 2010). Whilst there is a shortage of academic literature on empirical cases, the evaluation studies which are mostly carried out by governmental or business institutions, have pointed out that Dual TVET requires specific institutional capacities and governance structures that rarely occur in host countries.

On one hand, scholars recognize the limitation of transferring the model, they conclude with a reasoning where the impossibility of a "simple transfer" is recognized but further evaluation is also demanded. Stockman (1996, 2000, 2014) and Stockman and Silvestrini (2013) draw on a number of major evaluations of German development cooperation in the TVET sector in China, Honduras, Guatemala, El Salvador, Macedonia, Uzbekistan, Kazakhstan, Burkina Faso or Philippines to conclude that transfer activities have had some repercussion but only had an influence on institutions, but has had rather limited success in a wider context. Cooperation agencies justify the failure of the TVET system on contextual reasons not on the system itself (whose benefits are evidenced by ratios of unemployment, productivity or school transitions among other) (Stockman, 1996), cultural differences (Stockman and Silvestrini (2013) or the lack of infrastructure (Stockman, 2000). Consequently, the lessons learned from the evaluation reports are that instead of attempting to directly transfer the provision of Dual TVET as a technical solution, most efforts rather need to be focused on developing structures such as the figure of mentor, relationships between institutions, recognition of competences, or a system of monetary reimbursement for being an apprentice, in order to gradually implement elements of the Dual TVET provision in receiving countries. The emphasis on reform of local institutions and structures creates. This could create opportunities for bilateral cooperation in developing those new legal frameworks and qualification standards and in demanding a systematic evaluation that could guide and inform effective implementation of these procedures. In the less academic field, the studies conclude with a list of guiding principles for transferring dual TVET system and remark the need for close cooperation between the state and the business sector, work-based learning, context awareness or the engagement of relevant stakeholders among others (BMZ 2012).

On the other hand, academics analysing the TVET transfer model in Asia (Hummelsheim and Baur, 2014; Madgavakar, 2012; Martinez-Fernandez and Choi, 2013), Europe (Gonon, 2014), or focusing in countries, China (Stockmann, et al, 2000), India (Lippuner, 2002), Philipinnes (Silvistrine and Garcia, 2010), or Spain (Echevarría Samanes, 2016; Regro Agraso et al, 2015) conclude that the dual vocational training system responds to a specific idea of how work is organized in a given social context. It goes further than a technical and organizing principle where two learning sites need to be offered (work based and formal learning in colleges).

As noted above, the dual system can serve as a model. However it would seem that other countries can not replicate the dual system as a whole. The existence of a social contract in Germany is not transferred by copying the way of carrying out TVET. Gonon (2014) goes one

step further and concludes that the German system is not only a work in progress, but also an identity. The author remarks to the fact that the organizing principle of the German dual system is not, as commonly assumed, the duality of learning sites, i.e. work-based and formal learning in schools. Rather, it is the core element of the German dual system, the concept of 'Beruf', a term difficult to translate because it focuses on the achievement of work and self-development, the one that compiles its success or its failure.

In the same line of thought Deißinger (1997), reminds us that a vocational training system as it exists today is the result of historical and cultural forces and Germany's current dual system has been shaped by prevailing legal norms, traditions, pedagogical principles and institutional structures. The different examples imply that the complexity of this is commonly reduced to a stakeholder dialogue, which seeks the involvement of employers in TVET but ignores the other pillars of the social contract. These critics are not new and Turbin (1995), Stockmann and Kohlmann (1998) or Lewis (2007) argue that transferring the German model will require more than copying. Instead, any transfer should reflect the existing conditions in the country and adopting the system and the culture, to avoid it becoming the too easy answer for failure. Deißinger (1997, p. 2) claims that TVET is "the result of a national social and cultural history", Mayer (2001) analysed the German development cooperation in the TVET sector to conclude that the problematic results of transfer activities were due to scarce awareness of its cultural embeddedness. This cultural embeddedness was also noted by Wolf (2011) who made an attempt to categorize those into six dimensions. The categories of work regime used to feature each country were: Labor law, Technological development and application processes, Constitution of social actors in the production relations and in the related training structures, Social security, and Administrative-institutional order. Lassnig (2001, and 2015) pointed out similar features which evidence the failure of TVET transferability due to a general tendency of focusing only in one aspect and neglecting the coherent package of all the aspects that make Swiss, Austrian or German dual TVET system work.

Adding to the argument of the difficulties of transferring, Küblböck and Staritz (2015) include other elements as it is the aspect of different agendas. They Similarly, Küblböck and Staritz (2015) point out that for the transfer of the dual system several interests are compiling. First, there are interests of international enterprises. Second, there are interests of the local private sector. And third, there are interests on the national government. According to these authors those aspects do not necessarily correspond nor have to match.

Given the difficulty of the whole transfer of the system, current international debates focus on several issues. The issues of interest are such as the possibility of exporting only certain elements of the dual TVET system (Euler, 2013), the adaptation of the dual vocational training system to local contexts (Batliner, 2014) and the identification of the essential principles that must be respected in order to consider the dual vocational training system as one (Gonon, 2014).

Gonon (2014) outlined seven basic criteria that German-speaking countries have, and that countries require to aid the transfer of the dual system. The seven criteria are: (i) readiness of companies to train; (ii) Duality of learning sites (work place and school); (iii) Formalization of the dual model; (iv) access to codified scientific knowledge; (v) cooperative model of governance including social partners; (vi) Vocational practice as main learning activity; (vii) career relevance.

This literature reveals that on one hand there is a trust that the apprenticeships model should be exported to other countries as a means of overcoming economic or social problems such as low skilled workforce, youth unemployment or social integration. On the other hand,

literature evaluated implies that projects with the aim of introducing dual or collaborative training structures without any further modification are largely unsustainable (Euler, 2005, Silvestrini, Garcia 2010).

By taking into consideration the potential barriers to export the dual TVET system, the contribution here is by shifting the perspective. The next section further develops that point.

### Research gap and approach

What is emphasised by this review is that besides being two sources of literature (evaluation reports and academic literature) there are also difficulties to find a methodological coherence on the work carried out. In the existing literature named above one can differentiate two dominant types of research.

One group is formed by those that conduct research on behalf of an institution and is nurtured by legal frameworks, statistical results and good practices with the aim of finding evidences for introducing the dual TVET system (Euler, 2011). A second group of literature that has a descriptive and/or compiling character and is mostly based on historical and structural aspects to outline the success or failure of policy borrowing (Gonon, 2012; Langthaler, 2015, Deißinger, 2001; Maurer 2002). Making use of the classification of the literature offered by Langthaler (2015), the study locates itself on the intersection between the last two as the potential place to analyse the transferability of TVET systems.

The first the neo-institutionalist account of an assumed world culture (Meyer et al. 1992; Meyer & Ramirez 2009) is based on the notion of expanding the western model of schooling to other regions, in the case of in case of failure leads to conclusions favouring the western model and putting the responsibility on the country receiving or adopting the system. This model will focus on the macro level and on the adoption or not of a series of skills.

The second strand focuses more on the local context as a starting point for analysis (Steiner-Khamsi 2004, Mayer 2001; Lewis, 2007). These researchers are more interested in how local contexts react to traveling policies and how they transform them. Some of this work is also linked to the critical analysis of the influence of globalization on (local) education policies and systems (Dale 1999, 2000; Robertson & Dale 2008). The conclusions based on this model lead to an analysis based on cultural sensitivity and adaptation to the local institutional demands. The focus here is on the meso level and in particular on the local context as the main element influencing the transferability of TVET

Finally, the third strands of authors are centred on the discussion of the theoretical and conceptual foundations of policy transfer in relation to the dual model (Deißinger 2001; Greinert 2001; Mayer 2001; Barabasch & Wolf 2011). Barabasch (2010) as well as Rauner, Wittig and Deitmer (2010) also reach beyond a regular analysis of TVET and refer to the need to approach the study of transferability by the concept governance. For instance, Wittig and Deitmer (2010) presents a methodology to implement this framework in data collection and analysis on the basis of desk research and an evaluation tool for expert workshops.

According to this classification, evaluations reports that are commissioned by pertinent bodies will fit on the first approach. The second will correspond to the empirical work that is to be found written within the academic literature. Leaving the third approach to focus on research carried out mostly carried mostly from Europe (with the consequent risk of falling on the western view of the first strand), with scarce fieldwork and with a heavy historical research orientation.

The literature research evidences that there is a dominance of the research centred on the macro level of training systems. Consequently, it reveals that there is a need for an integrating approach with a stronger methodological and field work that is able to orient and guide the research.

From the literature, it is evident that transferring such systems certain aspects need to be taken into consideration, such as: contextual factors, stakeholders' agendas, cultural nuances, legal considerations. Although this paper represents a pilot, It considers the the implementation of the Mexican Model of Dual TVET (MMFD) as a plural structure with norms and relations whose greater interest does not lay only on the final results but rather on the process. The corresponding success or failure of MMFD implementation is rather on the procedure and causal factors that lead to it. Using the realist methodology and combining qualitative and quantitative methods, the research uses a team formed by Mexican and European researchers to focus on the inputs, processes, outcomes and outputs. This fills the gap in the literature of having theoretically informed empirical research that goes beyond the aspect of mere evaluation. It is optimal in the sense that the research combines elements of inputs like context, socio-economic background, design program with elements that foster a concrete outcome such as participation, orientation or relations. The yardstick for evaluating the performance of the implementation of the dual TVET system will include human capital aspects such as productivity, employability or entrepreneurship but also will combine those with the elements of students' satisfaction. This also provides value to the body of research as far as it integrates some of the critiques raised to the TVET literature in general.

## **The Mexican Model of Dual TVET**

The origin of the dual model of vocational education and training in Mexico goes back to the cooperation that took place between the National College of Technical Professional Education (CONALEP) in the federal state of "Estado de México" (Edomex) and Mercedes-Benz during the years from 1993 to 1998. Its German origins, linked to the expansion of the industry, look to attend the problem of the high rates of unemployment and sub employment of technical high school graduates. Additionally, the Federal Institute for Vocational Education and Training (BIBB) has been cooperating with CONALEP since 2009 (Russel, 2014)<sup>3</sup> in order to address three main sources of the problem: the lack of experience after graduating; the scarce social capital; and the oversaturated labour market of few fields.

Mexico is one of the world's major economic locations and, as a G-20 member, is also an attractive place for German companies to do business. Given the global competition in the manufacturing sector, the training and securing of skilled workers is becoming ever more significant and TVET provides a combination of theory and company-based training that is considered to be a successful strategy for training skilled workers in line with economic needs. By June 2013, the first public announcement towards the Mexican Model of Dual TVET (MMFD) was made by the Federal Secretary of Education, Emilio Chuayffet, announcing the intentions of the federal government to generate dual vocational policy and a legal framework for dual training in Mexico. In October 2013, a national pilot phase<sup>4</sup> was announced in which the Mexican Ministry of Education (SEP) and the National Employer's Association (COPARMEX)

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<sup>3</sup> <https://www.tecma.com/vocational-training-in-mexico/>

<sup>4</sup> Around 50 campuses of the CONALEP system, 11 COPARMEX business centres and more than 150 enterprises in the states of Baja California, Chiapas, Chihuahua, Coahuila, Estado de México, Guanajuato, Jalisco, Nuevo León, Puebla, Sinaloa, Sonora y Tlaxcala participated in the pilot test.



worked together with the German - Mexican Chamber of Industry and Commerce (CAMEXA) to start developing a Mexican model of dual vocational education and training (MMFD).

