FOUNDATION FOR ECONOMIC & INDUSTRIAL RESEARCH

Study on Soft Skills in Vocational Education and Training in Greece

Field report

September 2023

The value judgements and policy suggestions contained in this study reflect the views of the researchers and do not necessarily correspond to the opinions of the governance or the management of IOBE.

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1. INTRODUCTION

The main scope of the study is the measurement of soft (socio-emotional) skills of non-compulsory secondary education students in Greece. The aim is to compare the levels of these skills among students attending the country's general and vocational high schools and to contrast them with the needs of the labor market in Greece.

The study also seeks to promote further the understanding of the characteristics and factors that influence the formation and development of the students' soft skills. In order to do this, the study captures a snapshot of the soft skills of pupils of different grades, also exploring the key factors that are believed to strengthen or hinder the development of these skills in the wider student environment (their home, school, and peer community). Understanding the conditions and practices that encourage or hinder the development of these skills is considered to be of particular importance, as — based on the literature — these are considered to act as key pillars that promote lifelong learning and thus enable individuals to adapt to changing labor market conditions.

Given the significant information gap in the development of soft skills, especially as opposed to cognitive skills, this study attempts to help fill this gap by identifying policies and practices related to the development of these skills. The ultimate goal is to provide better support to the development of the social and emotional skills of the students. This is based on the premise that a holistic approach — promoting both cognitive and non-cognitive skills — is best suited to enabling the students to reach their full potential.

The study has five key deliverables. This deliverable is a field report with the results from the application of the instrument to measure "soft skills" and the corresponding data analysis. The other four deliverables of the study include:

- Instrument to measure "soft skills" and contextual questionnaire adapted to the Greek context (and in Greek language) and preparation of questionnaire to be addressed to the school directors
- Single database including the data collected from the student survey
- Note with the findings from consultations with key stakeholders
- Background paper on the importance of "soft skills" for the labor market outcomes among VET graduates in Greece

This report is structured as follows. The methodological approach of the analysis, together with technical notes on the survey implementation, is presented in Chapter 2. Chapter 3 presents key sample characteristics. The levels of soft skills and how they compare across various demographics are analyzed in Chapter 4. Chapter 5 explores the variations of other student characteristics from the contextual data vary within the sample and their association with soft-skill scores. The differences in contextual data on schools and their association with average soft-skill scores is explored in Chapter 6. The study concludes with the main findings from this report.

2. METHODOLOGICAL APPROACH

2.1 Overview

In order to measure and analyze the development of soft skills among high-school students in Greece, the study combined quantitative and qualitative approaches. On the qualitative side, we conducted a workshop with representatives from key stakeholders and obtained feedback from school directors through open-ended questionnaire items. On the quantitative side, we translated and adapted structured questionnaires to collect data from students and schools.

In order to select the participating schools and students, we followed a random sampling procedure. To carry out the survey, we applied to the Ministry of Education and Religious Affairs in mid-October 2022. The survey request was evaluated by the Institute of Educational Policy and approved by the Ministry in early February 2023.

We then contacted the sampled schools in order to obtain their permission and book a date for the school visit. In parallel, we developed online versions of the questionnaires in Microsoft Forms, to be completed by the students and the school directors through desktop or handheld devices. As the availability of desktop computers was limited, while the use of mobile phones was not always aligned with the school policy or the student preferences and capabilities (access to a recent generation smart phone with mobile data plan), a large number of the student responses were provided on hard-copy forms. The data collection process lasted until early May, about a week before the end of classes for grade 3 high-school students.

The study team then proceeded with entering the data from the hard-copy questionnaires in the online forms. Once the data was collected in a digital form, we translated and coded the responses with a script written in R. In order to ensure that the sample provided representative responses for the population of high school students in Greece, we estimated sample weights according to location (Attica region or Thessaloniki prefecture), gender, school type and school grade. We then estimated soft-skill factors per students, using the responses per individual soft-skill items and tested their structure in the Greek sample. To allow for a more parsimonious analysis, we also estimated scaled variables derived from individual items of the contextual questionnaires of students and directors. Lastly, we analyzed the results, estimating descriptive sample statistics, such as sample means and confidence intervals, and looked into factors that may influence the soft-skill development, by estimating correlation coefficients and multivariate regressions. In the remaining sections of this chapter, we provide further methodological details on the above steps of the work plan and in the next chapter we present the result of the analysis.

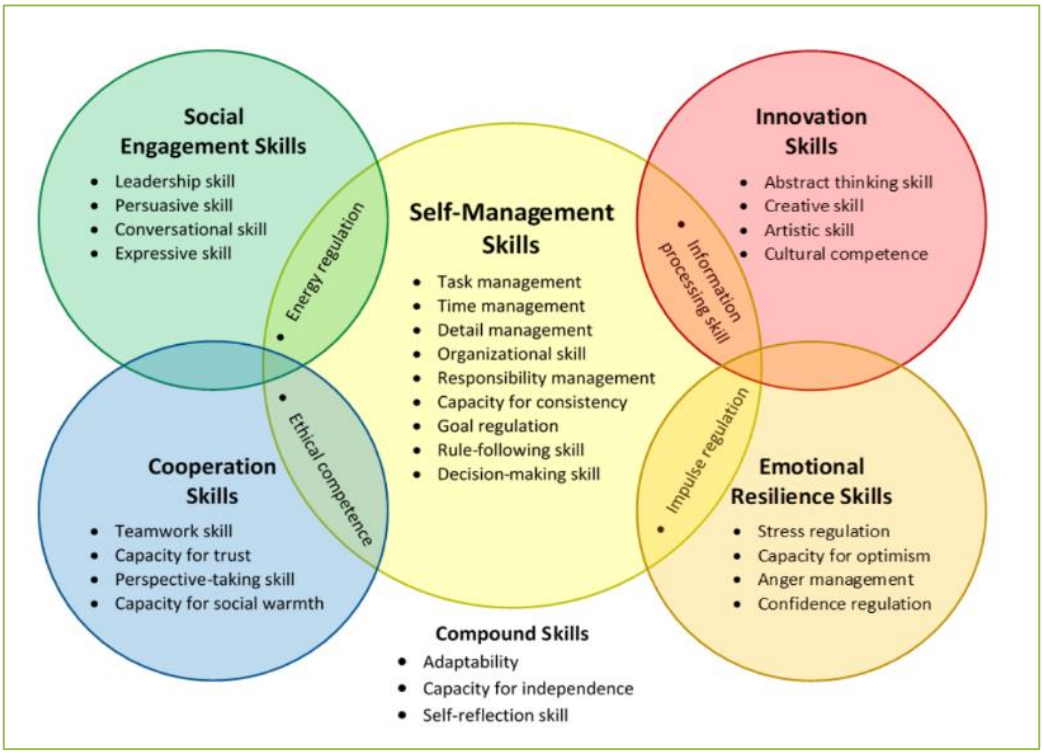
2.2 Adaptation of questionnaires

2.2.1 BEHAVIORAL, EMOTIONAL, AND SOCIAL SKILLS INVENTORY (BESSI)

The student questionnaire implemented in the survey consisted of two parts. The first part was based on the evaluation tool developed under the project “Behavioral, Emotional, and

Social Skills Inventory (BESSI)". This tool measures many specific skills that fall into five broad categories or "domains": 1. Self-management, 2. Social Engagement, 3. Cooperation, 4. Emotional Resilience and 5. Innovation (Figure 2.1). This tool has been shown to be reliable, valid, comprehensive, fast to apply, and available for non-commercial use. The questionnaire has been translated and adapted to the Greek context.

Figure 2.1: Behavioral, Emotional, and Social Skills Inventory



Source: http://www.sebskills.com/the-bessi.html

Through this questionnaire, students are asked to assess how well they can perform an activity. Note that how well someone can do something may differ from how often they do it or how much they like doing it. The data take the form of simple statements such as: "I can lead a group of people," which denotes one's ability to interact actively with other people and which belongs to the skills of "Social Engagement" or "keep calm even in stressful situations", which evaluates the person's stress behavior and belongs to the "Emotional Resilience" skills. The wording of the statements is maintained at very simple levels in order to avoid misinterpretations and to avoid any understanding difficulties. The responses are presented on a Likert scale of 5 degrees, ranging from 1 — "Not at all well" to 5 — "Extremely well".

To adapt the instrument to the sample of Greek high-school students, we used a backtranslation procedure, aiming at using as simple terms as possible. In greater detail, using a tool provided by the BESSI team, one of the members of the team of this study translated the 192 BESSI items from English to Greek. Then, another team member, with the original English text of the items hidden, translated the items back into English. Comparing the original and the translated-back-to-English versions of the BESSI items gave the team the opportunity to identify and correct renderings that could be misleading.

The Greek version of the questionnaire was finalized after the end of the pilot phase of the survey implementation, which included four school visits. During the pilot phase, a significant number of students expressed difficulty in understanding the following items (in their Greek translation):

- Let go of a grudge.
- Look inside myself.
- Control my cravings.
- Have intellectual or philosophical discussions.
- Stop and think things through.
- Think about the nature of the world.
- Examine myself and my life.

In addition, the completion of the survey, including also the contextual data questionnaire, was taking quite a lot of time for some students (especially those with Greek as a second language or with forms of dyslexia), reaching or even exceeding in some cases the allowed time limit of two school hours (of 45 minutes each). Also, we received feedback from quite a few students that the soft-skills questionnaire was too repetitive.

To overcome these issues, the BESSI team provided us with a shorter version of the questionnaire, consisting of 128 items. The shorter version excluded the above items that were shown to be problematic to some students during the pilot phase. It formed the basis for the data collection instrument used in the post-pilot phase and the analysis presented further below.

2.2.2 CONTEXTUAL STUDENT DATA

The second part of the student survey collected contextual information about the students. The collection of relevant contextual information is critical to understanding how students' social and emotional skills have developed and how these skills can be improved. Students learn in many different settings, including families, schools, peers, and social surroundings, while each setting plays an important role throughout childhood and adolescence. Relevant contextual information helps us gain insight into the factors that support or hinder the development of social and emotional skills, including relevant policies and practices.

The questionnaire used in the second part is based on the Survey on Social and Emotional Skills (SSES) of the Organisation for Economic Co-operation and Development (OECD). This is an international survey that identifies and evaluates the conditions, practices, and factors that encourage or hinder the development of social and emotional skills of students aged 10 and 15. The first cycle of the OECD survey began in 2016, the field test was implemented at the end of 2018 and the data collection of the main study involving 9 countries was completed at the end of 2019.

The questionnaire was adapted to the Greek context as part of this study. It collects data on demographics, well-being, attitudes and expectations, relations with parents and friends, school life, and knowledge of Information Technology and Communications (ICT). It also contains a short measure of cognitive ability.

2.2.3 SCHOOLS DATA

In addition to the student survey, the directors of the school units participating in the survey were also asked to complete a questionnaire, mainly based on the PISA 2018 school questionnaire. The data collected through the school questionnaire supplemented the survey with information on school characteristics, such as number of students with various characteristics (by gender, with learning difficulties, disabilities, etc.), number of teachers (permanent, supplementary, with postgraduate studies, etc.) and number of classes. The collected numeric data on schools allowed for the estimation of policy-relevant indicators, such as average class size or average number of students per teacher. The questionnaire also contained items on policies and practices instituted at the school level, such as taught foreign languages, afternoon activities and teacher training to develop soft and other skills. Lastly, the questionnaire contained open ended items that gave the opportunity to the directors to express their views on soft-skills development in their school.

2.3 Survey approval process

In order to obtain access to the schools, the survey had to be approved by the Ministry of Education. The study team submitted the relevant application documents (survey implementation request, detailed study plan, brief study sheet, list of selected schools, CVs) on 13 October 2022. The application received a positive evaluation by the Institute of Educational Policy on 26 January 2023.

The Ministry of Education released a decision to approve the survey on 9 February 2023. The approval was conditional on a number of requirements, including:

- The directors and the teacher associations of the selected schools are notified about the study and they agree to take part.
- The school directors send to parents and guardians parental consent forms, explaining the study scope, content, and methodology.
- The students taking part in the survey submit parental consent forms to the school signed by a parent or a guardian.
- The school directors and the students participate in the survey anonymously and willingly.
- The students take part in the survey on the school premises with the presence of a teacher, at a time set by the school director.
- The time of engagement of the students does not exceed two school hours (90 minutes in total)
- There is no use of means of recording pictures, video, or sound.
- The study team does not do any kind of student evaluation.
- The principle of protecting personal data is adhered to and no sensitive personal data is published.

2.4 Sample design

In the initial survey design, 100 schools (55 general and 45 vocational high schools) were selected with random sampling, to be approached for conducting the survey. The list of sampled schools included 20 additional schools for backup, in case that some of the selected

schools were not able to participate. Private, experimental (πειραματικά) and pilot (πρότυπα) schools were excluded from the school sample, as the vast majority of vocational high schools (EPAL) are state-owned and do not have experimental or pilot status, so including these special categories from the general track (GEL schools) might have raised challenges for comparing the students from the two tracks. Similarly, we excluded evening EPAL and GEL schools, as the study focuses on adolescent students.

The selection of this particular student segment was based on the following reasons. First, the study attempts to highlight the differences that may exist between students in general and vocational formal non-compulsory secondary education. Second, the non-compulsory secondary school students are in the process of transitioning from the education system to the labor market and are therefore concerned about their professional choices and career path. Lastly, students of these ages have already received several years of education, perhaps have previous experience of participation in surveys, and are therefore mature enough to be able to meet the study requirements.

The selected schools were located in the two largest regional units of the country (the region of Attica and the prefecture of Thessaloniki), hosting the country's two largest urban centers (Athens and Thessaloniki). These areas were selected to ensure that: (a) there were sufficient number of general and vocational high schools; (b) the school and class capacity was large enough to allow the random selection of pupils; and (c) the use of research resources was manageable.

The initial target was to survey 2800 students in total from the first and third grades of the schools selected to participate in the survey. The study design envisaged the random selection of 28 students per school, 14 students from grade 1 and 14 students from grade 3. This would have resulted in 2 clusters with 630 vocational school students and 2 clusters with 770 general school students each.

Following the receipt of the approval to conduct the study, the study team contacted the sampled schools to obtain their consent on participation in the survey. Unfortunately, a large number of schools declined our request. The reason most often provided was lack of suitable time slots so close to the end of the school year. In Greece, classes for grade 3 students end in mid-May, so that they have time to prepare for their finals and university-entry exams. Until the end of classes, there was need to allocate time for a two-week Easter break in mid-April and a 5-day school trip. Many schools reported that they had already booked a lot of time for extracurricular educational studies and activities. A number of schools had to cover lost time as they had closed for quite a few days due to student protests, following a train crash tragedy that took place on 28 February. A couple of schools located in the center of Athens, concentrating a large share of first-generation migrant children, declined to participate based on the belief by school directors that their students would not be able to complete the survey in Greek within the allocated time due to language difficulties.

During the pilot phase of the study collection, the study team assisted the schools with the random selection of the students. The school directors were provided with the option to receive a set of 14 randomly generated numbers, one for each grade. The numbers were

generated with a script in R, using a uniform probability function, applied on the range from one until the total number of students that each school had in each grade. The schools would then match the random numbers with students based on their position in lists generated by the school system.

As the communication with the sampled schools progressed, it became evident that the number of schools participating in the survey would be substantially lower than the initial target. In order to limit the gap between the number of responses and the student sample size target, the study team, in close cooperation with the World Bank team, opted for raising the number of students participating from each school to the maximum number of willing participants that the school can accommodate, which varied significantly across the participating schools. In many schools, it was easier for the school to accommodate our request by drawing the survey participants from the same class per grade, thus minimizing the overall disruption from the survey to the school program.

Given the requirement on anonymity of student responses, as envisaged in the Ministry of Education approval, and the need to match the grades with the responses from the survey, obtaining student grades imposed substantial burden on the school to collect and anonymize appropriately the data. To secure the participation of as many of the selected schools as possible, the study team impose the obtaining of student grades to the schools as a mandatory requirement for participation in the survey. At the end, none of the participating schools was in the position to go through the process of providing anonymized yet matchable school grades.

Given the above difficulties in obtaining participation consent from a sufficient number of sampled schools, the study team, following consultations with representatives of the Institute of Educational Policy and the World Bank, expanded the sample of schools contacted for participation in the study to include all EPAL schools in the region of Attica and the prefecture of Thessaloniki. To maintain a similar ratio of GEL to EPAL schools from the initial sample design, we also contacted 61 additional GEL schools with a request for participation in the study.

Overall, we contacted 213 schools in total (97 EPAL and 116 GEL). Out of these schools, 86 explicitly (33 EPAL and 53 GEL) stated their inability to participate in the survey, while for another set of 86 schools (45 EPAL and 41 GEL), the communication did not reach a definitive answer until late into the data collection process, despite repeated phone communications. In the end, 41 schools (19 EPAL and 22 GEL) agreed to take part in the survey and provided us with time slots for a visit.

2.5 Data collection

The study was conducted on school premises with the presence of one or more study team members. The availability of desktop computers to conduct the survey electronically varied across the schools. In very few schools, there were sufficient computers to conduct the survey digitally with the whole sample at the same time. Most IT labs of the visited schools had about 14-15 computers, while most GEL schools had one IT lab available for the survey. In some

schools, we used the same IT lab for different groups that took part in the survey on the same day at different hours. In most schools, one group undertook the survey in the IT lab and another group completed hardcopy questionnaires. In a few schools, handheld devices (tablets) were made available by the school for the group that was participating from an ordinary class (rather than an IT lab), while several schools allowed the use of the students' own mobile phones for completing the survey in class. To facilitate the use of handheld devices, the study team had printed QR codes that enabled speedy connection to the electronic forms. In a few schools, all responses were provided through hardcopy questionnaires. The responses from the hardcopy questionnaires were manually entered in the electronic database by study team members.

In addition, in order to capture the broader context, the study conducted a workshop with key stakeholders. Invitations for participation in the workshop were sent to representatives from the Ministry of Education and Religious Affairs, the Ministry of Labor and Social Affairs, the Institute of Educational Policy, the National Organisation for the Certification of Qualifications and Vocational Guidance (EOPPEP), the Public Employment Service (DYPA), the Hellenic Federation of Enterprises (SEV), the Institute of the Greek Tourism Federation (INSETE), Small Enterprises' Institute of the Hellenic Confederation of Professionals, Craftsmen, and Merchants (IME GSEVEE), the Institute for Trade and Services of the Hellenic Confederation of Commerce and Entrepreneurship (INEMY ESEE) and the Labor Institute of the General Confederation of Greek Workers (INE GSEE).

The discussion during the workshop was centered on the policies and initiatives of the stakeholders in developing the soft skills of VET graduates in Greece, the adequacy of the level of soft skills in VET graduates in Greece in relation to the current and future needs of the labor market in Greece and lastly on the main obstacles to further improving the process of developing these skills and matching them to the labor market needs. The discussion was summarized in detailed notes that formed a separate deliverable for this study, while it also informed the analysis for the remaining study deliverables.

2.6 Data compilation and validation

As a first step, we imported three data sets into the RStudio environment, two of them refer to the students' responses to the soft-skills and contextual data questionnaires and the third corresponds to the directors' responses. The two student datasets included school and student ID numbers that were generated by the study team, printed on paper, and distributed randomly to the students during the school visit. School ID was a compound index, combining a Greek letter with randomly generated three-digit numbers, while the school ID were randomly generated numbers from one to 120. The letter of the school IDs specified the type of school (Γ for GEL school and Π for EPAL school). The school IDs were also given to the directors to fill in the relevant field in the questionnaire.

Regarding the soft-skills dataset (BESSI), we converted the classification of all responses from string variables (in Greek) to numeric, using the following scaling numbers: 1 expressing "Not at all well", 2 as "Not very well", 3 as "Pretty well", 4 as "Very well" and 5 as "Extremely well".

We then consolidated the school and student ID variables to have a single form across all schools and students. We also merged the responses to the final questionnaire from MS Forms with an excel file that we used for entering hard-copy responses received in the pilot phase.

Then, we proceeded to translate and clean the contextual data (SSES dataset). Some of the questions in the questionnaire were open-ended (such as gender, country of origin, spoken language at home, occupations of parents, future occupation) and therefore they needed to be coded into specific categories for all students. Regarding occupations, the responses were converted to coded responses based on the International Standard Classification of Occupation (ISCO-08).

Next, we processed the responses from the directors' questionnaire. As in the previous datasets, we translated and codified variables with the directors' responses on characteristics of the school environment. In addition, we added a variable that gives the property value in the neighborhood of each school, obtained from the tables used by the Ministry of Finance to determine property taxation.[1] We used the system defaults, that is starting value (in EUR per m^2) for a property facing one street, situated on the first floor, of 100 m^2 size, built in 2021, with no special circumstances. The property value can be used as a proxy for the socioeconomic status of the school neighborhood.

In the final stage of the data preparation, we created a unique identifier for each student, combining the school ID, student ID and grade information, both in the BESSI and SSES datasets. We then proceeded to merge the two files based on the unique identifier (i.e., on school, student, and grade variables). The unified dataset includes responses from about 1,400 students. After that, we merged the above file with the director dataset according to school ID, in order to include school characteristics in the dataset.

We ended up with a consolidated file with all the answers by students and directors. In the final data set, we created additional variables such as school type, derived from the school IDs, and school region, by matching school IDs with the region from the list of visits. Having consolidated the data in a single dataset, we then proceed with estimating sample weights and derived variables, such as soft-skill facets and domains and various contextual indicators, as described below.

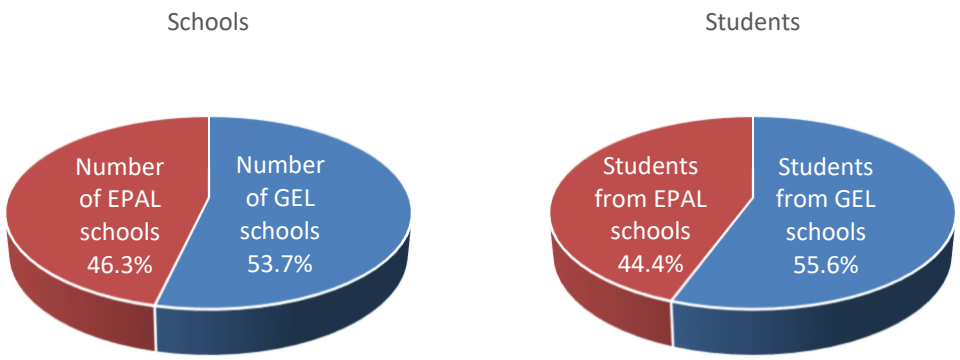
2.6.1 SAMPLE WEIGHTS

The initial selection of schools and students did not result in a representative sample, as it focused on EPAL students, while the cost of obtaining responses from Thessaloniki was also substantially higher. A closer examination of the received responses also showed underrepresentation of year 3 and female students, substantiating the need to use sample reweighting techniques in order to obtain statistics that are representative of the underlying population.

[1] Source: https://maps.gsis.gr/valuemaps/

In greater detail, the database includes responses from 19 EPAL and 22 GEL (41 schools in total). The sample includes 1392 answers to the contextual data questionnaire (55.6% from GEL students and 44.4% from EPAL students - Figure 2.2) and 1397 answers to the BESSI (soft-skills) questionnaire (not all students managed or were willing to compare both). The sample characteristics presented below are derived from the responses to the contextual data questionnaire.

Figure 2.2: Composition of the sample by school type



Given the focus of the study on vocational education and training students, the share of EPAL students in the sample is considerably higher than the corresponding share in the population of students attending EPAL and GEL schools in the region of Attica and the prefecture of Thessaloniki (30.3%).[2] The share of EPAL is even higher in terms of the number of schools (46.3%), as overall we managed to collect more responses per school from GEL rather than EPAL schools.

Out of that sample of 1392 students, 56,0% come from year 1 students (Figure 2.3). This implies that year 1 students are over-represented in the sample, as they comprise 50,1% of the student population for these two grades in the daily GEL and EPAL schools in the region of Attica and the prefecture of Thessaloniki. The under-representation of year 3 students is observed in both GEL and EPAL subsamples.

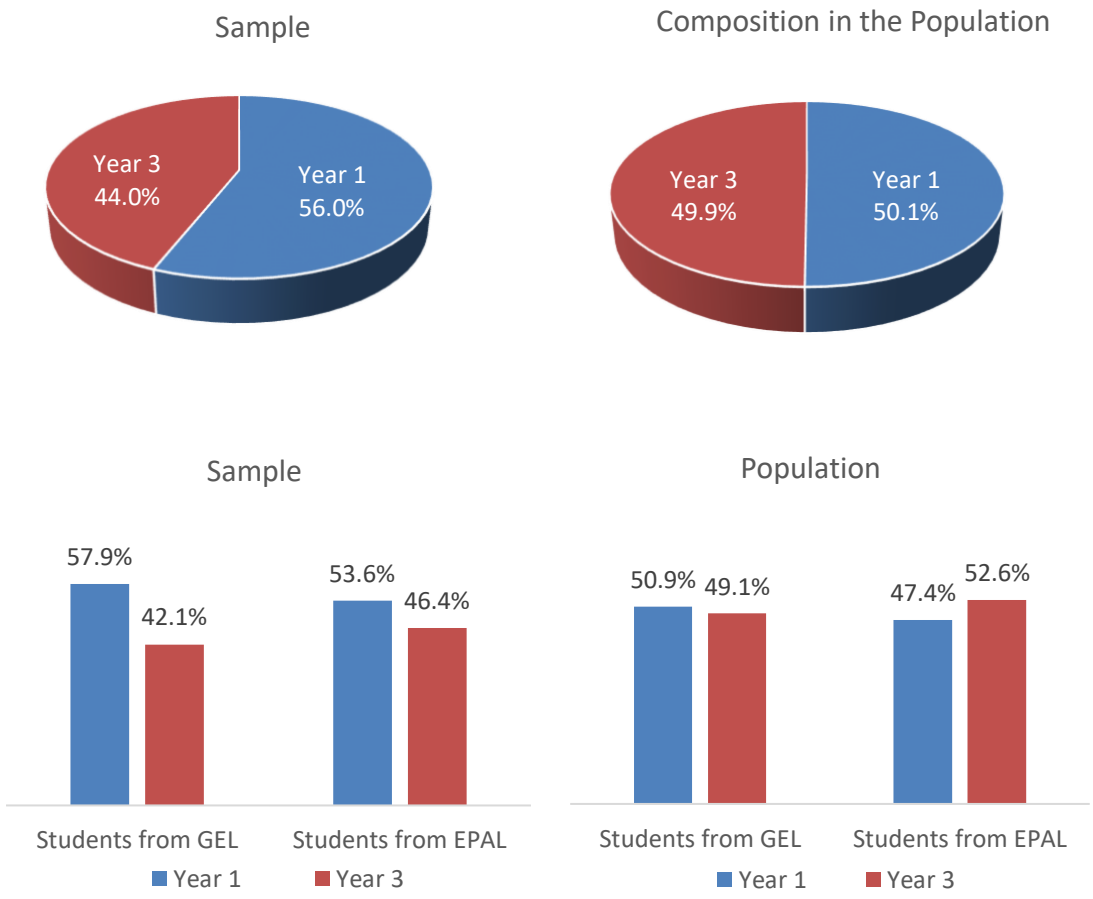
A plausible explanation for this discrepancy is that there are more absences in year 3 towards the end of the year, as the students are preparing for university entry exams through the shadow education system. Also, in some schools the sample was drawn from particular classes, rather than the whole grade, while year 3 classes in EPAL tend to be smaller in size as they correspond to more specializations.

In regard to gender representation, about 57,3% of the responses come from male students (against 52,0% in the total population of state-run daily schools). A greater percentage of girls

[2] The population figures are based on the latest available data from ELSTAT for the school year 2019-2020 for daily, state-owned high schools, operating in the region of Attica and the prefecture of Thessaloniki.

participated from the GEL than from the EPAL schools, but proportionally to the female student population they were fewer than their EPAL counterparts. So, this under-representation of female students in the sample is observed only in the GEL schools subsample (Figure 2.4).

Figure 2.3: Composition of students by grade

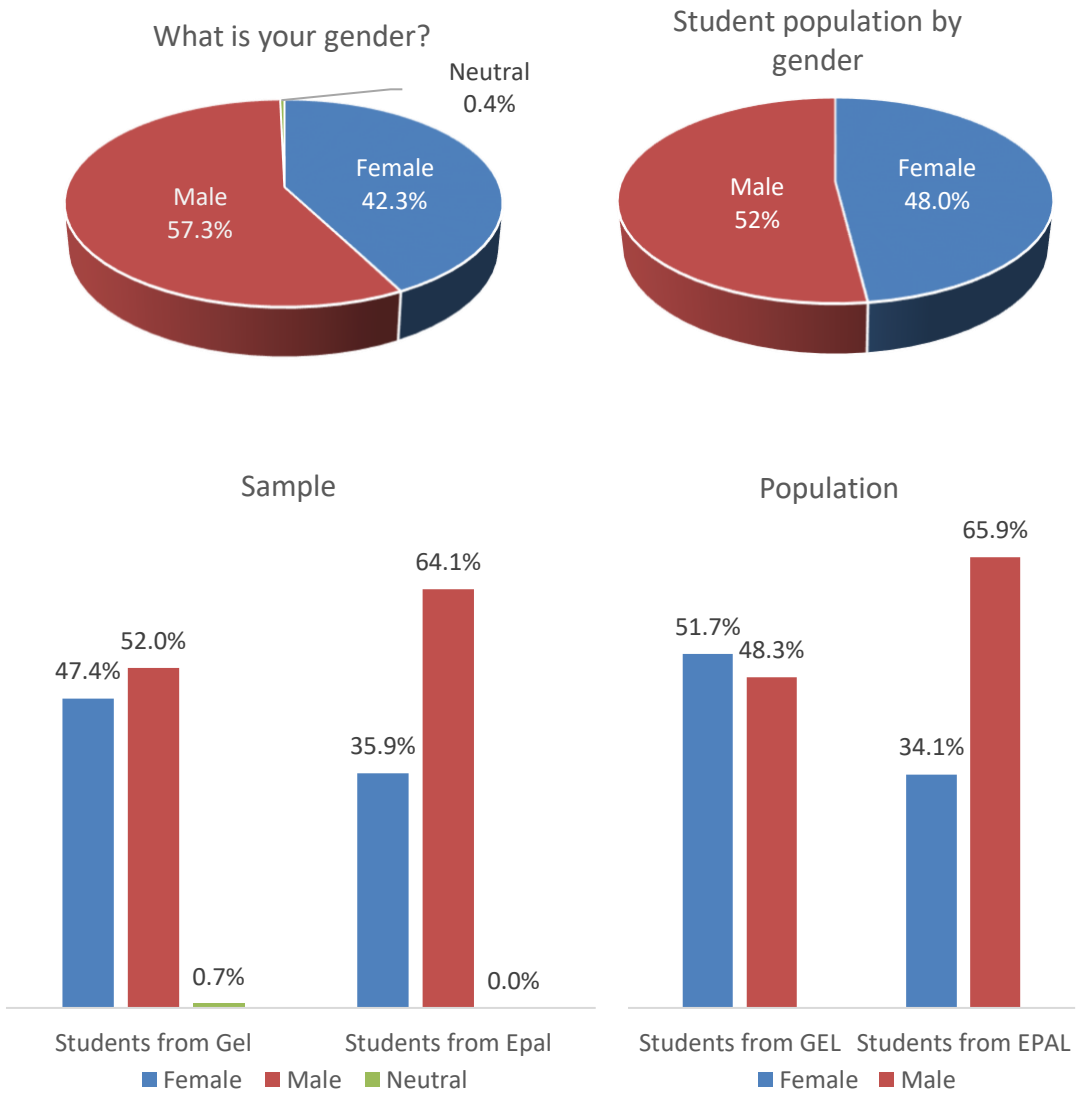


Finally, about 85.8% of the students in the sample come from the region of Attica (against 75.7% in the corresponding population). This divergence is partly due to the fact that a lot of Thessaloniki's high schools were closed due to protests by students at the time of the planned survey visit to that region, while the cost of obtaining responses from Thessaloniki was also substantially higher, given that the research team is based in Athens.

