

Gender differences production in Secondary Technical Vocational Education

Producción de diferencias de género en la educación media técnico profesional

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Abstract

This article describes and interprets school experiences of woman students in male-dominated fields of study of Vocational Education and Training (VET) in Chile, using qualitative and quantitative data. The aim is to show how gender differences are produced in this sector, in a setting in which the rhetoric of gender equality taking force. We found that there is a high students and teachers' approval of women participation in these field of study. However, discourses that give a lower profile to student gender, would prevent addressing unique problems faced by female students in a male-dominated environment. Likewise, micro-practices which reproduced gender stereotypes inside VET schools, as well as limitations to performs labor internship in industrial sector companies, would be obstacles not overcome yet for women persistence in this path. We conclude that to address gender issues in VET sector is a challenge that involve actors from educational and work world, and implies a deep questioning of the traditional way of doing things in this sector.

Keywords: career choices, gender stereotypes, mix methods, school experiences, vocational education and training

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Resumen

Este artículo describe e interpreta las experiencias escolares de estudiantes mujeres en especialidades industriales altamente masculinizadas de la Educación Media Técnico Profesional (EMTP) en Chile, a partir de antecedentes empíricos de tipo cualitativo y cuantitativo. El objetivo es develar cómo se producen las diferencias de género en este sector formativo, en un escenario donde la retórica en torno a la equidad de género emerge cada vez con mayor fuerza. La investigación evidencia una alta valoración de la incorporación de mujeres en estas especialidades por parte de docentes y de estudiantes varones. Sin embargo, ciertos discursos y prácticas que restan importancia al género del alumnado impedirían abordar problemáticas únicas que enfrentan las estudiantes mujeres en un entorno dominado por el sexo masculino. Asimismo, microprácticas reproductoras de creencias estereotipadas de género al interior de los establecimientos, junto con limitaciones para la realización de la práctica laboral en empresas del rubro, representarían obstáculos todavía determinantes para la persistencia de estudiantes mujeres en estas rutas formativas. Se concluye que el abordaje de la problemática de género en la EMTP es un desafío que convoca transversalmente a actores del mundo escolar y productivo, y que implica un cuestionamiento profundo al modo tradicional de hacer las cosas al interior de este sector educativo.

Palabras clave: educación media técnico profesional, elección de carreras, estereotipos de género, experiencias escolares, métodos mixtos

Introduction

In Latin America in the early 20th century, women were limited to tasks that were directly related to household labors that were considered to be non-productive (Weller, 1998). In line with this, national schools of arts and trades, or professional institutes, that emerged in the countries of the region during that period focused on training male workers, and clearly differentiated themselves from female vocational schools aimed at “instilling knowledge related to the status of mother and wife” (Herrera, 1993). Although these exclusively female institutions were created in order to prepare young women for paid work, in practice they legitimized the role for them in society that was focused on household duties. The sexual division of labor was highly marked and that was reproduced in the institutions that provided training in trades and which were the precursors of technical and vocational education in the region, which taught men and women separately (Sepúlveda, 2017).

The gender inequalities in the labor market and in technical and vocational education have persisted to the present, although social, political, and economic changes have meant that they now occur and appear in different ways than they did in the past. Thus, social and labor inequalities between men and women are currently sustained on the basis of a complex mixture of individual choices, social orientations, and institutional arrangements that lead to gender-typed career aspirations being constantly reproduced (Niemeyer & Colley, 2015). In particular, the structural patterns and policy orientations that govern the labor markets and society in general tend to lead men and women to self-select various study programs in technical and vocational education that are related to specific and contrasting occupational fields in terms of wages, professional development perspectives, and social status (Imdorf, Hegna, Eberhard, & Doray, 2015).

In a different context, where discourse on gender equity is increasingly present in the education system and in the world of work, the objective of this paper is to demonstrate how gender differences occur in the sector of technical and vocational education. In order to do this, we describe and interpret the experiences of female students in highly male-dominated study programs in vocational education and training (VET) in Chile. In this country, just as in other Latin American countries, there are significant differences in this education in terms of feminization or masculinization of certain areas of study: women are concentrated in areas associated with service sectors (food, tourism, health, and education), while the same is true of men in “tough” industrial areas (mining, metalworking, electricity, and construction), tendencies that have remained virtually unchanged over the last 15 years (see Figure 1). In spite of this, gender segregation associated with educational choices in this sector has been relatively unexplored and is not widely seen as a possible source of social inequality. Similarly, as it has not been covered by educational research, little

is known about the role that VET plays in the process of reproducing universal gender beliefs, such as stereotypes surrounding appropriate occupations for men and women. As a consequence, there is a lack of systematic precedents to provide input for reflection on the necessary consideration of the gender factor in policies intended to strengthen this sector.

Previous research suggests that technical and vocational education strengthens the process of gender segregation in labor markets insofar as, within the institutions, the structures and cultures of a large part of their programs have been designed for a specific gender, reinforcing the male or female image of professions (Fawcett & Howden, 1998; Hegna, 2017). Based on this evidence, the paper states that female students who enter educational spaces in which they are a minority are affected by practices and discourses inherent to policy orientations and social structures that act as barriers to their participation in male-dominated areas and which lead to the reversion of their initial vocational decisions to a much greater extent than those of their male colleagues. In this regard, the high degree of gender segregation within Chilean VET may not only represent a problem of access, but also of persistence with educational pathways not typical to the student's gender. This is consistent with the low proportion of female students who graduate in industrial specialties who pursue careers linked to that area when transitioning to higher education (35% of female students versus 80% of male students)¹.