By 2014, there were over 1,300 German firms operating in Mexico, employing nearly 120,000 workers. One year later, by mid-2015, major companies in the automobile sector had built or announced new investments of US\$18.5 billion in Mexico, requiring about 42,470 specialized workers between 2014 and 2018. German firms in Mexico not only required specialized technicians, but rather, 'certified' technicians. By June 11, 2015, the SEP provided the legal framework to implement dual education in Mexico by formally making dual training an "educational option" among all upper secondary school (grades 9-12) educational systems in Mexico. On June 9, 2015, the German and the Mexican governments committed 5 million Euros to the expansion of the MMFD in Mexico. On September 2015, The German development agency (GIZ) became fully involved in the new stage of the Mexican Model of Dual TVET (MMDF). Since early 2016, the GIZ has been advising Mexican partners on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ) on the systematisation and on expanding the pilot project. The Federal government has provided €5 million for this purpose and the Mexican government is generating the same amount from its own resources (BIBB, 2016)<sup>5</sup>

Aragon (2016), implies that that German firms started to demand certifications from their own chamber in Mexico, the German-Mexican Chamber of Commerce, or CAMEXA (Deutsch-Mexikanische Industrie und Handelskammer), as well as the National Trust of the Normalized Systems of Labor Competence and Certification of Labor Competence (CONOCER). Schools either did not have a pool of trained instructors or they did not have enough resources to acquire the materials to run the machines and to provide maintenance. The German firms in Mexico also contacted their HQ offices in Germany. Therefore, they, in turn, had their voices heard at the German Confederation of Chambers, or BDA (Bundesvereinigung der Deutschen Arbeitgeberverbände). Despite being based on the German Model, given the physical, social and economic differences, the MMFD has developed its own characteristics (see figure 1).

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<sup>5</sup> For further information: <https://www.bibb.de/govet/en/45406.php>

Figure 1. The German Model and the Mexican Model

German Model	MMFD
Standards within the framework of a national consensus with shared responsibilities.	Standards are developed within the framework of CAMEXA and CONOCER
The main link exists between an educator and a company, in addition to the relationship with the educational establishment.	It is proposed that most of the vocational training be carried out in the company under agreements of learning.
Minimum duration of two years - complete training.	It contemplates two modalities: 2 and 1 years minimum training in the company.
Transfer of the standard to the company - rotation plan.	A methodology has been developed for the development of the rotation plan for learning posts.
Use of supra-business training centers to complement training.	There are some centers and in the medium term the development of supra-business centers is contemplated.
The suitability of the workplace for training.	COPARMEX has worked on suitable workplaces for training with the pilot companies.
There are certified instructors	Trainers receive some qualifications
The inscription of the contracts between company and educating with a third institution to have constancy and control.	It is proposed that business centers register framework and learning agreements.
Establishment of an internal control system for obtaining competences - weekly reports	The rent of the Altratec administration system has been managed.
Final theoretical exam and practical external final exam.	Exams will be developed alongside the generation of competition standards.
Certification by external (Chambers)	Certification will be carried out within the framework of CAMEXA and CONOCER.
Federal registration for open positions where students can choose to apply	Companies choose students who apply to the dual program
Students receive a payment from the companies	Students receive a scholarship from the government

Source: own source.

To sum up, the situation in Mexico is the coexistence of several stakeholders providing and pushing a Mexican Model of Dual TVET. The German Mexican Chamber, CAMEXA, and CONOCER have the role of providing certifications; ALTRATEC represents the biggest dual training provider and works directly with CONALEP technical schools and German, and Japanese, Mexican firms; the international cooperation (BIBB, GIZ) and the business sector pushes their agendas via the German Chambers of Commerce and the German Embassy in Mexico; and finally, the CONALEP represent the school system of technical schools. In Mexico the vocational schools are often a long way away from the companies providing training, the theoretical part of dual training is often imparted via an e-learning platform (Russel, 2014).

This dual training model is founded on three main pillars:

1. Company-based training
2. Training in inter-company centres
3. Training via the multimedia teaching and learning software

Although the framework requires that a number of actors collaborate, the strategy is not homogeneously defined. Compared to Germany the number of companies providing training is very limited because many companies are not yet aware of learning via the dual principle or they are aware of stories of incompetence or failure when importing abroad TVET systems.

This research aims to fill that gap in knowledge by providing a critical state of the literature of the studies done so far as well as by providing a robust methodology.

## The Mexican Model in the State of Mexico

The federal state of “Estado de Mexico” Dual Education Model served as reference for the development of the Pilot Test performed at a national level in 2013. As of that year, the number of students trained under this model has been increasing. According to the information provided by SEP, in 2014, there were approximately 800 trainees in the dual system at a national level, about 600 of these being in Estado de México. This rate of participation is correlated with the promotion of the MMFD within the framework of the Education Act of the State of Mexico, as well as in the Plan of Development of the State of Mexico 2011-2017<sup>6</sup>. Because of the nature of its experience, “Estado de Mexico” is an ideal reference to study de Mexcian Dual Education Model (MMFD).

As mentioned before, the Dual Education Model in CONALEP began in 1993, with the company Mercedes Benz and the Santiago Tianguistenco CONALEP Campus in Edomex. The project concluded when the company met its training needs of technicians in 1998. In 2009, the project was reinstalled in the Santiago Tianguistenco Campus, with three companies and 30 students. In August 2011, the first students participating in the MMFD graduated. CONALEP-Edomex learned from German Dual Systems through a former VW German dual expert, Mr. Udo Schneider, who started operating his own Dual Training Center, or ALTRATEC, in the state. Now at days, CONALEP-Edomex offers 30 careers, of which 20 are available in the MMFD (see figure 2), grouped in 7 occupational training areas that are taught in 39 campuses.

Figure 2. Dual Model academic offer

Accountancy and Management	Health	Technology and Transportation	Tourism
<ul style="list-style-type: none"> <li>•Executive Assistant</li> <li>•Management</li> <li>•Accountancy</li> </ul>	<ul style="list-style-type: none"> <li>•Nursery</li> <li>•Dental Assistant</li> </ul>	<ul style="list-style-type: none"> <li>•Support and Maintenance of Computational Equipment</li> <li>•Informatics</li> </ul>	<ul style="list-style-type: none"> <li>•Food &amp; Beverages</li> <li>•Hospitality</li> </ul>

<sup>6</sup> The Plan of Development of the State of Mexico is the guiding instrument of state planning where the priorities, objectives, strategies and general lines of action in economic, political and social matters are stated to promote sustainable development and improvement of quality of life of the population. The Plan of Development of the State of Mexico 2011-2017 stands for the vision of citizens having access to a high standard of living and greater equality of opportunity thanks to a competitive economy that will generate well-paid jobs in a security and rule of law environments (Government of the State of Mexico 2011); based on three main pillars a Solidary Government, a Progressive State, and a Protected Society.

Electricity and Electronics	Maintenance and Installation	Production and Transformation
<ul style="list-style-type: none"> <li>•Industrial Electricity</li> <li>•Maintenance of Electronic Systems</li> </ul>	<ul style="list-style-type: none"> <li>•Autotronics</li> <li>•Industrial Ectromechanics</li> <li>•Refrigeration and climatization</li> <li>•Maintenance of Automatic Systems</li> </ul>	<ul style="list-style-type: none"> <li>•Plastics</li> <li>•Enviromental Conservation</li> <li>•Industrial Food Processing</li> <li>•Industrial Chemistry</li> <li>•Production and Processing of Aquaculture Products</li> </ul>

Source: Own elaboration with information from CONALEP

On December 16, 2011, the Local Ministry of Education, ALTRATEC and the Steinbeis Foundation signed the "Letter of Intent to Promote the Model of Dual Education in the State of Mexico"<sup>7</sup>. Its objectives were to implement a system of technological transfer and technology development to attend the demand of the enterprises and schools in the State of Mexico participating in the Dual Model.

The current "Guidelines for General Operation of The Model of Dual Education in the Institutions of Higher and Higher Education of The Secretariat of Education of The Government of The State of Mexico", published in the Official Gazette of the State Government in August 2016, enlist a seven-step process (see figure 3) for the design, execution and evaluation of the Dual Model Education.

Companies willing to be considered as participants in the MMFD must: have specialized areas compatible with the Dual Student's graduation profile; have instructional personnel with experience in their position, technically and personally qualified, without criminal records and suitable to direct the dual student during the training process; have a trainer certified by CAMEXA or an organization endorsed by it, who will be responsible within the company to coordinate all instructors; and acquired the commitment to operate and promote the MMFD according to the current process.

<sup>7</sup> [http://normateca.edugem.gob.mx/normateca/wp-content/uploads/2016/07/CARINT\\_002.pdf](http://normateca.edugem.gob.mx/normateca/wp-content/uploads/2016/07/CARINT_002.pdf)

Figure 3. Guidelines for General Operation of the Dual Model Education

1.Planning and promotion	<ul style="list-style-type: none"> <li>•Plan, promote and disseminate in the companies of the region the MMFD and its benefits, allowing to strengthen the school-sector productive linkage, through the signing of specific agreements.</li> </ul>
2.Enterprise Selection	<ul style="list-style-type: none"> <li>•Ensure the suitability of the workplace for training, where the company participating in the MMFD has the technical capacity, available human resources and infrastructure, as well as the business and labor culture necessary to promote dual training.</li> </ul>
3.Dual Student Selection	<ul style="list-style-type: none"> <li>•Jointly selected between the educational institution and the company based on the needs of the company and the requirements established in the manual by the educational institution.</li> </ul>
4.Selection and Training of the Trainer and Tutor	<ul style="list-style-type: none"> <li>•Select, register and train the Trainer and Tutor-Tutor according to the profile and competencies of the career of the student who wishes to train.</li> </ul>
5.Training Project	<ul style="list-style-type: none"> <li>•Analyze the business standard, curricula and competencies covered by the standard and develop the rotation plan, the learning goals and objectives and design a complete training project, including the chronological structure for each dual student and not duplicate training actions</li> </ul>
6. Signing of agreements	<ul style="list-style-type: none"> <li>•Formalize the link and commitment that the school, company and dual student acquire to operate the MFD, through the joint signing of the Enterprise-School Framework Agreement and Dual Business-Student Learning Agreement.</li> </ul>
7. Strategies For Learning And Evaluation Of Competences	<ul style="list-style-type: none"> <li>•Verify the vocational training process in the MFD, through the application of relevant strategies to achieve dual student learning and equitably evaluate the competences in the different places of their formation.</li> </ul>

Source: Own elaboration based on the "Guidelines for General Operation of The Model of Dual

Education in the Institutions of Higher and Higher Education of The Secretariat of Education of The Government of The State of Mexico"

The Dual Student Profile is defined in the "Manual for the preselection of students of the Mexican Model of Dual Training" and looks to guarantee the permanence of the learner in the formation of the MMFD, who must cover the following characteristic:

- Attitudes: Intellectual and emotional maturity, sense of responsibility for self-training, proactive, committed, tolerant, empathetic, build self-knowledge through practice, assertiveness, sense of belonging, collaborative and participatory work
- Knowledge: Reading comprehension and Mathematical reasoning
- Abilities: management of information technologies, active listening and proper communication skills.

This profile must be published on every call for the Preselection of Students, along with the objective and benefits of training in the MMFD, the selected technical careers, name and address of participant companies, number of students required, deadline for the corresponding procedures and date on which the informative meeting will be held.

Students, who want to enroll in the Dual Program, must follow a three-stage pre-selection process. The first phase consists of an informative meeting where the MMFD is presented to the students and their legal guardians. Those interested in participating must prove to be enrolled as regular students of in the technological baccalaureate or technical professional bachelor; submit an explanatory statement of the reasons and expectations to participate in the Mexican Model of Dual Training; present a letter of authorization from the parent or legal guardian; have the recommendation of two teachers who endorse their performance, have the valid card of medical services; and full-time availability to approve exams of the pre-selection process.

The second phase is a personal interview divided on five blocks of structured questions with the purpose of exploring the student's degree of information about the MMFD, knowledge of the career, capacity of adaptation, and its personal goals and perseverance, with the objective of diagnosing its profile as a possible candidate. On each question a score from 1 to 3 is assigned (where 1 is null, 2 is regular, and 3 is good). It is important to mention that there are no right or wrong answer. At the end of the interview score are added, including all blocks of questions, the result is multiplied by 20 (weight of the interview phase) and divided by 45 (total points to be obtained). The third phase consists of applying knowledge tests on reading comprehension and mathematical reasoning, Keirsey's temperament inventory<sup>8</sup> and demonstration of practical performance and group integration.