To overcome the above discrepancies, we reweighted the sample based on type of school, year, gender, and region. We employed the post-stratification method (Battaglia et all, 2009; Debell and Krosnick, 2009), which is a technique used to ensure that the selected samples accurately represent the entire population, according to a set of demographic variables. In order to achieve this, weights were assigned to each stratum to effectively balance the representation of different categories within the sample. For each category in the sample, the post-stratification weight can be calculated using the formula:

Post-stratification weight = (Population % / Sample %)

Figure 2.4: Composition of students by gender



These weights took into account the varying population sizes and proportions within each category. The population statistics utilized in this study were obtained from the Hellenic Statistical Authority, ensuring the data was based on reliable and official sources.

To illustrate the method, let's consider the weight we used for Attica's General Education Lyceum (GEL) schools in grade 1. In this category, the population size for male students totaled 12,641, which accounted for 15.17% of the total population of grade 1 and students in the region of Attica and the prefecture of Thessaloniki. From this population, a subset of 198 males was selected in our sample, representing 14.74% of the total sample. A post-stratification weight of 1.03 (0.1517/0.1474) was thus assigned to each male in this category in the sample to account for the population and sample proportions and ensure proper representation. For easier reading of the results, the final weight is estimated by multiplying the post-stratification weight by 100, thus each individual in this category was assigned 102.91 as a final weight.

Figure 2.5: Composition of students by region

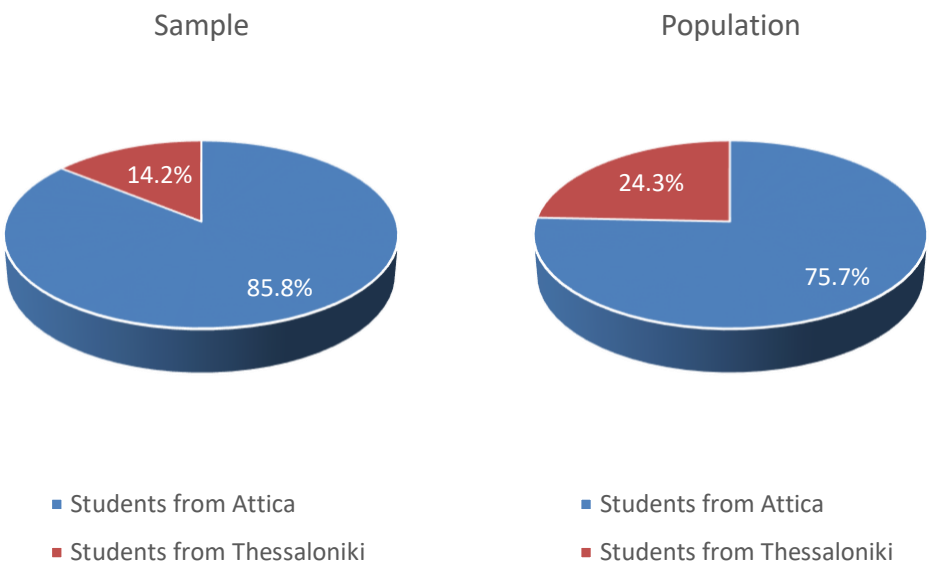


Table 2.1: Estimation of sample weights per student segment

Region	School type	Grade	Gender	Population size	Population %	Sample count	Sample %	Post-stratification weight	Final weight
Attica	GEL	1	Male	12.641	15,17%	198	14,74%	1,03	102,91
			Female	13.161	15,80%	181	13,48%	1,17	117,21
		3	Male	11.805	14,17%	131	9,75%	1,45	145,26
			Female	12.967	15,56%	131	9,75%	1,60	159,56
	EPAL	1	Male	4.010	4,81%	180	13,40%	0,36	35,91
			Female	1.874	2,25%	96	7,15%	0,31	31,47
		3	Male	4.291	5,15%	149	11,09%	0,46	46,42
			Female	2.299	2,76%	86	6,40%	0,43	43,09
Thessaloniki	GEL	1	Male	3.746	4,50%	32	2,38%	1,89	188,70
			Female	3.982	4,78%	24	1,79%	2,67	267,45
		3	Male	3.663	4,40%	32	2,38%	1,85	184,52
			Female	3.960	4,75%	22	1,64%	2,90	290,15
	EPAL	1	Male	1.570	1,88%	27	2,01%	0,94	93,73
			Female	788	0,95%	15	1,12%	0,85	84,68
		3	Male	1.584	1,90%	24	1,79%	1,06	106,39
			Female	975	1,17%	15	1,12%	1,05	104,78

Table 2.2: Estimation of sample weights per school segment

School Type	Region	Population size	Population %	Sample count	Sample %	Post- stratification weight	Final School Weights
GEL	Attica	313	59.2%	18	43.9%	134.8%	134.8
	Thessaloniki	105	19.8%	4	9.8%	203.4%	203.4
EPAL	Attica	88	16.6%	16	39.0%	42.6%	42.6
	Thessaloniki	23	4.3%	3	7.3%	59.4%	59.4

Source: Hellenic Statistical Authority. Note: The population statistics in this presentation refer to school units at the end of school year 2019-2020 for GEL and EPAL schools.

The same technique was followed for the computation of School Weights (Table 2.2). As before, we aimed to achieve a comprehensive representation by selecting samples from each

category, such as region (Attica- Thessaloniki) and school type (GEL- EPAL). A representative sample is achieved by estimating weights that consider the composition of schools in the sample and in the overall population. After computing post-stratification weight of schools for each group, the final school weights are calculated by multiplying the post-stratification weights with 100.

2.6.2 COMPARISON OF SOCIO-ECONOMIC STATUS OF STUDENTS WITH PISA 2018 SURVEY

Regarding the representativeness of our survey, another interesting dimension to examine is the socio-economic status of the students compared to those of the PISA 2018 survey for Greece. After downloading the data from the PISA 2018 database[3], we use the R package "intsvy", developed especially for work with international assessment surveys (such as PISA, TIMSS, PIRLS and PIAAC) by Caro and Biecek (2017). The functions of this package take into account the complex sample design with replicate weights in the calculation of frequency tables.

Since the survey of PISA focuses on 15 years old students without reporting school's type and region they study at in the Greek sample, we make the comparisons only for 1st grade students from the total sample. After controlling for sample weights, we compare frequencies between the two surveys for variables related to socio-economic status, such as the parents' highest education level, parents' occupation, and some selected household possessions.

Comparing parental education, the share of students having parents with bachelor's degree and above is higher in our survey compared to PISA 2018 for both the mother and the father (Figure 2.6). In particular, the share of students who have a mother with bachelor's degree totals 48.59% in our survey compared to 35.4% in PISA 2018. For fathers with bachelor's degrees, the share in our survey reaches 40.24% compared to 31.7% in PISA 2018. Correspondingly, for lower educational levels, there is under-representation in our survey compared to PISA 2018 for both the mother and the father. The deviation of differences for lower educational levels on the mother side ranges between 3.69 and 9.51 percentage points (pp) and on the father side between 1.18 and 7.37 pp.

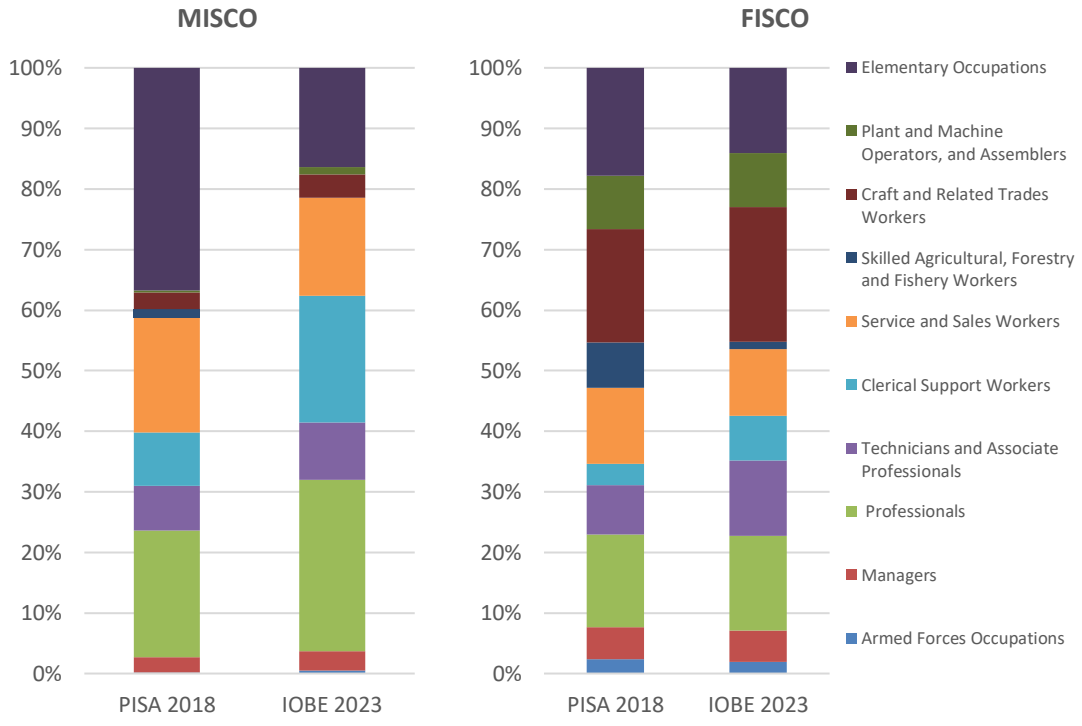
Comparing mother's occupations (Figure 2.7), our sample has a significantly higher share of mothers working as Professionals (28.3%, against 20.9% in PISA 2018) and Clerical support workers (20.9%, against only 8.8% in PISA 2018), and much lower share of mothers employed in Elementary occupations (16.4%, against 36.8% in PISA 2018). The differences are much less pronounced when comparing the father's occupation. In our survey, we observe higher shares for employed as Crafts and related trade workers (22.3%, against 18.7% in PISA 2018), Technicians and associated professions (12.4% against 8.2%), and Clerical support workers (7.4% against 3.5%) and lower shares for fathers working in Elementary occupations (14.1% against 17.8%) and as Skilled agricultural, forestry and fishery workers (1.2% against 7.4%).

[3] https://www.oecd.org/pisa/data/2018database/

Figure 2.6: Weighted shares of mother's (MISCED) and father's (FISCED) education versus PISA 2018 findings, at ISCED levels

Source: Student survey and PISA 2018, Note: ISCED 0-3: Upper secondary education and below; 4-5: Post-secondary non-tertiary education and short-cycle tertiary education; 6: Bachelor's degrees and above.

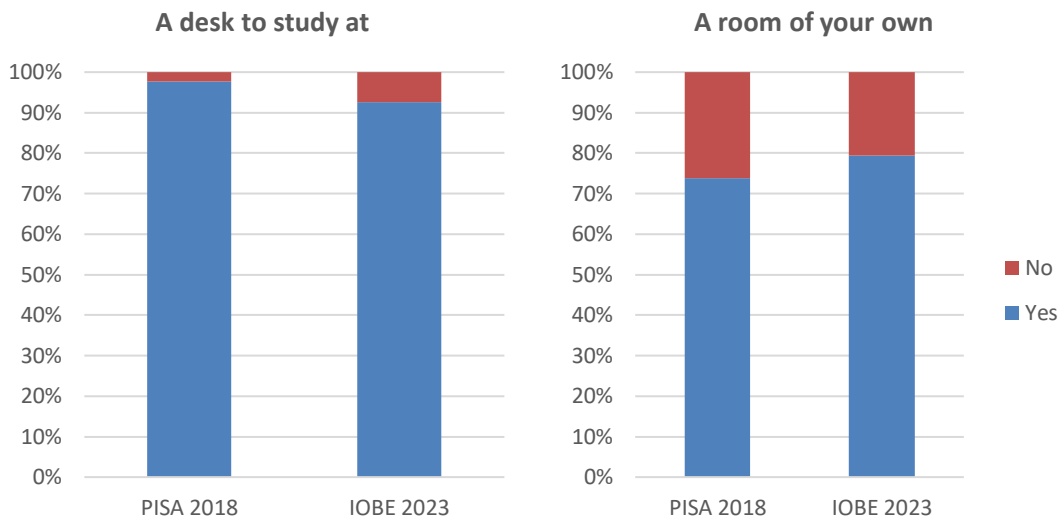
Figure 2.7: Weighted shares of mother's (MISCO) and father's (FISCO) occupation versus PISA 2018 findings, at ISCO levels



Source: Student survey and PISA 2018, Note: For ISCO-08 levels https://ilostat.ilo.org/resources/concepts-and-definitions/classification-occupation/

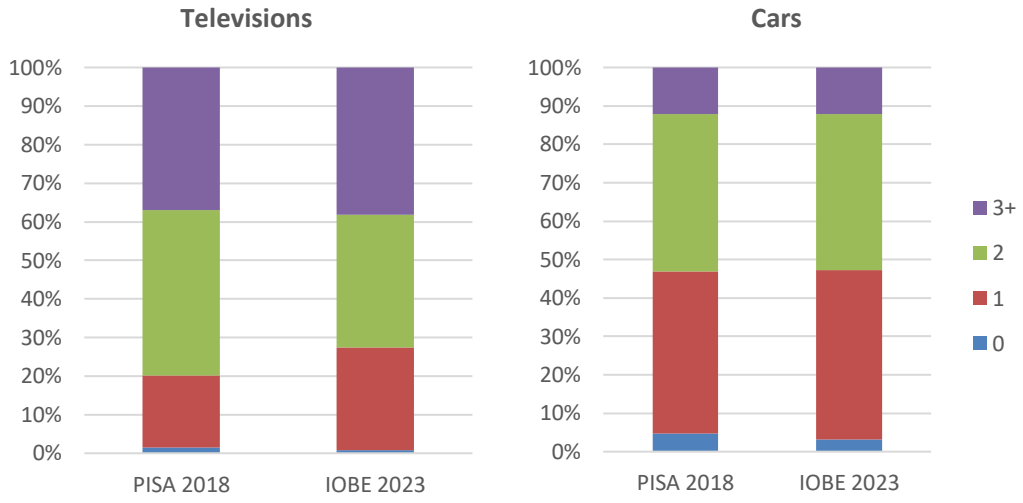
As for the conditions of the students at home, the shares of students having their own room and a desk to study at are relatively close among the surveys (Figure 2.8). In particular, the corresponding share in PISA 2018 reaches 97.7% compared to 92.5% in our survey. Students having their own room is at 73.8% in PISA 2018 and 79.2% in our survey.

Figure 2.8: Weighted shares of students with their own room and desk to study at versus PISA 2018 findings



Source: Student survey and PISA 2018

Figure 2.9: Number of home possessions versus PISA 2018 findings, weighted percentages



Source: Student survey and PISA 2018

Finally, we compare the share of students reporting the number of televisions and cars in their households (Figure 2.9). The shares of students having no television (1.42% for PISA 2018 and 0.69% for our survey) and more than three television sets (36.95% for PISA 2018 and 36.91% for our survey) are quite similar across the two samples. Our sample has somewhat higher

share of households with 1 TV set (25.8% against 18.8% in PISA 2018) and a lower share of households with 2 sets (33.3% against 42.8%).

As for cars, the distribution of the two samples is almost identical. For example, 42.7% of the students in our sample live in a household with one car versus 42.2% in PISA 2018, while the share of students living in a household with three or more cars reaches 11.7% in our survey, compared to 12.1% in PISA 2018.

Overall, the comparison shows that our sample has students that are in a better position with respect to parent education and occupation (especially on the mother side), which does not necessarily translate to a significant advantage in terms of wealth and household possessions. This difference can be explained in part with the fact that our study concentrates on the two largest urban regions of Greece that have a higher concentration of public administration services, company headquarters, university - research units and other entities that provide jobs for professionals and higher education graduates.

2.6.3 COMPARISON OF THE SOCIOECONOMIC CONDITIONS IN THE NEIGHBORHOOD OF THE SCHOOLS

To evaluate further the representativeness of our survey, we considered an additional dimension - the property values of schools that participated in the survey compared to those that did not within the region of Attica and the prefecture of Thessaloniki. The property value in the immediate neighborhood of the school can be seen as a proxy for the average socioeconomic level of the school population. Neighborhoods where properties are selling at lower values tend to be inhabited by households with lower socioeconomic status and vice versa, while in the public schools that we consider in this study (no model or experimental schools) most students tend to come from nearby areas.

Comparing the data, we find that in Attica, participating GEL schools have higher property values compared to non-participating schools (Figure 2.10). To be more specific, for GEL schools in Attica, the participating schools are located in neighborhoods where a first-floor flat of 100 m^2 has a mean value of 1831 €/m^2 and a wide confidence interval (ranging from 1572 to 2090), while non-participating schools are located in neighborhoods with a lower mean property value of 1521 €/m^2 and a narrower confidence interval (from 1462 to 1580). Examining the statistical significance of the difference through a two-sided t-test, we find that it is indeed significant at the 5% level (t-statistic = 2.227, p-value = 0.038 - Table 2.3).

By contrast, the mean property values in the neighborhood of EPAL schools in Attica are almost identical (1372 €/m^2 for participating and 1387 €/m^2 for non-participating schools). This result is confirmed in the two-sided t-test which shows that the difference is not statistically significant (t-statistic = -0.166, p-value = 0.870).

In Thessaloniki, the data indicates that the sample of participating schools in our dataset has lower property values in their neighborhood compared to non-participating schools for both GEL and EPAL schools. Participating GEL schools have a mean of 800 €/m^2 with a confidence interval ranging from 740 to 860 €/m^2, while non-participating schools have a higher mean of 1094 €/m^2 with a range from 1021 to 1166 €/m^2. The t-test results reveal that the difference is highly significant (t-statistic = -5.731, p- value = 7.535e-05).

Figure 2.10: Value of property by school type for participating and non-participating schools, means and 95% confidence intervals

Source: maps.gsis.gr/valuemaps/#

Lastly, for EPAL schools in Thessaloniki, the mean value for participating schools is 750 €/m^2 (CI: 611 to 889 €/m^2), whereas for non-participating schools, it is 985 €/m^2 (CI: 881 to 1089 €/m^2). In this case, however, the difference is statistically significant only at the 10% level (t-statistic = -2.298, p = 0.086).

To conclude, the property value comparison provides indications that for the population of GEL students, our sample may have an overrepresentation of students with higher socioeconomic status in Attica and students with lower socioeconomic level in Thessaloniki. Meanwhile, within the EPAL students, the representativeness with respect to the socioeconomic status, judging by the property value in the school neighborhood, is much more balanced, with practically no difference in Attica and a marginally significant difference in Thessaloniki. It is also interesting to note that the mean property value is considerably higher for GEL than for EPAL schools in both Attica and Thessaloniki regions, implying that the

EPAL schools tend to be situated in relatively less well-to-do neighborhoods, confirming their role to provide upper secondary vocational education for underprivileged students.

Table 2.3: Two-sided t-test on difference in means between participating schools in survey and non-participating schools

Region	School type	T test	P value
Attica	GEL	2.227	0.038
	EPAL	-0.166	0.870
Thessaloniki	GEL	-5.731	7.535e-05
	EPAL	-2.298	0.086

2.6.4 BESSI FACETS AND DOMAINS

In order to group the 128 soft-skills items selected for the final phase of the survey into broader categories that can be used for a more parsimonious analysis, we followed the hierarchical structure of Soto et al. (2022) that separates these items into 32 facets and 5 domains (Figure 2.1 in section 2.2.1). We estimated the scores for each facet and domain per student response, adopting the script published by the BESSI team.[4]

In particular, each facet score is estimated as the arithmetic mean of the soft-skill items that it contains. Then, the facets are assigned to their corresponding domains. Most facets are uniquely assigned to a single domain, except for four facets (Energy regulation, Information processing, Impulse regulation, Ethical competence) that are assigned to two domains each (interstitial facets) and three facets that do not fall under any of the domains (compound facets). The score for each domain is calculated as the arithmetic mean of the corresponding facets, with the interstitial facets taking halved weight in each of the two domains that they participate.

To test the appropriateness of the hierarchical structure proposed by Soto et al. (2022) for the sample of Greek high-school students, we used a procedure proposed in Lechner et al. (2022). In particular, we carried out exploratory factor analysis (EFA) with target rotation, using the 32 facet scores as an input. For the target matrix of the rotation, we used the theoretical loadings described previously. In particular, the unique facets had a unit loading on their corresponding main domains and a zero loading on the other domains. The interstitial facets had loadings of 0.5 on their corresponding domain pairs and zero loadings on the remaining domains. Finally, the compound facets had zero theoretical loadings on all domains.

[4] https://osf.io/mt8yv

Table 2.4: EFA loadings of BESSI facet scales on domains

Facet	Loadings on BESSI domains					Indicators	
	Cooperation	Emotional Resilience	Innovation	Self-Management	Social Engagement	Complexity	Uniqueness
Capacity for Trust	0.60	0.23	0.00	0.14	0.05	2.33	0.56
Perspective-Taking Skill	0.58	-0.01	0.34	0.28	0.08	3.03	0.47
Capacity for Social Warmth	0.53	0.09	0.15	0.29	0.43	1.21	0.42
Teamwork Skill	0.46	0.07	0.13	0.45	0.23	2.63	0.51
Ethical Competence	0.25	0.07	0.21	0.49	0.10	1.97	0.64
Stress Regulation	-0.05	0.80	0.06	0.22	0.11	1.05	0.29
Anger Management	0.12	0.73	0.17	0.26	-0.17	1.17	0.33
Capacity for Optimism	0.18	0.58	0.06	0.30	0.31	1.80	0.43
Impulse Regulation	0.06	0.38	0.22	0.53	-0.07	2.97	0.51
Confidence Regulation	0.13	0.36	0.08	0.38	0.44	3.15	0.51
Abstract Thinking Skill	0.14	0.10	0.64	0.31	0.17	1.05	0.44
Cultural Competence	0.32	0.00	0.53	0.27	0.03	1.14	0.54
Creative Skill	0.11	0.19	0.46	0.28	0.30	1.60	0.57
Artistic Skill	0.14	0.07	0.46	0.14	0.02	1.09	0.74
Information Processing Skill	0.02	0.23	0.41	0.47	0.30	2.63	0.46
Task Management	0.01	0.17	-0.03	0.80	0.19	1.06	0.29
Time Management	0.06	0.08	-0.11	0.71	0.08	1.08	0.47
Responsibility Management	0.15	0.09	0.15	0.70	0.13	1.11	0.44
Detail Management	0.15	0.05	0.22	0.69	0.15	1.31	0.43
Goal Regulation	0.05	0.10	0.12	0.67	0.30	1.23	0.43
Capacity for Consistency	0.16	0.13	0.09	0.66	0.05	1.10	0.52
Rule-Following Skill	0.41	0.04	0.05	0.63	-0.11	1.75	0.42
Organizational Skill	0.07	0.07	0.00	0.59	0.12	1.00	0.63
Decision-Making Skill	0.14	0.22	0.31	0.56	0.06	2.34	0.51
Conversational Skill	0.43	0.17	0.01	0.16	0.63	1.04	0.37
Persuasive Skill	0.07	0.08	0.26	0.29	0.62	2.82	0.45
Leadership Skill	-0.05	0.17	0.25	0.33	0.58	2.51	0.46
Energy Regulation	0.05	0.27	0.01	0.61	0.38	1.79	0.40
Expressive Skill	0.36	0.11	0.16	0.23	0.29	1.39	0.70
Adaptability	0.26	0.25	0.28	0.31	0.32	2.72	0.60
Capacity for Independence	-0.06	0.18	0.27	0.51	0.29	2.79	0.55
Self-Reflection Skill	0.22	0.28	0.24	0.42	0.27	4.02	0.56

The above testing procedure resulted in loadings aligned with theoretical expectations (Table 2.4). In particular, most single-domain facets loaded on their expected domains with λ higher than 0.4, while the interstitial facets loaded on the targeted domain pairs and the compound facets spread their loadings fairly evenly across many domains. A few exceptions in the Greek sample concerned Confidence Regulation, which loaded on Social Engagement (with λ equal

to 0.44), Self-Management (0.38) and Emotional Resilience (0.36) and the Expressive Skill which loaded on Social Engagement at 0.29, having higher loading on Cooperation (0.36).

Table 2.5: Factor congruency coefficients (Tucker's ϕ)

Domains	Compared to US high-school sample					Compared to theoretical matrix				
	Cooperation	Resilience	Innovation	Self-Management	Social Engagement	Cooperation	Resilience	Innovation	Self-Management	Social Engagement
Cooperation	0.91	0.35	0.42	0.37	0.18	0.75	0.14	0.24	0.3	0.27
Emotional Resilience	0.29	0.94	0.3	0.37	0.14	0.13	0.83	0.15	0.29	0.21
Innovation	0.39	0.3	0.95	0.33	0.25	0.24	0.16	0.76	0.27	0.22
Self-management	0.36	0.47	0.49	0.93	0.19	0.26	0.26	0.23	0.85	0.24
Social Engagement	0.4	0.45	0.42	0.43	0.85	0.25	0.2	0.2	0.26	0.69

We also tested the factor congruency of the domain-facet structure, estimating the Tucker's ϕ coefficient, comparing our sample with the US high-school sample of Soto et al (2022) and the theoretical loadings (Table 2.5). The coefficients of the congruency test in the comparison with the US high-school study ranged between 0.85 for Social Engagement and 0.95 for Innovation, remaining with the range of high similarity. Compared with the theoretical matrix of loadings, the congruence coefficients ranged between 0.69 for Social Engagement and 0.85 for Self-Management, indicating a fairly good fit across most domains. Overall, although there seem to be some differences in Social Engagement and to a lesser extent Cooperation in the Greek sample, the results of the tests indicate that the domain scores would work similarly to the results reported in Soto et al (2022).

2.6.5 SCALING

In order to summarize questions with the same topic and construct composite indicators, we used the method of principal component analysis as illustrated in the following steps. The indicators and the corresponding questions for the student contextual data can be found in the Appendix (Table 7.12).

Data Preparation

The analysis began by removing any rows that had missing values in the specified columns – questions which corresponded to each composite indicator. This ensured that only complete cases were considered for the construction of each composite indicator.

Recoding Categorical Variables

In this step, categorical responses were converted into numeric values. Each response category was mapped to a specific numeric value. To give an example with responses

representing the strength of agreement or disagreement, the response "Strongly disagree" was recoded as 10, "Disagree" as 20, "Not agree/Not disagree" as 30, "Agree" as 40, and "Strongly agree" as 50. For school data, we also used “Not affect” as 10, “Affects a little” as 20, “Fairly” as 30, “Affects a lot” as 40, “Affects too much” as 50. Also, we used 1 for “No” and 10 for “Yes”.

There were certain response categories that required reverse coding. This applied to items that had a negative meaning or were worded in a way that represented the absence of a desirable attribute. For instance, consider two items related to school belonging: "I made friends easily at school" (positively worded) and "I felt lonely at school" (negatively worded). In the case of negatively worded items like "I felt lonely at school," higher agreement with the statement implied a higher level of loneliness or a negative sentiment. Therefore, to ensure consistency in the coding scheme, reverse coding was applied to these items. This means that higher numeric values represented lower agreement or a less desirable attribute.

By applying reverse coding to the appropriate response categories, the analysis accurately captured the intended meaning of each item, distinguishing between positively and negatively worded statements. This helped in interpreting the data and understanding the respondents' level of agreement or disagreement with each item in a consistent manner.

Standardization with Weights

The values of the recoded variables were standardized to bring them to a common scale. It involved subtracting the mean of each variable and dividing the result with the variable's standard deviation. The standardization process took into account the weights assigned to each observation, ensuring that the variables were appropriately adjusted.

Principal Component Analysis (PCA)

The standardized variables were then subjected to Principal Component Analysis (PCA), a technique used to identify underlying factors or components within a number of data series. PCA reduces the dimensionality of the data by transforming the variables into a set of uncorrelated linear combinations called principal components. In such a way, we can use a limited number of components instead of the full dataset, retaining most of the information that it conveys.

Extraction of Component Scores

We obtained the values for most composite indicators by extracting the first principal component score from the PCA results. The interpretation of the first component needed to be reversed in some cases. If the rotation of the first component was negative across all underlying variables, indicating a reverse relationship, the interpretation of the scores needed to be reversed to align with the intended direction of interpretation. To achieve this, the extracted component scores were multiplied by -1, effectively reversing their interpretation.

Cognitive ability indicator

We did not follow the above steps for the student cognitive ability indicator (ST_COGN). This indicator evaluated student cognitive skills through a set of seven math and comprehension questions. The construction of the indicator involved the creation of new indices for each question, and the final indicator was derived by summing these indices.

In particular, for each question, a new index was created to assess the accuracy of the student's response. This index took on the value of "1" if the student answered the question correctly and "0" if the answer was incorrect. Once the new indices had been generated for all seven questions, the final step involved constructing the ST_COGN indicator by summing the individual indices. The summation process aggregated the performance of students across all the questions, resulting in a comprehensive indicator that in effect summed the number of correct responses.

Construction of ISEI-08 scores

In our questionnaires, we encountered a set of questions relating to the occupations of students' parents, as well as the occupations these students anticipated having in the future. In order to ensure that this variable had a meaningful interpretation, we tried to establish a connection between the mentioned professions and their corresponding ISEI-08 scores. To achieve this, we employed a matching process by associating the occupations, represented by the ISCO_08 codes, with their respective ISEI-08 scores.

By aligning the ISCO_08 codes with the ISEI-08 scores, we created a cohesive link between the occupations mentioned in our dataset and their corresponding socioeconomic status. By assigning ISEI-08 scores to the respective professions, we could gauge the socioeconomic implications and implications of these occupations. This integration of occupation data with the ISEI-08 scores contributes to a more comprehensive understanding of the socioeconomic context surrounding the individuals in our dataset.

2.6.6 IMPUTATION OF MISSING DATA

An important aspect of the survey design was that the participation in the survey was voluntary. None of the questions in the survey were compulsory to complete and the students could end their participation in the survey at any point of time. Furthermore, some students with Greek as a second language or with learning difficulties were not able to complete the two questionnaires in full and within the time allocated by the school. As a result, the dataset has a considerable number of missing values.

The descriptive analysis presented in the following chapters is based on the valid answers for each question. However, for the regression analysis, the use of a multitude of derived indicators implies that an observation that has any missing values across a wide number of variables is left out from the analysis, significantly reducing the available sample. In order to address this issue, we employ imputation techniques to estimate and fill in the missing values for certain indicators. This approach allows us to retain a larger portion of the dataset for the

regressions, ensuring a more comprehensive analysis and minimizing the potential loss of valuable information.

In particular, we apply the Multiple Imputation by Chained Equations (MICE) method in order to impute the missing data used to estimate the "HOMEPOS" (Household possessions) and "ST_COGN" (Short cognitive ability test) indicators, which have the largest number of missing values. MICE is a popular approach for handling missing data, where multiple imputations are created by modeling each incomplete variable with its own regression model, considering the other variables as predictors.