The description and interpretation of the school experiences of female students was carried out in contrast to the experiences of their male peers, using qualitative and quantitative precedents collected in a recent study in educational institutions in several cities around the country. Data from semi-structured interviews were combined with a survey of students and teachers conducted with a sample of 71 VET establishments with industrial specialties and mixed enrollment. These institutions appear as local contexts in which cultural beliefs of gender can be amplified or attenuated, to the extent that the subjects define themselves in relation to others (Ridgeway & Correll, 2004).

This paper is organized into six sections, including the introduction. The second section summarizes relevant literature about educational aspirations and trajectories, as well as on gender inequalities and stereotypes. The third section describes the research methodology and empirical data used. The principal findings of the study and the respective discussion are presented in the fourth and fifth sections, respectively. Finally, the sixth section provides a concluding summary and certain suggestions for debate on educational policies.

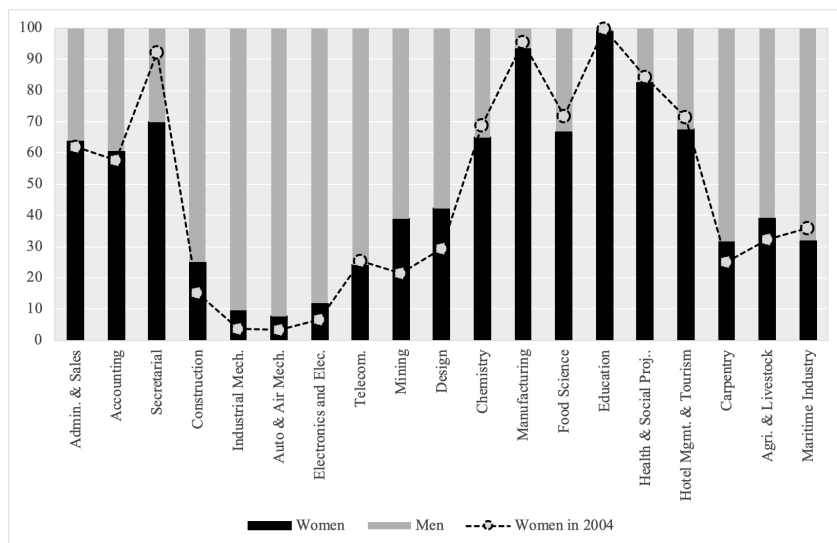


Figure 1. Gender balance in specialty groups in VET. 2017 enrolment with reference to that in 2004 (as percentages). Source: Prepared by the authors.

¹ According to calculations by the authors based on administrative data from the Ministry of Education for the 2015 secondary school graduation cohort. In this cohort, 63% and 60% of female and male graduates, respectively, continued their higher education in the first two years after the conclusion of their secondary education.

Literature Review

In recent times, studies of young people's education aspirations and trajectories have shown that policies aimed at increasing access to education have provided access to closed social spaces for certain groups. However, they also suggest that they have tended to reproduce and strengthen the power of dominant groups (Hart, 2014), making discussion of the effects of the massification of education and its eventual contribution to greater democratization and social equality more relevant (Grytnes, 2011; Lehmann, 2004). Various studies have demonstrated that even though aspirations are subjective evaluations about the possibilities of social mobility and the construction of a personal trajectory, at the same time their form and content are determined by structural constraints; that is, they are limited depending on the degree of social constraint that the subjects experience (Archer & Yamashita, 2003; Ball, Maguire, & Macrae, 2000).

Research on aspirations also recognizes that many young people are acquiring an increasingly active attitude towards risk in their own social experience. In so doing, they take pragmatic choices that allow them to broaden their aspirations despite the persistence of structural influences in their lives (Evans, 2010; Wyn & Dwyer, 1999). Meanwhile, studies of trajectories indicate that the traditional characteristics of life transitions have ceased to be collective orientations, becoming a dimension that is largely individualized and which lacks a single model of transition or for building a career for the future (Ball et al., 2000; Castel, 2009; Furlong & Cartmel, 2009; Staff & Mortimer, 2003).

These discussions about the influence of structural and subjective factors in shaping aspirations and defining trajectories open up a new space to broaden analysis of the reproduction of gender stereotypes and the shaping of aspirations and future trajectories in educational spaces, particularly in areas such as science, technology, engineering, and mathematics (STEM), where low female participation is a constant concern and, therefore, a growing field of research, especially in countries such as the United States, where the focus has been placed not only on traditional academic STEM courses (mathematics and physics), but also on STEM technical vocational courses, which are aimed at solving practical problems (Gottfried, Bozick, Rose, & Moore, 2016). In this regard, the conclusion of the research conducted in this area is shared: although the participation of women in STEM areas has increased in recent decades, the gaps in participation compared to men remain unchanged, essentially because women are less likely to choose these types of careers in their initial trajectories and, if they do, they are less likely to persist with them (Griffith, 2010). Researchers use the metaphor of the "leaking pipeline" to refer to the fact that the presence of women in STEM areas declines to a greater degree than that of men as they advance through the educational and occupational routes from secondary school to post-secondary education, and then the arena of employment (Makarova, Aeschlimann, & Herzog, 2016).

Meanwhile, the existing evidence demonstrates the complexity of the problem and the need for an approach that goes more deeply into the nature of the barriers to access and the persistence of students in these areas. The framework of gender segregation and inequality in technical vocational areas is complex and responds to multiple factors related both to the processes of socialization and institutional interventions themselves (Millenaar & Jacinto, 2015). The multidimensionality is intensified when converging with other social differences such as class, ethnicity, and race, meaning it is essential to approach the problem based on the interaction of factors, taking the complexity of this problem into account (Burke, Crozier, Read, Francis, Hall, & Peat 2013).