After the third phase, a report of integration of results for each student is presented with the observations of the findings found in the interview and in the tests carried out. The interview is weighted with 20%, integrational group technique with 5%, knowledge tests with 30%, Keirsey's temperament inventory with 20%, and the practical performance with 25%. The minimum preselection score will be 70/100.

It is important to consider that the best students to join the MMFD are not necessarily those with high grades, since in many cases there are students who memorize contents with ease. The MMFD student must be accomplished, participatory, self-responsible, with initiative, disciplined in his attendance and in activities that require effort. Tests of knowledge about reading comprehension and mathematical reasoning. Once the candidates for dual training

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<sup>8</sup> Keirsey's temperament inventory is a personality self-assessment questionnaire designed to help people better understand themselves and those around them.

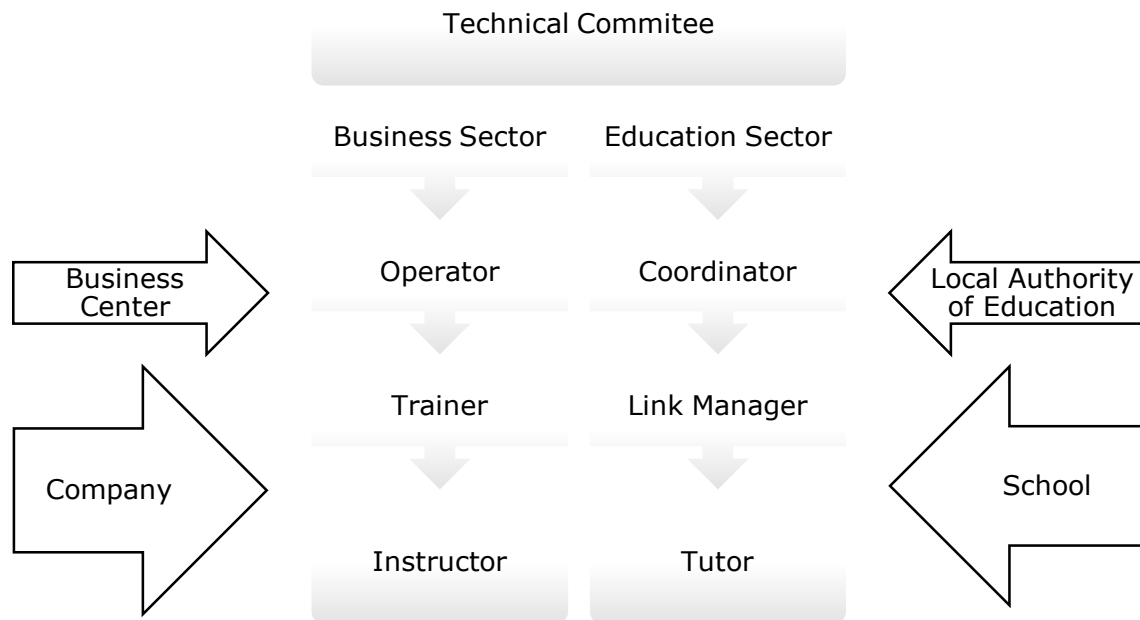


successfully complete the pre-selection process, their dossier will be forwarded with the corresponding report, so that the training companies will continue with the selection of the trainees according to their policies and requirements. Students who have successfully completed the tests and requirements, but were not selected by a company, will be entered in a portfolio of preselected students for their probable insertion in another company. After the student has received the acceptance and the corresponding commitment from the training company, the Learning Agreement is signed, and they become candidates for financial aid.

Scholarships for the Dual Model cover an amount, equivalent to the minimum daily wage of \$80.04 MXN for an 8-hour working day, \$2,000 monthly during twelve months. In order to be eligible applicants must not be receiving any economic benefit for the same purpose granted by any dependency or agency of the Federal Government during; fill out the scholarship application form properly, through the Socioeconomic Survey of Higher Education Students (ENCSEEMS); be performing a professional practice with a duration of not less than 20 hours per week in a public, private or a civil society organization during the time established by the regulations of each participating Campus; submit a letter of acceptance of the company or institution in which the student will perform his professional practice. The letter must specify the branch of economic activity to which the company or institution belongs to, as well as the tasks to be carried out by the applicant; that the company or institution in which the student has been accepted belongs to a work sector related to the area of knowledge of the student and that there is compatibility between the activities that the student is going to carry out and the curriculum of the applicant.

The Technical Committee in charge of monitoring the application, follow-up and award of the scholarships is led by the Local Secretary of Education, who serves as president, and five vocals who are representatives from the Local Ministry of Education, the Local Ministry of Development, the head of Director de Scientific Research and Human Resource Formation. A representative from the enterprise and an expert in dual education can assist as additional vocals if they are invited by the president of the committee. The committee must follow the "Rules of Operation for the Granting of Dual Education Scholarships" highlighted in the Official Gazette of the State Government on April 16, 2012, by The Board of Directors of The Mexican Council of Science and Technology (COMECYT). Below the Technical Committee, the operator, on the business sector, and the coordinator, on the education sector, are the intermediaries in charge of the transversal communication among actors; both are fully dedicated to follow up the formation process of the participants. The trainer, who must be certified, is responsible to follow the dual student's learning and articulate the rotation plan of learning posts where the instructors supervise the student's daily work. In the education sector, the link manager is responsible for the area of technical training in the educational establishment, who validates the learning posts and is the link with the business sector. Finally, the teacher of the educational establishment follows the student's learning in the company and verifies the progress in relation to the curricular plan.

Figure 4. The hierarchy in the dual system



Source: own elaboration based on CONALEP

The experience of the State of Mexico, serves as reference to provide a functional institutional design structure to the MMFD which has translated in a high rate of participants if compared to the rest of the nation. For these reasons it serves as well as case of study to understand the processes and outcomes of the MMFD.

## Analytical and methodological approach

### Realist evaluation approach

To assess the research goals the team will adopt a realist evaluation. Realist evaluation (1997) is drawn from Pawson and Tilley's seminal work, and is a member of the family of theory-based evaluation approaches. It sits between positivism and constructivism and starts by clarifying the 'programme theory' – that is, clarifying how programme activities are understood to cause (or contribute to) outcomes.

The realist evaluation focuses on 'outcome' and includes changes for people and their lives, but can also include other kinds of changes (for organisations, workers, governments and so on). Consequently, the realist evaluation allows for carrying an analysis of the direct and indirect changes originated by the implementation of the Dual TVET system as well as an analysis of how it affects people's lives on the region.

A realist evaluation has a particular focus on understanding causation and understanding why different outcomes are achieved in different contexts. By taking into consideration the context as a variable, this could improve the understanding of how and why interventions work or do not work in a region or placement. It scrutinizes the features of a particular context and how those are likely to affect and for whom.

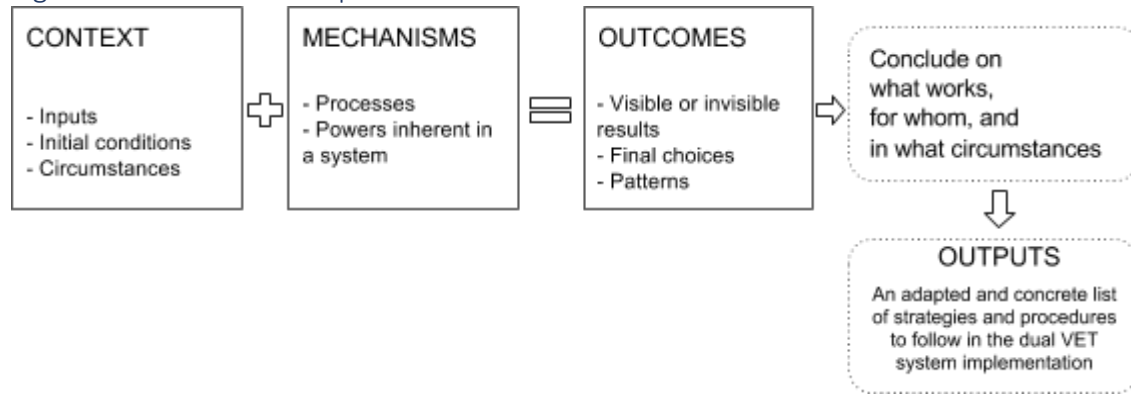
Realist evaluation focuses, on describing and understanding the process behind a program's output, which is generated by outputs that are born from inputs. These inputs are factors such as labor, capital, materials. All are analyzed from a quantitative as a qualitative approach. It also considers the formal and informal involvement of the agents involved and the institutional environment. This allows us to follow the genealogical line of a result, making evident the products and the inputs that are behind it. In this way, the decision maker can generate a benchmark that shows the good practices involved.

Realist evaluation does not focus on the impact of the program. This does not mean that these two methodological approaches are mutually exclusive. For example, if it is possible to verify the impact then the process behind it can be described. Unfortunately, impact assessments, both experimental and quasi-experimental, may have flaws in their preparation or be very difficult to perform. For example, an experimental approach is that program supports are focused on only one part of the population and not another. In this way, the result indicators of the treated and untreated group are compared and verified to identify if the program makes a difference. This has ethical problems.

Once the intervention is done, the quasi experimental case looks for to look for agents with the same characteristics as those who were supported before being intervened, these agents are known as a control group. A control group is usually those who wanted to receive government support but did not receive it, because resources are limited. However, on many occasions, control groups are not easy to obtain, so impact estimation is impossible.

The implication of applying a realist evaluation to the MMFD is to consider that what matters about context is that it has an influence whether and which mechanisms operate. The following figure represents it:

Figure 5. CMO relationship in a realistic evaluation



Source: own elaboration

In summary "realism provides a specific way of thinking about 'context'. Whether mechanisms 'fire' (operate at a particular moment) depends on the context" (Westhorp, 2014). Using Wong (2013) words:

"realism holds that mechanisms matter because they generate outcomes, and that context matters because it changes... the processes by which an intervention produces an outcome. Both context and mechanism must therefore be systematically researched along with intervention and outcome. By implication, research or evaluation designs that strip away or 'control for' context with a view to exposing the 'pure' effect of the intervention limit our ability to understand how, when and for whom the intervention will be effective" (Wong et al 2013, p. 13).

## Programme theory and hypotheses

For the purposes of transfer, based on the literature, a vocational training system should be viewed not as a single entity, but rather in terms of its various components. In order to assess that we introduce the theory of change.

The literature has identified several potential advantages in terms of the employability of students in dual apprenticeships, particularly when compared to full time school-based TVET models. Together with the positive effects on the employability of dual TVET graduates, the literature has also identified possible negative ones on the skills and disposition for lifelong learning of these graduates (Ryan, 1998).

In the following paragraphs we will try to delineate the social mechanisms that are supposed to connect dual apprenticeships to these positive and negative effects.

There are at least two types of mechanisms that can operate favouring the employability of Dual TVET graduates: the skill-learning mechanisms and the institutional link mechanisms.