We implement the MICE method for five imputed datasets, to account for the uncertainty introduced by the imputation process. Each imputed dataset contains plausible estimates of the missing values for the "HOMEPOS" and "ST_COGN" indicators. Combining the values generated in these datasets, we imputed the missing values for the indicators used in the regression analysis.

2.7 Data analysis

To analyze the collected data, we first estimated weighted means, frequency tables and confidence intervals for the soft-skill indicators. We then performed the same descriptive analysis for the contextual data at the student and school level. To explore likely impact of factors on soft-skill development, we first explored correlations of various contextual indicators with the BESSI indicators. We also performed regression analysis in order to control for covariation across the contextual variables.

As for the analysis at the school level, we combined the data from the directors' responses with properly aggregated student-level variables, such as SSES composite indicators and the five BESSI domain scores. In particular, for the student-level indicators, such as the BESSI scores per school, we calculated mean BESSI scores of every school, weighted by the student sample weights.

In the econometric analysis, we examined the relationship between the BESSI scores and various contextual indicators at the student and school level, controlling for key demographic characteristics of the students. The analysis was performed on all students and separately on specific subgroups depending on the students' gender and the type of school.

We estimated two separate models, focusing in turn on the student and school characteristics. The dependent variables in both models are the BESSI domain scores. The explanatory variables for Model 1 are the composite indicators from the student contextual survey, while in Model 2 we used the school variables from director survey as explanatory variables. We also included key student demographics (such as Gender, Grade, School Region, School Type) as control variables in both models.

To perform the regression analysis, we followed a two-step procedure for both model 1 and 2, adjusting for student weights and the heterogeneity of the error term, clustered at the school level. First, we ran a Least Absolute Shrinkage and Selection Operator (LASSO) procedure for a more robust process of selecting the final set of explanatory variables. The

LASSO technique was proposed by Tibshirani (1996), while in the context of student surveys it was recently used by OECD in the report summarizing the findings from the SSES (OECD, 2021). The LASSO procedure is used to discard redundant variables in models that could potentially suffer from high levels of multicollinearity from the inclusion of a large number of potentially highly correlated variables.

Instead of eliminating variables with statistically insignificant coefficients in an iterative and somewhat arbitrary way, the LASSO technique eliminates variables in an iterative process that includes the following steps. It first estimates a linear regression. It then introduced penalty terms based on the absolute values of the derived coefficients. The third step is to minimize an objective function that includes the residual sum of squared errors and a sum of the penalty terms, which correspond to the absolute values of the coefficients multiplied by a tuning parameter λ (L1 regularization). The minimization can shrink some coefficients to zero, effectively eliminating the corresponding variables from the model.

The set of contextual indicators that were included at the start of the LASSO procedure for Model 1 included Wellbeing, Test anxiety, Bullying, School belonging, Student- teacher relations Student- parents' relations, Student- friends' relations, Highest level of parental occupation, Highest level of Parental education, Household possessions, Short cognitive ability test and Global Awareness. Correspondingly, the school characteristics included at the start of the LASSO procedure in Model 2 were average class size, obstacles to the learning process, digital infrastructure, property value of school unit (€'000/m^2 according to 2021), share of foreign students, share of female students, shares of students entering tertiary education, students per teacher, share of teachers with postgraduate studies, afternoon activities, career advice to students, share of students with special needs, share of students from families with socioeconomic difficulties, teachers training soft-skills inside and outside school.

Box 2.1: Estimated regression models

Model 1:

$$y_i = \beta_0 + \sum_{j=1}^{n} \beta_{ij} * x_{ij} + \sum_{j=n+1}^{k} \beta_{ij} * ST_{ij} + e_i$$

where y_i are the BESSI domain scores, $x_{i1} \dots x_{in}$ are the demographic variables and $ST_{i1} \dots ST_{in}$ are the OECD indices obtained and constructed by students' survey.

Model 2:

$$y_i = \beta_0 + \sum_{j=1}^{n} \beta_{ij} * x_{ij} + \sum_{j=n+1}^{z} \beta_{ij} * SC_{ij} + e_i$$

where y_i are the BESSI domain scores, $x_{i1} \dots x_{in}$ are the demographic variables and $SC_{i1} \dots SC_{in}$ are the schools' characteristics obtained and constructed by students' and directors' survey.

The control variables (Gender, Grade and School Type) were excluded from the selection process so that they are always part of the final model. This was achieved by assigning 0 penalty value in the LASSO algorithm to make sure that they are always selected. Despite the imputation of blank values as mentioned in the previous chapter (2.6.6), there are still some missing values, which were excluded - the analysis was performed only on complete cases.

The selection of the final set of variables is sensitive to the size of the tuning parameter λ. To overcome this issue, we ran 100-fold cross-validation, obtained the λ that minimizes the resulting mean square error and used the optimal λ to select the final model.

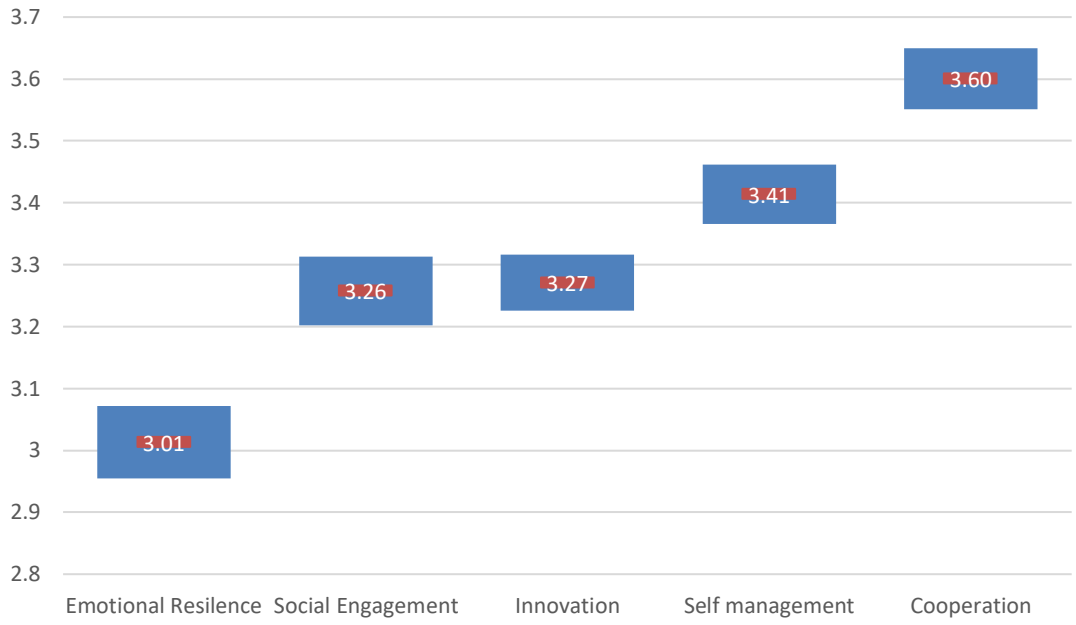
As a final step, we estimated a weighted generalized linear model, using the subset of variables selected by LASSO regression. In this step, we clustered the error terms on the School ID variable, taking fully into account the school survey structure of our data and obtain robust standard error estimates. The resulting coefficients are discussed below and presented in full in the Appendix.

3. SOFT-SKILL LEVELS IN SECONDARY EDUCATION SCHOOLS IN GREECE

3.1 Overview

Among the five BESSI domains, the students from the high-school sample in Greece scored highest in terms of Cooperation (3.60 units on average), followed by Self-Management (3.41). Innovation and Social Engagement came next, with a similar mean score (3.27 and 3.26), yet the dispersion of the answers on Social Engagement was wider, as shown by the 95% confidence interval of the mean estimate (Figure 3.1). Emotional Resilience came last, with 3.01 on average. The difference in the means across the BESSI domains are all statistically significant, with the exception of the Innovation and Social Engagement pair.

Figure 3.1: BESSI domain scores, total sample, weighted means and 95% confidence interval



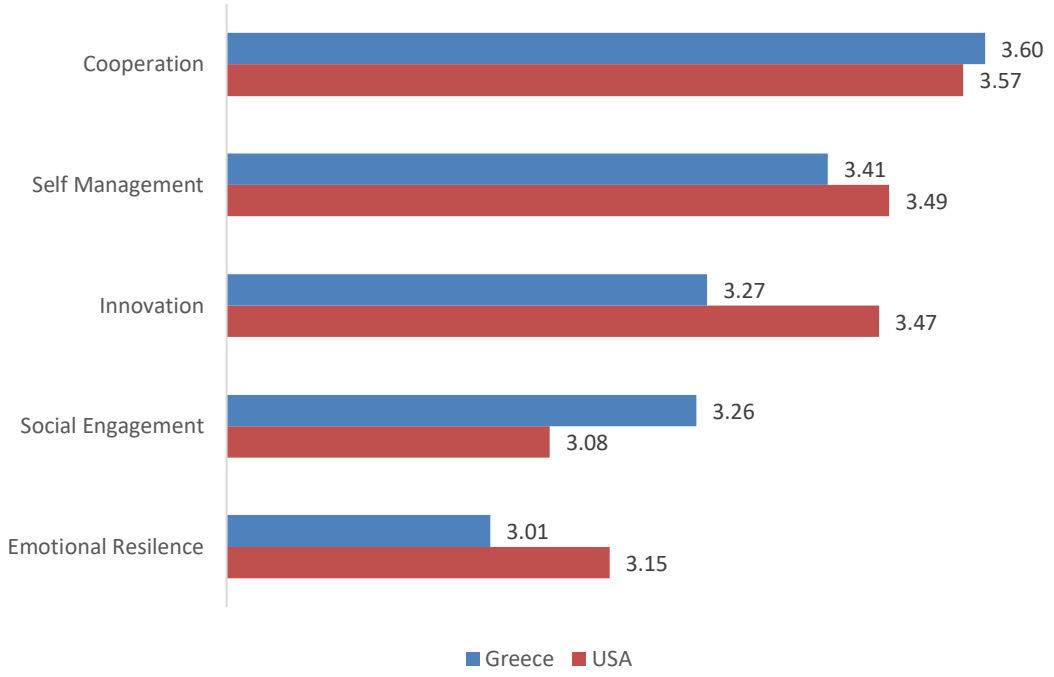
Source: Student survey

Compared to a sample of US high-school peers (Soto et al., 2022), the students in Greece reported significantly higher Social Engagement skills (3.26 against 3.08) and somewhat higher Cooperation skills (3.60 against 3.57). By contrast, they scored significantly lower in term of Innovation skills (3.27 against 3.47) and Emotional Resilience (3.01 against 3.15). In Self-Management skills, the Greek students also reported a lower score on average than their US peers, but the difference was less pronounced (3.41 against 3.49).

At the facet level (Figure 3.3), the highest ranking of soft skills in the Greek sample was obtained on average by Perspective-Taking and Capacity for Social Warmth, with 3.78 each, followed by Teamwork and Capacity for Independence (3.69 each). At the other end of the scale, the lowest ranked skills were Artistic Skill (2.57), Stress Regulation (2.61) and Anger Management (2.76). Compared to their US peers, the high-school students in Greece scored considerably higher in Conversation Skill (3.42 against 3.11), Adaptability (3.55 against 3.32) and Expressive Skill (3.01 against 2.80). By contrast, the largest negative difference in the BESSI

facet means between the Greek and the US high-school sample was observed in Artistic Skill (2.57 in Greece against 3.11 in the US), Anger Management (2.76 against 3.18), Stress Regulation (2.61 against 2.88) and Organization Skill (3.34 against 3.57).

Figure 3.2: Weighted means for BESSI domain scores, comparison with US high-school sample



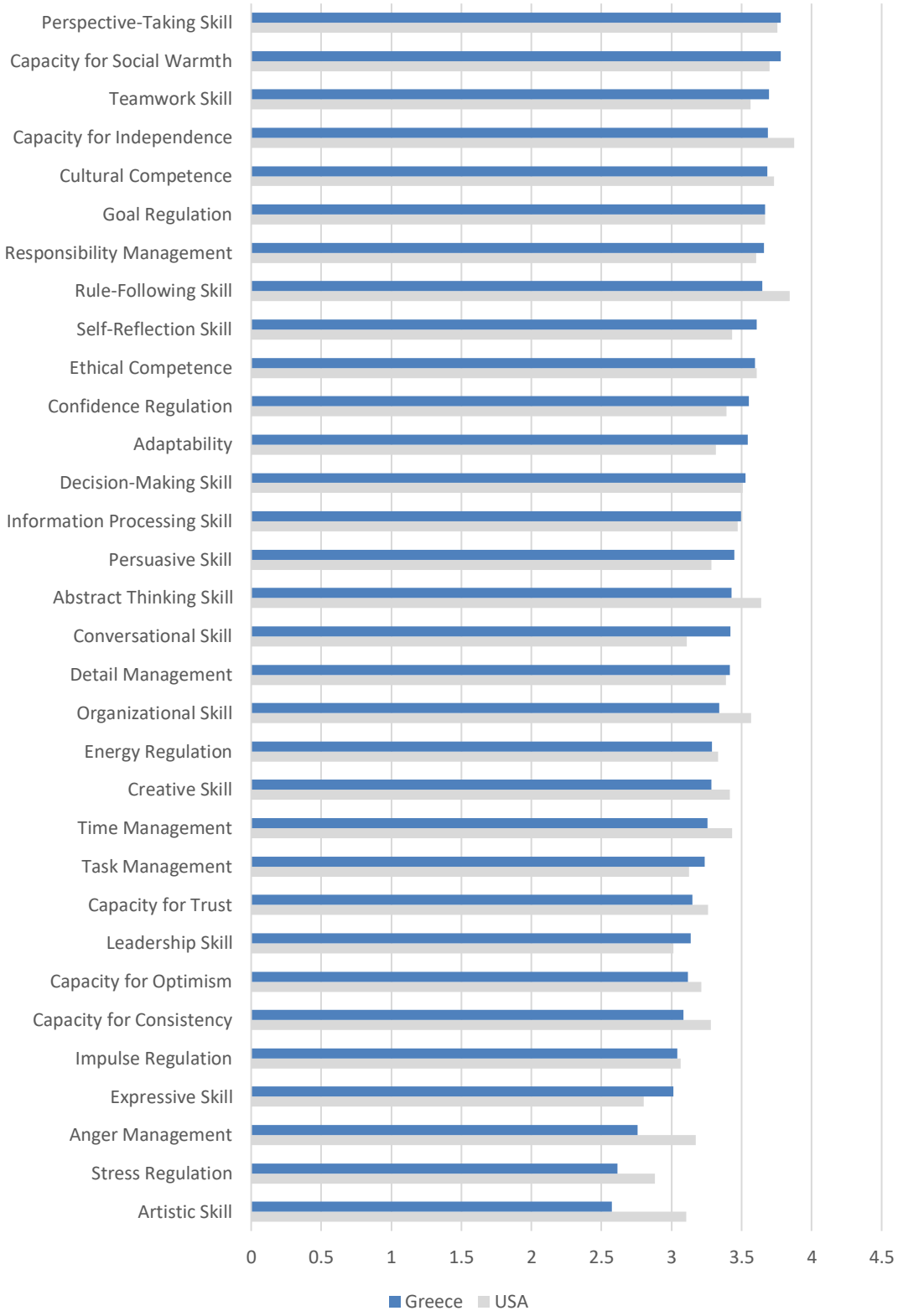
Source: Student survey and Soto et al (2022)

It is interesting to note that the comparison between the two samples aligns with commonly held perceptions on Greek and more broadly Mediterranean culture and social behavior as more extrovert, expressive and conversational and less organized compared to the rest of Europe. It also provides some indications on lags in providing courses that stimulate artistic skills and innovative thinking in Greek high schools (and probably lower secondary schools as well), which tend to specialize away from the Arts relatively early on the education path. Lastly, there are some indications that the emphasis on tertiary education and the preparations for exam-based entry makes the Greek high-school students feel less able to regulate their stress and anger.

3.2 Cooperation

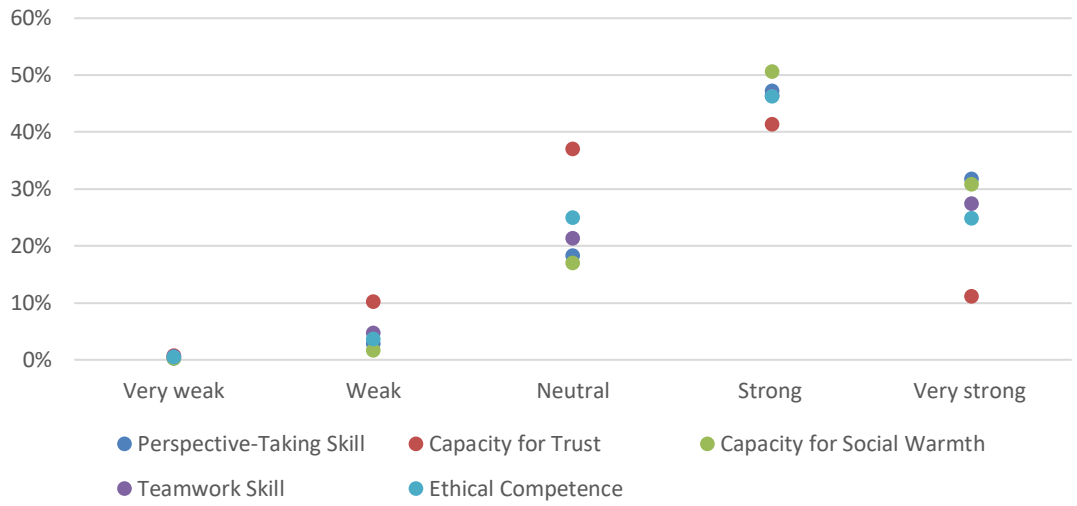
Digging deeper in how the soft-skills scores differ across the student sample and looking first into the Cooperation skills domain, we observe that the Capacity for Trust collected significantly more responses in the Neutral (37.0%) and Very strong and Strong bands, compared to the remaining facets in this domain (Figure 3.4). Ethical competence also collected relatively more Neutral and relatively fewer Strong and Very strong responses. By contrast, Capacity for Social Warmth had the highest share of Strong responses, with Perspective-Taking Skill taking the lead in the Very strong band.

Figure 3.3: Weighted means for BESSI facets, comparison with US high-school sample



Source: Student survey and Soto et al (2022)

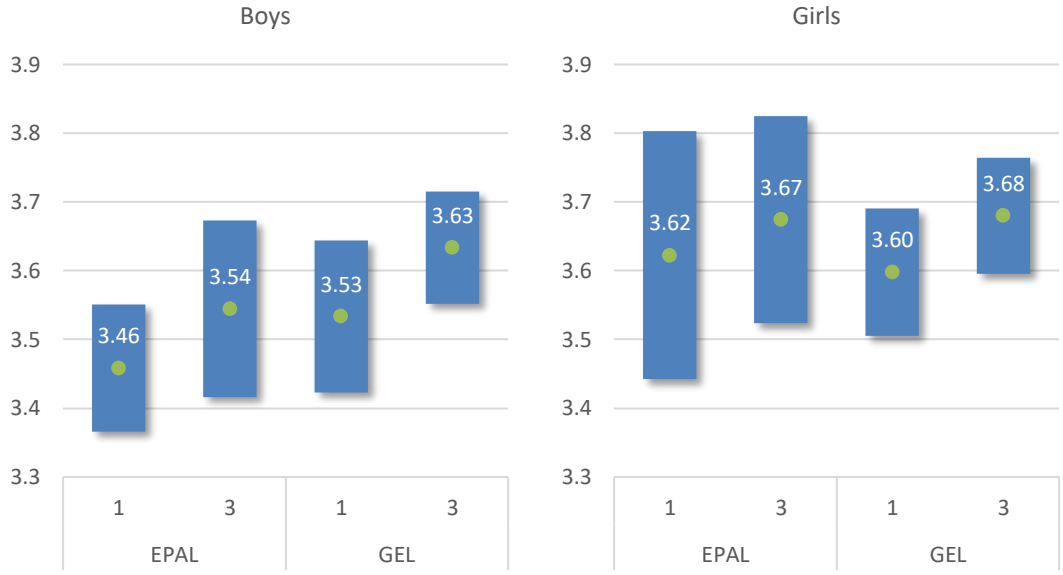
Figure 3.4: Cooperation skills, mean frequency of responses per facet



Source: Student survey

Comparing the domain scores across grades, school types and genders, the average scores tend to be higher for third-grade then first-grade students across both GEL and EPAL schools for both girls and boys (Figure 3.5). Given the variability of responses, however, the difference in the means between the two grades are not statistically significant (Table 7.1 in the Appendix). Overall, girls tend to score higher than boys in this domain. Regarding the school type, the average is notably higher for GEL schools among the male sample, while among the female sample the first-grade GEL students score marginally lower than the first-grade EPAL students with the reverse being true for the third-grade GEL and EPAL female students.

Figure 3.5: Cooperation skills score by school type and grade, weighted means and 95% confidence intervals



Source: Student survey

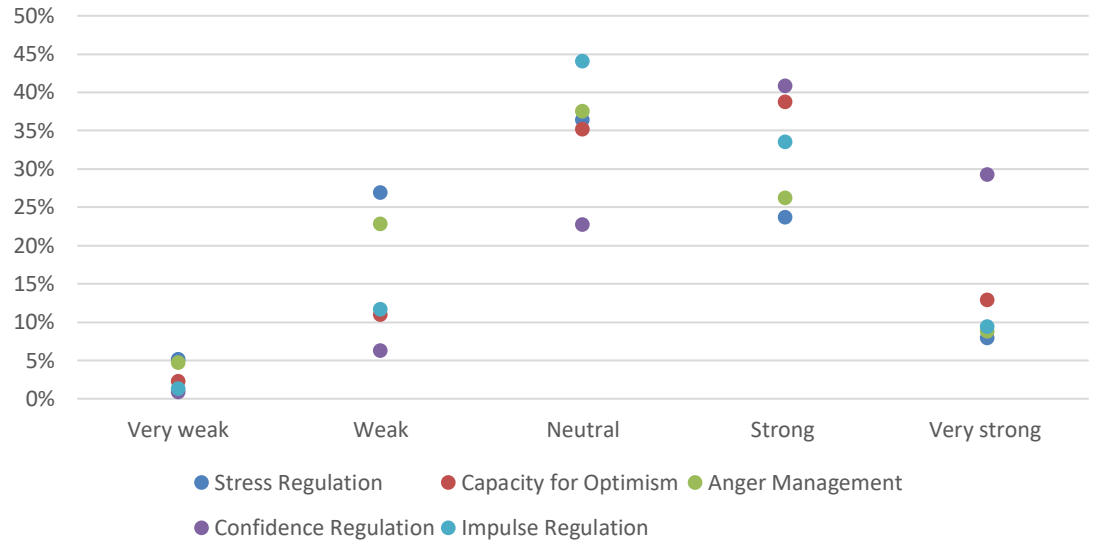
Controlling for the influence of various demographic and other factors, examined together in a multivariate regression (Table 7.5 in the Appendix), grade three students appear to score higher than their grade first counterparts in statistically significant way, at the 1% significance level in the total sample and among boys studying in GEL schools and at the 5% level among boys studying in GEL schools. The association of grade and Cooperation skills is not statistically significant in EPAL schools and among girls studying in GEL schools.

Regarding other demographic characteristics, being a boy is associated with having a lower average score for Cooperation in a statistically significant way. The school type as such does not appear to have a statistically significant association with Cooperation skills in the total sample. Lastly, studying in Thessaloniki has a positive association with Cooperation skills at the 5% significance level among girls studying in EPAL schools.

3.3 Emotional Resilience

In the Emotional Resilience domain (Figure 3.6), Stress Regulation and Anger Management concentrate disproportionately high percentage of Weak responses (26.9% and 22.8% respectively) and significantly lower Strong responses (23.7% and 26.2%). By contrast, Confidence Regulation received much higher share of Very Strong responses (29.3%), compared to the remaining facets in this domain. Capacity of Optimism also received elevated Very Strong (12.9%) and Strong (38.8%) responses. Lastly, Impulse Regulation came on top in terms of the share of Neutral responses (44.1%).

Figure 3.6: Emotional Resilience skills, mean frequency of responses per facet



Source: Student survey

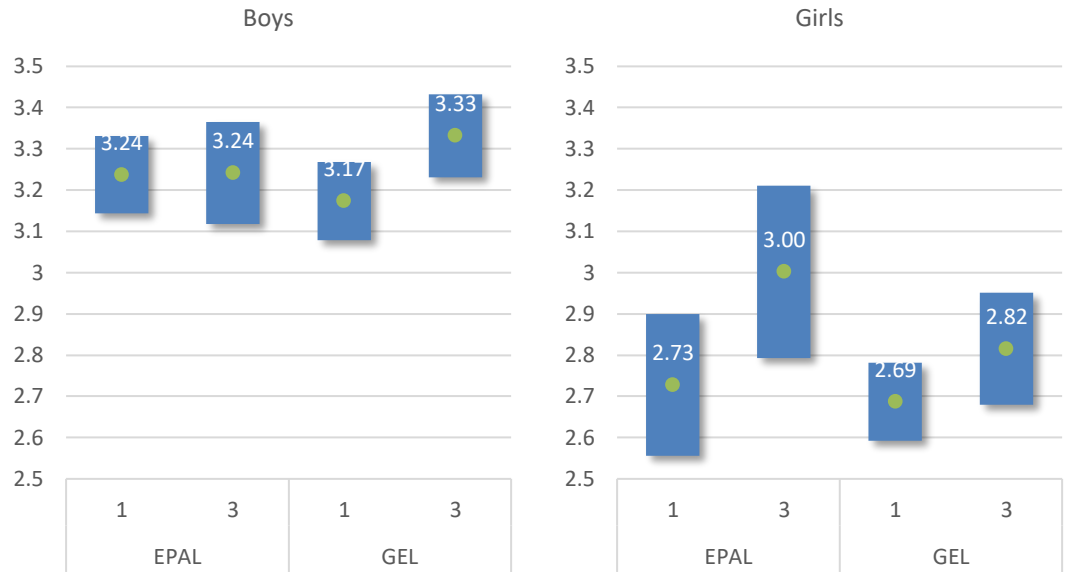
Comparing the domain scores among various subsamples, the average Emotional Resilience scores are notably higher and less variant among boys than among girls (Figure 3.7). The mean scores for the third graders are higher compared to their first-grade counterparts within all examined subsamples. The largest difference is recorded among EPAL girls (3.00 in grade 3 against 2.73 in grade 1) and the lowest among EPAL boys (only 0.004 units). Meanwhile, the

difference in the score means is statistically significant only in GEL schools, at the 5% level among the male students (3.33 against 3.17) and the 10% level among the female students (2.82 against 2.69).

The multiple regression setup largely confirmed the above associations (Table 7.4 in the Appendix). The coefficient on the grade 3 variable is positive in the total sample and across all four subsamples. It is statistically significant at the 1% level in the total sample and among GEL boys and at the 5% level among GEL girls, while it is not statistically significant in the two EPAL subsamples.

Regarding the other demographic variables, the coefficient on being male is positive and statistically significant (at the 1% level), the school type does not appear to have any influence, while the students in Thessaloniki appear to report lower Emotional Resilience in a statistically significant way in the total sample and in the GEL subsamples, while the EPAL boys in Thessaloniki report higher Emotional Resilience than their peers in Attica in a statistically significant way (at the 5% level).

Figure 3.7: Emotional Resilience score by school type and grade, weighted means and 95% confidence intervals

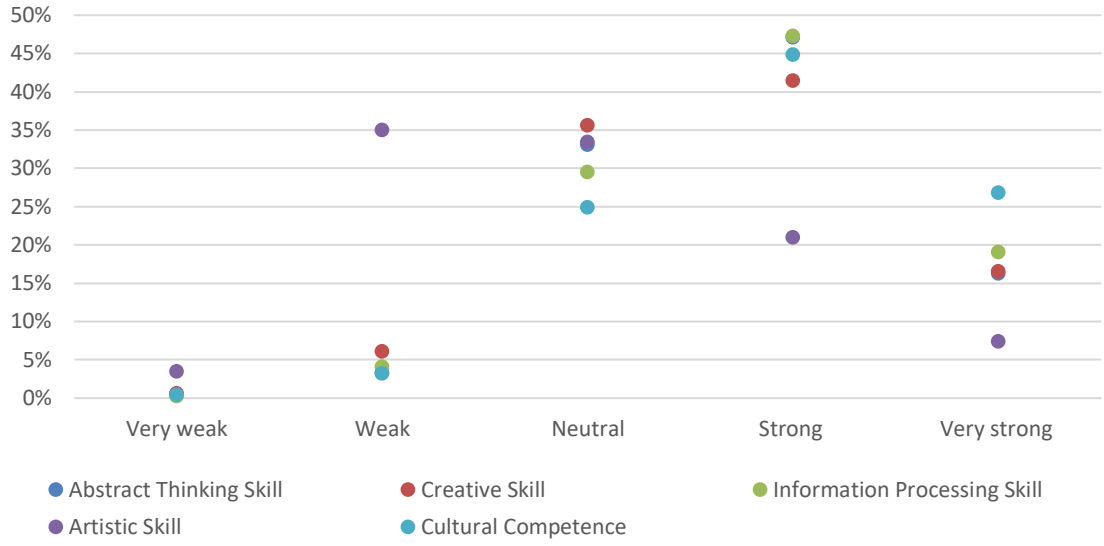


Source: Student survey

3.4 Innovation skills

In the Innovation skills domain, Artistic Skill is the facet that stands out (Figure 3.8). Compared to the other facets, it has vastly more Weak responses (34.9% against 6.1% for the Creative Skill) and substantially fewer Strong (20.9%) and Very Strong (7.4%) responses. By contrast, Cultural Competence collects most Very Strong responses (26.7%) and the fewest Neutral responses (24.9%). Information Processing and Abstract Thinking skills collect most Strong responses (about 47.2% in each facet).

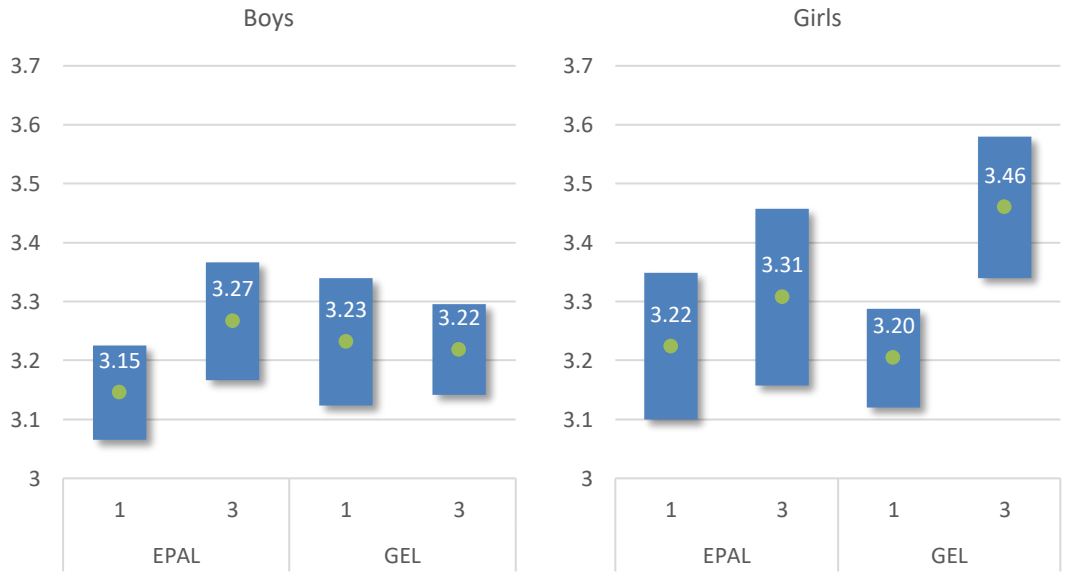
Figure 3.8: Innovation skills, mean frequency of responses per facet



Source: Student survey

Comparing the domain scores across the subsamples of main interest (Figure 3.9), grade 3 students have higher scores on average than grade 1 students across all groups, except for male GEL students, where the difference is marginally negative (3.22 for grade 3 against 3.23 for grade 1) and statistically insignificant. The difference in the mean scores is largest and statistically significant at the 1% level among girls studying in GEL schools (3.46 against 3.20). Next come the boys studying in EPAL schools (3.27 against 3.15, statistically significant at the 10% level) and the girls studying in EPAL schools (3.31 against 3.22, not statistically significant).