Sociocultural expectations regarding the roles of men and women delimit choices because, assuming they are natural and inevitable, they reflect how men and women are perceived, prescribing the ways in which they act and are in society (Cundiff & Vescio, 2016). Specifically, the expectations expressed in socialization spaces, such as the family and the school, may condition career choices by becoming vocational orientations through the legitimization of the participation of a certain gender in certain areas and their being discredited in other areas (Heilman & Parks-Stamm, 2007; Rudman & Phelan, 2007). In line with the arguments of socialization theory, it is understood that individuals internalize typical values of gender, preferences, and social norms, with the habitus and opportunity structures being the factors that have the greatest influence on the perception of their options or educational alternatives (Hodkinson & Sparkes, 1997). In this respect, both barriers and opportunities may be created by the ethos derived from the very history of those who experience it and who generate a significant impact in determining what is possible for them (Atkins, 2017).

At the empirical level, the study of barriers has gone into particular depth, recognizing some of the phenomena associated with the reproduction of stereotypes and gender roles and their effect on choices and trajectories. These include the so-called “career-related backlash effect”, which takes into account the negative consequences that women suffer when they contravene prescribed gender stereotypes by taking part in activities that are not consistent with their gender, according to the prevailing social order. This effect from non-stereotypical behaviors may contribute to gender inequalities and their reproduction in people’s careers (Rudman & Phelan, 2007). Nevertheless, practices that generate inequalities can often be imperceptible by being legitimized through arguments related to gender roles or biological differences between men and women (Acker, 2006). Furthermore, when these differences become accentuated excessively, they tend to lead to “benevolent sexism” that stereotypes women, describing them as wonderful but weak and thus in need of male protection (Glick & Fiske, 1996).

Empirical research also indicates that women in areas dominated by men may not solely be disadvantaged by gender-stereotyped cultures, but also by their numerical minority in comparison to their male counterparts (Kanter, 1977). Therefore, the disproportionate composition may determine the dynamics in the interaction that leads to a numerical minority group experiencing high visibility, being aware of their overrepresentation. In this framework, their differences are exaggerated compared to the dominant group (polarization) and assimilative pressure is generated for them to conform to the established prototype. As a result, even when the minority group performs well, this may be achieved at high costs and stress levels not present in the members of the dominant group, which could eventually trigger a process of exclusion of the minority.

Along with studies that describe the practices that generate inequalities in school environments, there are others that underline the importance of educational institutions in reducing gaps between men and women in various areas of school life. Their findings suggest that gender beliefs or stereotypes can become intensified or attenuated in these spaces, since they structure and shape the interactions of students with their peers and teachers. A school environment that provides encouragement and emotional support benefits the disadvantaged group to a greater extent, which, in the case of STEM areas, is women (Legewie & DiPrete, 2014). Similarly, inclusive classroom environments and positive interactions between female students and teaching staff could influence the view that female students have of their own skills and abilities to perform satisfactorily in their careers (Johnson, Starobin, & Santos Laanan, 2016).

Based on this background, emphasis is placed on the relevance of studying the school experiences of female students in educational spaces traditionally dominated by men, in order to better understand the gender gaps. How these experiences are perceived by the students is the result of the relationships with their teachers and their male peers, and also their learning opportunities in the educational establishments. In Chile and Latin America, there is a lack of research on this subject that this article is intended to address, based on both qualitative and quantitative empirical data.

Methodology

The description and interpretation of the choices and school experiences of students in industrial specialties of VET that are outlined in this paper are part of the research project “Acceso y persistencia de estudiantes mujeres en especialidades técnico profesionales tradicionalmente masculinas (2017-2018)”, funded by FONIDE². The project followed a mixed research approach, combining the collection of qualitative and quantitative data from VET institutions in the V, VI, VIII, and Metropolitana regions of Chile. In particular, a parallel convergent design was used, that is, based on a common matrix of thematic dimensions, the stages of development of instruments, data collection, and analysis were carried out separately and independently. This type of design, also known as a triangulation model, allows the validation of primary data based on the convergence of qualitative findings with quantitative results (Edmonds & Kennedy, 2013).

In the qualitative phase, meanwhile, the data were collected from a sample of six institutions in the regions included in the study, which were selected considering different administrative models (municipal, private-subsidized, and delegated administration) and variability in industrial specialties (Electricity ,

² Fund for Research and Development in Education of the Ministry of Education of Chile, Eleventh Contest.

Construction, Automotive Mechanics, Telecommunications, among others), with students belonging to medium and medium-low socioeconomic levels. Semi-structured individual interviews were conducted in each institution with two young women in the second year of secondary school who had decided to study some of the industrial specialties offered at their institution in the third year, as well as two women and two men in the fourth year of secondary education enrolled in these specialties. Also, in each educational institution, one manager and two specialized teachers were interviewed. In total 18 teachers and managers were interviewed and 36 students (24 women and 12 men).

In order to analyze the qualitative material collected, we followed the principles of the grounded theory approach, carrying out three successive analytical steps: initial categorization, integration of categories and properties, and structuring of a comprehensive model constructed based on a “discourse of discourses”. In the case of the interviews with students, the initial categories of analysis corresponded to thematic areas that include the major milestones of their school experiences (choice of specialty and supports, experiences in relation to significant others, and aspirations and future projects), as well as their perceptions about the working world. Likewise, emerging categories were added to the initial categories, which, in the case of the students, were related to the family influence on vocational options, perception regarding the specialties of the VET aimed at women, and the view of the specialty studied as a backup plan. Meanwhile, for teachers, added to the initial categories on perceptions about the incursion of women into educational and labor spaces in the industrial area were categories associated with the practices of curricular implementation, distribution of practical learning tasks, and assessment of learning between men and women.