### 1. The skill-learning mechanisms

- 1.1. Situated learning of the curriculum: It is often claimed that a curriculum which contextualises knowledge to the workplace (situated learning) is for some learners both more motivating and easier to undertake than the less situated learning that characterizes classroom-based programmes (Soskice, 1994).
- 1.2. Work-related pedagogies: a pedagogy which involves problem-solving and workplace activity may produce more learning, particularly amongst less academically oriented students (Grubb, 1995; Unwin & Wellington, 1995)

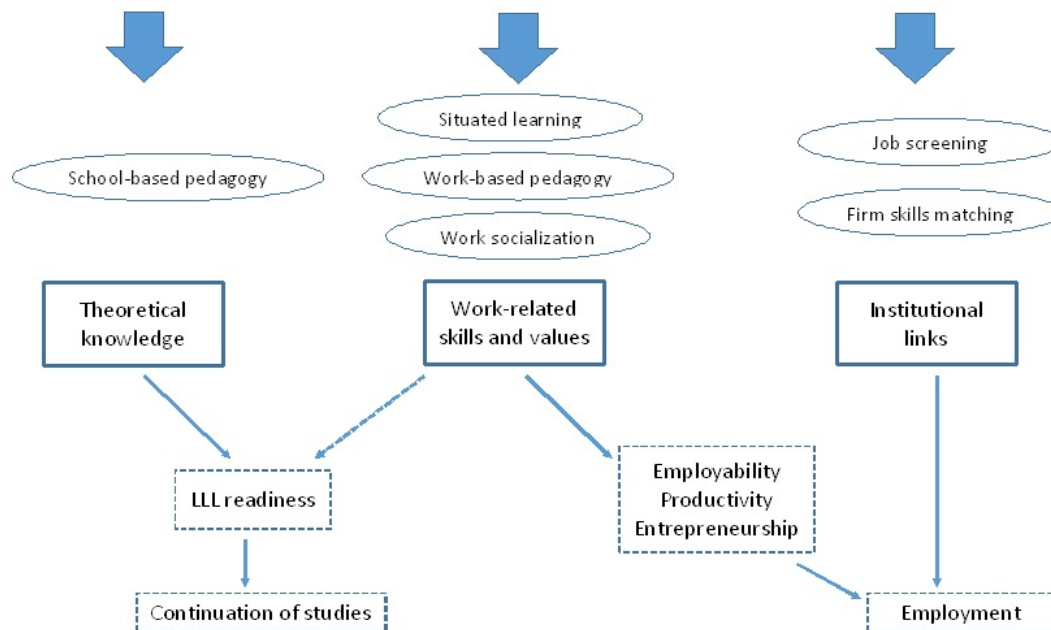
- 1.3. Socialization in the world of work: The benefits of apprenticeship are sometimes said to be associated to the learning of the norms, values and requirements of the world work, favouring the development of affective 'skills' as self-discipline, reliability, attention to detail, and respect for peers and teachers (Streeck, 1989).
2. The institutional link mechanisms
  - 2.1. Employee screening: apprenticeship may help bring young people to the attention of the sponsoring employer as potential employees. Apprentices spend most of their time at the workplace, allowing employers to screen for subsequent employment more effectively than is possible in the case of full-time vocational graduates, who apply from outside rather than within.
  - 2.2. Skill matching: the skills learned by apprentices are inevitably partly specific to the sponsoring employer, unlike those learned in full-time schooling, making ex-apprentices potentially the more attractive candidates for employment at a given level of skill.

There are at least two mechanisms that can operate producing negative effects on the skills and disposition for lifelong learning of dual TVET graduates: the exploitation mechanism and the disconnection from school mechanism.

3. Exploitation: Employers involved in apprenticeship often limit learning at the workplace and access to part-time education in the interests of immediate production (Ryan & Unwin, 2001).
4. Disconnection from school: Even in externally regulated apprenticeship, there remains the practical difficulty of integrating school-based and workplace-based vocational learning apprenticeship may well lead to less theoretical learning and less stimulus to lifelong learning.

This type of relations can be represented in the following figure. The arrows represent relationships which can take a positive or negative consequence on the student.

Figure 6. Theory of change of dual apprenticeship



Source: own source

In the diagram one can see the dual experience can be triggered in a positive or negative form based on mechanisms (school based pedagogy, situated learning, work socialization, skill matching, job screening). Each of those mechanisms operate producing positive (i.e. motivation for lifelong learning) or negative effects (on the skills and disposition for lifelong learning of dual TVET graduates).

We could say that the activation of skill learning mechanisms is associated to the following outputs:

- Higher student motivation for learning
- Higher command of occupational skills
- Higher transversal skills
- Higher self-confidence

We also could say that the activation of institutional link mechanisms is not associated to any of the outputs, but directly with some of the outcomes:

- Higher employment in the same company
- Higher productivity/salary

We could say that the activation of the exploitation and the disconnection from school mechanisms are associated to the following outputs:

- Lower motivation for learning
- Lower acquisition of theoretical knowledge

In terms of the relationship between outputs and outcomes, we could say that, in general terms:



- Outputs like student motivation for learning, theoretical knowledge and self-confidence are associated to outcomes like higher expectations/aspirations and continuation of studies.
- Outputs like transversal skills and self-confidence are associated with higher entrepreneurship and employment.
- Outputs like the command of occupational and transversal skills are associated with higher employment and higher salary/productivity.

The main difference between theory of change evaluation and realist evaluation is that the realist pays more attention to the context (Blamey & Mackenzie, 2007). We need to introduce the context variables in our analysis in order to generate a thoughtful analysis. The variables to consider are described hereunder and they are initially associated to one of the mechanisms outlined above:

- 1) Recruitment of students with an intrinsic interest in work-based learning
  - a) Skill learning: Since the participation is not mandatory, it is assumed that students willing to enroll in the dual system find some of its' characteristics attractive, meaning they are self-motivated and open minded for a work based learning, which leads to a more robust and nutritive experience.
- 2) Employers' willingness to invest in the holistic training of the apprentice
  - a) Exploitation: Companies have the incentive to invest in the training of the apprentices since this represents the opportunity to develop specific human capital in order to improve productivity. On the other hand, if it is considered that participants will only work temporally, investment in their training might be considered a sunk cost. In this scenario, participant's lose the theoretical knowledge of the classroom and the work based learning is reduced to duties with a low level of complexity.
- 3) Correspondence between the student professional interests and the sector of the company
  - a) Skill learning: as mentioned before, participants are assumed self-motivated when enrolling in the dual system. Yet, to stay motivated, the work based learning must satisfy the expectations of the participants, as to performed tasks related with their area of study as an example, otherwise productivity might fall translating in a prejudicial experience for both the company and the participant.
  - b) Institutional link: when the correspondence is achieved, the student gets to develop specific skills that matches the company needs.
- 4) Adaptation of school processes to the needs of the apprentice
 

-Participants face the opportunity cost of spending less time in the classroom, which may imply acquiring a less profound theoretical knowledge. There's also a risk of unbalanced work-school schedules which threatens the academic performance or spare time for students.
- 5) Adaptation of company processes to the needs of the apprentice

- a) Skills learning: the learning curve development depends directly on the guidance received during the training. If the work based learning environment is not adapted to the needs of the apprentice, then the improvement of skills might be mined or suspended.
- 6) Monitoring of progress, early detection and individualized support
  - a) Skills learning: A more supervised training must be translated in a better performance of the participants and a constant increase in the complexity of the assigned tasks.
  - b) Disconnection from school: lifelong learning and theoretical concepts might not be acquired if there is not a proper follow up of the academic development of the participants. As an example, it might be the case of a participant who wants to continue undergraduate studies, yet the absence specifics concepts might become an obstacle to be admitted at a university.
- 7) Quality assessment of work related skills and certification
  - a) Skills learning: the back up of an external party that certifies the quality of the program, can increase the confidence of the participants on the learned skills and gives them a powerful signal to be send to the labour market.
- 8) Support in the transition to employment
  - a) Skills learning: After the dual training, participants acquire knowledge of the company systems and processes, develop specific skills needed to perform tasks at different levels of the organizational structure of the company.
  - b) Screening: Consequently, the gathered experience as well as the participant performances increases the probability to get hired since the employer already knows her work.

## Methods, sampling and data

Qualitative and quantitative methods are portrayed within academia as different traditions and perspectives, as two options that occur in an isolated space and where the existence of one results in the non-existence of the other (Denzin, 1994, 2008). However, the rigid division between quantitative and qualitative is unproductive within research. For a thoughtful analysis quantitative and qualitative data are needed. Consequently, the traditional dichotomous either/or options (quantitative approaches or qualitative approaches) are here replaced by a flow of choices in favour of philosophical options, or “what works” empirically (Tashakkori & Teddlie, 2010). For this reason, the research opts for combining the two of them in order to disentangle the reasons that drive regions, students, employers and policy makers to opt for one or other decisions.

The methods and instruments selected to collect data are mostly qualitative combined with some quantitative questions in order to measure the productivity and success ration of the implementation. The main methods will be questionnaires, discussion groups, and personal semi-structured interviews, and it will address the questions of for whom does it work (or not), why does it work (or not), in what contexts will this work or not, what are the main mechanisms by which we expect this programme to work, what outcomes and over what duration will we obtain those.

The pilot study was composed by 25 semi-structured interviews to 11 women and 14 men that had finished their studies, and 25 structured interviews (questionnaires). Each of them had approximately 55 minutes and were conducted either in person or by phone. Participants were offered a card with \$300 as an incentive to attend the interview, and were explained that the reward was not based on their answers, in order to avoid a desirability bias.

The sample for the second round (the questionnaires) was similar. Out of 25 interviewees, 17 agreed to collaborate with the structured interview (questionnaire). Henceforth, 8 of the graduates that completed the questionnaire were not previously interviewed. The questionnaire was conformed of 128 questions, divided in five sections. The first section gathered sociodemographic characteristics of the participant such as gender, age, level of studies, and proxy variables of the household income such as number of light bulbs, restrooms and access to services. The second section was structured with multiple choice questions the reasons of the participant to enroll in the dual program and the degree of influence their social environment in their decision; open questions where interviewees were asked to describe the enrollment process and the challenges faced during the process. The third section focused on the satisfaction with the processes during the enrollment, the school participation and the company participation; this question where mainly Lickert elements, where 1 is totally satisfied and 4 not at all satisfied. The options "I don't know" (8) and not responding (9) were included as well. The fourth section similar to the third one, but it focused on the satisfaction with results perceived by the students. The last section, gathered information in order to measure the outcomes of employability, entrepreneurship, productivity and student satisfaction through a combination of Lickert elements, opened questions and binary options.

The sample was selected from a database of graduate students as well as by snowballing (references provided by the interviewees). The process was difficult because many trainees no longer worked in the companies where they studied the dual model. This fact needs to be taken into account for the representativeness of the conclusions because only 19 of the 60 people that formed the initial database with the phones and information of graduated students, participated in the study. Additionally, another possible shortcoming is that some questions were difficult to understand by the participants as well as they evidenced difficulties to express their opinion on various subjects.

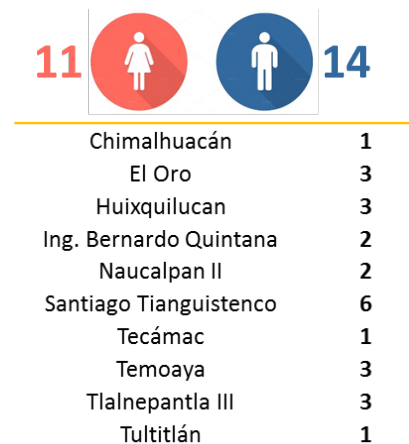
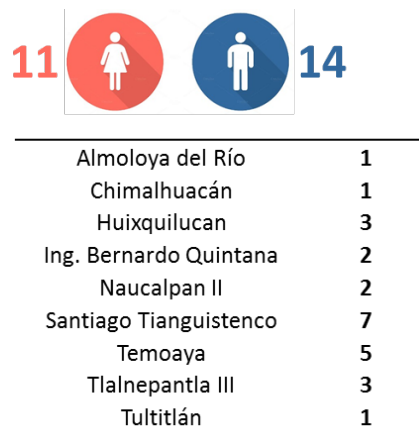
The most notorious sections were

- Define the main challenge to participate in the project (P25b).
- Specific terms such as "Promotions (labor)" (P89).
- Understand the question and give a percentage of skill development during the course of the dual program (P90).
- The description of competences learned during the program and unknown before starting the course of the dual program (P127).

The following graph illustrates the sample. For analytical purposes the two groups (semi structured interviews and questionnaires) will be treated as one from now onwards:

# Graph 1. Sample: gender and region

Stage 1 – Semi-structured interviews Stage 2 –Structured questionnaires



The qualitative data from the interviews and the quantitative data from the survey were integrated and analysed through the same framework. This framework included information on the profile of students, their reasons to participate, their satisfaction with programme processes, their perception in terms of outputs, and their educational and labour market outcomes (see table below).