Figure 3.9: Innovation skills score by school type and grade, weighted means and 95% confidence intervals



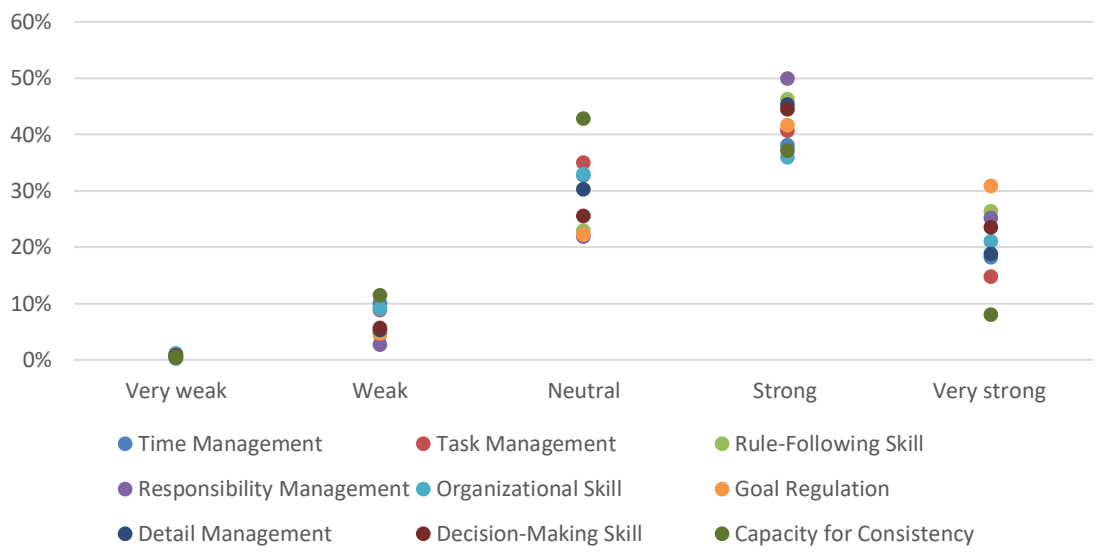
Source: Student survey

Controlling for the covariation of these and other factors in a multiple regression setup (Table 7.3 in the Appendix), the coefficient on the grade 3 variable is positive throughout, statistically significant in the total sample (at the 1% level), among GEL girls (at the 1% level) and EPAL boys (at the 10% level). Studying in a GEL school is negatively associated with Innovation Skills (at the 1% level of statistical significance), while being male has a negative coefficient that is not statistically significant. The region variable for Thessaloniki is not picked through the LASSO procedure across most samples, except for EPAL girls, where it appears with a positive and statistically significant coefficient (at the 10% level).

3.5 Self-Management

Self-Management is the domain that concentrates the largest number of facets. In the Very Strong band, the facet that has the highest mean frequency of responses is Goal Regulation with 30.9%, followed by Rule Following (26.3%) and Responsibility Management (25.2%). At the other end of the scale, the lowest mean frequency was recorded by Capacity for Consistency (8.1%). Responsibility Management appears high in the Strong band of responses (49.9%), while the Capacity for Consistency stands out in the Neutral band, with 42.8%.

Figure 3.10: Self-management skills, mean frequency of responses per facet



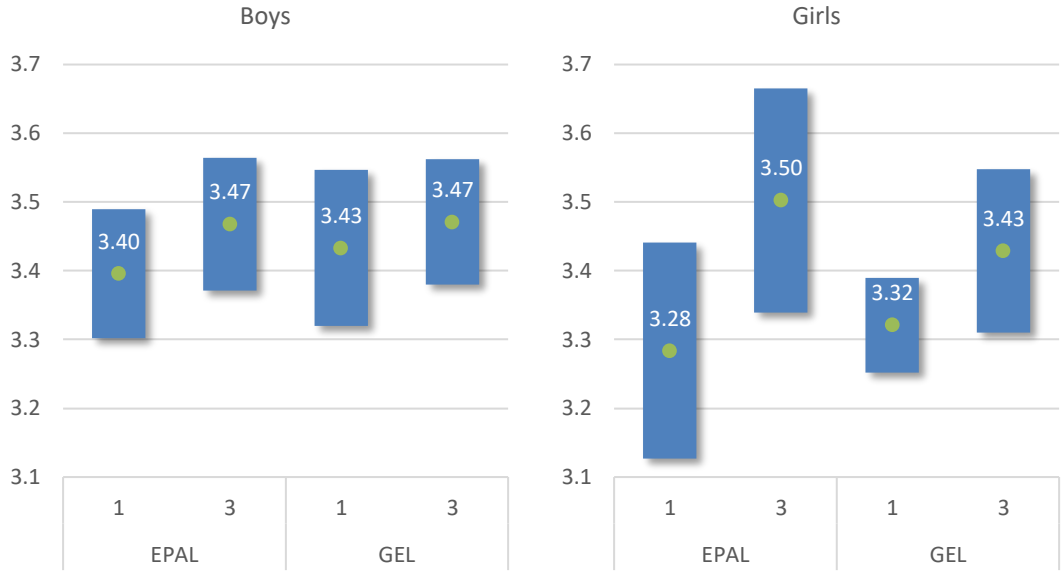
Source: Student survey

Across the main subsamples of interest, grade 3 students report higher Self-Management scores on average than their grade 1 peers. The largest difference is recorded among EPAL girls (3.50 in grade 3 against 3.28 in grade 1), while the difference is least pronounced among boys studying in GEL schools (3.47 against 3.43). The difference in the mean scores across the two grades is statistically significant only among the girls studying in EPAL schools (Table 7.1 in the Appendix).

In a multiple regression setup (Table 7.2), the coefficient of the grade 3 variable is positive yet statistically insignificant across the four subsamples and is statistically significant only at the 10% level in the total sample. In the Self-Management domain, neither the school type nor

the gender of the students appears to have any noteworthy association with the score. Regarding regional differences, EPAL girls studying in Thessaloniki do appear to report higher Self-Management scores on average than their peers studying in Athens (at the 5% significance level).

Figure 3.11: Self-Management skills score by school type and grade, weighted means and 95% confidence intervals



Source: Student survey

3.6 Social Engagement

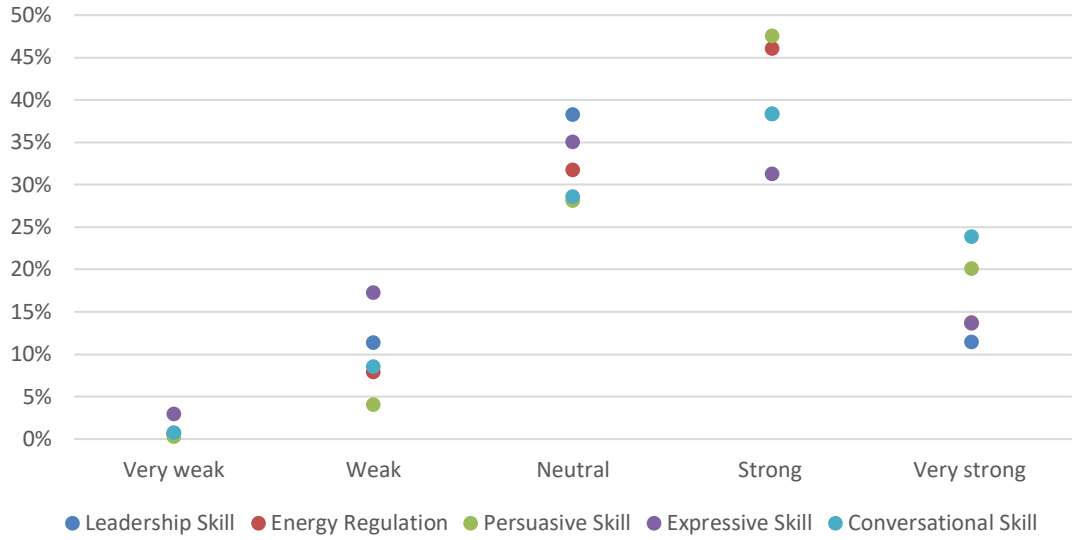
In the Social Engagement domain, the Conversation skill concentrates most Very Strong responses (23.9%), followed by the Persuasive skill (20.1%). The latter is the strongest performing facet within the Strong band (47.5%), followed closely by Energy Regulation (46.0%). Leadership skill has most Neutral responses (38.3%). The worse performing facet is the Expressive skill, concentrating the highest share of Weak responses (17.2%) and the lowest share of Strong responses (31.2%).

Examining differences across subsamples at the domain level (Figure 3.13), the mean score is higher for grade 3 students, compared to grade 1 students, among female GEL students (3.24 against 3.15), male EPAL students (3.34 against 3.25) and female EPAL students (3.29 against 3.26). The difference is negative among male GEL students (3.29 against 3.34). Given the variability of the responses, however, none of the mean differences is statistically significant (Table 7.1).

Controlling for covariation across these and other variables, however, some statistically significant associations do emerge (Table 7.6). In particular, the grade 3 variable is positive and statistically significant in the total sample (at the 5% level). The coefficient is also positive among GEL students and EPAL boys, without achieving statistical significance. Regarding the other key demographic variables, the male students have a negative yet statistically

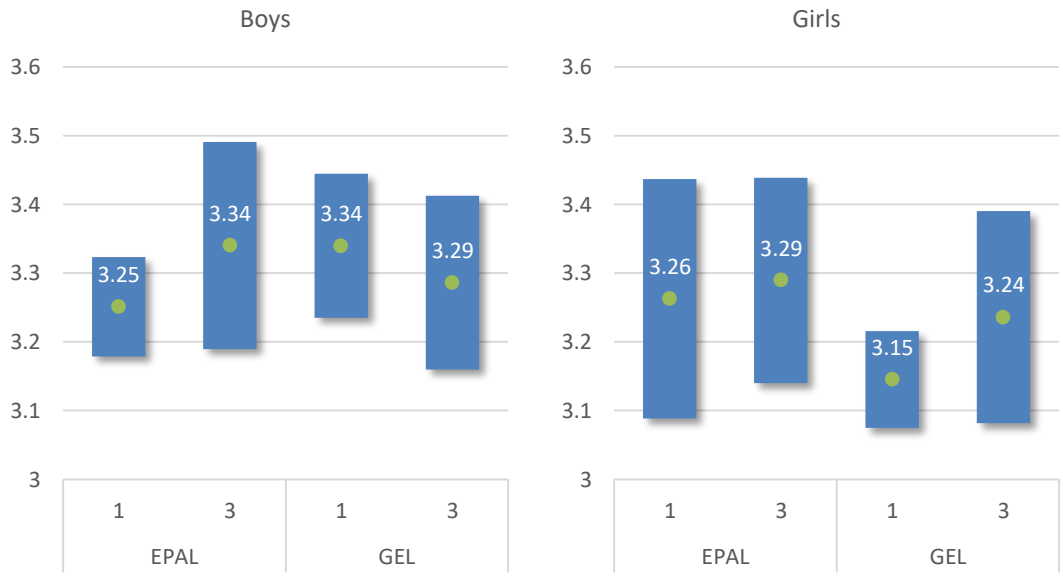
insignificant coefficient, the school type is also not statistically significant, while the Thessaloniki region dummy is positive and statistically significant among the girls in both GEL (at the 5% level) and EPAL schools (at the 1% level).

Figure 3.12: Social Engagement skills, mean frequency of responses per facet



Source: Student survey

Figure 3.13: Social Engagement score by school type and grade, weighted means and 95% confidence intervals



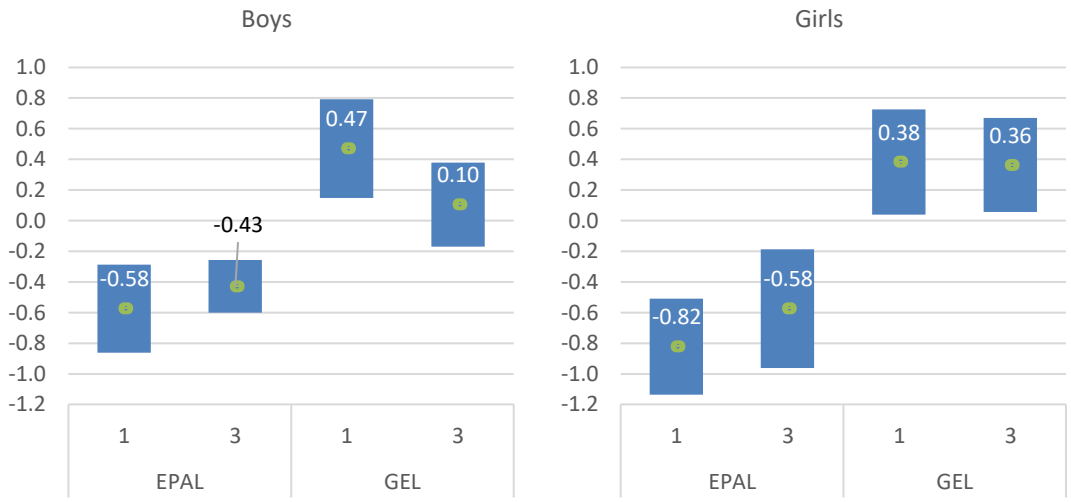
Source: Student survey

4. CONTEXTUAL STUDENT CHARACTERISTICS AND SOFT SKILLS

4.1 Socioeconomic status

The economic, social, and cultural status (ESCS) indicator combines data on household possessions, parental education, and parental occupation. For EPAL schools, the mean values of the ESCS indicator range across grades 1 and 3 from -0.58 to -0.43 for boys and from -0.82 to -0.58 for girls. For GEL schools, the mean values for boys range from 0.10 to 0.47, and for girls, they range from 0.36 to 0.38 across grades 1 and 3. These differences indicate that, on average, students in GEL schools tend to have a higher socioeconomic status compared to those in EPAL schools, regardless of gender or grade.

Figure 4.17: Socioeconomic status score by school type and grade, weighted means and 95% confidence intervals



Source: Student survey

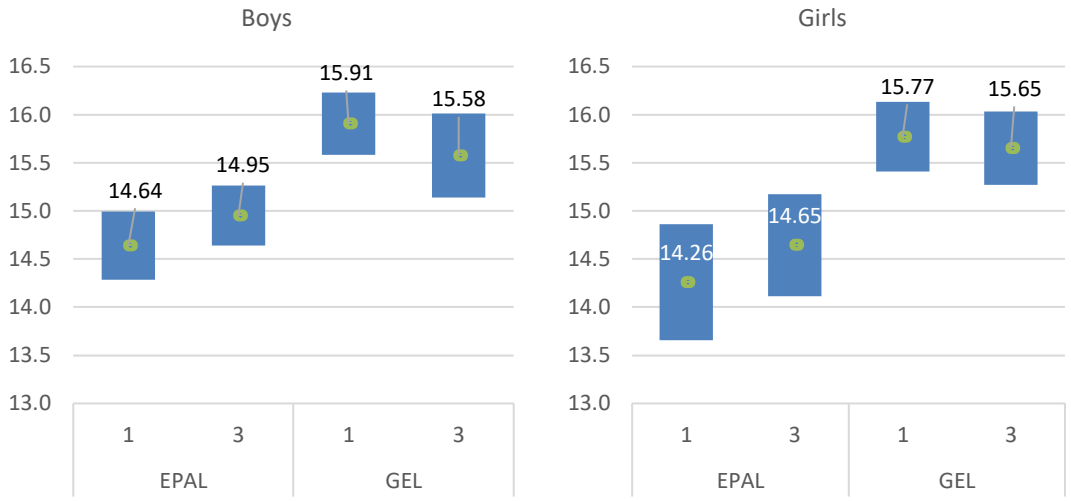
4.1.1 PARENTAL EDUCATION

Comparing the years of education of parents across grades, school types and genders, the mean tends to be higher for GEL than EPAL students across both grades 1 and 3 for both girls and boys (Figure 4.1). In particular, year 1 boys studying in GEL have on average a parent with 15.9 years of education, compared with 14.6 years on average for their EPAL peers. Similar differences are recorded for year 3 boys (15.6 years in EPAL, 15.0 years in GEL), while the gap appears even larger among the female students - 15.8 against 14.3 years for year 1 girls and 15.7 against 14.7 years for year 3 girls.

The frequency data confirms that there is difference in the distribution of parents' education level between EPAL and GEL schools (Figure 4.2). In EPAL schools, a higher percentage of parents are classified as having attained ISCED 4-5 (52.0%) and ISCED 3 (9.3%). By contrast, in GEL schools a higher percentage of parents are classified as ISCED 6 (64.0%), while the percentages for ISCED 3 (3.8%) and ISCED 4-5 (32.2%) are relatively lower. This suggests that a larger proportion of parents in GEL schools have pursued higher education, reaching a more

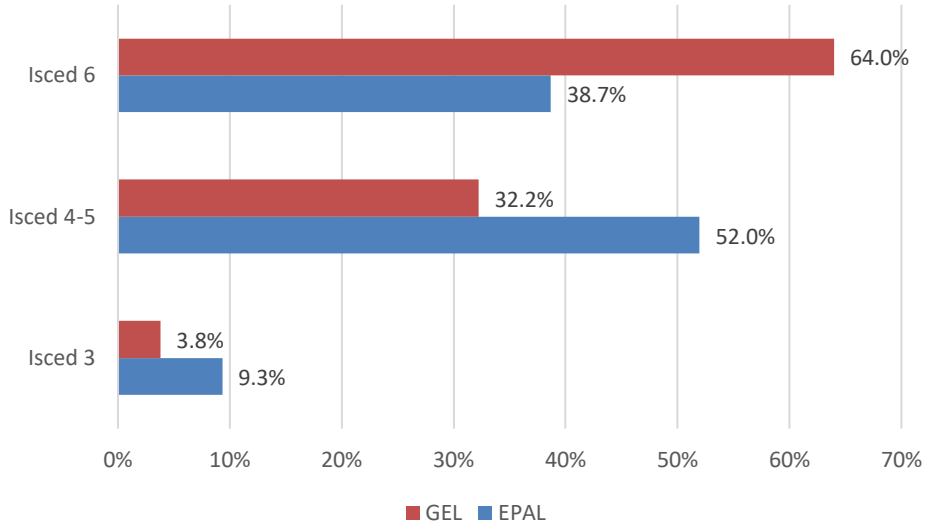
advanced level (University), while a significant proportion of parents in EPAL schools have achieved education levels that correspond to intermediate education levels (High School/Post-secondary non tertiary education or Junior high school).

Figure 4.1: Years of education (highest level) by school type and grade, weighted means and 95% confidence intervals



Source: Student survey. Note: The result corresponds to the parent with the higher number of years of education in the family. The years are calculated from responses on education attainment of parents, assigning 9 years to ISCED 3, 14 years to ISCED 4-5 and 17 years to ISCED 6.

Figure 4.2: Parental education (highest level) by school type, weighted percentages



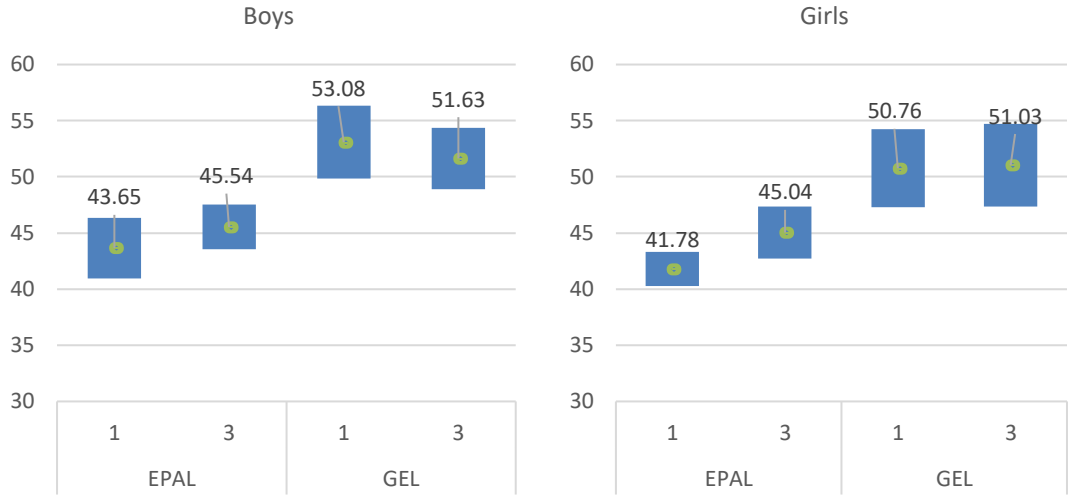
Source: Student survey. Note: Based on the parent with the higher education attainment level in the family.

4.1.2 PARENTAL OCCUPATION

The scores on parental occupation exhibit a similar pattern with those on education. In particular, parents of students attending GEL schools consistently display higher mean values

on the ISEI scale, hovering above 50 points, regardless of student's grade or age (Figure 4.3). By contrast, parents of students enrolled in EPAL schools tend to have lower mean values in the ISEI scale, averaging at around 43 points. This indicates a correlation between parents' occupation and educational outcomes.

Figure 4.3: HISEI score (highest level) by school type and grade, weighted means and 95% confidence intervals



Source: Student survey

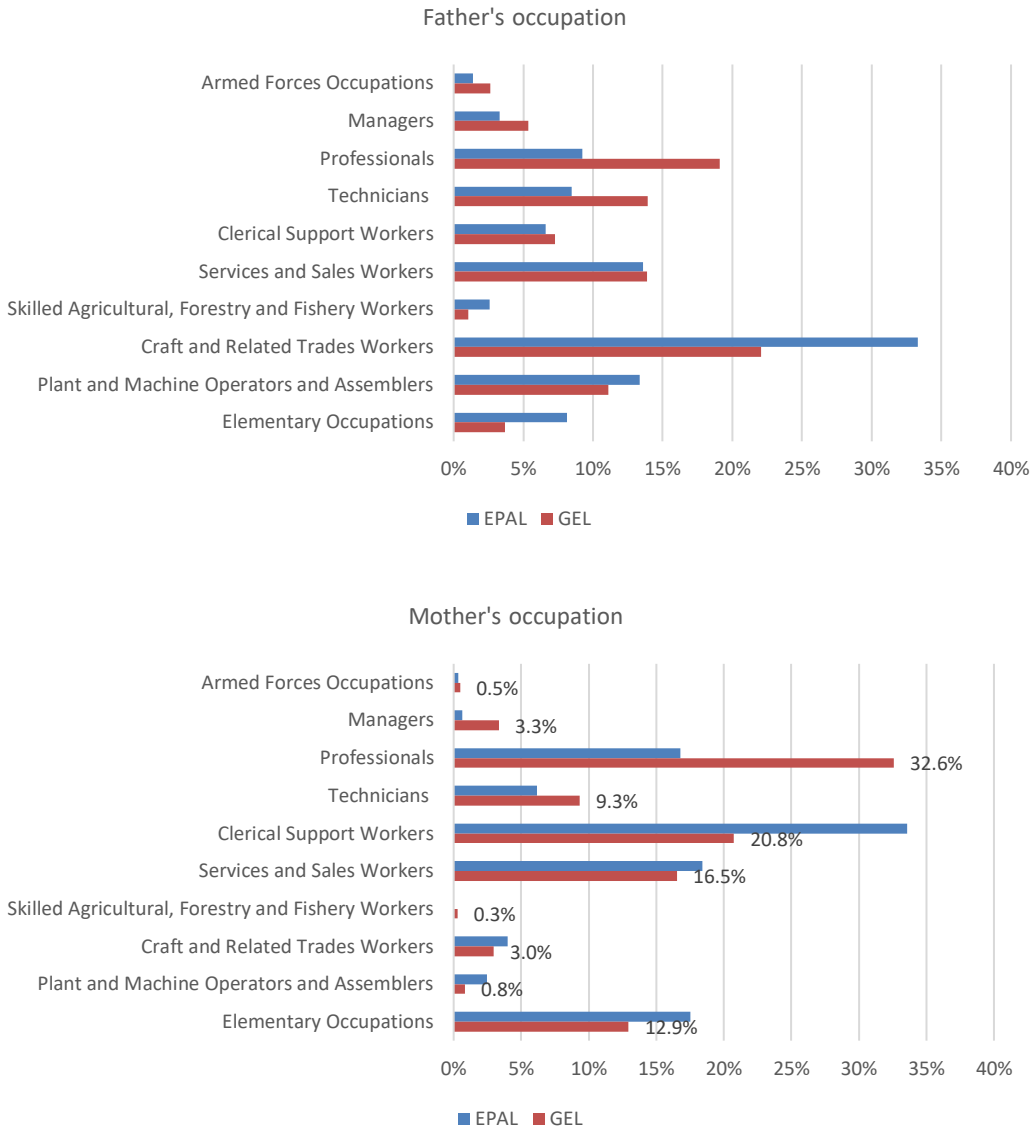
In EPAL schools, the highest percentage of fathers falls under the category of craft and related trades workers, comprising 33.3% of the total (Figure 4.4). This is followed by services and sales workers at 13.6%, professionals at 9.2%, and technicians at 8.5%. In GEL schools, craft and related trades workers come first, but with a significantly lower percentage than in the EPAL schools (22.0%), while professionals come second at 19.1%. Technicians and services and sales workers follow at 13.9% each.

On the mother side, the differences are even more pronounced. In EPAL schools, the highest percentage of mothers falls under the category of clerical support workers, accounting for 33.6% of the students. This is followed by services and sales workers at 18.4%, elementary occupations at 17.5%, and professionals at 16.8%. Conversely, in GEL schools, the highest percentage of mothers are professionals, making up 32.6% of the total. Next, we see clerical support workers at 20.8%, services and sales workers at 16.5%, and elementary occupations at 12.9%.

4.1.3 HOUSEHOLD POSSESSIONS

Notable difference between GEL and EPAL students are also evident in the household possessions (HOMEPOS) indicator, the third pillar of the ESCS index. In particular, students from GEL schools tend to have higher HOMEPOS scores compared to students from EPAL schools, indicating that they typically have a greater number of possessions of wealth items (e.g., cars), educational, and cultural resources (e.g., books) at home.

Figure 4.4: Parental occupation by school type, weighted percentages



Source: Student survey

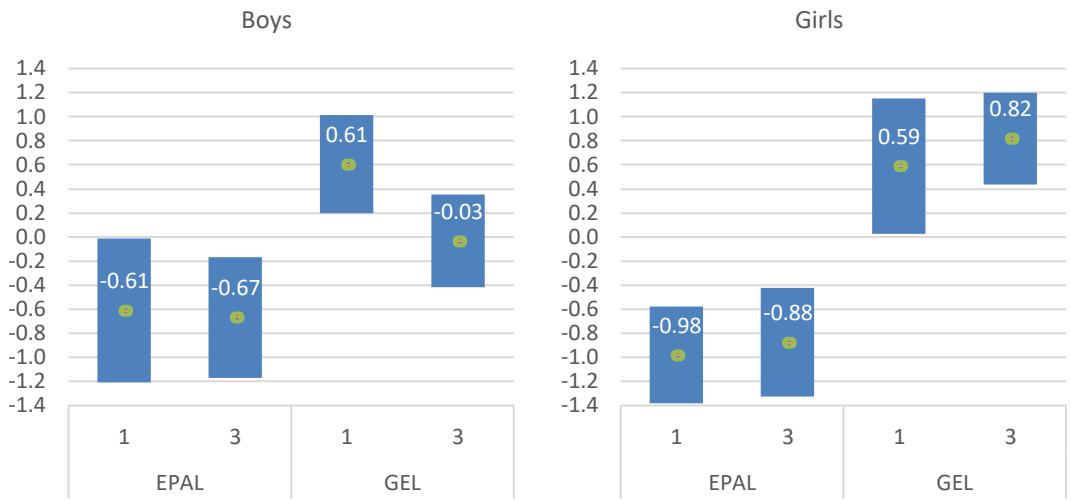
In greater detail, the mean HOMEPOS score for EPAL schools stands at -0.79 while the mean HOMEPOS score for GEL schools is 0.50. The difference is particularly strong among year 1 girls (0.59 against -0.98 points for GEL and EPAL schools), while it is less pronounced but still significant among year 3 boys (-0.03 and -0.67 points respectively - Figure 4.4).

4.1.4 RELATION WITH SOFT SKILLS

Correlating the ESCS indicator with the BESSI domain scores, we observe no significant correlations with student's socioeconomic status in the Cooperation domain. Controlling for the influence of covariates in a multivariate regression setup, from the constituent indicators of the socioeconomic status indicator, the household possessions appear to have a positive and statistically significant association with Cooperation skills in the total sample and among boys studying in GEL schools (Table 7.5 in the Appendix). Lastly, the parental education

indicator is selected as an explanatory variable only among GEL girls, but the coefficient is not statistically significant.

Figure 4.5: Household possessions score by school type and grade, weighted means and 95% confidence intervals



Source: Student survey

In the domain of Emotional Resilience, boys from GEL schools in grade 1 demonstrate a statistically significant positive correlation (0.18) with socioeconomic status, while the same case appears to hold for girls from EPAL in grade 1 (0.30). In the multivariate regression setting (Table 7.4 in the Appendix), household possessions are selected as an explanatory variable only in the total sample, yet the coefficient is not statistically significant. Similarly, parental occupation appears in the model for total sample and for GEL girls, while parental education is present among GEL boys, and this time the coefficient passes the statistical significance test.

In terms of Innovation, positive and statistically significant correlation is observed among boys in grade 1 in both school types and among girls in grade 1 in EPAL. The stronger relation of socioeconomic status and innovation skills is confirmed in the multivariate regression setting, where the household possessions variable yields positive and statistically significant coefficients in the total sample and among GEL girls, GEL boys and EPAL boys (Table 7.3 in the Appendix). Parental occupation appears with a negative but not statistically significant coefficient in the total sample and among EPAL boys. Lastly, parental education appears in the subsamples of EPAL schools for both genders, but its regression coefficient is not statistically significant.

In Self-Management, there is a positive and statistically significant correlation with socioeconomic status among grade 1 GEL students (both boys and girls). The home possessions indicator has a positive and statistically significant regression coefficient in the total sample and a statistically insignificant regression coefficient among GEL girls, while it does not appear in the model for the other sub samples (Table 7.2 in the Appendix). The parental occupation indicator has a positive and statistically insignificant coefficient among

EPAL girls. The parental education indicator appears as negative and insignificant only in EPAL girls.