For its part, the quantitative phase considered the design, validation, and application of a set of questionnaires to a sample of VET institutions offering traditionally male-dominated industrial specialties. Those instruments were constructed based on systematized material from previous surveys implemented in the Chilean context³, as well as others applied in international studies on gender inequalities in both educational and work environments⁴. Using these materials, two types of questionnaires were designed: the first were aimed at male and female students in the fourth year of secondary school, focused on collecting systematic and consistent information regarding their perceptions about their school experience (both covered in the qualitative phase) and existing gender differences; while, the second was aimed at general and specialty teachers, and was focused on quantifying the scope of predominant educational and relational practices in the education centers, as well as their discursive positions regarding the gender issue. Both questionnaires were pilot-tested at three schools in the Metropolitan Region, with around 100 students of both sexes and 6 teachers being surveyed. In addition to allowing greater familiarity with the use of the instruments, the pilot-testing made it possible to prepare a standardized procedure for the final application of the surveys.

The target population of the survey was the universe of VET establishments offering specialty industrial courses, with mixed enrollment, and with at least 10 female students studying these specialties in the last year of secondary education. Given these restrictions, of the 258 establishments that identified themselves as providers of these specialties in the focus regions of the study in 2017, the universe was reduced to 92 educational institutions that could potentially be studied. Of this total, 71 establishments agreed to participate in the survey within the periods considered. In each establishment, the goal was to survey the total number of female students on all the specialty industrial courses taught there and male students of a particular specialty chosen at random, in addition to a minimum of two general education and two specialty teachers. We obtained responses from 634 teachers and 3,122 students, which were typed up and analyzed descriptively with the support of the STATA software, Tables 1 and 2 show the details of the cases collected.

³ Particularly Sepúlveda and Valdebenito (2014).

⁴ Including Koenig and Richeson (2010) and Bitters (1990).

Table 1
Teachers surveyed by gender and area of teaching

	Male	Female	Total
Differentiated Education	306	44	350
General Education	130	154	284
Total	436	198	634

Source: Prepared by the authors.

Table 2
Students surveyed by gender and specialty group

	Male	Female	Total
Construction	91	271	362
Mining	114	286	400
Telecommunications	274	393	667
Electricity	393	246	639
Electronics	164	249	413
Industrial Mechanics	149	183	332
Auto Mechanics	190	119	309
Total	1,375	1,747	3,122

Source: Prepared by the authors.

Results

Cultural changes. The apparent opening of the school space

One of the first significant aspects that emerged from the empirical information points to the consensus among school actors regarding the idea of a cultural transformation in recent years that allows progress towards equal education between men and women. Although there is no correlation with national enrollment data (which show persistent gender segregation in VET) in the predominant discourse of both teachers and students, reference is made to greater openness of school spaces to the participation of female students in historically male-dominated industrial specialties, as well as men in areas focused on personal services such as nursing care and gastronomy. This greater openness, which may take place gradually without necessarily being the result of intentional actions on the part of the schools, means that “male specialties” and “female specialties” are increasingly becoming a thing of the past, at least from the point of view of the school actors.

As regards the perception of change, the majority of the discourses that emerge from the institutional discourses on education are “correct”, as they state that entry to industrial specialties is open to all students regardless of their gender. They indicate their disposition to favor choices that are not influenced by interests other than the student’s own decision. In that sense, the most important thing for a woman when entering a specialty is, according to the opinion of one of the teachers interviewed, “that you like and you know what you’re getting into.” The choice should thus focus on the desires, abilities, and affinities of each student rather than the prescriptive cultural discourses that assign certain tasks and areas of work to men and women. Around 84% of the teachers surveyed agreed or moderately agreed with the statements made in this regard, a figure which rose to 90% among the teachers of specialties.

However, in this scenario, with the opening of school spaces, in a large proportion of the educational institutions, the interviewees believe that it is not necessary to carry out specific actions to support the incorporation of women into industrial specialties. This is because: “Women are inserted, they adapt

quickly, and the differences with men aren't noticed;" hence, for a teacher interviewed in the Metropolitan Region: "The treatment has to be the same... since both men and women have the same abilities, the same skills, and the same possibilities of achieving learning." Many authors believe that these discourses that obscure the students' gender, as well as the strong perception that women can make decisions that are not traditional to their gender if they wish, tend to obscure the obstacles that they encounter and, therefore, prevent unique aspects or experiences that they face in male-dominated environments from being addressed (Blair, Miller, Ong, & Zastavker, 2017; Fuller, Beck, & Unwin, 2005; Martin & Phillips, 2017).

Choice of specialty. Vocation and resistance to gender determinism

What leads a woman to choose a traditionally male specialty? The evidence collected reflects a choice motivated by interest and also by the recognition and value assigned to the type of work that is done in the training for the specialty. "I chose it because I like doing manual work" or "I chose it because you're always on the move, like I am," are arguments that students commonly use to justify their choices. Nevertheless, in the case of their male colleagues, vocational alignment emerges more clearly due to their identification of high educational or employment projections in the specialty area. As can be seen in Figure 2, in all the industrial VET specialties dominated by men, choice of a specialty motivated by plans to study careers in the area or to work at companies in the field is higher among male students than among females, with gaps of more than 20 percentage points in specialties such as Construction and Metal Construction. Only in Mining—a sector that in recent years has managed to attract more female students and in 2017 exceeded the 30% threshold (see Figure 1)—is the proportion of both sexes that expects to study higher education in the specialty area the same, and the difference in favor of men in the workplace is also minimal.