Table 3. Sources of information and structure of the analysis

	INTERVIEWS	SURVEY
<b>PROFILE</b>	Gender	Gender
		Socioeconomic background
		Area of studies
		Company sector
<b>PARTICIPATION</b>	Reasons	Reasons P23
	Influences	Influences P27-P32
		Selection process _P24a/b/c
<b>PROCESSES</b>	School (general)	School satisfaction P54-P64
	Company (general)	Company satisfaction P33-P45
		Company person instructor P46
		Company training P47
		Company rotation P49
	Program (general)	Program satisfaction P67-P77
<b>OUTPUTS</b>	Specific skills	Specific skills P93-P95

	Transversal skills, values, attitudes, responsibility	Transversal skills P100-P103
	Knowledge	Knowledge P97-P99
	Disposition to training	Disposition to training P112, P116, P122-P123
		Own project P96, P113
		Ethic behaviors P124-P125
		Self-efficacy P105-P107, P114
		Employability P117-P121
		Entrepreneurship P104, P126
OUTCOMES	Transition	Transition to work P86
		In the same dual company P87, P109-P111
	Employment situation	Current situation P84, P115
		Use of skills P90
		Lack of skills P108
		Salary P91
	Continuation of studies	Current studies P85

## Results

### Profile

CONALEP-Edomex offers 30 careers grouped in 7 occupational training areas that are taught in 39 campuses located in the State of Mexico. The participants in the dual system were from 11 different campuses of the CONALEP-Edomex and studied 11 different careers from 5 occupational training areas.

The analysis of the distribution of the apprentices among areas of study shows clear patterns of gender segregation (see Table 1). Only 2 out of the 11 women in the sample pursued a technical degree in the field of Production and Transformation; 8 pursued a technical degree in Accounting and Management; and only 1 pursued a degree related with Technology and Transportation. Among the males, 5 pursued a technical degree in the field of Production and transportation; 4 in field of Maintenance and Installation; 1 in Technology and Transportation, 2 in Electricity and Electronic; and 2 more in the Accountant and Management field. This table shows the unequal distribution among **careers** and **gender**. However, it also brings some positive aspects thanks to the parity in current careers such as Technology and Transportation. Additionally, a general consistency is observable between the careers studied and the industries recruiting them for the dual system.

Table 4. Participants by Gender and Area of study

	<b>Total</b>	<i>Women</i>	<i>Men</i>
<b>Production y Transformation</b>	<b>7</b>	<b>2</b>	<b>5</b>
<i>Building</i>		0	1
<i>Automotive Industry</i>		0	1
<i>Machine Tools</i>		0	2
<i>Plastic Products</i>		1	1
<i>Industrial Chemistry</i>		1	0
<b>Maintenance and Installation</b>	<b>4</b>	<b>0</b>	<b>4</b>
<i>Industrial Electromechanics</i>		0	2
<i>Autotronics</i>		0	2
<b>Technology and Transportation</b>	<b>2</b>	<b>1</b>	<b>1</b>
<i>Informatics</i>		1	1
<b>Electricity and electronic</b>	<b>2</b>	<b>0</b>	<b>2</b>
<i>Maintenance of Electronic Systems</i>		0	2
<b>Accounting and Management</b>	<b>10</b>	<b>8</b>	<b>2</b>
Executive Assistant		4	1
Accounting		4	1
<b>Total</b>	<b>25</b>	<b>11</b>	<b>13</b>

Source: own source

Participant companies are mainly Mexican (8 out of 18) and American(5 out of 18), while there were just two German companies, two Japanese and one Austrian that participated for this sample. The predominant sector is related with the automotive industry, including auto parts, cars, tractor and transportation. Yet there is no specific career demanded by industries.

Table 5. Company Profile

<b>NATIONALITY</b>	<b>INDUSTRY</b>	<b>PARTICIPANTS</b>	<b>CAREERS DEMANDED</b>
<b>AUSTRIAN</b>	Packaging	3	Plastic Products And Machine Tools
<b>MEXICAN</b>	Asphalt	1	Industrial Chemistry
<b>MEXICAN</b>	Pharmaceutical	1	Accounting
<b>MEXICAN</b>	Paint and Coating	2	Accounting
<b>AMERICAN</b>	Hotel	3	Industrial Electro-Mechanics And Informatics
<b>MEXICAN</b>	Auto Parts	1	Autotronics
<b>AMERICAN</b>	Agro-Chemistry	2	Executive Assistant



<b>AMERICAN</b>	Automotive	1	Machine Tools
<b>GERMAN</b>	Food	1	Maintenance Of Electronic Systems
<b>AMERICAN</b>	Entrepreneurship	1	Executive Assistant
<b>MEXICAN</b>	Textiles	1	Executive Assistant
<b>JAPANESE</b>	Cars	1	Autotronics
<b>MEXICAN</b>	Tractor	2	Accounting
<b>JAPANESE</b>	Cars	1	Executive Assistant
<b>GERMAN</b>	Cars	1	Industrial Automotive
<b>MEXICAN</b>	Packaging	1	Maintenance of Electronic Systems
<b>MEXICAN</b>	Transportation	1	Accounting
<b>AMERICAN</b>	IT and Web Design	1	Informatics

Source: own source

Beyond the **company profile**, the profile of the students that participated in the analysis is another variable to consider. The first section of the structure questionnaire collects information of the socioeconomic level of the participants, based on the the Mexican Association of Market Intelligence and Opinion Agencies (AMAI) Socio-Economic Level Standard (NSE)<sup>9</sup>. The sample was composed by individuals of mid-low and low levels NSE. From the interviewed participants, 12 have a D NSE level; 4 have a D+; 7 achieved a C- level; and only 2 have a C level. Among the main similarities in the sample are that every household has less than 5 rooms and at maximum 3 lightbulbs. 13 of the households do not have a shower and only 10 have concrete floor.

Table 6. Household Socio Economic Level (NSE Index)

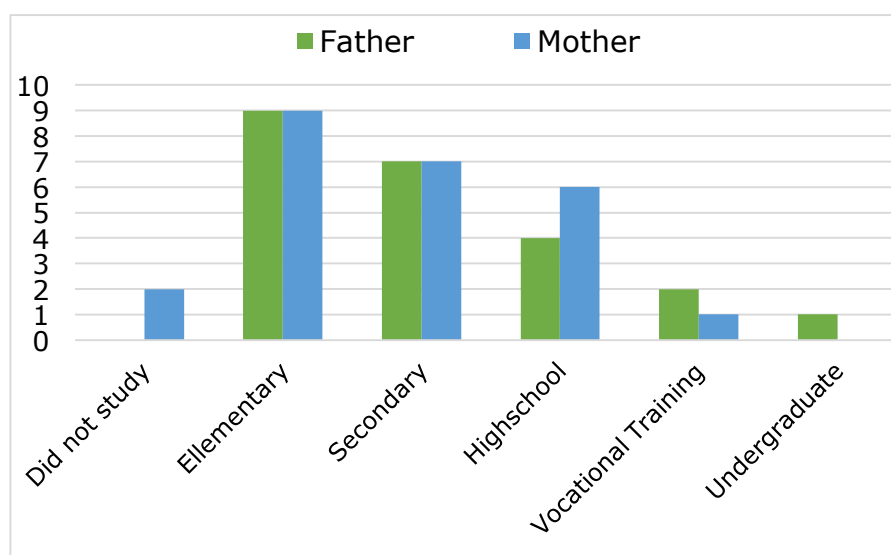
NSE	Mexico	Estado de Mexico	Sample
A/B	6%	4%	0%
C+	11%	10%	0%
C	13%	13%	8%
C-	14%	15%	28%
D+	15%	16%	16%
D	30%	32%	48%
E	11%	9%	0%

Source: Own elaboration with data from AMAI

<sup>9</sup> This index allows classifying households in an objective and quantifiable manner according to their economic and social well-being, in the sense of how satisfied their needs for space, health and hygiene, comfort, practicality, connectivity and planning and future are. It is important to consider the scope and limitations of the AMAI NSE index is focused on segmenting households, not individuals, as well as it is not an indicator of wealth or poverty. Its purpose is to segment homes by their degree of wealth in a scale from E (the lowest) to AB (the highest) with the categories D, D+, C-, C and C+ in between.

Concerning the **educational background of their families**, the following graph shows the parental maximum level of schooling revealing that the majority of the families have an elementary level and that the vocational training is by far an unexperienced path for the parents. This is also relevant, considering that in 2016, at a national scale, 53% of young adults (25 to 34 years old) only had education below the upper levels, and 63% of people between 25 and 64 years old (OECD 2017)

Graph 2. Parents' maximum level of schooling

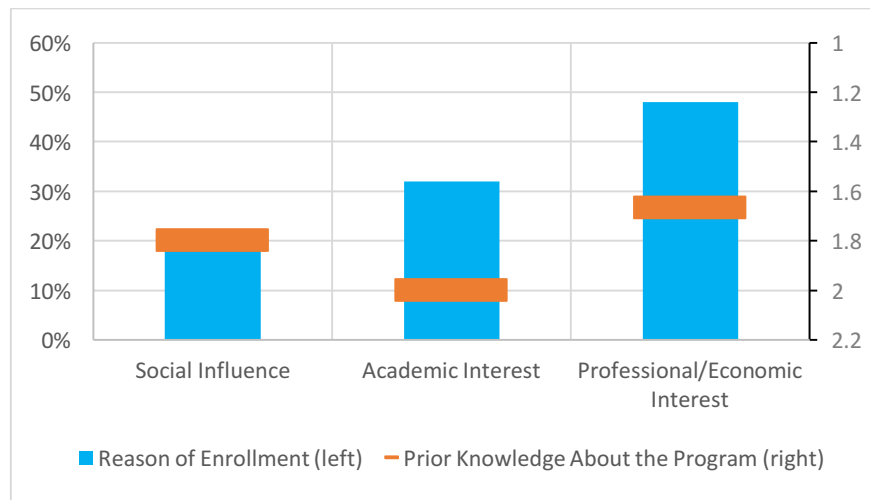


## Participation

In the second section of the structure questionnaire, participants were asked about the reasons to enroll in the program and the influences that lead to that choice.

Concerning the **reasons to enroll in the program**, the results show that nearly half of the sample participated because of professional and economic interests as shown in the blue bars in Graph 3. The orange bars represent the degree of prior knowledge participants had before enrolling in the program. Evidence suggest that participants with professional and economic interests tend to be better informed about the program prior to their enrollment.

Graph 3. Reasons for enrollment



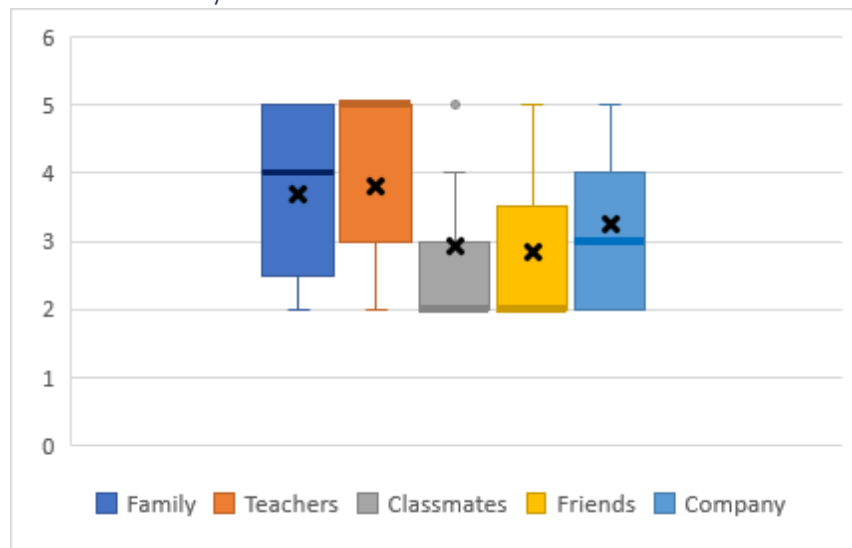
Whilst 19% of the sample reported that their decision was influenced by their social circles, rather than coercion, this influence is related to moral commitments such as receiving a recommendation from one of their teachers as two participants reported. The open interviews give voice to those:

The suggestions given to us by the teachers. They told us that we were going to require experience, that they were going to give us a scholarship, that we were going to do practical work. For those reasons [...] My dad said: It's a good opportunity, that you can do all that, your practices, you acquire experience and besides that, you can get a job there if you perform your job well, those were the reasons (Participant n°2, man, Industrial Electromechanics)

Well, the teacher Uri, he told us it was a very good option to learn new things from the company and then I told my mom and my mom told me that she agreed with that, then ... also my mom supported me (Participant n°14, woman, Directive assistant)

Participants were asked to grade the degree of influence their social circles had in the decision to enroll in the dual program (where 1 is not at all influenced and 5 is quite influenced). Reported answers show that teachers are the most influential circle, followed by the family.