Lastly, in terms of Social Engagement, the girls from GEL schools exhibit a statistically significant positive correlation with the socioeconomic status indicator in both grades (grade 1: 0.18, grade 3: 0.22). In multivariate regression setting, the home possessions indicator has a positive and statistically significant coefficient in the total sample (at 10% significance level) and a positive but not significant coefficient among EPAL boys. Parental occupation appears to have a positive but not statistically significant association with Social Engagement among GEL girls and EPAL girls and also in the total sample. Parental education is not selected in any of the parsimonious models.

Table 4.1: Correlations between Socioeconomic status and BESSI domains

BESSI domain	Gender	GEL		EPAL	
		Grade 1	Grade 3	Grade 1	Grade 3
Cooperation	Boys	0.1	0.09	0.02	-0.06
	Girls	0.16	0.06	0.05	-0.13
Emotional Resilience	Boys	0.18*	-0.02	0.06	-0.12
	Girls	0.08	0.15	0.3*	-0.05
Innovation	Boys	0.23*	0.07	0.2*	0.02
	Girls	0.17*	0.04	0.15	0.16
Self-Management	Boys	0.14*	-0.06	0.01	-0.08
	Girls	0.18*	0.15	0.13	-0.1
Social Engagement	Boys	0.04	-0.07	0.12	0.01
	Girls	0.18*	0.22*	0.06	-0.07

* Statistically significant correlation at the 5% significance level

4.2 Aspirations

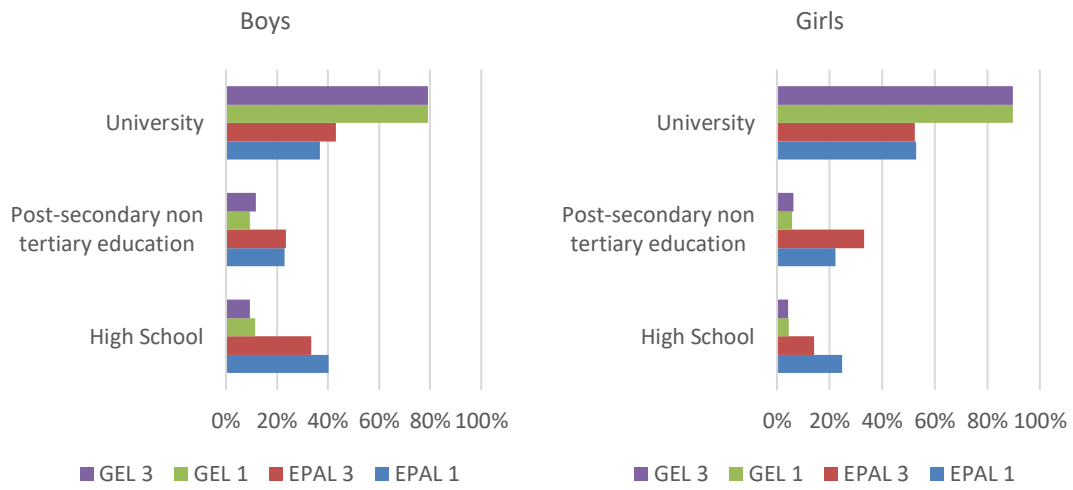
4.2.1 EDUCATIONAL EXPECTATIONS

Educational expectations vary strongly across school types. Students attending GEL schools consistently demonstrate higher percentages of students aspiring to pursue university education (Figure 4.6). Furthermore, it is worth noting that there is a noticeable progression in expectations between different grade levels. While some students in grade 1 express lower expectations for higher education beyond high school, there is a notable shift in grade 3, where more students express a desire to at least complete post-secondary education.

Noticeable differences also emerge when comparing girls with boys. In terms of university aspirations, approximately 89% of the girls in GEL schools express their desire to pursue higher education, whereas boys demonstrate a slightly lower percentage at 79%, regardless of the

grade level. Similarly, in EPAL schools, around 53% of the girls aspire to enter university, while only about 40% of boys share the same goal (37% in grade 1 and 43% in grade 3). This disparity suggests that girls are more likely to have academic ambitions beyond high school, while boys exhibit a relatively lower percentage of university aspirations.

Figure 4.6: Student's education expectations by school type and grade, weighted percentages



Source: Student survey

4.2.2 OCCUPATIONAL EXPECTATIONS

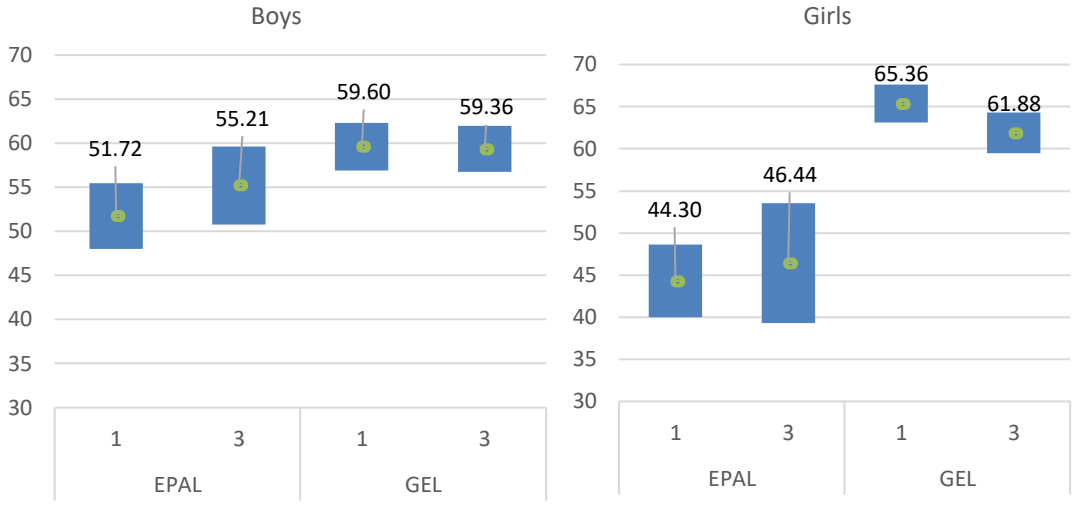
Students from GEL schools tend to have higher mean ISEI values, indicating a greater ambition towards occupations with higher socio-economic status. This observation holds true for both male and female students, but the difference is particularly stark among the female students. In particular, the girls attending GEL schools have a mean value of 65.3 and 61.9 in year 1 and 3 respectively, while the girls from EPAL schools have a mean value of 44.3 and 46.4 points in the two grade respectively. The differences among boys are not as pronounced as those observed among the female students. Therefore, gender seems to play a role in the differences observed, with the girls displaying more noticeable variations.

The students' grade levels also seem to play a role. The data shows that students in EPAL in grade 1 generally have lower mean ISEI values compared to those in grade 3. This implies that as students progress in their education, their expectations for occupations with higher ISEI increase. The opposite holds in GEL schools, where the occupation aspirations seem to fall from year 1 to year 3. As a result, the occupation aspirations gap between EPAL and GEL schools seems to diminish between year 1 and year, without disappearing entirely.

In terms of particular occupation categories, the girls in EPAL schools display a higher percentage of aspirations to work as Services and Sales Workers (43.1%) and as Professionals (37.6% - Figure 4.8). By contrast, their male peers in EPAL schools hold stronger preferences for becoming Professionals (41.4%) and Technicians (15.5%).

The gender differences are also pronounced in the GEL schools. The female students in GEL schools exhibit significantly higher share of aspirations in Professionals (71.9%) compared to males, where the share of aspiring professionals is limited to about half the sample, while the percentages are elevated for Services and Sales Workers (16.9%) and Technicians (15.5%).

Figure 4.7: Anticipated ISEI score of students by school type and grade, weighted means and 95% confidence intervals



Source: Student survey

There is also a clear difference in occupational preferences between EPAL and GEL schools. GEL schools, irrespective of gender, tend to have higher percentages in categories such as Professionals and Managers, indicating a stronger inclination towards occupations associated with higher socio-economic status. By contrast, EPAL schools show higher percentages in categories such as Technicians and Craft and Related Trades Workers.

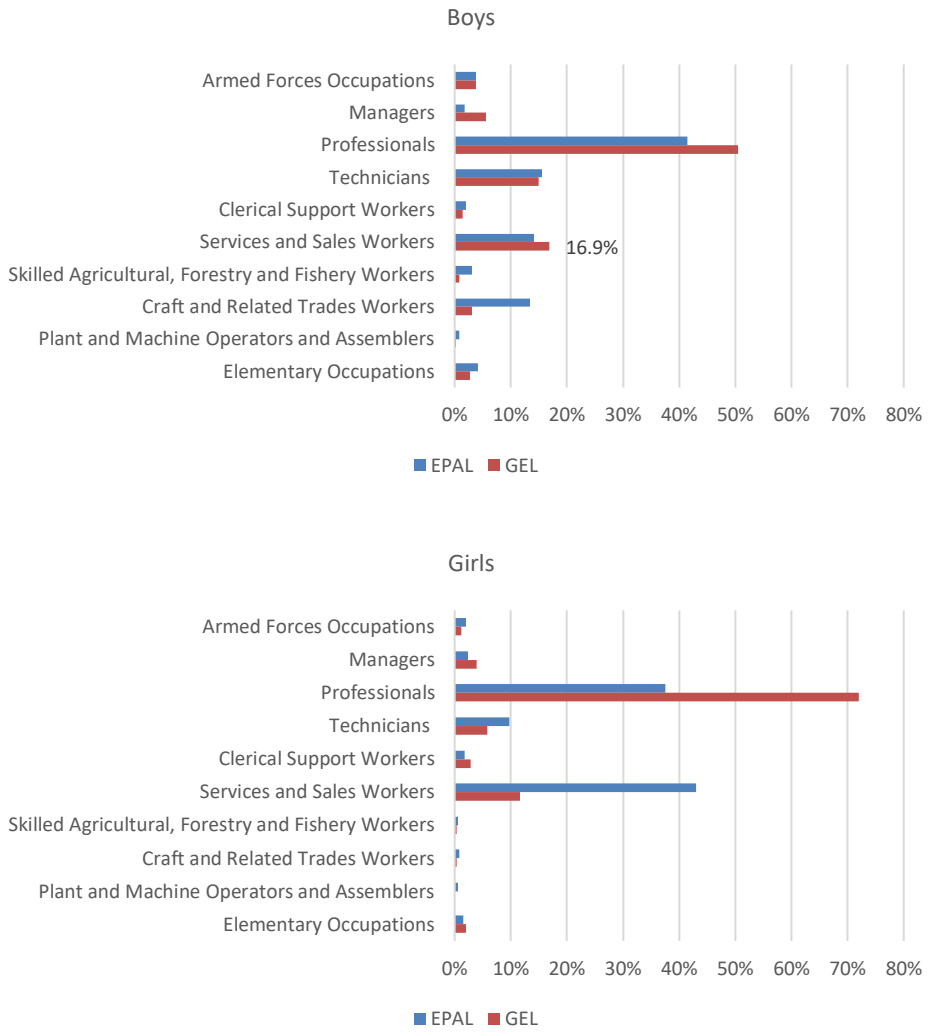
4.3 Psychological wellbeing

There are notable differences in the psychological wellbeing between boys and girls, as well as variations based on the school type (EPAL and GEL) and grade level (1 and 3). In the EPAL schools, boys tend to have higher mean wellbeing scores compared to girls across both grade levels. In grade 1, the boys in EPAL schools have a mean score of 0.50, while girls have a lower mean score of -0.19. Similarly, in grade 3, boys in EPAL schools have a mean score of 0.37, while girls have a lower mean score of -0.15.

A similar pattern appears in the GEL schools, where the boys also tend to have higher mean wellbeing scores compared to girls. In particular, in grade 1, boys in GEL schools have a mean score of 0.63, whereas girls have a lower mean score of -0.43. Likewise, in grade 3, boys in GEL schools have a mean score of 0.03, while girls have a notably lower mean score of -0.84. These results suggest that, regardless of the school type, boys consistently exhibit higher mean wellbeing scores than girls.

As concerned the differences between EPAL and GEL schools, EPAL schools show higher mean wellbeing scores compared to GEL schools in both genders and grades with an exception only for boys in grade 1. Finally, across all school types and genders, there is a general decline in mean wellbeing scores. The drop from grade 1 to grade 3 is especially pronounced in GEL schools. This suggests that the psychological wellbeing of students in GEL schools may be affected much worse, compared to their EPAL peers, by the pressure to prepare and perform well in the tertiary education entry exams, taking place at the end of the year 3 studies.

Figure 4.8: Student's occupation expectations by school type, weighted percentages



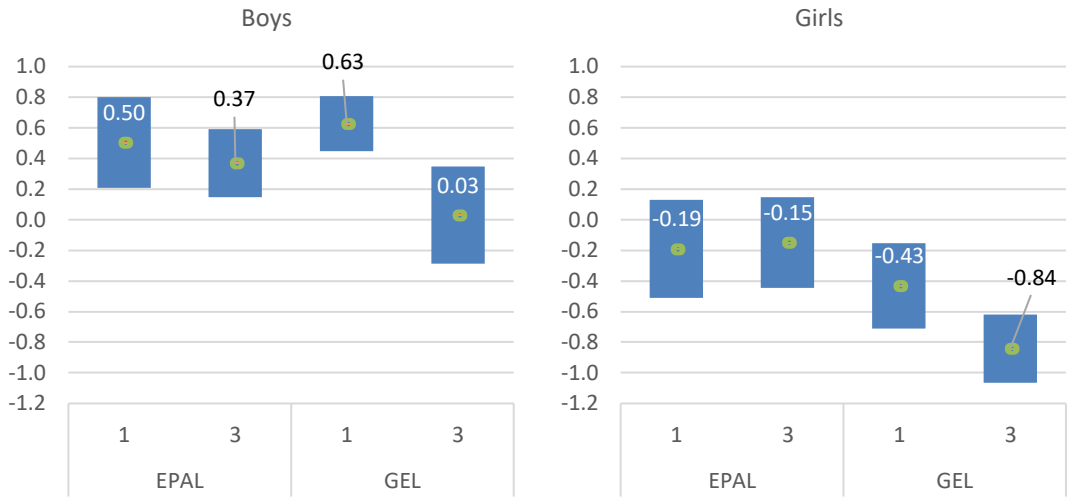
Source: Student survey

4.3.1 LIFE SATISFACTION

Looking at the constituent elements of the overall psychological wellbeing indicator, about 15.9% of the students reported low levels of satisfaction with their life, while only 9.5% can be classified as being very satisfied with their life (Figure 4.10). The lowest levels of life satisfaction are observed on average among year 3 GEL students (Figure 4.11). This outcome may also be attributed to the fact that grade 3 students from GEL have added pressure and

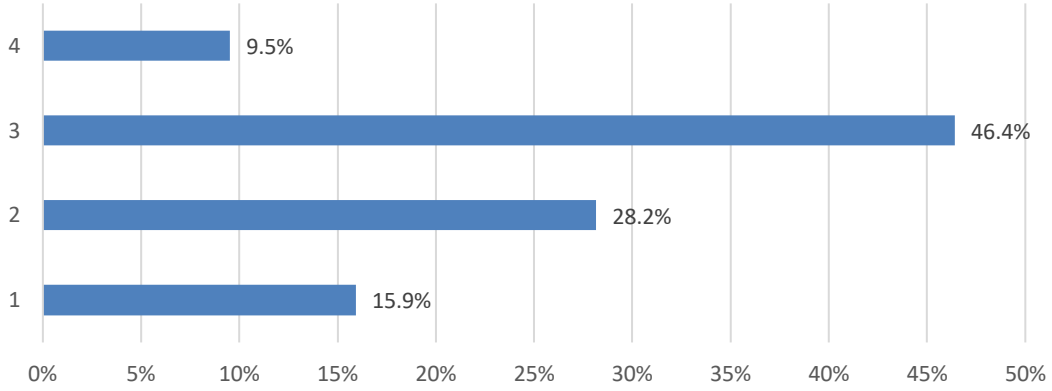
focus on academic performance as they are likely preparing for their final exams in order to gain admission to universities.

Figure 4.9: Wellbeing score by school type and grade, weighted means and 95% confidence intervals



Source: Student survey

Figure 4.10: Student's life satisfaction, weighted percentages in total sample



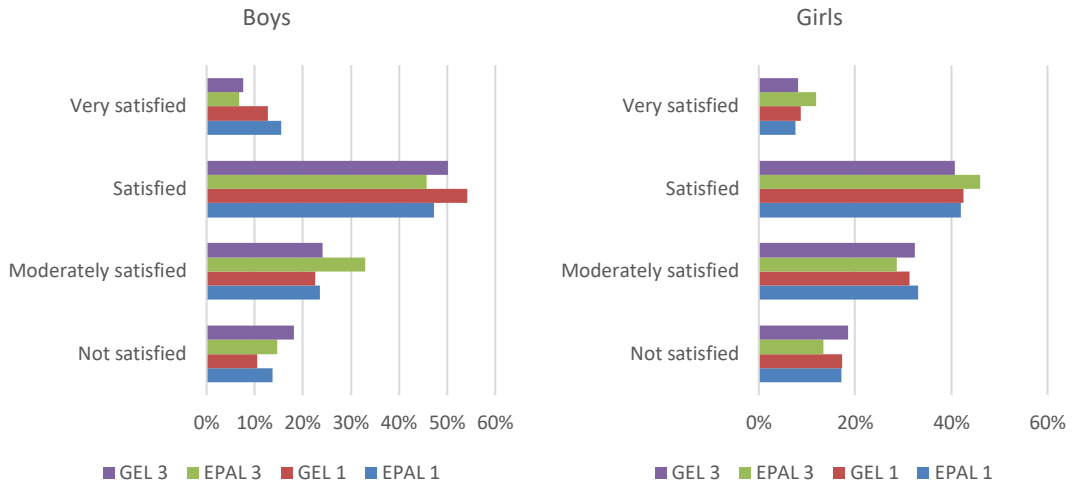
Source: Student survey. Note: A score of 4 or "very satisfied" corresponds to students providing responses of 9 or 10 to the question when asked to provide a score of 1 to 10 to characterize how satisfied they are with their life, 3 or "satisfied" corresponds to original scores of 7 or 8, 2 or "moderately satisfied" corresponds to scores of 5 or 6 and 1 or "not satisfied" corresponds to scores of 4 or lower in the original scale.

4.3.2 CURRENT PSYCHOLOGICAL WELL-BEING

The pressure on year 3 GEL students transpires in a number of other current psychological well-being indicators. In particular, year 3 GEL students report lower shares of "often" and "always" responses compared to the other 3 segments of the student population in four out of five relevant items among the boys and in three out of five items among the girls (Figure 4.12). An exception to this rule is observed for boys in the item "I have felt cheerful and in good spirits" where the lowest share is reported by year 3 EPAL students. Among girls, the

exceptions are observed in the item "I have felt active and vigorous" where the lowest score is recorded on average among year 3 EPAL students and in the item "I have woken up feeling fresh and rested", where the lowest score was reported by year 1 GEL students.

Figure 4.11: Student's life satisfaction by gender, school type and grade, weighted percentages



Source: Student survey

4.3.3 RELATION WITH SOFT SKILLS

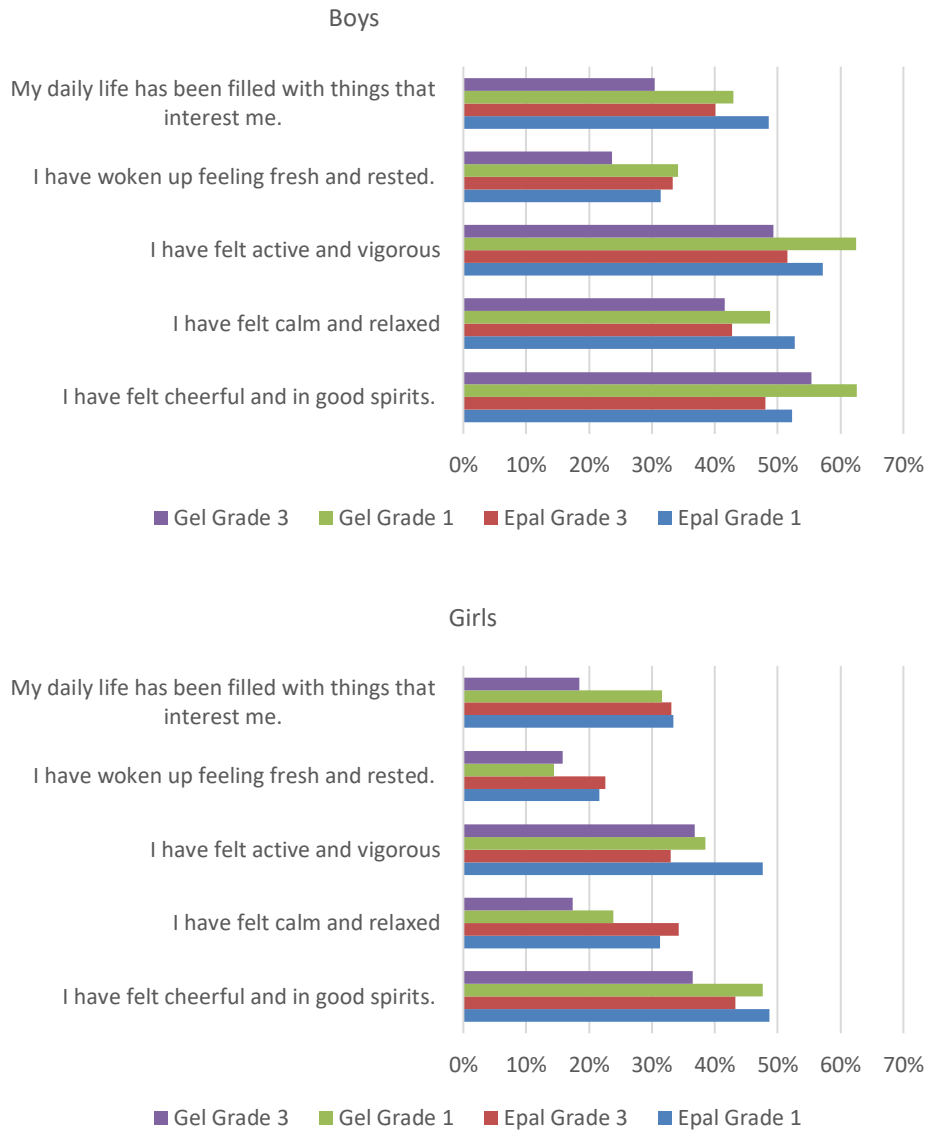
Concerning the Cooperation domain, for boys in grade 1 in EPAL schools, there is a positive and statistically significant correlation of 0.28, and a stronger correlation of 0.49 in grade 3. For girls, there is a positive statistically significant correlation between Cooperation and wellbeing in GEL schools (0.23) and in EPAL schools (0.21), with a slightly stronger correlation in grade 3 in EPAL schools (0.28). The correlation is not statistically significant only among year 1 GEL boys. In a multivariate regression setup, the analysis revealed that the wellbeing indicator is statistically significantly associated with cooperation skills for boys from EPAL schools (0.099), as well as girls from GEL schools (0.104) with significance levels of 1%. Additionally, this significant association holds true for the total sample (0.033) at a 5% significance level (Table 7.5 in the Appendix).

Regarding the domain of Emotional Resilience, the correlation is statistically significant among all examined subsamples. The highest correlation coefficient is recorded in year 3 EPAL students (girls: 0.53, boys: 0.52). The coefficient is lowest yet still statistically significant among year 1 EPAL girls (0.22) and year 1 GEL boys (0.29). Controlling for the influence of demographics and other composite indicators, the wellbeing indicator returns positive and statistically significant results across all models, with the highest coefficient registered among EPAL boys (0.17) and the lowest among GEL boys (0.11 - Table 7.4 in the Appendix).

There are no significant correlations between Innovation skills and wellbeing in the GEL schools. Among the EPAL schools, the correlation is statistically significant in all categories except for year 1 EPAL girls. In the regression setup, wellbeing has a positive and statistically

significant association with innovation skills only among EPAL boys. The variable is selected in the parsimonious model among EPAL girls and in the total sample, yet the coefficient is not statistically significant (Table 7.3 in the Appendix).

Figure 4.12: Weighted percentage of students who reported that they feel like this "often" or "always"



Source: Student survey

For Self-Management domain, the correlation coefficient is positive and statistically significant in all categories, except for year 1 EPAL girls. Boys in grade 1 exhibit positive statistically significant correlations between Self-Management and wellbeing indicator in GEL schools (0.20) and in EPAL schools (0.34), with a stronger correlation in grade 3 (GEL: 0.35, EPAL: 0.57). Girls also show the highest positive and statistically significant correlations among year 3 EPAL students (0.42). In the multivariate regression on Self-Management scores, the coefficient on the wellbeing variable is positive and statistically significant across all

categories, yet its size is lower among girls from EPAL schools, where the statistical significance is also achieved only at the 10% level (Table 7.2 in the Appendix).

Finally, Social Engagement skills and psychological engagement show a positive and statistically significant correlation across all student categories. Among boys in grade 1 the correlation is weaker in GEL schools (0.21) than in EPAL schools (0.40). The correlation strengthens for boys in grade 3, in both GEL (0.23) and EPAL (0.57). Girls also show a positive correlation between Social Engagement and wellbeing in GEL (0.26) and EPAL (0.23) in grade 1, and GEL (0.37) in grade 3. In the regression analysis, the wellbeing indicator has a positive and statistically significant indicator at 1% level in the total sample, among GEL girls and EPAL boys. The indicator is also selected in the parsimonious models among EPAL girls and GEL boys. However, the coefficient was not statistically significant for boys from GEL schools. For girls from EPAL schools, the coefficient was found to be statistically significant but only at a 10% level of significance (Table 7.6 in the Appendix).

Table 4.2: Correlations between Wellbeing indicator and BESSI domains

BESSI domain	Gender	GEL		EPAL	
		Grade 1	Grade 3	Grade 1	Grade 3
Cooperation	Boys	0.12	0.26*	0.28*	0.49*
	Girls	0.23*	0.24*	0.21*	0.28*
Emotional Resilience	Boys	0.29*	0.39*	0.38*	0.52*
	Girls	0.40*	0.46*	0.22*	0.53*
Innovation	Boys	-0.01	0.05	0.18*	0.43*
	Girls	0.05	0.04	0.05	0.20*
Self-Management	Boys	0.20*	0.35*	0.34*	0.57*
	Girls	0.25*	0.25*	0.20	0.42*
Social Engagement	Boys	0.21*	0.23*	0.40*	0.57*
	Girls	0.26*	0.37*	0.23*	0.41*

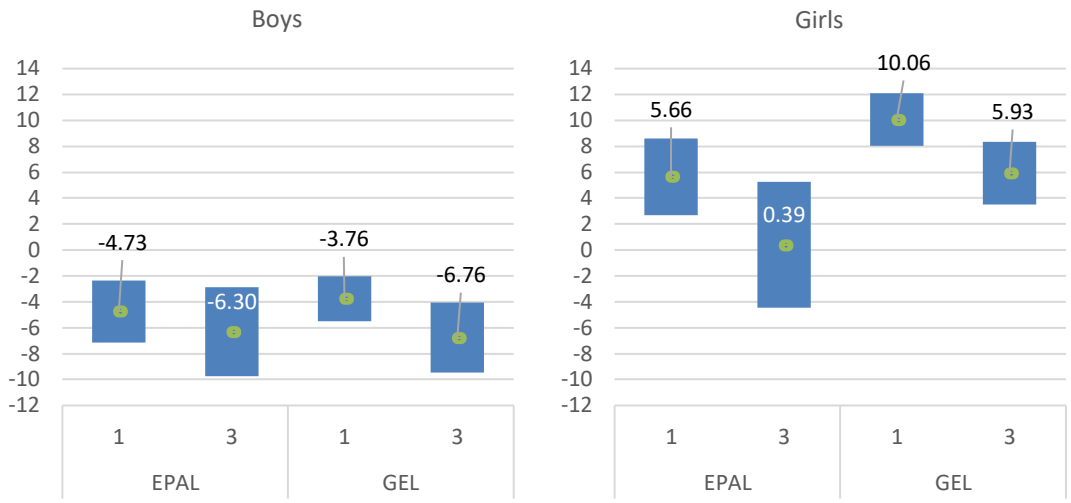
* Statistically significant correlation at the 5% significance level

4.4 Test anxiety

Girls generally have higher mean test anxiety scores compared to boys (Figure 4.13). Specifically, girls in EPAL schools display a mean test anxiety score of 5.66 in grade 1 and 0.39 in grade 3. By contrast, boys in EPAL schools exhibit lower mean scores of -4.73 in grade 1 and -6.30 in grade 3. Similarly, girls in GEL schools show higher mean test anxiety scores, with a mean of 10.06 in grade 1 and 5.93 in grade 3, while boys in GEL schools have lower mean scores of -3.76 in grade 1 and -6.76 in grade 3. Moreover, it appears that students in GEL schools generally demonstrate higher levels of test anxiety than those in EPAL. Finally, grade

1 students, across both genders and school types, tend to exhibit higher levels of test anxiety compared to their grade 3 counterparts.

Figure 4.13: Test anxiety score by school type and grade, weighted means and 95% confidence intervals



Source: Student survey

In greater detail, in both GEL and EPAL schools, girls (especially in grade 1) tend to experience higher levels of anxiety even when well prepared for a test and worry more about test difficulty compared to boys. In addition, overall, the data suggests that the students from Gel school are associated with higher levels of anxiety across various aspects of test-related emotions, such as worry, anxiety, and tension (Figure 4.14).