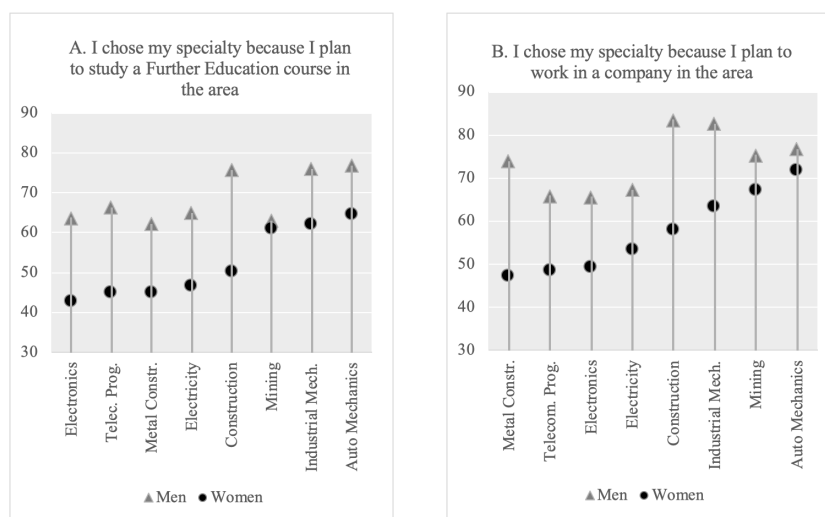


Figure 2. Future projections in the choice of industrial specialties (% agreement).
Source: Prepared by the authors.

Along with the vocational interest, young people's reasons for choosing an industrial specialty also revolve around arguments that refer to the disposition and the personal willingness of the student to undertake an activity different to that which may possibly be conditioned, that is, it is related to aspirations that could be classed as resistance (Hart, 2014). The results of the student survey indicate that the proportion of women who state that they chose their specialty in order to find spaces alternative to typical female areas is not insignificant. "To do something different to the rest of my friends" (50%) or "being curious about being in a male specialty" (46%) are responses that can be interpreted as expressions of resistance to reproducing traditional gender models, as one interviewee stated:

The majority think of women as something delicate, so that's why they should choose nursery school, but I'm not interested in that, because I feel that I just because I'm a woman I don't have to choose a career that has to do with children or which is

full of women (female student, VIII region).

Also, women’s choice of specialty depends on more diverse and complex reasons than those used by their male colleagues. The distance and resistance to determinism to studying in areas specifically for women is also a relevant factor in the initial choice of young students.

In addition to the above, it should be underlined that in some cases the presence of a relation or significant person to women in male-dominated specialties was also a motivating factor for the vocational choice. “My dad is a auto mechanic and he wanted me to go to into Automotive Mechanics”, “I’m motivated to study Electricity because I have a relation who does that work,” are reasons provided by the students interviewed in reference to third party influences that, either intentionally or not, facilitated the choice of their specialty. They thus become opportunities derived from their personal history and that, unlike beliefs about gender roles in society that act as obstacles, have a positive impact on their choices (Atkins, 2017).

The student’s choices generally imply recognition of being part of a minority group and where the educational processes may not necessarily be friendly to them. In this regard, these are conscious decisions in which emotional supports are highly relevant (Legewie & DiPrete, 2014). Around 80% of the female students surveyed said that their family supported their decision to study their specialty, while 67% said the same about support from their closest friends. Lastly, we can also emphasize the high proportion of female students who say they have received support from teachers at their school in choosing their specialty, a proportion that is higher than that recorded for male students in the same specialties (80% versus 72%).

Appreciation of the school experience. Welcome and protection with subtleties

Regardless of the reasons that lead female students to choose their specialty, they generally have a positive appreciation of their school experience when they finish secondary education. In fact the students broadly express their satisfaction with the teaching and education received. In particular, more than 70% of the students give differentiated education a grade of higher than 6 (on a scale of 1 to 7). In all cases this grade is higher than that given to general education, demonstrating high appreciation of the educational experience received at their schools.

The favorable opinion of the female students about their school experience also occurs in the area of sociability and conviviality. More than 65% rated the treatment received by their peers at 6 or 7, while over 75% gave the same grades to the treatment they received from their teachers. As can be seen in Figure 3, a higher proportion of women students in more industrial areas like Construction and Automotive Mechanics give high grades to their treatment by the teachers in their respective specialties.

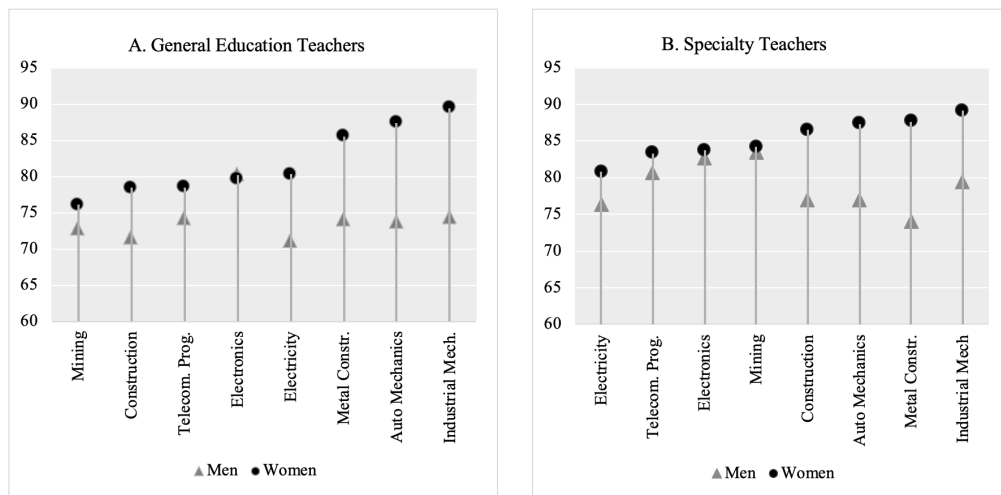


Figure 3. Appreciation of treatment received by school teachers (% of cases graded at 6 and 7). Source: Prepared by the authors.