Graph 4. Degree of Influence by Social Circles



The answers of the open questions highlight that acquiring experience to the labour market, alongside the structure of the program, information received in the school and the economic support are additional incentives.

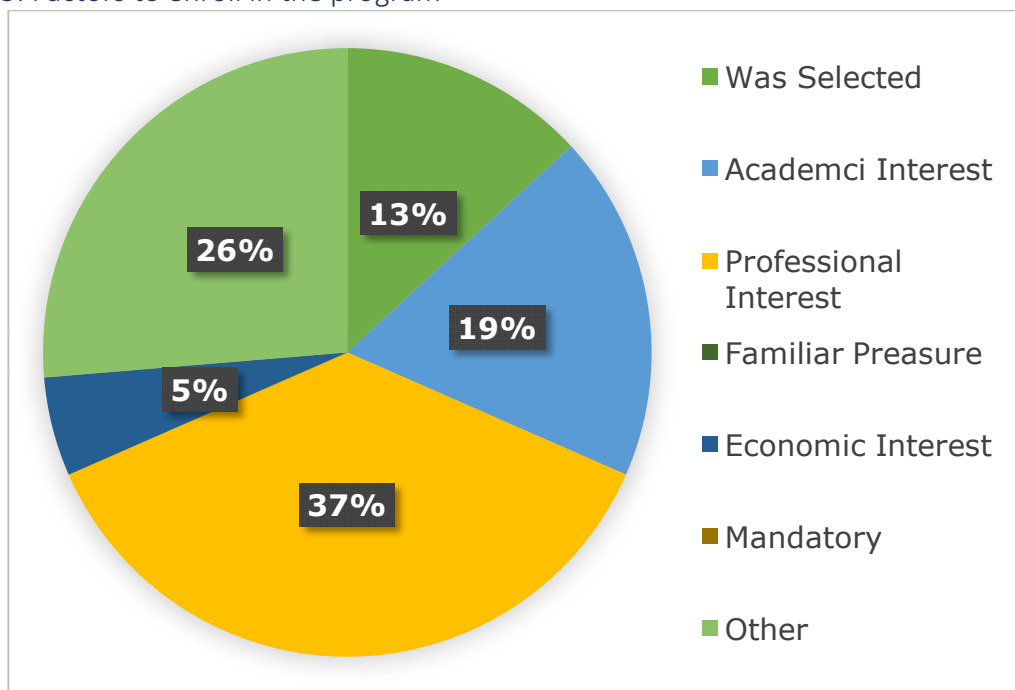
And that was what most caught my attention, that we had more chance of getting a job, like a little more experience (Participant n°3, man, Industrial electromechanics)

(...) because we were going to learn more, to acquire more experience, I was going to help for some future so to speak, and then I considered the time I was there, which is a good system (Participant n° 15, woman, Management Assistant)

What motivated me the most was to work in a work area because I, before entering the Dual Education system, had not worked (Participant n° 20, man, Industrial electromechanics)

This pie chart illustrates the different factors that **influenced** the students to enroll in the dual system.

Graph 5. Factors to enroll in the program



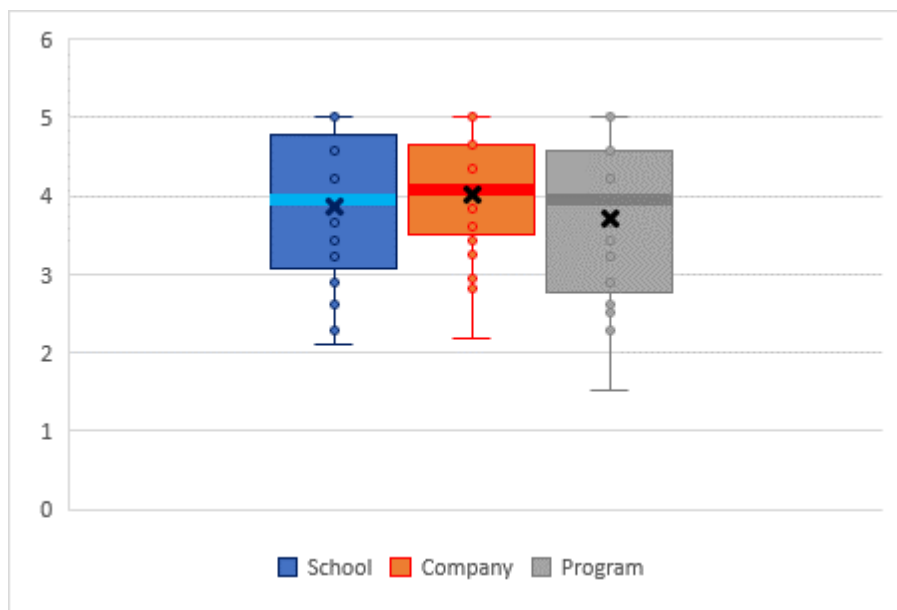
The most frequent answer was that students enrolled because of professional interests (37%). Disentangling the section of "others" one finds that are also factors related to the labor aspirations. Finding a job easily after graduating by having professional experience, personal development and curiosity about the labor market are examples of that (26% others). The third biggest group of answers was academic interest (19%).

## Processes

Participants graded their level of satisfaction (where 1 is totally satisfied and 5 is completely unsatisfied) for different elements of the process, such as the quality of acquired knowledge, the learned skills, the treatment and attentions received, as well as the payment during their experience at campus, at the company and in the program as a whole. With the reported answers, a Likert Index was built for each section<sup>10</sup> that goes from 1 to 5 (where 5 is the maximum level of satisfaction and 1 the least). In general, participants reported higher levels of satisfaction with the **company** rather than with the school, valuing the most the acquisition of practical skills and the treatment received and the less valued was the evaluation system. The main differences between the satisfaction with the school and the company can be noted in the quality of materials and equipment and the feedback received. In both cases the payment had a low level of satisfaction in comparison with the others.

<sup>10</sup> Each index was built using the formula  $(n * 5) / \sum_i^n x_i$ , where  $x_i$  is the answer  $i$  and  $n$  is the number of elements (answers).

Graph 6. Level of Satisfaction with the Process



Note: x represents the mean while the thick bar represents the median.

The students expressed a medium level of satisfaction regarding the **school** experience due to the lack of interaction with real teachers and an overload of work through the online platform:

That you neglect the school a lot even though you are putting some materials on the platform, even so you neglect much of what you can see, even in the main subjects of your career [...]. For example, I met a girl who told us that in their company they took some teachers over, who taught them their subjects there [...] In Conalep I would have liked that, for example, on the platform where we had to study, I would have liked it to be more concrete or that someone told you, you're good at that or you're wrong, that there we could have gotten some feedback on what we were doing [...] (Participant nº4, woman, Computer Systems)

I would have liked that at least once a week we would have had taken class in the classroom to listen to the teacher. (Participant nº 10, woman, Directing Assistant)

Concerning the company, the level of satisfaction was very high although some criticisms were raised regarding the quality of equipment as it is expressed by the following student:

They gave me the activity, but they also explained to me how to do the activity. In the Company many times something failed, I do not know, the machines that they gave us at that time, because the company had just started, but the equipment was very slow, the Internet very slow, the computer equipment something ..." (Participant nº 8, woman, Accounting)

It is observed that the students are satisfied with the processes within the Company and the school. Although, they are less satisfied with respect to the timetabling of school activities, the hours of training and the study conditions.

Regarding the **program** in general the level of satisfaction is 3.71 out of 5 points, being the critical points the value and the reliability of the payment and the responsiveness of the schools. These quotes reveal some of the points of conflict:

(A payment) Of \$ 2000 per month, but it took a lot, 2 to 3 months to deposit it. And to let us know that we already had a money took 6 to 8 months (Participant nº 4, woman, Computer studies)

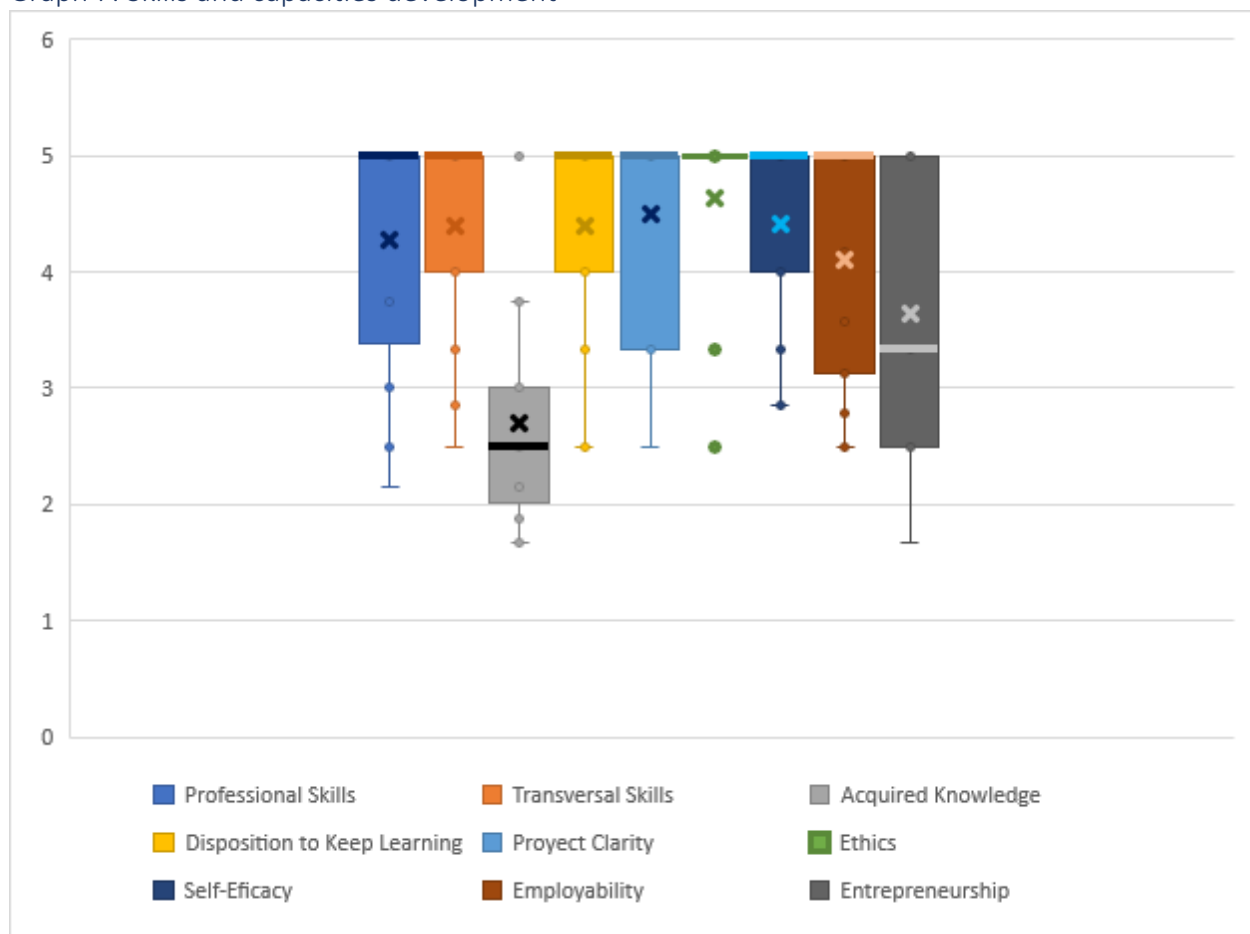
Then they took too much time with the scholarship, and yes, it was a bit complicated, it implied a little more spending from our sides on tickets and meals. It was the only negative thing about the experience (Participant nº 9, man, Industrial Electromechanics)

Well, they told us something about some scholarships the government was going to give us, maybe the most negative thing that could have happened in this one, in this one, now, in this process, it was that, the scholarship, because sometimes they deposited us , other times not, other times they accumulated it, that is, it was a relaxation now that, with the scholarship, but because so negative, it was not (Participant nº 12, woman, Accounting)

## Outputs

The participants report to have increased their **skills** thanks to the dual system. Besides one of the interviewees, all expressed a general satisfaction with the impact of the dual system in their professional skills (4.27 out of 5 L.I) as well as on transversal skills such as communicational skills, teamwork or responsibility (4.40 out of 5 L.I).