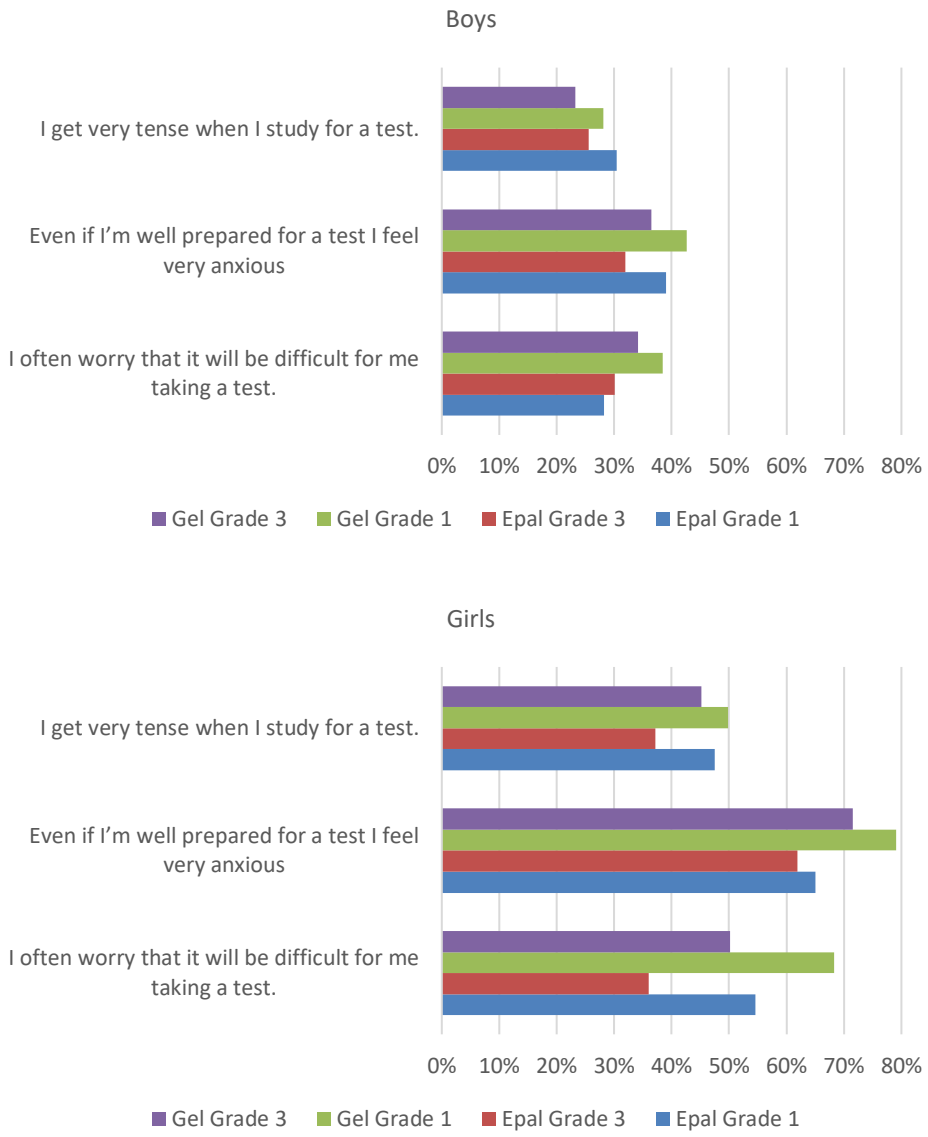
4.4.1 RELATION WITH SOFT SKILLS

Concerning the test anxiety indicator, the correlation coefficient with cooperation skills is negative and statistically significant only among year 3 EPAL girls. For boys in GEL schools, there are no significant correlations for both grade levels. For boys in EPAL schools, there is a slight positive correlation between test anxiety and the Cooperation domain in grade 1 (0.10) and grade 3 (0.11) but still not statistically significant**.**

The correlation results are very similar for Self-Management, where there are no significant correlations between test anxiety and the Self-Management domain for boys in any grade and school type. Girls also show no significant correlations in grade 1 in any school type but exhibit a negative statistically significant correlation with studying in year 3 EPAL schools (-0.27).

When it comes to Innovation, there are no significant correlations with test anxiety in any of the student categories. The results are different in Social Engagement, where the correlation coefficients are negative and statistically significant for grade 3 students in GEL irrespective of gender and for grade 3 EPAL girls.

Figure 4.14 Weighted percentage of students who reported that they "Agree" or "Strongly Agree"



Source: Student survey

The strongest indications of negative correlation of test anxiety and soft skills is observed in the domain of Emotional Resilience. For boys, the negative correlations are statistically significant in GEL (grade 1: -0.28, grade 3: -0.34) but are not significant in EPAL (grade 1: -0.10, grade 3: 0.02). For girls, the negative correlations are statistically significant in both school types and grades (grade 1: GEL: -0.28, EPAL: -0.31 and grade 3: GEL: -0.26, EPAL: -0.28).

The results obtained through multiple regression analysis largely align with the findings mentioned above. In particular, when examining the domains of Innovation and Cooperation, the coefficients are not statistically significant for the cooperation domain in any subsample or in the total sample. In the domain of Innovation, the only statistically significant negative coefficient is observed among EPAL girls, with a significance level of 5% (Table 7.3 and Table 7.5 in the Appendix). A negative and significant relationship was observed in the total sample

and among EPAL girls for Social Engagement. In Emotional Resilience, negative and statistically significant relationships were found (significance at 1% level) for the total sample as well as for all subgroups, except for boys from EPAL schools. In the Self-Management domain, the regression coefficient is negative and statistically significant (at the 1% level) among EPAL girls and positive and statistically significant (at the 10% level) among GEL girls.

Table 4.3: Correlations between Test anxiety indicator and BESSI domains

BESSI domain	Gender	GEL		EPAL	
		Grade 1	Grade 3	Grade 1	Grade 3
Cooperation	Boys	0.00	0.00	0.10	0.11
	Girls	-0.02	0.06	0.05	-0.32*
Emotional Resilience	Boys	-0.28*	-0.34*	-0.10	0.02
	Girls	-0.28*	-0.26*	-0.31*	-0.28*
Innovation	Boys	0.04	0.14	-0.10	0.02
	Girls	0.08	0.00	-0.15	-0.20
Self-management	Boys	-0.01	-0.09	-0.08	0.13
	Girls	-0.01	0.09	-0.07	-0.27*
Social Engagement	Boys	-0.08	-0.21*	-0.06	-0.09
	Girls	0.06	-0.16*	-0.17	-0.33*

* Statistically significant correlation at the 5% significance level

4.5 Bullying, social interactions and activities

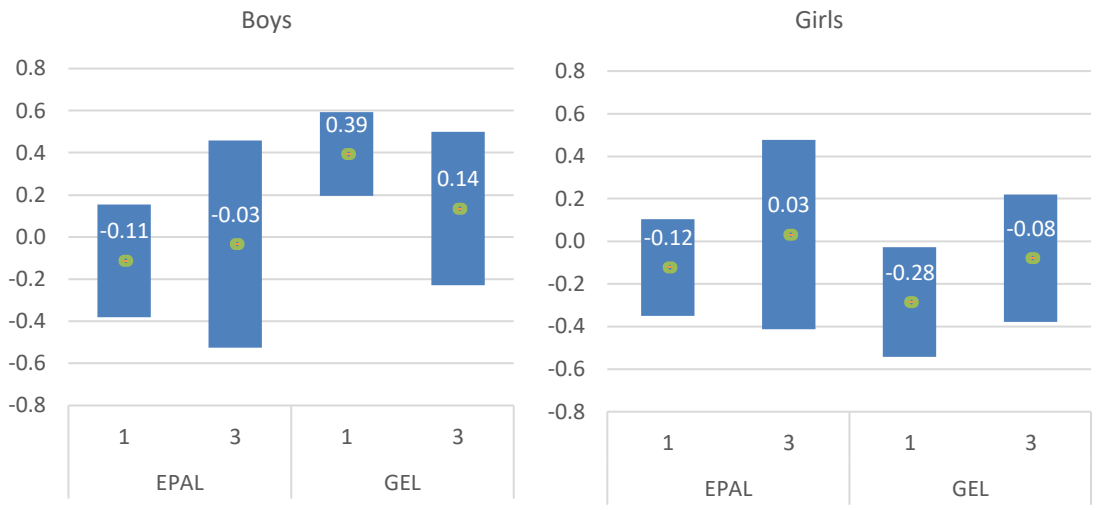
4.5.1 SCHOOL BELONGING

For students from EPAL schools there are no substantial differences in the mean scores between boys and girls in the school belonging indicator (ST_BELONG). The confidence intervals for both genders have a significant overlap, indicating a lack of significant difference in the reported sense of belonging (Figure 4.15). By contrast, when considering students from GEL schools, we find that boys tend to report higher mean scores compared to girls, indicating a stronger sense of belonging among male than female GEL students. In particular, in grade 1, boys in GEL schools have a mean score of 0.39, while girls have a mean score of -0.28. Similarly, in grade 3, boys in GEL schools have a mean score of 0.14, while the girls have a mean score of -0.08.

Furthermore, when comparing the frequency of "Agree" and "Strongly Agree" responses in school belonging items across EPAL and GEL schools, GEL schools generally show higher percentages of students who feel like they belong at school and have other students liking them, especially for male students (Figure 4.16). In addition, the data indicates that the percentages for students feeling like an outsider and feeling awkward and out of place differ

across grade levels. In some cases, such as feeling like an outsider in EPAL schools, the percentages appear to decrease as students progress from grade 1 to grade 3.

Figure 4.15: School belonging score by school type and grade, weighted means and 95% confidence intervals



Source: Student survey

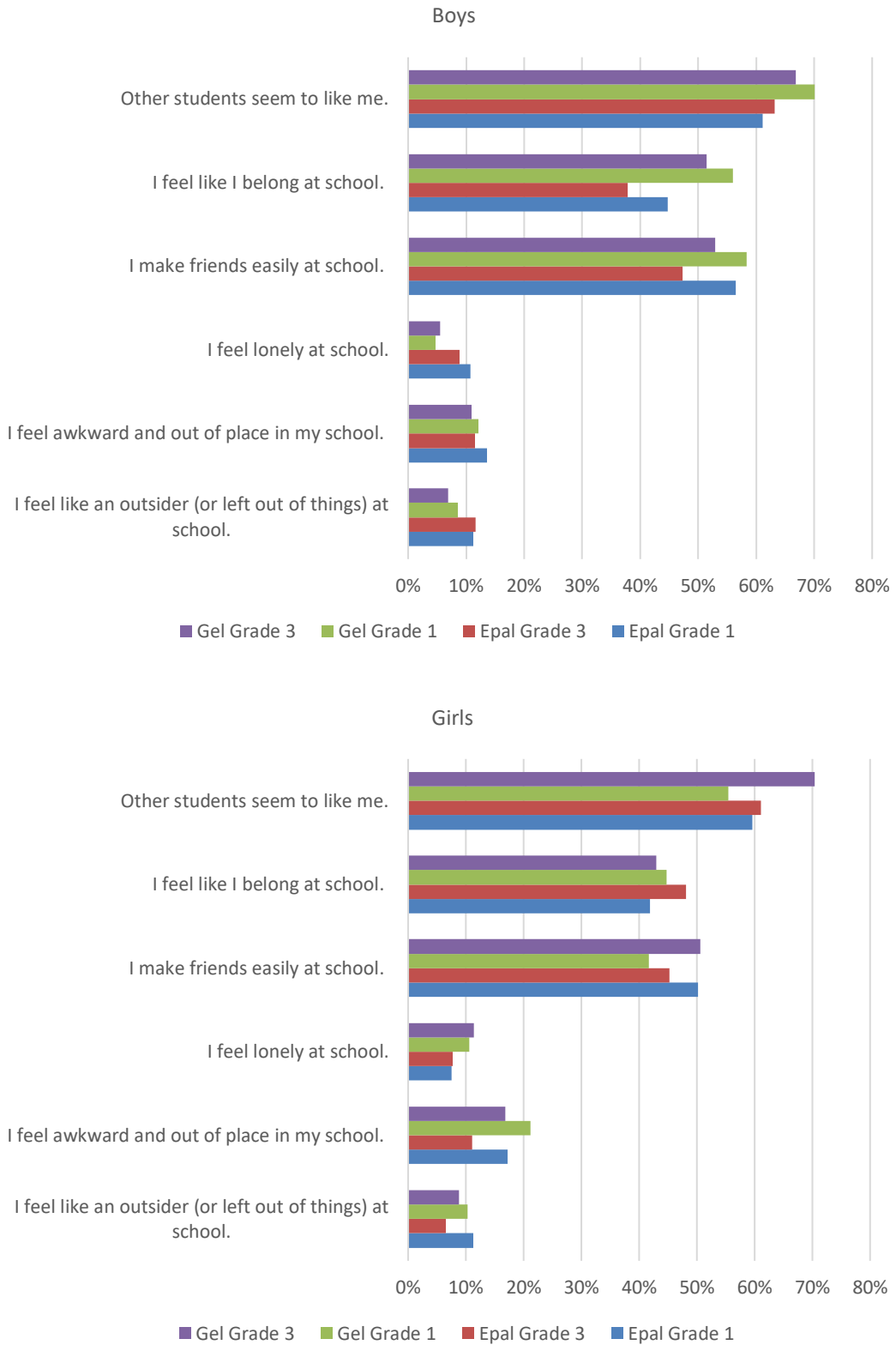
Regarding the association of school belonging with soft skills, there is a positive and statistically significant correlation in the Cooperation domain for both boys and girls in both grade 1 and 3 and in both GEL and EPAL schools. The correlations appear similarly strong and significant in the Social Engagement domain.

The results are more nuanced in the domains of Emotional Resilience and Self-Management. In the former domain, boys exhibit positive statistically significant correlation with school belonging in grade 1 for GEL school (0.17), while in grade 3 the correlation remains significantly positive only for EPAL schools (0.18). Girls also display significant positive correlations between Emotional Resilience and school belonging in grade 1 (GEL: 0.24) and grade 3 (GEL: 0.25, EPAL: 0.38). Boys in grade 1 show positive and statistically significant correlations between school belonging and Self-Management in both GEL (0.19) and EPAL (0.21) schools. For boys in grade 3, the correlation is statistically significant only in EPAL schools (0.22). Girls exhibit significant positive correlations between school belonging and Self-Management in grade 3 in both GEL (0.26) and EPAL schools (0.36), while the correlation is not statistically significant among year 1 girls. In the Innovation domain, there are no significant correlations between school belonging and Innovation for both boys and girls in both grade 1 and grade 3.

The results obtained from the regression analysis (shown in the Appendix) confirmed in general the above observations. Notably, the domain- of Social Engagement exhibited positive and significant relationships with school belonging, both in the total sample and in the sub-samples categorized by gender and school types. Regarding the Cooperation domain, the analysis revealed positive and statistically significant relationship with school belonging for the total sample, as well as for two specific subgroups: girls from EPAL schools and boys from

GEL schools. By contrast, no significant relationship was found between school belonging and Innovation, Self-Management, and Emotional Resilience.

Figure 4.16: Weighted percentage of students who reported "Agree" or "Strongly Agree"



Source: Student survey

Table 4.4: Correlations between School belonging indicator and BESSI domains

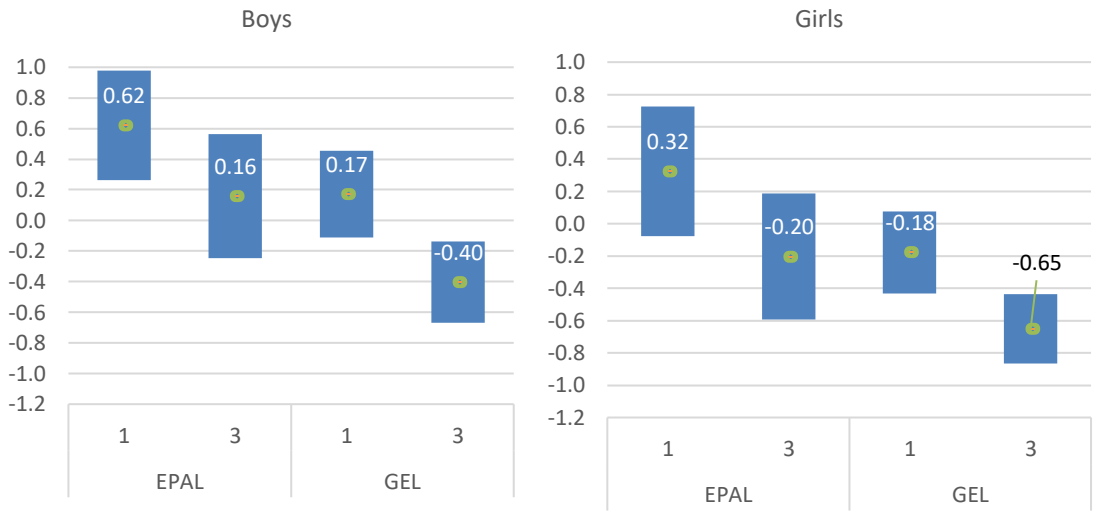
BESSI domain	Gender	GEL		EPAL	
		Grade 1	Grade 3	Grade 1	Grade 3
Cooperation	Boys	0.33*	0.28*	0.24*	0.39*
	Girls	0.25*	0.37*	0.23*	0.49*
Emotional Resilience	Boys	0.17*	0.16	0.08	0.18*
	Girls	0.24*	0.25*	0.06	0.38*
Innovation	Boys	0.05	-0.07	-0.06	0.10
	Girls	-0.10	0.12	0.14	0.15
Self-Management	Boys	0.19*	0.05	0.21*	0.22*
	Girls	0.12	0.26*	0.12	0.36*
Social Engagement	Boys	0.38*	0.29*	0.33*	0.39*
	Girls	0.26*	0.35*	0.37*	0.37*

* Statistically significant correlation at the 5% significance level

4.5.2 EXPOSURE TO BULLYING

The analysis of the data reveals that there is a higher incidence of bullying reported in the survey in EPAL schools compared to GEL schools (Figure 4.17). Additionally, when comparing grade levels, it becomes apparent that students in grade 1 experience higher levels of bullying compared to those in grade 3. Furthermore, boys seem to experience more bullying than girls.

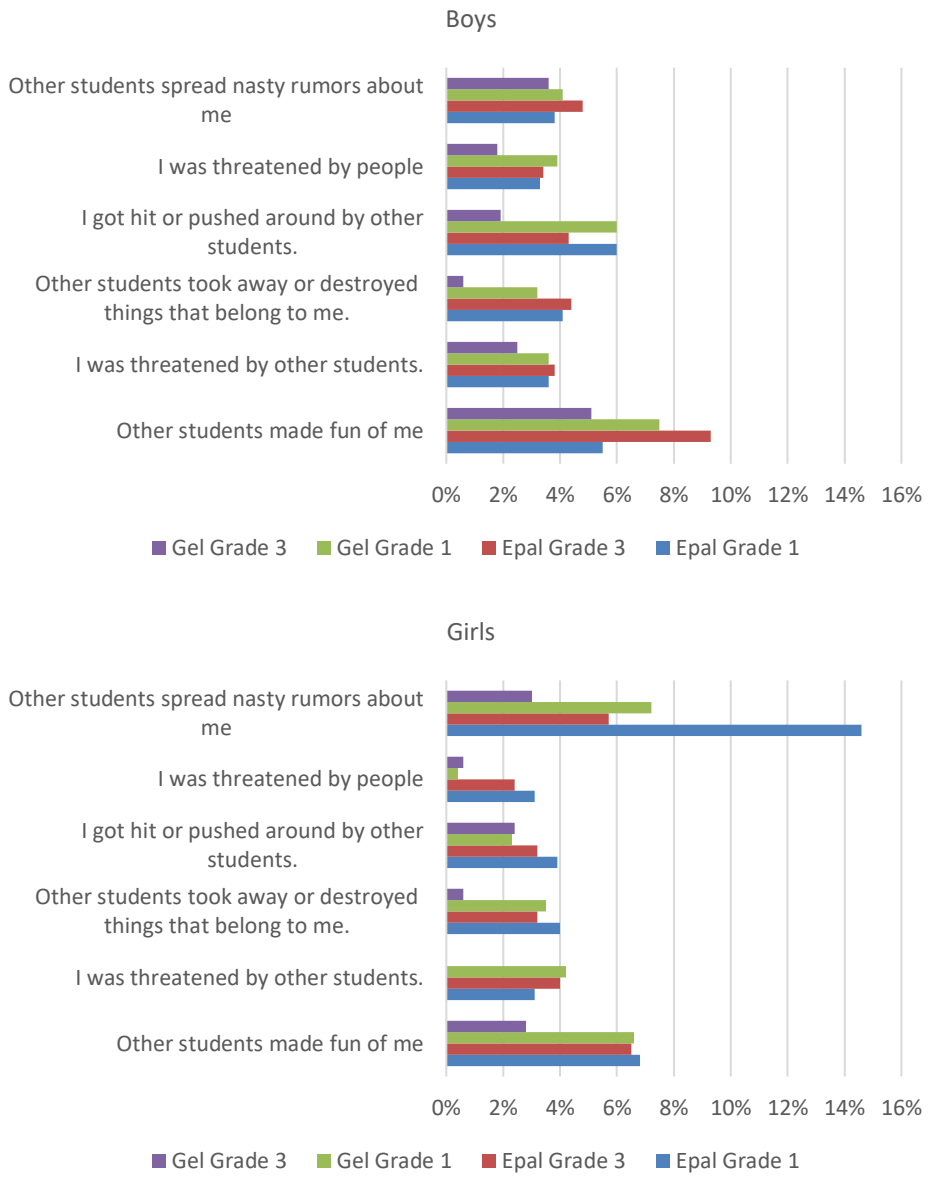
Figure 4.17: Bullying score by school type and grade, weighted means and 95% confidence intervals



Source: Student survey

More specifically, in grade 1, female students in EPAL schools report a mean bullying score of 0.32. In contrast, female students in GEL schools have a mean score of -0.17, suggesting a lower incidence of bullying among this group. Similarly, male students in EPAL schools have a higher mean bullying score of 0.62, compared to mean score of 0.17 for male students in GEL schools.

Figure 4.18: Weighted percentage of students who reported "Often" or "Always"



Source: Student survey

In terms of the constituent items, in EPAL schools, the percentage of girls in grade 1 who reported experiencing often or constantly the spread of nasty rumors about them is strikingly high at 14.6%. This is significantly higher compared to boys in the same grade (3.8%). A difference of similar sign but much lower intensity was also observed in grade 3 of EPAL schools, where the share of girls reporting frequent instances of this item stood at 5.7% compared to 4.8% for boys.

The share of year 1 EPAL boys reporting high incidence of other students making fun of them stood at 5.5%, lower than in year 1 EPAL girls (6.8%). The opposite was true for the other three subgroups. In grade 3, the share of boys from EPAL schools reporting high incidence of this type of bullying stood at 9.3% compared to 6.5% for girls. Similarly, the percentage for year 1 GEL students stood at 7.5% for the boys and 6.6% for the girls, while among year 3 GEL students, it stood at 5.1% for the boys and 2.8% for the girls.

Regarding the relations of bullying and the soft skills, there are no statistically significant correlations in the Cooperation and Self-Management domains across school types, genders, and grades. For the Emotional Resilience domain, the only significant negative correlation is found for girls from GEL schools in grade 1 (-0.16). In Self-Management, the correlation is positive and statistically significant in GEL schools among boys in grade 1 (0.17) and girls in grade 3 (0.14).

The stronger positive association of experiencing bullying and soft skills is observed in the Innovation domain. In particular, boys in EPAL schools, in both grade 1 (0.18) and grade 3 (0.16) display significant positive correlations between bullying and Innovation skills. Among the girls, the correlation is positive and statistically significant only in GEL schools in year 1 (0.17).

Table 4.5: Correlations between Bullying indicator and BESSI domains

BESSI domain	Gender	GEL		EPAL	
		Grade 1	Grade 3	Grade 1	Grade 3
Cooperation	Boys	-0.01	0.01	-0.05	0.07
	Girls	-0.06	-0.01	-0.05	-0.04
Emotional Resilience	Boys	-0.04	0.10	0.08	0.06
	Girls	-0.16*	0.08	-0.12	-0.08
Innovation	Boys	0.09	0.18	0.18*	0.16*
	Girls	0.17*	-0.13	-0.04	0.11
Self-Management	Boys	0.02	0.01	-0.08	0.08
	Girls	-0.04	-0.06	-0.16	-0.09
Social Engagement	Boys	0.17*	0.14	0.01	0.07
	Girls	0.13	0.14*	-0.11	0.10

* Statistically significant correlation at the 5% significance level

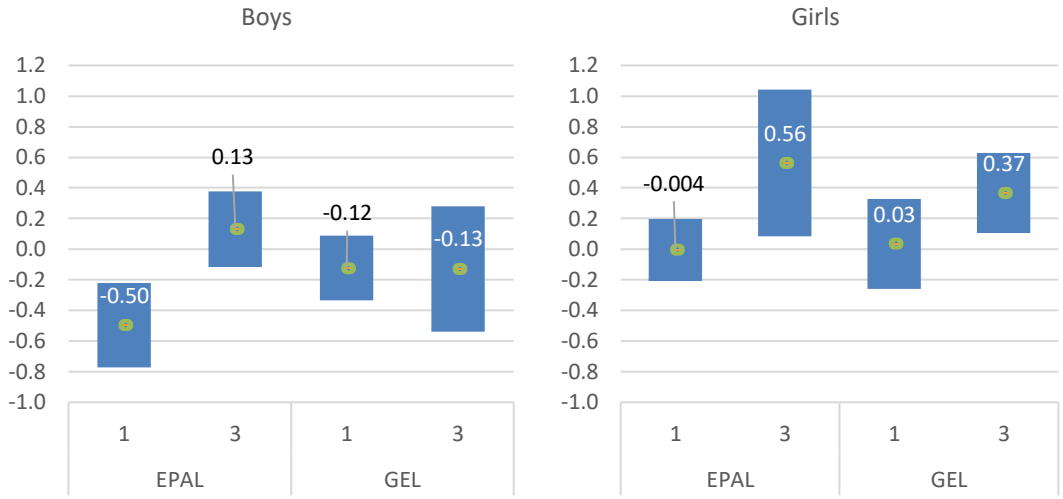
The regression analysis reveals rather different results. In the total sample, the variable indicating bullying at school is positive and significant across almost all domains: Innovation (significant at 5%), Emotional Resilience (at 10%), Cooperation (at 1%), and Social Engagement (at 1%). The only exception is the Self-Management domain, where it is not selected in the total sample or in any of the analyzed subgroups.

4.5.3 STUDENT-TEACHER RELATIONS

With the exception of boys in GEL schools, there appears to be a progression in the relationship with teachers as students advance from grade 1 to grade 3. The mean values are higher for grade 3 students compared to grade 1 students in all other cases. This suggests that, generally, as students spend more years in their schools, their relationships with teachers tend to improve.

Across the various groups, girls tend to have more positive mean values indicating better relationships with their teachers. By contrast, boys, particularly in GEL schools, report negative mean values. This implies that girls, regardless of the school type or grade level, generally exhibit more positive relationships with their teachers compared to boys.

Figure 4.19: Student- teacher relations score by school type and grade, weighted means and 95% confidence intervals



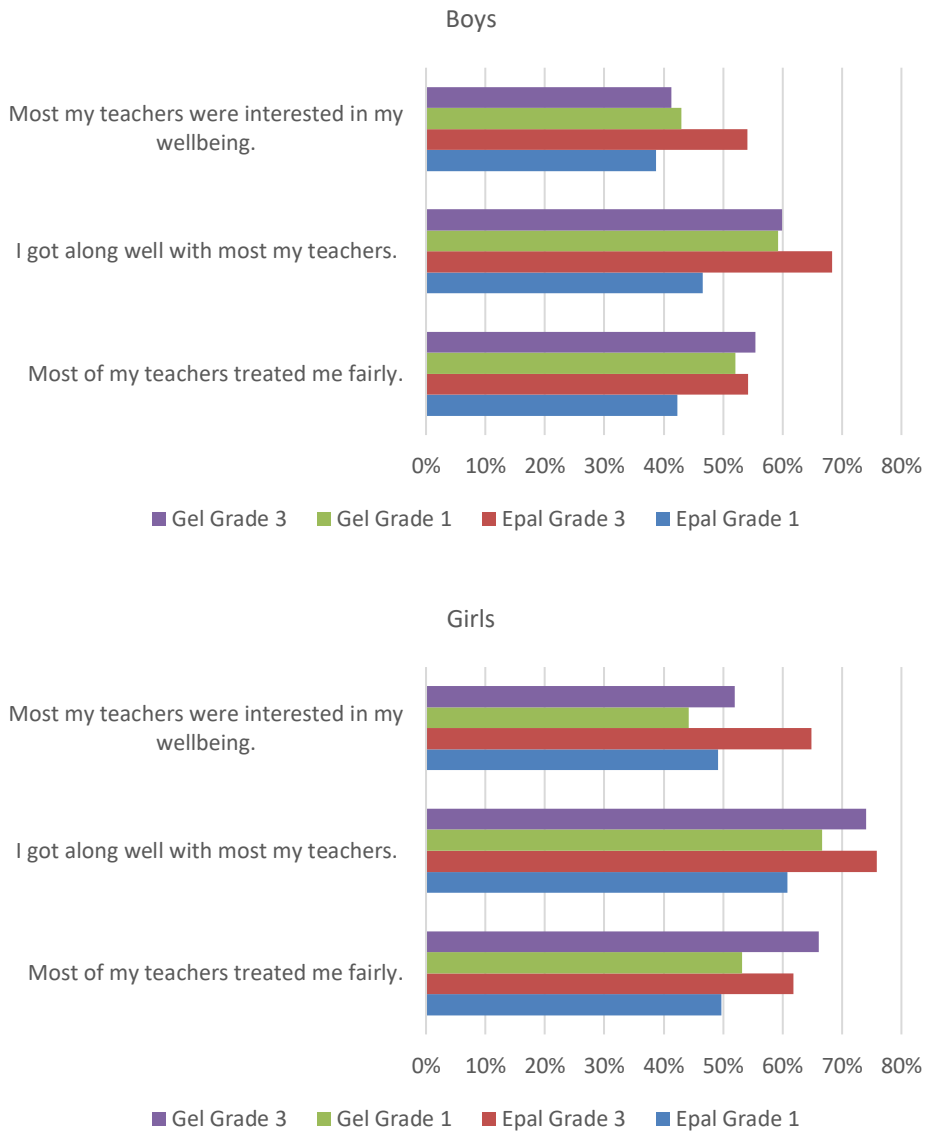
Source: Student survey

In greater detail, for girls, regardless of the type of school or grade level, higher percentages indicate a general positive sentiment towards their teachers. Across most statements, there is an increase in agreement from grade 1 to grade 3, suggesting an improvement in their experiences. In EPAL schools, the percentage of girls who feel most of their teachers treated them fairly increases from 49.7% in grade 1 to 61.8% in grade 3. Similarly, the percentage of girls who state that they get along well with most of their teachers rises from 60.8% to 75.9% in EPAL schools, and from 53.2% to 66.1% in GEL schools. Moreover, there is an increase in the percentage of girls who believe most of their teachers were interested in their well-being from grade 1 to grade 3 in EPAL schools (49.1% to 64.9%) and GEL schools (44.3% to 52.0%).

The data for boys shows a similar pattern, but with lower percentages overall. Boys tend to exhibit a lower agreement with the statements compared to girls. However, there is still a positive trend from grade 1 to grade 3 across two of the three items. In EPAL schools, the percentage of boys who feel most of their teachers treated them fairly increases from 42.3% in grade 1 to 54.2% in grade 3. The percentage of boys who state that they get along well with

most of their teachers rises from 46.6% to 68.3% in EPAL schools and from 52.1% to 55.4% in GEL schools. Similarly, there is an increase in the percentage of boys who believe most of their teachers were interested in their well-being from grade 1 to grade 3 in EPAL schools (38.8% to 54.1%), yet this indicator decreased in GEL schools (from 43.0% in grade 1 to 41.2% in grade 3).

Figure 4.20: Weighted percentage of students who reported "Often" or "Always"



Source: Student survey

Regarding the associations with soft skills, in the Cooperation domain, there are strong positive correlations in both genders and types of schools for grade 1 and grade 3, with one exception: boys from GEL in grade 3. A similar relation can be observed in the domains of Emotional Resilience and Self-Management.

In Innovation, the correlations between the teacher-student relationship and soft skills are generally weaker, particularly within GEL schools, where the correlation is positive and

statistically significant only among year 3 female students (Table 4.6). The associations are similar in the Social Engagement domain, where the correlations with the teacher-student relationship tend to be modest, especially within GEL schools, where statistically significant and positive correlation is again observed only among year 3 girls. In EPAL schools, both boys and girls in grade 1 demonstrate significant positive correlations (boys: 0.20, girls: 0.26), which is not the case for year 3 students.