However, beyond the favorable treatment that female students state that they receive, the interviews conducted revealed the presence of certain stereotypes that refer to differences between men and women that are highlighted and celebrated by teachers, particularly those in differentiated education. These discrepancies can be associated with the aforementioned benevolent sexism (Glick & Fiske, 1996). The following quote is a clear example of that:

I, personally, treat them more indulgently... I give them preference in certain things, because they're women. I call them 'my pets'... It's because essentially women always contribute something feminine to a place. I think the specialty and ourselves were lacking that: working with that feminine weakness, in inverted commas, that feminine sensitivity that men don't have. Sometimes you have to talk to them with care, which allows a little self-control, because when it's just men another kind of interactions are produced (male specialty teacher, Metropolitan Region).

On the other hand, the teachers' survey confirmed the broad scope of the presence of gender stereotypes in establishments that teach traditionally male-dominated industrial specialties. Some 85% of the teachers associated qualities such as warmth and sensitivity with women, while only 42% related them to men. Instead, 90% of the teachers associated them with attributes such as leadership and strength. Similarly, the sexist naturalization that associates brute force with men and fine motor skills with women was a widespread and generalized issue in the discourse in the schools that teach industrial specialties. "They demonstrate greater abilities for certain tasks, they have extraordinary fine motor skills compared to men," said one teacher from Region V. This assertion was shared by more than 50% of the teachers surveyed. Thus, these stereotypes appear to assign not solely qualities, but also specific roles to women, and this is not only done by teachers, but also by their male peers, as shown in these accounts:

They are kind of more meticulous and that's noticeable in groups, because sometimes there are groups of men who can finish quickly, but they're not as meticulous as when there's a woman who adds a certain touch... For example, in my group there are two men and a woman and we divide things up; two work and she works more on the reporting; anyhow, the woman, that is, is helpful, my female partner helps us a lot with the reports because we don't write much on the computer (male student Region VIII).

When we have to put on a harness, we prefer to a man to go up, as they're more agile than a woman, who could be injured... but they still like it, they like to learn more. When we're welding, they also like to be there looking at how you do it. So they're kind of eager to learn the things that we do (male student, Metropolitan Region).

Learning opportunities for men and women. The imperceptibility of inequalities

By assigning specific roles to female students based on the qualities of their gender, they are distanced from activities of the specialty that are associated with masculine attributes. However, as these practices rest upon biological differences between men and women or traditional gender roles, they can be imperceptible and deployed regardless of institutional discourses. (Acker, 2006). An example of this is the low proportion of female students who perceive the promotion of gender-differentiated learning or activities in specialty classes on the part of their teachers (less than 10%). This is in contrast to the third of male respondents who identify different situations, specifically in specialties such as Construction, Metal Construction, and Automotive Mechanics. Likewise, it contrasts with more than 50% of the teachers who, in the framework of a discourse about recognition and equality, state that they promote different learning for men and women, taking into account the particularities of their gender.

The differences between male and female students appear more clearly when they are asked to rate their own learning opportunities in the specialty and those of the opposite gender on a scale of 1 to 7. As shown in Figure 4, from the perspective of both genders, there is a gap in opportunities for educational activities that favors male students. These differences are more frequently observed in specialties associated with handling machinery and heavy tools. It is therefore evident how gender stereotypes present in teachers and institutional practices can lead to the inhibition of female students' learning potential, opening up spaces of inclusion-exclusion and conflict (Burke et al., 2013), that can be naturalized by school agents, thus complicating the scenario of reproduction of gender inequalities in VET.

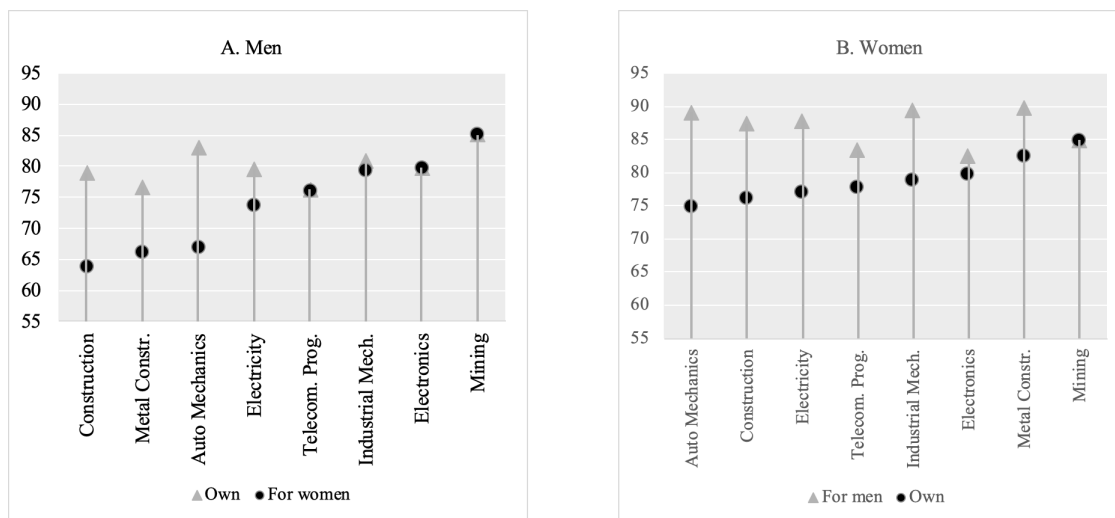


Figure 4. Evaluation of learning opportunities in the specialty (% grades higher than 6).
Source: Prepared by the authors.