Graph 7. Skills and capacities development



Note: x represents the mean while the thick bar represents the median.

The different narratives emphasize the positive impact of the dual system in their profesional and **personal development**. In the interviewees the references to responsability are numerous:

It has taught me many things that I did not know and I feel sure that if I go to another place, maybe they will receive me because of the knowledge I have acquired [...] Well skills ... For example, in the Conalep, We entered the workshops, and we were short of material, we were short on teachers but here we were only 3 and the experience was easier (Participant nº 2, man, Industrial Electromechanics)

because it teaches you a lot in terms of work, in terms of how you should treat people [...] I liked it a lot because I became a little more sure and I know how to treat people a little better, myself in a matter of pressures [...] I think that the most important thing was to have security in myself (Participant nº 4, woman, Computer Studies)

Realize that you are capable of doing things, to realize that we will not be all the time in a safe circle, that "I can not or I do not want to," is a matter of



doing it yourself. Trust and work in the team (Participant nº 9, man, Industrial Electromechanics)

Responsibility. Well, I think that being in the program changed many things or the way I see many things, because I realized, I have classmates at the university that they are 23 years and they said: "I come to school to take a break, I come to school to socialize" and that kind of things. For example, you go to school because you know you want a degree, that you can continue learning, I do not know, for example, to start a business (Participant nº 11, woman, Accounting)

Alongside the social skills, students reported self-perceived improvement in their **transversal skills**, such as making decisions based on available information. Structured questionnaires showed both male and female participants have a positive perception on the improvement of their information research and analysis skills for decision making. On the other hand, skills related with **entrepreneurship** such as initiative to start their own business improves as well, yet the median response in both groups was closer to the "neither improved nor worsen".

In conclusion, despite of the diversity of student's profiles and areas of work, all the students report that the practical character of the dual system has helped them to professionally mature in terms of being responsible as well as confident working with others.

Whilst the dual system has the advantage for some of the students of doing the tasks and learning at their own path, there are some criticisms (16%) to the online methodology which puts a shadow in the aspect of integration of practice and theory and to the general level of **knowledge acquired**.

Four out of twenty-five interviewees expressed disappointment when they realized that the academic learning will be done by themselves without attending the school and uncertainty if that will be enough to acquire the knowledge that they were supposed to acquire.

This concern was mainly centered on the knowledge theoretical gap between traditional classes and online classes.

There were times in the online courses, that it was not very complete. Yes, I would have liked it more if they had put more emphasis on what mathematics is. We discussed it and classes were scheduled to have more knowledge about mathematics (Participant nº 20, man, Industrial Electromechanics)

The dual (students) know how to do things but our school friends can explain why the incidents happen and why you have to move the machine in such a way (Participant nº 21, man, Autotronics)

The feeling among the interviewees of having fallen short in the academic field is referred as the need of deepening the knowledge in some basic subjects that they feel not enough prepared such as English or Mathematics, despite of it there is an interest in continuing further education after finishing the dual system.

Some students report to have shared that feeling back that to their institutions and in some cases they obtained weekend classes. Still, that feeling of "dropping out" persists. Not everyone is comfortable with a computer and prefers the traditional system with a teacher to

express their doubts. Being closer to the school and classrooms is the preference of many of the interviewees.

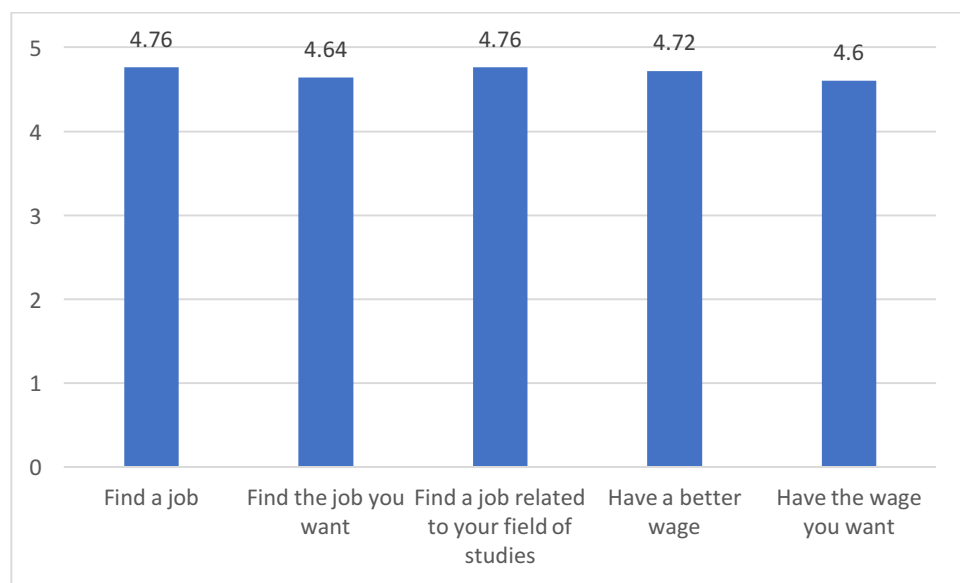
As a final output, it was found that students perceived an increase on their **disposition to keep learning** and develop in the professional field as well as in the academic one.

I have not stopped studying, at some point I said I will not be able to pass through the school, the work, materials, if I continue studying is on my own, maybe my parents were not going to have the possibility, then if talking to Hector, my immediate boss, gave me the opportunity to continue studying. He supports me with a part of the school, but practically because of my desire to go out and do something I keep studying (Participant nº 16, woman, Accounting)

I find it very good because it provides me with the basis for continuing studying and maybe you can motivate yourself to continue working or studying. And I think that this is already being applied in the university (Participant nº 21, man, Autotronics)

This disposition also increased their output of **employability**. Based on the open interviews one can conclude that the confidence on finding a better job and a better wage is based on the increase of their professional and personal skills noted above.

Graph 8. Employability, self-perception Likert Index



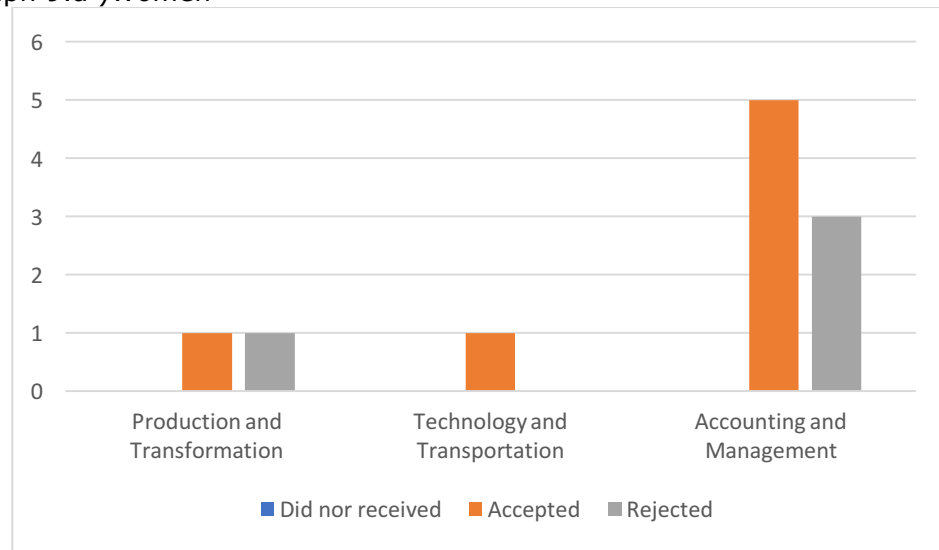
## Outcomes

The **transition** to a working place is highly positive. After their graduation with the dual system, students were hired by 18 enterprises from 14 different industries located in the state and its surroundings. Given the size of the sample it is not concluding whether enterprises had a gender bias while hiring the participants. Out of the 25 participants, 5 (all of them males) did not receive a job offer at the end of the program due mainly to the absence of

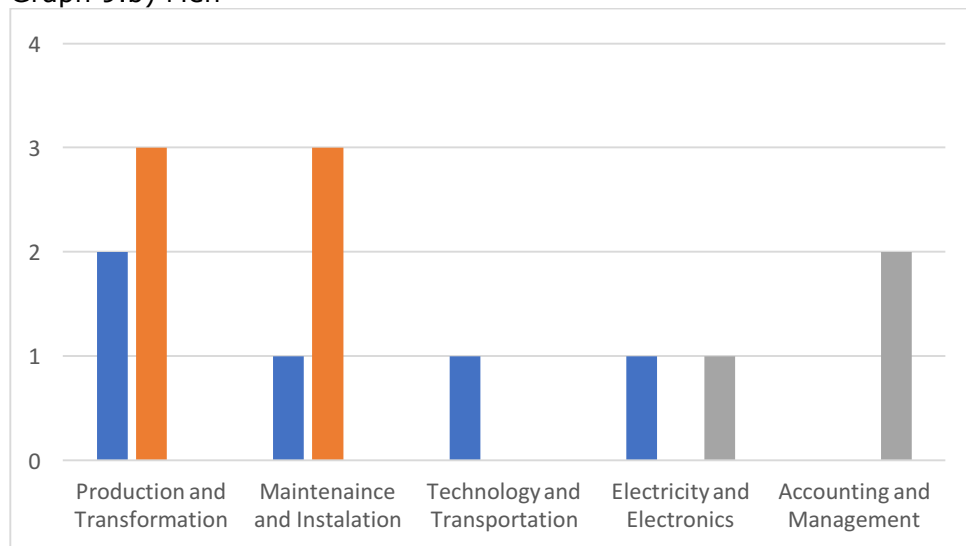
vacancies, as reported by the respondents. On the other hand, of the 20 participants who received a job offer, 7 rejected the offer because they did not feel comfortable with the work environment or the offer was not related to their studies. The issue of transportation and income also plays a role on that decision. The 13 participants who accepted the offer stressed that the decision was due to the job conditions because those were equal or better salary that during the programme and in the same area that they carried out the activities during the dual studies.

Graph 9. Job Offers after the Training

Graph 9.a )Women



Graph 9.b) Men



The results show that the majority of students after finishing the dual system received a **job offer**. However, it is worthy to note that in the second graph (men) the students of the sectors of production and transformation and maintenance and installation, accepted all the offers. Similarly, in the first graph (women), all the interviewees received a job offer. It is also important to add that, according to the interviews, most of the companies of the production, transformation and maintenance industries did not have enough vacancies for the Dual Participants. Yet, in the cases that students did not stay, this fact did not become an impediment to stop looking for work.

No, I left for personal and family problems and I could not continue, I say, if I could go back it would be great, but I think that with the knowledges that I have acquired I can continue this in other companies, right? It does not need to be like all at the same time (Participant nº 5, man, Accounting)

There is no a specific pattern of how participants received job offers. Some of them received an offer straight from the company where they performed their vocational training

We had farewell meal and were grateful to be part of the company. And when, it happened 2 weeks that we re-marked and there will be vacancies for such date. (...) (participant nº 9, man, Industrial Electromechanics)

Another participant reported that job offers also come from family and close friends

I have a cousin who is an accountant and he offered me to. work with him, and well I could not work with him because I was already in this job. Same, good friends of my parents have offered me jobs, but I'm fine with the job I have right now. (Participant nº 17, man, Management Assistant)

Extracting the information about the **current occupation**, the results evidence a high rate of success because the majority are working (despite of the gender difference), as well as using many of the skills acquired. Taking the data of the surveys, students report to be using almost 87% of the skills learned during the dual training.