Table 4.6: Correlations between Student- teacher relations indicator and BESSI domains

BESSI domain	Gender	GEL		EPAL	
		Grade 1	Grade 3	Grade 1	Grade 3
Cooperation	Boys	0.30*	0.00	0.19*	0.28*
	Girls	0.20*	0.32*	0.20*	0.26*
Emotional Resilience	Boys	0.14*	0.15	0.21*	0.25*
	Girls	0.16*	0.26*	0.36*	0.36*
Innovation	Boys	0.14	-0.04	0.21*	0.22*
	Girls	0.08	0.17*	0.28*	0.15
Self-Management	Boys	0.29*	0.01	0.24*	0.25*
	Girls	0.16*	0.37*	0.37*	0.43*
Social Engagement	Boys	0.09	-0.10	0.20*	0.14
	Girls	0.10	0.28*	0.26*	0.18

* Statistically significant correlation at the 5% significance level

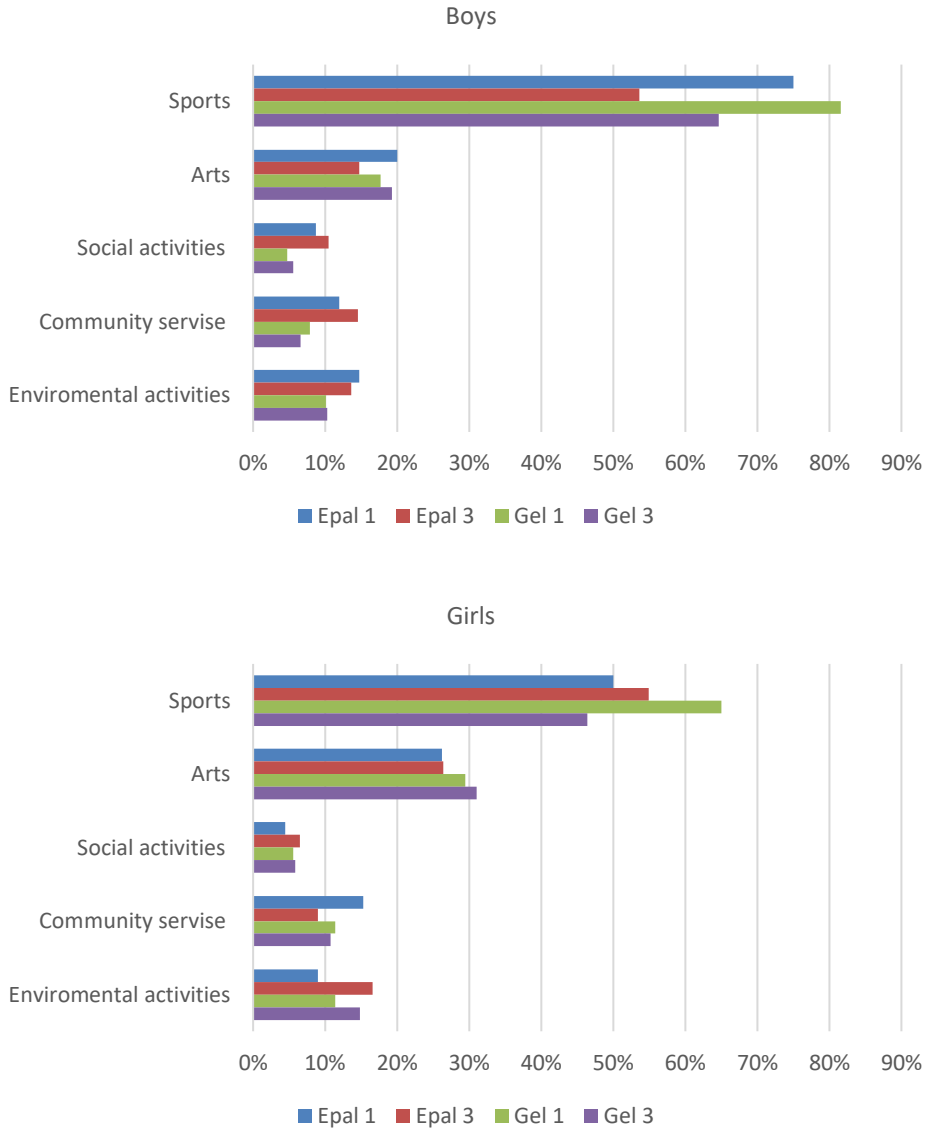
Upon examining the regression results, it is evident that there are positive and significant associations between Emotional Resilience and the relationship with teachers. These associations hold true for both the total sample and most of the sub-samples. However, for GEL girls and GEL boys, while the associations are still positive, they are not found to be statistically significant. As for the Innovation domain, the coefficients are not statistically significant. In the Self-Management domain, significant relationships are observed in the total sample and sub-samples for girls but not for boys. In the Cooperation domain, the coefficient on student-teacher relations is positive and statistically significant (at 5%) only for the total sample, while it is either absent or statistically insignificant in the Social Engagement domain.

4.5.4 PARTICIPATION IN ACTIVITIES OUTSIDE SCHOOL

The boys generally exhibit higher participation rates in sports compared to the girls across all school types and grades. In particular, the highest participation rate of 81.6% is observed among grade 1 boys in GEL schools, while the lowest participation rate of 46.4% is seen among grade 3 girls in GEL schools, probably due to the stronger need to prepare for university entry exams through the shadow education system. By contrast, the girls generally have slightly higher participation rates in arts compared to boys across all school types and grades. The

participation rates in arts for both girls and boys are relatively consistent across different grades within the same school type (Figure 4.21).

Figure 4.21: Weighted percentage of students who reported that they participate in the following activities.



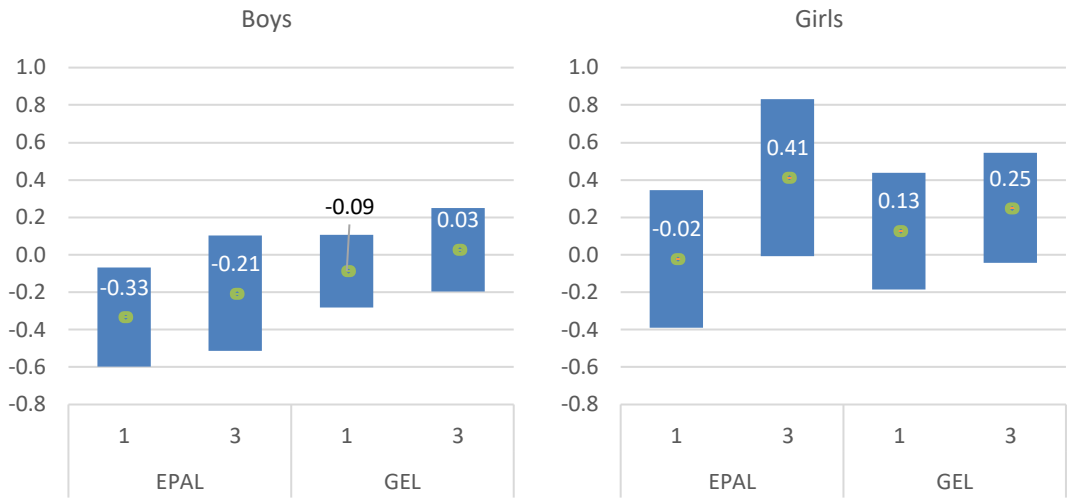
Source: Student survey

4.6 Students' perceived relationships with parents and friends

Perceived relations with friends

Overall, girls tend to report more positive relationships with their friends compared with boys, as indicated by higher mean values in both EPAL and GEL schools (Figure 4.22). Furthermore, students from grade 3 tend to concentrate higher mean values compared to those from grade 1 irrespective of gender or type of school.

Figure 4.22: Relationship with friends score by school type and grade, weighted means and 95% confidence intervals



Source: Student survey

In greater detail, regarding girls, regardless of the school type and grade level, there is a consistently high percentage of students who feel understood, accepted, and find their friends easy to talk to. Girls in grade 3 from EPAL schools show the highest percentages, with 78.2% feeling understood, 92.7% feeling accepted, and 81.2% finding their friends easy to talk to. Similarly, in GEL schools, girls in grade 3 report high percentages in these categories. Boys also express positive experiences in their friendships, although slightly lower compared to girls. Boys in grade 1 from GEL schools stand out with the highest percentage (87.9%) feeling that their friends are easy to talk to, while the lowest degree of agreement is expressed about the statement "My friends understand me" among EPAL grade 3 students (67.0%).

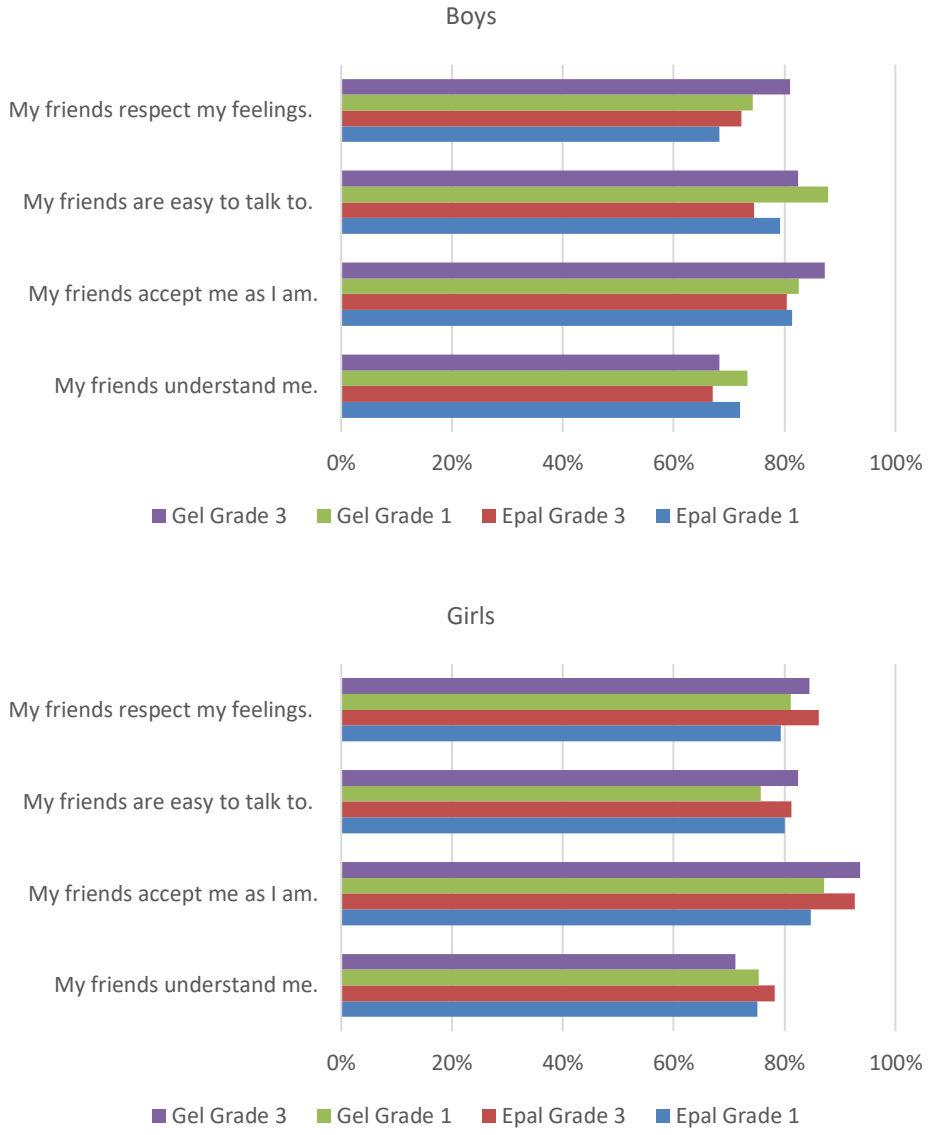
The strongest association of the relationship with friends with soft skills is recorded in the Cooperation domain. For boys, there is a significant positive correlation between relationship with friends and Cooperation in both grade 1 (0.19) and grade 3 (0.38) for GEL schools. The same significant positive correlations are observed for EPAL schools in grade 1 (0.31) and grade 3 (0.38). For girls, there is a significant positive correlation between relationship with friends and Cooperation in grade 1 (0.27) and grade 3 (0.37) for GEL schools. However, in EPAL schools, there is no significant correlation in grade 1 (0.14).

The association appears almost as strong in the Social Engagement domain. For boys, there is a significant positive correlation between relationship with friends and Social Engagement in GEL schools in both grade 1 (0.19) and grade 3 (0.26) and similarly in EPAL schools in both grade 1 (0.28) and grade 3 (0.32). Among girls, there is a significant positive correlation between relationship with friends and Social Engagement only in grade 3 (0.24) for GEL and EPAL schools (0.26).

In the Self-Management domain, significant positive correlations with the relationship with friends are primarily observed in EPAL schools for both genders and across different grades,

while in GEL schools the correlation is positive and statistically significant only for year 3 female students.

Figure 4.23: Weighted percentage of students who reported that they "Agree" or "Strongly Agree"



Source: Student survey

The correlation results are even more nuanced in the Emotional Resilience domain. Among boys, there is significant positive correlation with relationship with friends only in grade 1 for EPAL schools (0.16), while for girls the correlation is statistically significant in grade 3 for both GEL (0.26) and EPAL (0.28) schools. Lastly, in Innovation the correlation is statistically significant only for boys in EPAL schools, in both grade 1 (0.20) and grade 3 (0.17).

The regression results for the variable indicating the relationship with friends reveal that, in the total sample, the coefficient for this variable is both positive and significant for the Cooperation and Social Engagement domains. In the other domains, although the variable has

been selected through the LASSO procedure, there is no significant association observed in the total sample, with positive and statistically significant results recorded for Self-Management among EPAL girls (at the 5% level) and EPAL boys (at the 10% level) and for Emotional Resilience among EPAL girls (at the 10%).

Table 4.7: Correlations between Relationship with friend's indicator and BESSI domains

BESSI domain	Gender	GEL		EPAL	
		Grade 1	Grade 3	Grade 1	Grade 3
Cooperation	Boys	0.19*	0.38*	0.31*	0.38*
	Girls	0.27*	0.37*	0.14	0.31*
Emotional Resilience	Boys	0.07	0.09	0.16*	0.14
	Girls	0.00	0.26*	0.19	0.28*
Innovation	Boys	-0.06	0.06	0.20*	0.17*
	Girls	-0.05	0.16	0.01	0.08
Self-Management	Boys	0.05	0.14	0.30*	0.30*
	Girls	0.09	0.23*	0.18*	0.37*
Social Engagement	Boys	0.19*	0.26*	0.28*	0.32*
	Girls	0.14	0.24*	0.10	0.26*

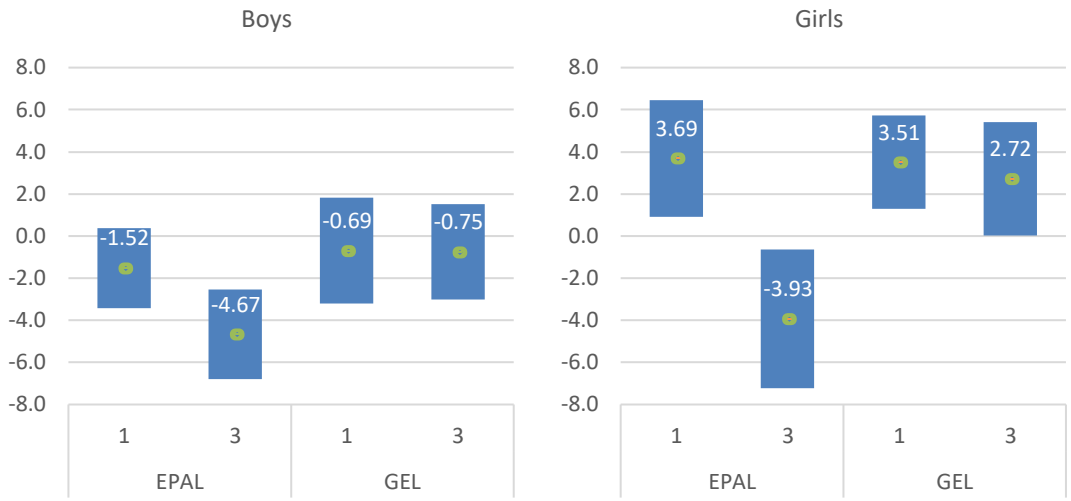
* Statistically significant correlation at the 5% significance level

Perceived relations with parents

Students attending GEL schools appear to experience more conflicts with their parents compared to their counterparts in EPAL schools. Students attending grade 3 at EPAL schools concentrate the lowest means (-4.67 for boys and -3.93 for girls) and as a result exhibit fewer conflicts and they have better relationships with their parents. The conflict with parents score is also elevated among year 1 EPAL girls, while in general it appears that girls tend to have worse relations with their parents than boys.

In greater detail, boys appear to exhibit a higher tendency towards feeling anger towards their parents compared to girls in grade 3 GEL schools and to get upset with their parents in grade 3 EPAL schools. In contrast, girls tend to concentrate higher percentages in the remaining subgroups of these two items. In EPAL schools, the percentages when it comes to getting upset easily with parents, for girls range from 20.9% in grade 1 to 36.3% in grade 3, while in GEL schools, the values range from 41.4% in grade 1 to 43.9% in grade 3. Regarding the difficulty in talking with parents, the girls consistently show relatively higher percentages across both school types and grades. In EPAL schools, the percentages range from 13.9% in grade 1 to 27% in grade 3. Similarly, in GEL schools, the values range from 17.5% in grade 1 to 23.6% in grade 3. Furthermore, in general, students from GEL schools tend to exhibit higher percentages across all three questions, indicating a potentially stronger emotional response in their relationships with parents compared to their counterparts in EPAL schools.

Figure 4.24: Relationship with parents score by school type and grade, weighted means and 95% confidence intervals



Source: Student survey

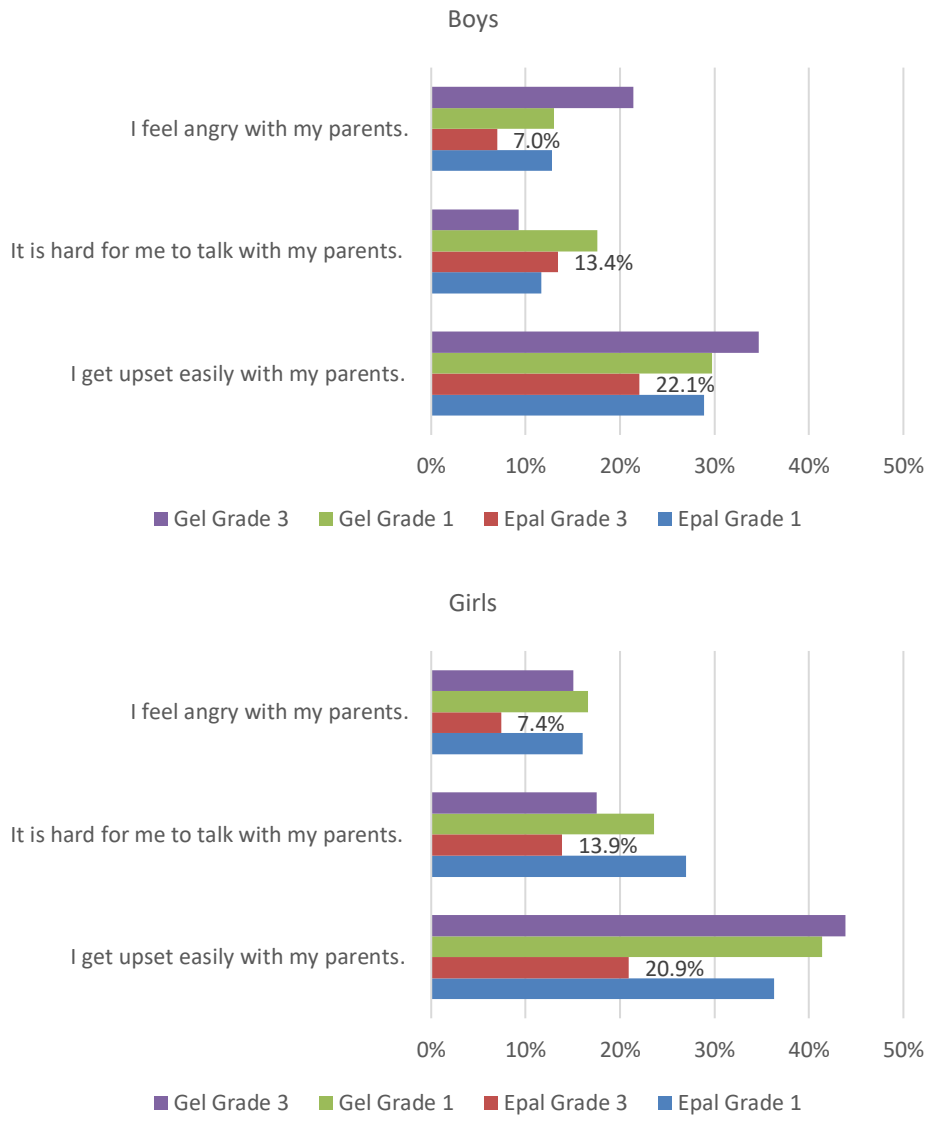
There is no significant correlation between relationship with parents and Cooperation for boys in grade 1 and grade 3 for both types of school. Similarly, no significant correlation is found for girls in grade 1. However, there is a significant negative correlation for girls in grade 3 in GEL (-0.22), indicating that a weaker relationship with parents is associated with lower levels of Cooperation. The association with soft skills is somewhat stronger for Social Engagement where girls in grade 3 exhibit a significant negative correlation in both GEL (-0.23) and EPAL (-0.24) schools.

Concerning Self-Management, boys in grade 1 in GEL schools display a significant negative correlation with their relationship with parents (-0.25). Similarly, girls in grade 1 show a significant negative correlation between Self-Management and their relationship with parents for both type of schools (GEL: -0.20, EPAL: -0.28). No significant correlation is found in grade 3 between relations with parents and Self-Management in either genders and school types.

The correlations between parents' relations and soft skills appear strongest in the Emotional Resilience domain. In particular, boys in grade 1 in GEL show a significant negative correlation (-0.22), as do boys in grade 3 in EPAL (-0.17). Girls in grade 1 also exhibit a significant negative correlation (GEL: -0.29, EPAL: -0.29), along with girls in grade 3 (GEL: -0.24, EPAL: -0.25). By contrast, no significant correlations are found between relationship with parents and Innovation for boys as well as for girls in both grades and school types. This indicates that the parent-child relationship does not significantly impact Innovation skills in this context.

According to the regression results (shown in the Appendix), the variable indicating the relationship with parents is selected as noteworthy in all domains. However, its coefficients are negative and statistically significant in the total sample only in the Emotional Resilience and Self-Management domains and positive and significant at 10% in the Innovation domain. The coefficients are also negative and statistically significant for the girls studying in GEL schools in the Emotional Resilience domain (at 1%) and positive and significant for girls in both GEL (at 10%) and EPAL (at 5%) schools in the Innovation domain.

Figure 4.25: Weighted percentage of students who reported that they "Agree" or "Strongly Agree"



Source: Student survey

4.7 Awareness and cognition

4.7.1 GLOBAL AWARENESS

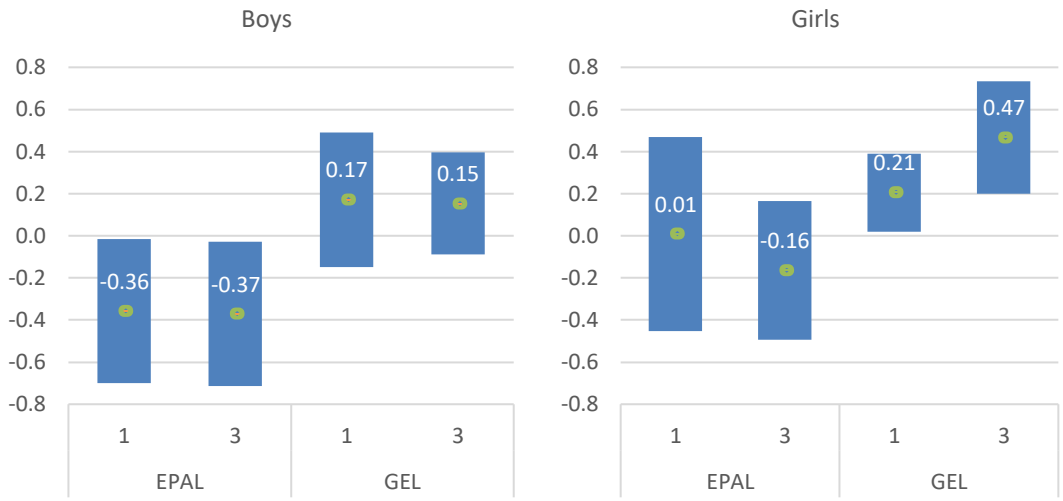
GEL schools tend to have higher mean values for global warming awareness compared to EPAL schools, particularly among female students. In particular, among female students in grade 1, those attending GEL schools demonstrate a mean value of 0.21, compared to 0.01 for their counterparts in EPAL schools. Similarly, in grade 3, female students in GEL schools display a significantly higher mean value (0.47) compared to female students in EPAL schools (-0.16). For male students in grade 1, those in GEL schools exhibit a mean value of 0.17, compared to -0.36 among their peers in EPAL schools. In grade 3, male students in GEL schools show a positive value (0.15), while male students in EPAL schools display a negative value (-0.37).

Table 4.8: Correlations between relationship with parents indicator and BESSI domains

BESSI domain	Gender	GEL		EPAL	
		Grade 1	Grade 3	Grade 1	Grade 3
Cooperation	Boys	-0.10	0.00	-0.06	-0.01
	Girls	-0.14	-0.22*	- 0.12	-0.20
Emotional Resilience	Boys	-0.22*	-0.15	-0.12	-0.17*
	Girls	-0.29*	-0.24*	-0.29*	-0.25*
Innovation	Boys	0.03	0.16	0.07	-0.02
	Girls	0.16	0.00	0.03	0.01
Self-Management	Boys	-0.25*	-0.08	-0.11	-0.11
	Girls	-0.20*	-0.15	-0.28*	-0.18
Social Engagement	Boys	-0.08	-0.01	-0.07	-0.12
	Girls	-0.11	-0.23*	-0.04	-0.24*

* Statistically significant correlation at the 5% significance level

Figure 4.26: Global awareness score by school type and grade, weighted means and 95% confidence intervals

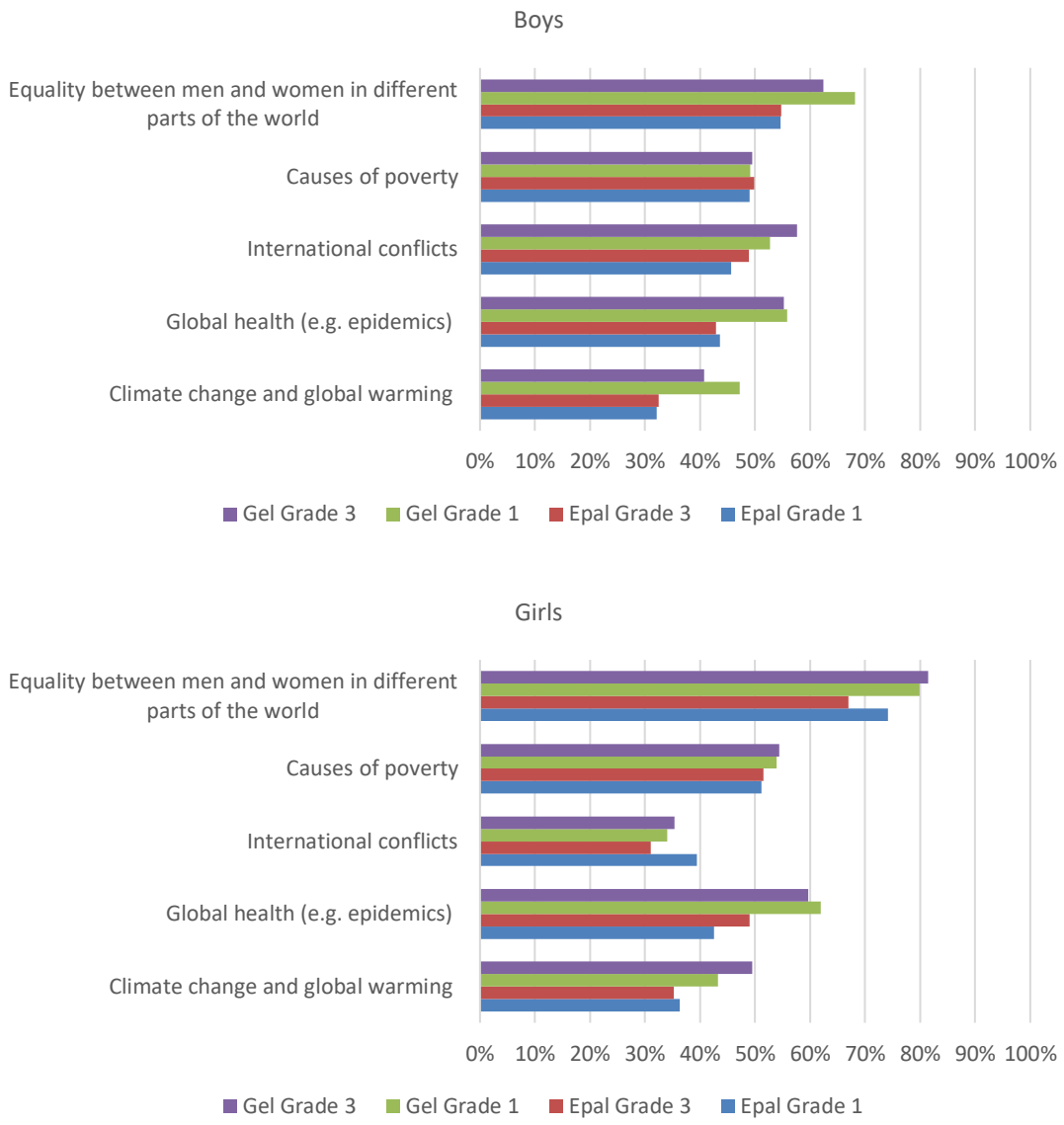


Source: Student survey

In greater detail, the awareness and engagement levels among students in GEL schools tend to be greater compared to students from EPAL schools across various examined topics. When examining the disparities between male and female students, the girls emerge as being more well-informed about the concept of equality between men and women in different parts of the world, as they consistently demonstrate higher percentages, such as 74.1% and 66.9% in EPAL schools, and 79.9% and 81.5% in GEL schools, compared to boys (54.6% and 54.7% in EPAL schools and 68.2% and 62.4% in GEL). A notable exception is the issue of international

conflicts, where the boys declare higher levels of awareness compared to the girls (Figure 4.27).

Figure 4.27: Weighted percentage of students who reported "A lot" or "Completely"



Source: Student survey

In general, the global awareness indicator appears correlated with soft skills in a statistically significant way across many population subgroups (Table 4.9). In particular, the correlations are statistically significant across all combinations of gender, school type and grade for the Innovations skills. The relation is almost as pervasive in terms of Self-Management, where only among grade 3 girls the correlation coefficient is not statistically significant. The relation is slightly more nuanced in the Social Engagement domain, where the correlation is not statistically significant only among grade 3 GEL boys and grade 3 EPAL girls.

In the cooperation domain, for boys, there are significant positive correlations between global awareness and Cooperation in both GEL and EPAL schools and in both grades while for girls

there are significant correlations only for students from GEL schools (0.25 for grade 1 and 0.27 for grade 3). Lastly, in Emotional Resilience, boys have significant positive correlations with global awareness in GEL schools in grade 1 (0.21) and in EPAL schools in both grade 1 (0.24) and grade 3 (0.31).