Professional practices. Anticipating difficulties in the working world

One point that provokes stress in the opening of school spaces to the participation of female students in industrial specialties is professional practice internships in related fields. In that regard, they constitute another of the major barriers for women's projections in the area. VET institutions have to make extra efforts to obtain professional practice internships for their female students and, once they are located in a company, they are frequently assigned tasks that are not specific to the specialty (on average 66% of the teachers mention this type of situation in their schools). The following quote illustrates the negative effect on the educational-work project of these students regarding the lack of willingness of companies in the field to allow their integration into professional practice internships:

Employers tell us 'you know what, I prefer that you only send me men', so it's much more difficult for us to place the women that we have in professional practice internships. And so that shows the girls that 'these specialties aren't for us', and that girl is going to tell her mother or brother that I made a mistake in my specialty, I prefer a different one, something where it's less difficult to find work later'. That's a chain and it all comes from the companies (female manager, Region VIII).

Therefore, the difficulties of the working world can be seen before the end of the educational process itself. The students recognize their disadvantages to make achievements in this activity, since a significant number of companies do not appear to be available or open to receiving them. Rather than using explicitly sexist arguments, those responsible for the company-school relationship argue that there is inadequate space available for the coexistence of workers of both sexes and the lack of basic facilities for personal hygiene for women, in order to explain this rejection. On the other hand, students of both sexes are aware of these difficulties: around 30% state that, at their school, female students always or nearly always have greater difficulty in carrying out internships compared with male students.

For female students of industrial specialties the labor market appears to be an unwelcoming space and a threat to the development of their employment trajectories once they graduate if they persist in that educational area. In a certain way, they anticipate the negative consequences, or the so-called career-related backlash effect, for having transgressed prescribed gender stereotypes when studying VET specialties that are not in accordance with their gender (Rudman & Phelan, 2007). In fact, on average, 62% expect that they will have to work harder than their male peers graduating in the same specialties to achieve their employment goals. Likewise, 30% believe that they will end up performing different jobs in the field that have little value, and 43% perceive that women are not welcomed in companies in the industrial area. So, in contrast to the feelings of refuge and welcome that the vast majority of students experience in their educational centers, the world of work and companies (in the broadest sense of the term) constitutes

a threat that is difficult to resolve and which occurs at the end of their educational process with the professional practice internship.

Plans for graduation from secondary education. Complexity and reversibility of trajectories

In accordance with the school experiences described above, the information collected under the study shows that the future projects of women in industrial specialties are characterized by being complex and reverse their initial educational choices. The lack of initial projection in the area of their specialty, in addition to the obstacles that emerge in the years of differentiated education that anticipate difficulties of progressing in the employment market, may mean that, for a significant proportion of female students, the specialty studied is seen only as a “backup plan” or an instrumental resource for the realization of their aspirations to graduate from secondary education. The following quote illustrates this type of situation, which appears with different variations among those interviewed:

I mean, plumbing isn't what I want to continue studying, but I liked the specialty because I learned a lot of useful things to do in my home so we don't have to depend on other people to do those jobs... besides plumbing is useful for lots of careers in the construction field, although what I want to study is nursing. I'm not ruling out those careers that I have as a second option because I already have the basis (female student, Region VIII).

In contrast to the trend for females, the long-term trajectories considered by male students in industrial specialties are more consistent with their initial choice: “I want to go on to a higher technical level of construction, then work and at the same time study construction engineering”, “I want to continue specializing in electrical or industrial civil engineering”. The scope of this type of projects related to the specialty studied, either in terms of work or continuation of higher education, is illustrated in Figure 5, which includes the responses of male and female students regarding their future plans. As can be observed, the greatest level of alignment among the male students appears in the specialties of Construction, Automotive Mechanics, and Metal Construction (over 50%). On the other hand, in the case of female students, in all specialties—excepting Automotive Mechanics—less than a third of the students are projected to go on to higher education into the employment market in the same area, which demonstrates the disaffection with the area of study at the end of their secondary education.

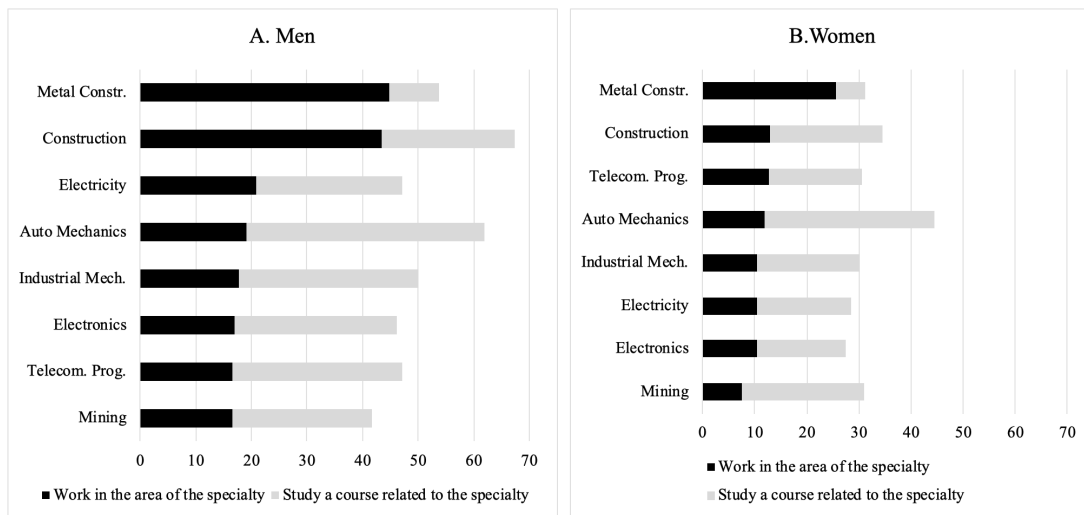


Figure 5. Projections at the end of secondary education (%). Source: Prepared by the authors.

Around 41% of the respondents, showing the same tendency of disaffection with their specialty, state that they have vocational doubts and are interested in exploring other areas, while 18% have a more radical view as they admit that their specialty does not motivate them and they prefer to study or work in something else. In the case of the male students, these proportions fall to 29% and 11%, respectively.