Another variable to take into consideration for analyzing the impact of the dual system in the interviewees' outcomes is their **salaries**. The analysis offered some data regarding income evolution of the students after finishing the program. Women earn on average 4,500 MXN six months after concluding the program and men 5,000 MXN. This is a little bit more than half of the average total household income per month reported in the questionnaires and fits the national mean range of wage according to the National Survey of Occupation and Employment for workers with the same level of education. This data is not representative in a homogenous way because the time frame since they finished the dual system is not the same for all the respondents. However, it can be used as illustrative purposes to evaluate if the aspirations to find a job (and a well-paid one) are realistic as well as how gender may play an influence on it. According to the OECD data, in 2015, the Gender Wage Gap<sup>11</sup> in Mexico was 16.7%<sup>12</sup>. The reported income behavior is relatively consistent with the OECD's number, showing gaps of

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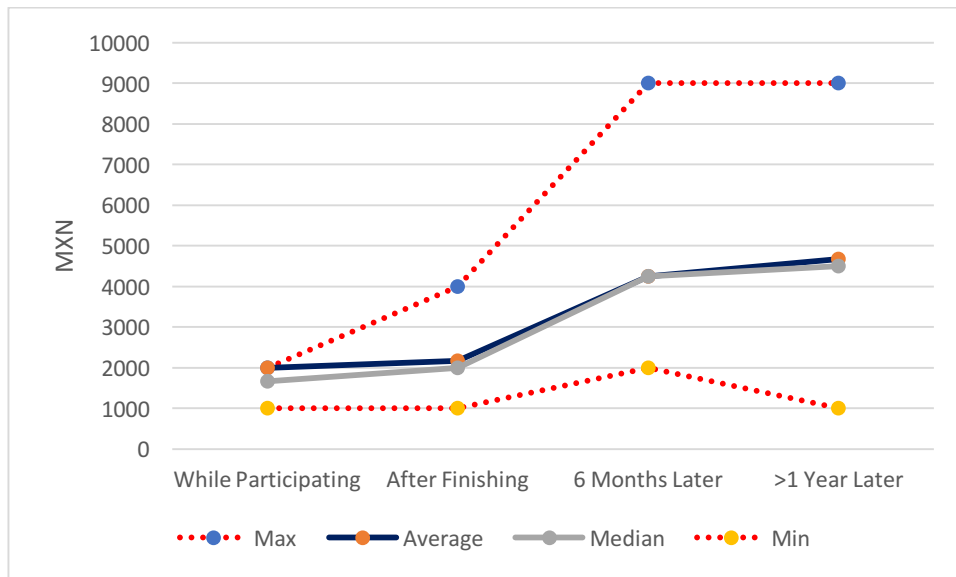
<sup>11</sup> The gender wage gap is unadjusted and is defined as the difference between median earnings of men and women relative to median earnings of men.

<sup>12</sup> <https://data.oecd.org/earnwage/gender-wage-gap.htm>

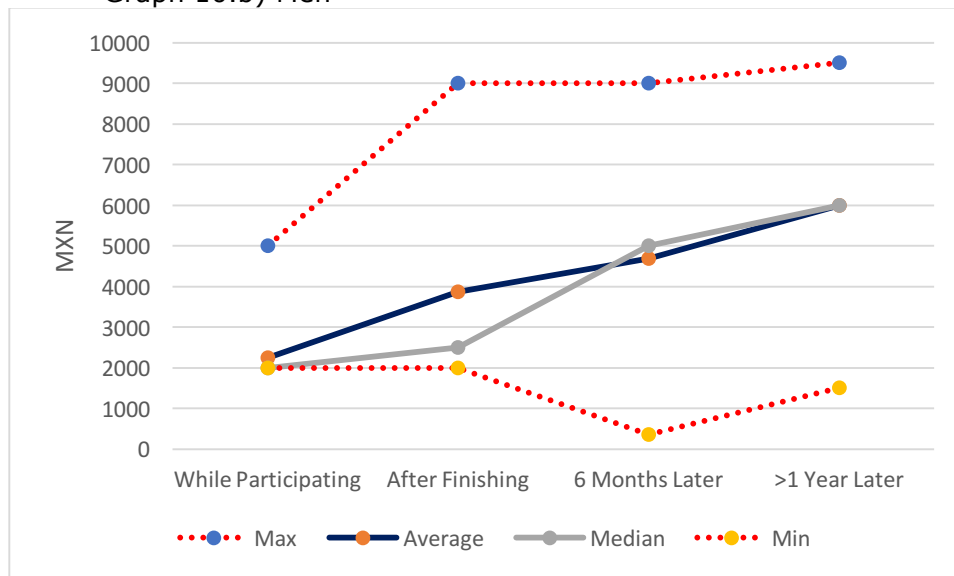
20%, 15% and 25% for the reported income after finishing, the earned income 6 months later and the actual wage respectively.

Graph 10. Income Evolution

Graph 10.a) Women



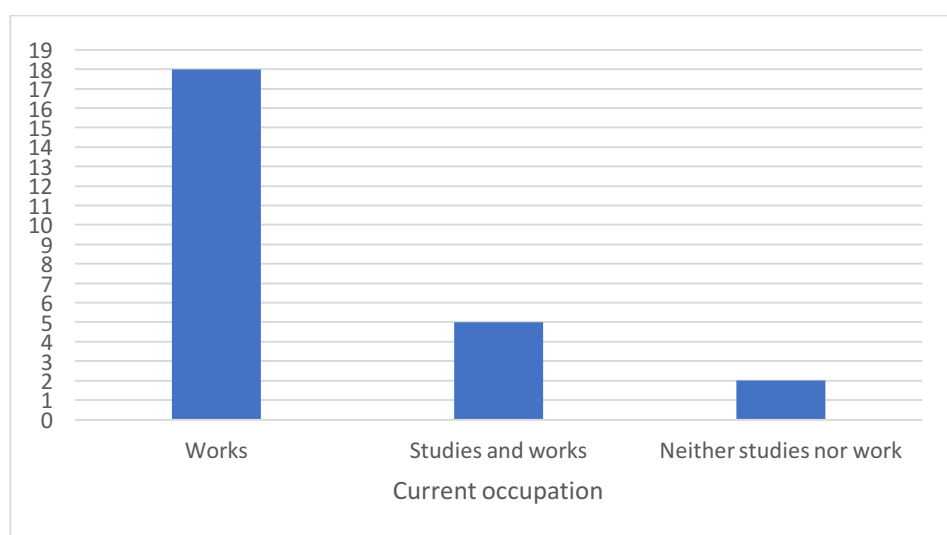
Graph 10.b) Men



Although the graphs show a gender difference with higher and faster returns for those who departed from an economic advantage as well as for men, in absolute numbers both cases show an increase of the salary income through and after the dual system.

The final outcome of this analysis is the impact of the dual system in their **current student status**. The results are positive as far as 5 of them continue with University studies with the combination of studies and work; two for degrees related with accounting and management and three are studying a degree in engineering. Evidence suggests that the other 18 participants who are currently just working, as well as the two female participants who are neither working nor studying, keep having a high disposition to keep learning.

Graph 11. Current Occupation



because I stayed to work [...] Much, it has influenced a lot, because as I say, I am now at the University and I am working here and I am happy, because I like to be here (Participant nº 2, man, Electromecanical Engineering)

The above quote evidences the positive outcome of the dual system in the motivation of the young people to pursue further studies as well as in their current occupation and well-being.

Considering that 23 out of the 25 participants are currently employed; with a positive trend in their wage increase, evidence suggest that the Dual TVET Model did had a positive influence in the participants labour situation. These outcomes seem to be relevant considering that, according with the National Survey of Occupation and Employment, the unemployment for this segment of the population is 8.5%, the second highest after the 9.2% for the population with concluded undergraduates studies; and that 41% of the young professionals with a concluded high school or a technical degree work for an informal source of labor.

## Conclusions

International research on the policy transfer of Dual TVET has traditionally focused on comparing the different institutional, political, economic and cultural characteristics between donor and recipient countries. This body of comparative research has shown the importance of contextual conditions to understand the challenges of Dual TVET policy transfer initiatives. On the other hand, evaluation studies commissioned by cooperation agencies have focused on monitoring the implementation and measuring the impact of these interventions, showing the unsustainable effects of these programmes and the importance of good management for their success. Our study lies on a third way between these two bodies of literature. We have aimed to evaluate the implementation and impact of the MMFD in the State of Mexico but we have also tried to understand how contextual conditions may be affecting its effectiveness.

The study has adopted a realist evaluation approach to investigate the impact of the programme on the learning and labour market outcomes of young people that participated in the MMFP in the State of Mexico. By outlining the theory of change and the social mechanisms behind the policy we have shown that the positive effects of dual apprenticeships on employment not only can be attributed to its expected positive effects on skills (learning hypothesis) but also to the connections between young people and employers (institutional link hypothesis). Moreover, it is perfectly possible that, if not managed adequately, this model of provision can produce poor learning outcomes and low student satisfaction (exploitation hypothesis). We have tried to test these hypotheses through a combination of qualitative and quantitative methods. A group of 25 students graduated from the programme took part in an apprentice survey and in individual in-depth interviews. The findings produce evidence on the profile of participants, their reasons to participate, their level of satisfaction with programme processes, their perception of the learning achieved and their labour market situation.

The main results of the study for each of these blocks are:

- In terms of profile of the beneficiaries, it is important to note that the majority of the participants come from disadvantaged family backgrounds (D NSE) with low educational levels (elementary schooling). It is also important to say that the highest number of participants was trained in Mexican companies with the rest being in American, Japanese and Austrian companies, and only two participants being trained in German companies.
- Most of the students chose to take part in the programme because their interest in a particular professional field, their willingness to have labour market experience or for their inclination for more practical forms of learning. While many of them maintain that this was their own personal decision, they also recognise the importance of teachers' suggestions and parents' support.
- Participants showed greater satisfaction with the learning experience at the company than at school. Very few cases expressed low satisfaction in relation to the treatment received by employers, managers or other workers. Two elements that received low scores were the equipment and the assessment methods in the workplace. Less positive was the level of satisfaction with school processes. The lack of interaction with school teachers and relying mainly on an online platform were components assessed negatively by participants. Apprentices felt that they had been deprived from a more meaningful school experience and that was perceived as having negative consequences on their learning. In terms of the overall level of satisfaction with the

programme, participants repeatedly showed criticism in relation to delays and unreliability of the payments.

- The perception of learning of occupational and transversal skills was extremely high. Students perceived a very positive impact of the programme on their own ability to perform in a work environment, as well as on their level of maturity, self-confidence and responsibility. The only domain that was systematically perceived negatively was the acquisition of theoretical knowledge. It seems that the disengagement with school processes damaged their learning in core subjects (e.g. language, mathematics), what they perceived as an impediment if they wanted to continue their studies at a higher level in the future.
- The programme presents very positive results in term of labour market outcomes, with 23 out of 25 participants being employed and 20 of them having received a job offer from the training company. The decision to accept the offer or to move to another company was based on matters of convenience (e.g. travelling distance) and their personal experience in the work environment of the company. The average salary was equivalent to the working population with similar levels of education (5,000 MXN for males and 4,500MXN for females). It is also important to stress the high level of use of the skills developed in the programme once they move to the labour market. Five of the participants reported that they were combining their current occupation with higher education studies.

The positive impact reported for the programme should not make us forget that many of its components should be improved if we want to guarantee a fulfilling learning experience to all the students. The articulation between the learning plans at school and the company seems to be an area that requires further attention. Schools have not been able to offer learning plans that accommodate the different needs of students and this seems to be having a negative impact on their academic progression and satisfaction. Likewise, the unreliability of the payments is affecting negatively their perception of the programme and making more difficult for them to cover the travel and subsistence expenses associated to their participation. While the overall experience in companies is very positive, apprentices point out that equipment facilities and the assessment methods are not adequate for their learning, indicating that closer monitoring and support to employers is necessary for companies to adapt to the requirements of the programme.

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