Among the careers that female students indicate as possible options are those linked to the areas of education and health. These responses are consistent with the processing of administrative information by the Ministry of Education of Chile, which indicates that among female graduates of industrial specialties who continue higher education in other areas⁵, 43% favor careers in education or health, followed by 12% who opt for careers in the commercial field. Although changes in vocational interests are frequent among young people and particularly those who have chosen an area of study at an early stage, what we can see here is the contrast of its scope between male and female students studying industrial specialties. This is because it reveals that in this highly male-dominated sector there may be late reproduction of career aspirations typified by sex, insofar as a relevant proportion of female students eventually opt for traditionally female alternatives.

Discussion

The empirical evidence analyzed indicates that the persistent gender segregation in Chilean VET is associated with multiple factors that influence female students' initial choices and decisions to persist in male-dominated specialties. Although, to a greater or lesser degree, these factors stem from universal gender beliefs—such as stereotypes about appropriate occupations for men and women—they are also influenced by discourses and practices present in school environments and their connection with the business world. Institutional rhetoric that downplays the gender of the student body, the overprotection and praise of the qualities of female students, the assignment of specific tasks in specialty classes, and the challenge of obtaining professional practice internships all constitute obstacles that are often not visible, which lead to initial vocational interests or intentions to break away from pre-established gender patterns being less immovable for female students in industrial specialties. So, in line with the existing literature, the study highlights the importance of the role that school institutions play in the production of gender differences in VET, in addition to contextual factors.

As we have shown, the educational establishments where industrial specialties are taught declared themselves open to the inclusion of female students, giving them a sense of refuge in achieving study plans that are atypical to their gender. This is a very different situation to that seen in the past, when the institutional arrangements in the technical and vocational education sector in Chile and in other countries in Latin America deliberately segregated male and female students. Nevertheless, certain indications in contemporary school environments for female students, regarding the “appropriateness” of their decision to be part of a highly visible minority with learning opportunities different from those of the dominant gender, and the difficulties of carrying out professional internships, place strain on eventual considerations to continue on their educational paths. Thus, the metaphor of the leaking pipeline (Marakova et al., 2016) would accurately illustrate the loss of the few female students in areas associated with the industrial specialties of VET in their transition to higher education or the employment market, as a result of the lack of recognition of this kind of trajectory to the same degree as with male students.

One aspect that may be considered critical is the depth and far-reaching stereotyped beliefs about the feminine and masculine attributes among the teachers at VET institutions, as well as among the students. This may be because the naturalization of certain characteristics associated with gender (men use brute force; women are more meticulous and orderly) could have an impact on educational activities and practical activities on specialty courses, in parallel with privileged treatment and protection provided to female students which, to some degree, would lead to benevolent sexism, which is a form of discrimination, while undermining the status of women in certain situations and positions (Rudman & Phelan, 2007). Thus, although women are not excluded from choosing to study industrial specialties in VET, the male-dominated culture of this education, which is analogous to that of the employment market, may act as a barrier to their projection in this area.

Considering these results, a phenomenon revealed in other studies is also confirmed, which refers to the weight of the conditioning factors associated with gender roles in the process of shaping young women's aspirations, which manifest themselves in a complex and non-linear manner during the processes of choosing a vocation (Hart, 2014). It is confirmed that, even though the initial choices of these young

⁵ 65% of the 63% who continue higher education, one or two years after graduating from secondary education for the cohort that graduated from secondary school in 2015.

women were in line with motivations that denoted a certain propensity to resist gender stereotypes and the risk that this implies (Wyn & Dwyer, 1999), the evolution of their educational experiences, exposure to institutional logics to close learning opportunities (Burke et al., 2013; Millenaar & Jacinto, 2015), and the anticipation of obstacles in employment markets, have an influence on the reversal of their previous choices and disaffection for professional careers in male-dominated areas. In this regard, the framework of meanings that construct the educational dynamics themselves and the processes of shaping gender identities associated with the construction of professional identities have different impact for men and women, reinforcing certainties in some and weakening security and confidence in one's own skills, abilities, and possibilities for change in the case of women, (Leathwood & Read, 2009).

Conclusion

This article aims to show how gender differences occur in technical and vocational education, through the description and interpretation of the school experiences of female students in highly male-dominated specialties of Chilean VET. The ultimate goal is to contribute to reflection on the necessary consideration of the gender dimension in policies to strengthen this sector. We conclude that, at present, gender differences occur in educational units in more subtle ways than in the past. Firstly, they take place through apparently inclusive discourses that, by reducing the importance of the student's gender, obscure existing obstacles for female students to enter the industrial area. Secondly, this occurs through micro-practices which, in the form of privileged treatment, or discourses that extol feminine virtues, reproduce and amplify stereotypical gender beliefs, limiting learning opportunities for female students in their field of specialization.

The more subtle—and often imperceptible—ways of reproducing gender differences in VET suggest that addressing this problem requires not only the establishment of guidelines and protocols from higher levels (as is the case of many public education policies), but also essentially involves questioning the traditional way of doing things in this education sector. This implies tackling problems that are at the basis of the experiences of all actors, including teachers, students, and parents or guardians. This involves bringing about significant changes in the values, beliefs, roles, and approaches to the concept of work itself, which constitute a challenge not only for educational institutions, but also for society as a whole.

Finally, it is important to underline that professional practice internships in companies in the area represent one of the challenges that requires special consideration for women to make appropriate inroads into industrial specialties. As long as the business sector does not make progress towards progressive integration of men and women in common tasks, the possibility of improving VET with greater gender equality will be unsuccessful. From this perspective, the evidence collected in this study highlights the importance of extending the policies of coordination of public and private actors with the aim of gradually eliminating the gender biases that are evident in the employment market.

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