Table 4.9: Correlations between Global Awareness indicator and BESSI domains

BESSI domain	Gender	GEL		EPAL	
		Grade 1	Grade 3	Grade 1	Grade 3
Cooperation	Boys	0.27*	0.30*	0.25*	0.30*
	Girls	0.25*	0.27*	0.19	0.02
Emotional Resilience	Boys	0.21*	0.10	0.24*	0.31*
	Girls	0.03	0.15	0.02	0.01
Innovation	Boys	0.31*	0.35*	0.33*	0.28*
	Girls	0.50*	0.35*	0.23*	0.27*
Self-Management	Boys	0.26*	0.25*	0.39*	0.40*
	Girls	0.29*	0.34*	0.24*	0.09
Social Engagement	Boys	0.18*	0.15	0.29*	0.32*
	Girls	0.21*	0.24*	0.31*	0.08

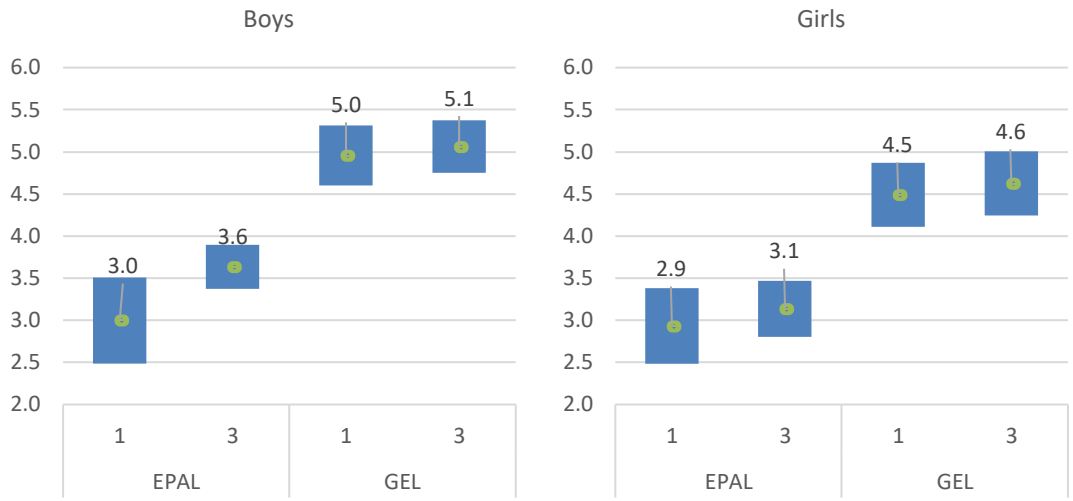
* Statistically significant correlation at the 5% significance level

Based on the regression results, it appears that there are strong associations of soft skills with the global awareness indicator in all domains except Emotional Resilience. Specifically, significant relationships are found within the Innovation and Social Engagement domains for the total sample and in each group broken down by gender and type of schools. In the Cooperation and Self-Management domains, the coefficients are statistically significant for the total sample and for some but not all subgroups, with EPAL schools in both genders and girls from GEL schools forming the exception in the former and EPAL girls in the latter domain. Finally, in the Emotional Resilience domain, the only statistically significant coefficient is found among boys from EPAL schools (at 5% significance level).

4.7.2 SHORT COGNITIVE ABILITY TEST

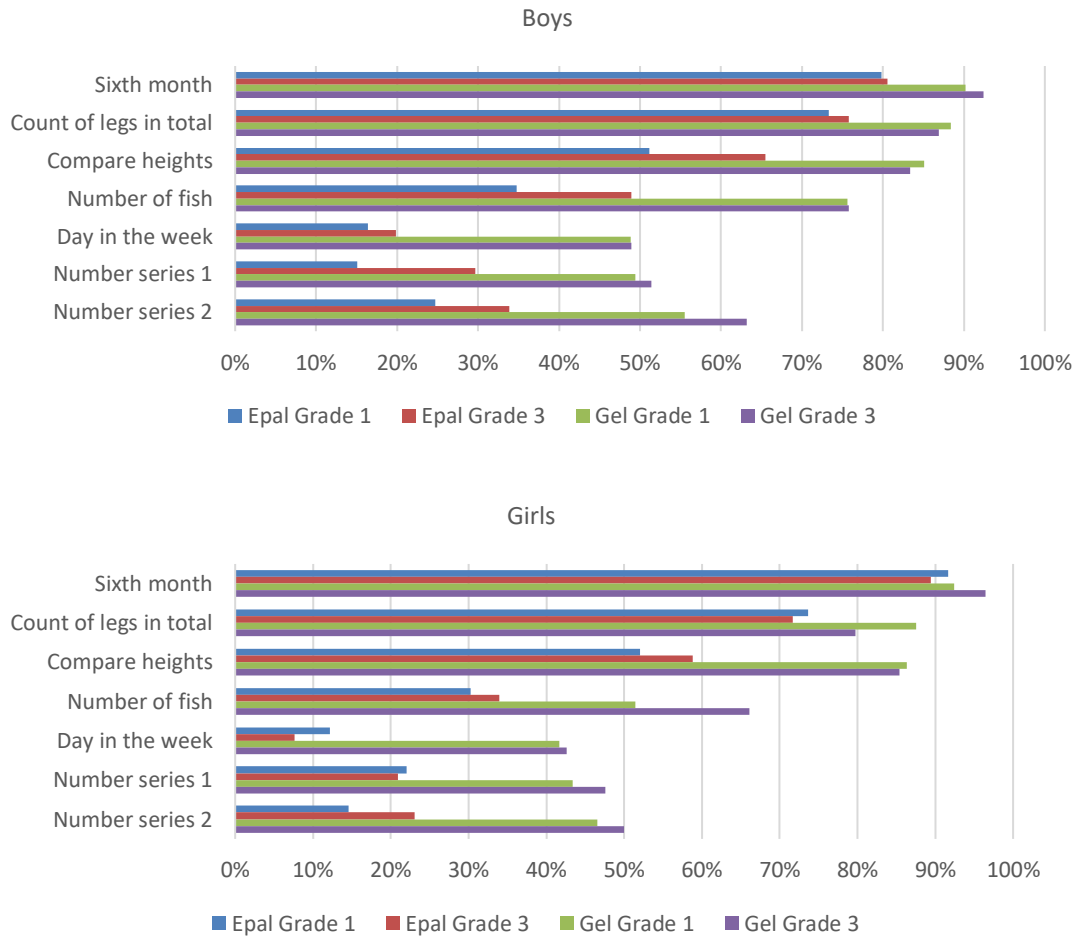
Students from GEL schools consistently have higher mean cognitive scores compared to EPAL students across different grades and genders. Among female students in grade 1, GEL students have a significantly higher mean cognitive score (4.5) compared to EPAL students (2.9). Similar to grade 1, male students in GEL schools also exhibit a higher mean cognitive score (5.0) compared to EPAL students (3.0). Similar differences exist in grade 3.

Figure 4.28: Short cognitive ability test score by school type and grade, weighted means and 95% confidence intervals



Source: Student survey

Figure 4.29: Weighted percentage of students who found the right answer



Source: Student survey

When comparing grade 1 and grade 3 students within the same school type and gender, there is an overall increase in the mean cognitive scores. The difference in mean cognitive scores between boys and girls is consistent across both EPAL and GEL schools. However, the magnitude of the difference is relatively smaller in EPAL schools compared to GEL schools.

In greater detail, the percentage of students who answered correctly is higher in GEL schools compared to EPAL schools across all items of the short cognitive test. This difference is particularly notable in the last two questions that involve computation of number series. The performance gap between GEL and EPAL schools is more noticeable in grade 1, particularly for the task "Number series 1," where 49.5% of the GEL students and only 15.1% of the EPAL students found the correct answer. Also, the results highlight that boys outperform girls in most but not all cognitive items.

There is weaker evidence of association between cognitive ability and soft skills, compared to other contextual indicators. In particular, boys demonstrate significant positive correlations between cognitive ability and Cooperation only in grade 1 for GEL schools (0.17), while for girls the only significant positive correlation appears for GEL schools in grade 3 (0.23). The same pattern is observed in the Innovation domain. Regarding both Emotional Resilience and Self-Management, the only significant positive correlation with cognitive ability is observed among boys in grade 1 for GEL schools (0.21 in both domains). Finally for Social Engagement, there are significant correlations with the cognitive ability indicator only for girls in grade 3 for both GEL (0.18) and EPAL (-0.25) schools.

Table 4.10: Correlations between Short cognitive ability test indicator and BESSI domains

BESSI domain	Gender	GEL		EPAL	
		Grade 1	Grade 3	Grade 1	Grade 3
Cooperation	Boys	0.17*	-0.05	0.05	-0.03
	Girls	0.13	0.23*	0.06	-0,09
Emotional Resilience	Boys	0.21*	0.07	-0.05	0.1
	Girls	0.13	0	-0.06	-0,09
Innovation	Boys	0.23*	-0.03	0.01	0.01
	Girls	0.14	0.27*	-0.06	0.09
Self-Management	Boys	0.21*	-0.03	0.07	0
	Girls	0.15	0.04	0.04	-0.04
Social Engagement	Boys	0.11	-0.06	0	-0.07
	Girls	0.13	0.18*	0.06	-0.25*

* Statistically significant correlation at the 5% significance level

The regression analysis does not indicate strong associations between soft skills and cognitive ability. In the total sample, the variable is selected in all domains except Social Engagement, yet it is insignificant in the Self-Management domain, in the Emotional Resilience domain and

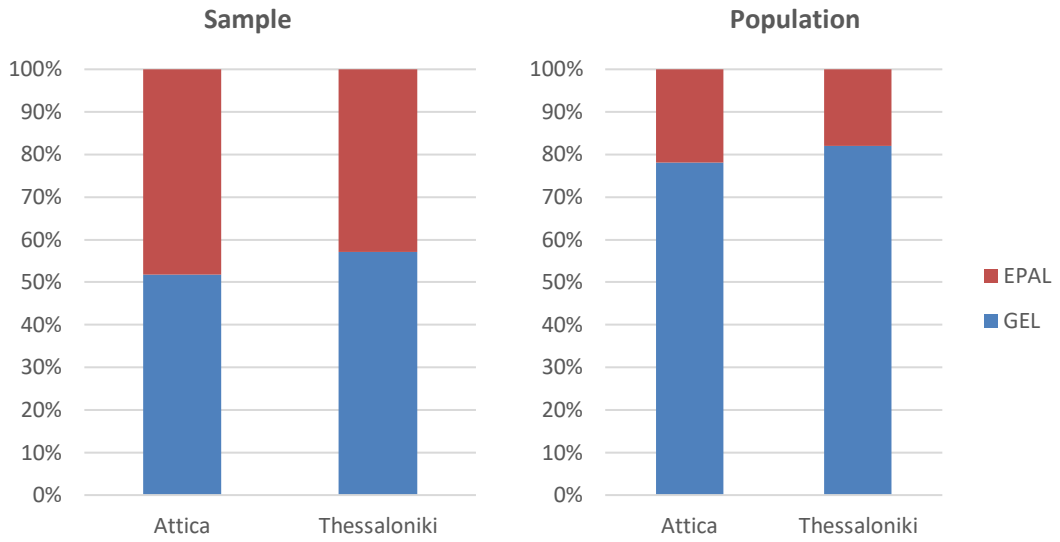
in the Cooperation domain. It is only significant at a significance level of 10% in the Innovation domain.

5. SCHOOL CHARACTERISTICS AND SOFT SKILLS

5.1 Introduction

The directors' database includes responses from 36 out of the 41 schools visited by the research team. The responses come from 17 EPALs (47,2%) and 19 GELs (52,8%). Compared to the population of schools, there is under-representation of GEL schools in both Attica and Thessaloniki (Figure 5.1).

Figure 5.1: Composition of schools by region and school type



Source: Director survey, Hellenic Statistical Authority Note: The population statistics in this presentation refer to school units at the end of school year 2019-2020 for GEL and EPAL schools.

5.2 School demographics

5.2.1 DESCRIPTIVE ANALYSIS

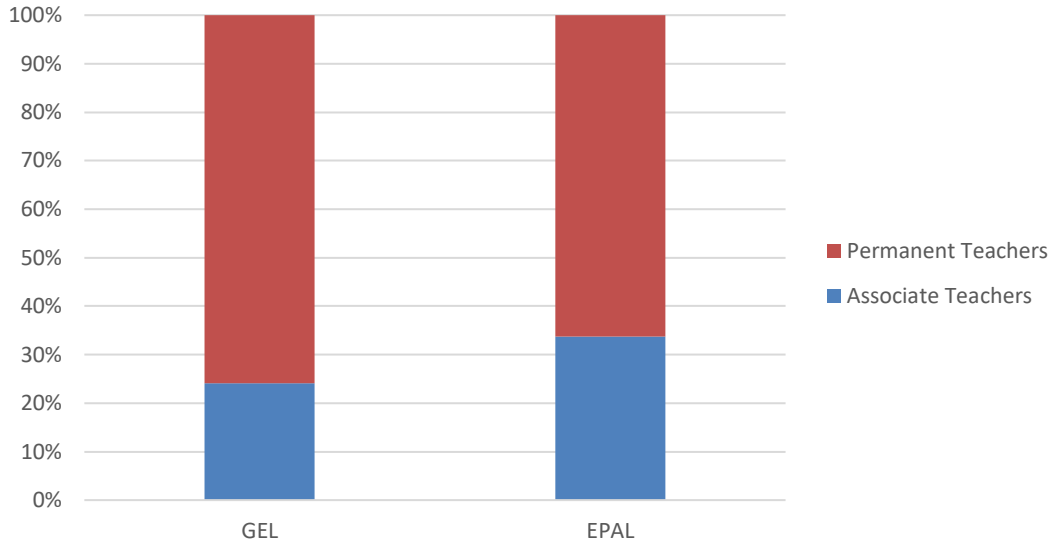
The share of permanent teachers is significantly higher in in GEL schools (75.9% against 66.3% in EPAL schools - Figure 5.2). This result is probably substantiated by the larger number of specializations in the EPAL schools that are harder to fill with permanent teaching staff.

As for their educational level, 29.4% of the teachers in GEL schools have postgraduate studies, compared with 43.7% of the teachers in EPAL schools. This result may also be linked to the higher number of specializations in the EPAL schools, which may require the teacher to hold a postgraduate or a second university degree, in order to qualify as a teacher.

Regarding the average class size, the higher the grade the lower the class size (Figure 5.3). In GEL schools, the average class size is almost steady across the two grades. In particular, the average class size in grade 1 is 21.1 students per class, while in grade 3 the number of students slightly declines to 20.7 per class. By contrast, the average class size drops sharply in EPAL schools, as the students split in specializations. The average EPAL class in grade 1 contains

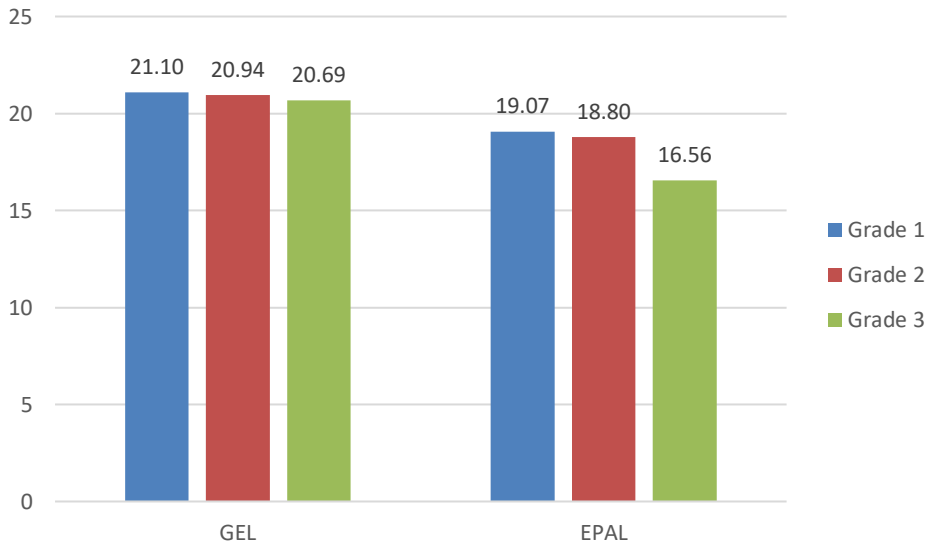
19.8 students, whereas in grade 3 the average size is 16.6 students. As for the number of students per teacher, the corresponding ratio is higher in GEL schools (8.67 students - Figure 5.4) compared to EPAL schools (5.62 students).

Figure 5.2: Composition of teachers by contract and school type



Source: Director survey

Figure 5.3: Weighted average class size by school type and grade

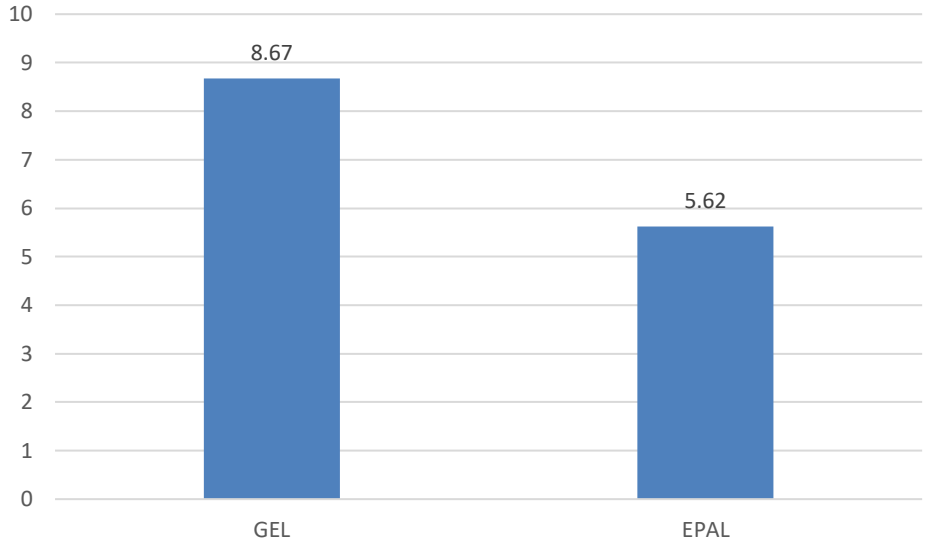


Source: Director survey

Regarding the student nationality, according to the school directors the foreign students account for almost 12% of the population in GEL schools and for more than 22% in EPAL schools. Students from families with socioeconomic difficulties are more than double in EPAL compared to GEL schools (37.03% of students in EPALs and 15.15% of students in GELs). Also, students with a different mother tongue are almost three times higher in EPAL schools

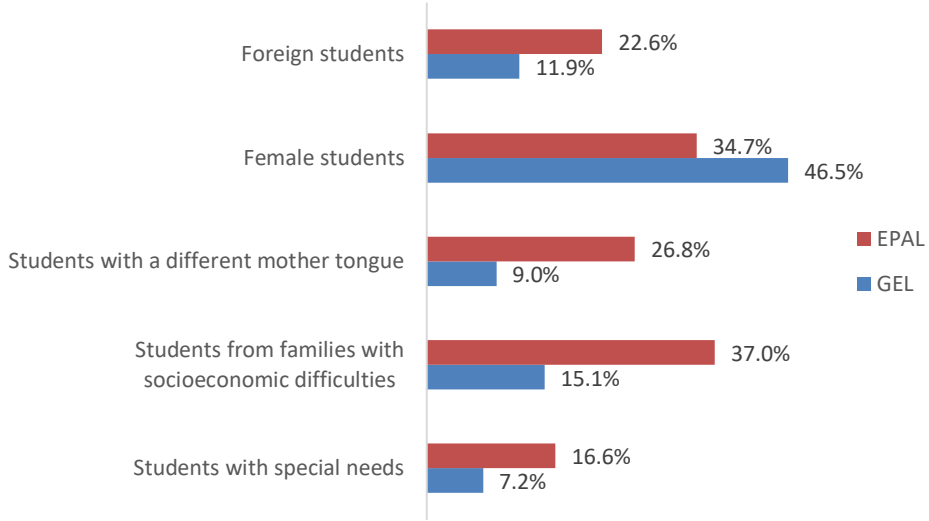
(16.76% against 8.97% of students in GELs). EPAL schools also tend to have more students with special needs compared to GEL schools (16.57% against 7.24%).

Figure 5.4: Weighted number of students per teacher by school type



Source: Director survey

Figure 5.5: Students by categories and school type, weighted percentages



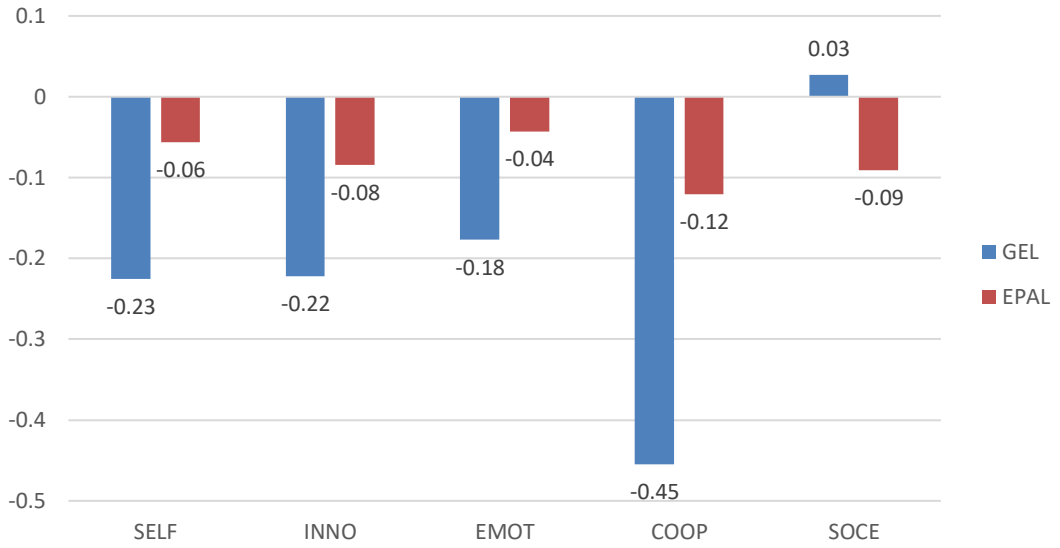
Source: Director survey

5.2.2 RELATION WITH SOFT SKILLS

First, we examine the relationship between BESSI domain scores for the students and the share of highly educated teachers at schools (Figure 5.6). Average Social Engagement skills per school and the share of teachers with postgraduate studies are positively correlated (0.03) for GEL schools, while in EPAL schools and among the remaining soft skills domains, the correlation coefficients are negative. Controlling for the influence of other variables in a

multiple regression setting (Appendix, Table 7.7-Table 7.11), we observe that the association between teachers with postgraduate studies and Innovation skills is positive and statistically significant among EPAL girls at 10%. As for the relationship with Emotional Resilience among EPAL girls, it is selected by the LASSO procedure and has a positive estimate, but it is not statistically significant. However, the relationship with Cooperation skills is negative and statistically significant for all students, among GEL girls and among EPAL boys. The association with Self-Management is negative for the total sample.

Figure 5.6: Correlations of BESSI domains weighted means with the share of teachers holding master's degree or PhD by school type



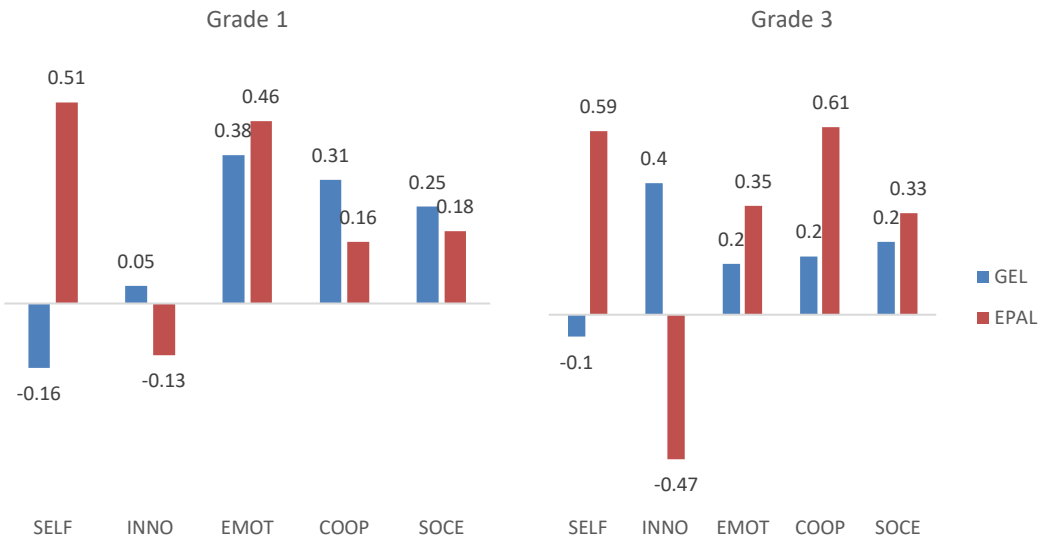
Source: Student and Director surveys

Next, we examine the relationship between BESSI domains and average class size (Figure 5.7). As for average class size of grade 1, classes with small number of students are associated with stronger Self-Management skills for GEL schools and Innovation skills for EPAL schools, while larger classes are associated with higher scores in the rest of BESSI domains such as Emotional Resilience, Cooperation and Social Engagement both in GEL and EPAL schools. As for the average class size of grade 3, the signs of correlation follow the same pattern. By inserting average class size in the regression model (Appendix, Table 7.7-Table 7.11), we observe that there is a positive and statically significant association of average class size with Self-Management skills for the total sample at 10% and Cooperation skills among GEL girls at 5%, EPAL boys at 1% and in the total sample at 1%.

As for students per teacher (Figure 5.8), the higher the number of students per teacher in GEL schools the higher the scores for Self-Management, Emotional Resilience and Social Engagement in both school types. The highest positive correlation in GEL schools is observed in Social Engagement, reaching 0.44. For EPAL schools, Self-Management records the highest correlation coefficient of 0.54. Controlling for the influence of other variables in a multiple regression setting (Appendix, Table 7.7-Table 7.11), the students per teacher ratio has positive

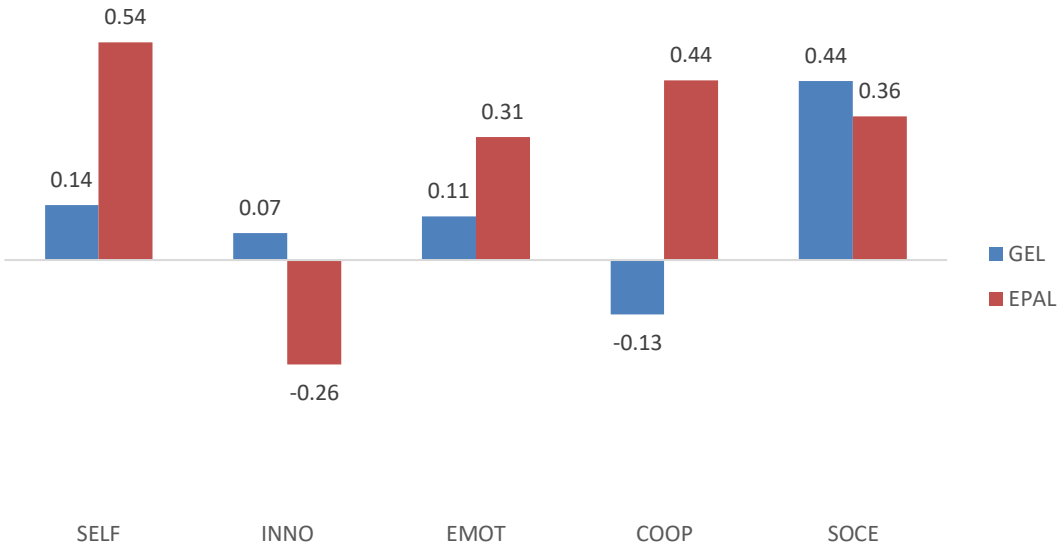
and statistically significant relationship with Self-Management for total sample and among EPAL boys at 5%, and with Emotional Resilience among GEL girls at 1% and EPAL boys at 5%.

Figure 5.7: Correlations of BESSI domains weighted means with average class size of grade 1 and 3 by school type



Source: Student and Director survey

Figure 5.8: Correlations of BESSI domains weighted means with students per teacher by school type

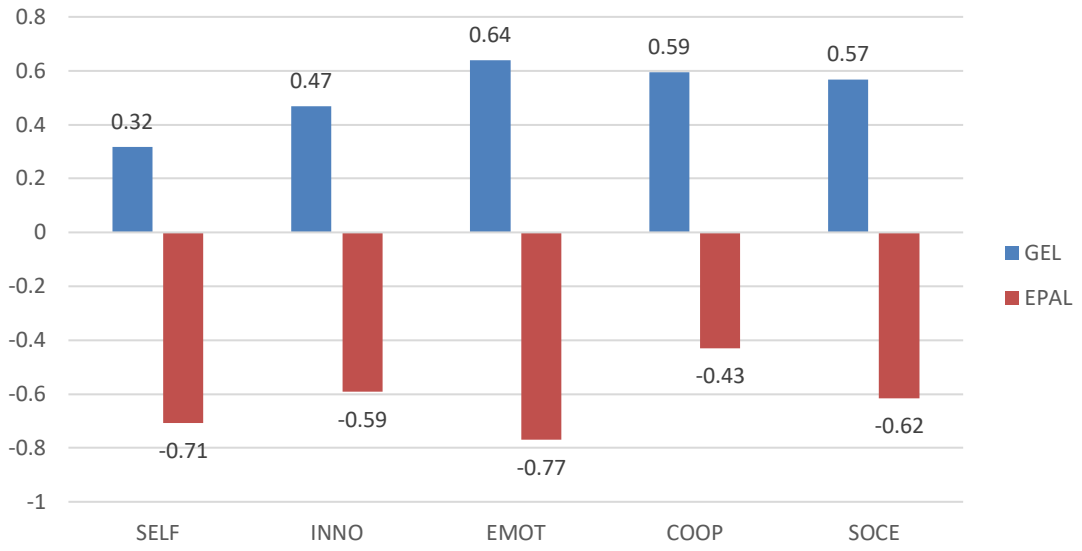


Source: Student and Director survey

An interesting finding is that the kind of relationship between the property value in the school's area and BESSI domains has opposite directions across types of schools and across all domains (Figure 5.9). In detail, all BESSI domains are positively correlated with property value of GEL schools, while the opposite happens for EPAL schools. In particular, the highest positive correlation of property value among GEL schools is recorded for Emotional Resilience,

reaching 0.64. The same domain has the strongest negative correlation among the EPAL schools, at -0.77. As for regression results (Appendix, Table 7.7-Table 7.11), the coefficient of property value is positive and statically significant for the total sample in Self-Management at 1%, Innovation at 5%, Emotional Resilience at 1% and Social Engagement skills at 5%. Regarding EPAL girls, the relationship between property value and Cooperation is positive and statistically significant at 5% and the association with Social Engagement is positive and statistically significant among GEL girls at 1%. For GEL boys, the coefficient of property value is positive and statistically significant for Innovation and Cooperation. For EPAL boys, the negative estimate of property value is statistically significant for all BESSI domains, except for Innovation skills and Social Engagement.

Figure 5.9: Correlations of BESSI domains weighted means with property value in the school's area by school type



Source: Student and Director surveys

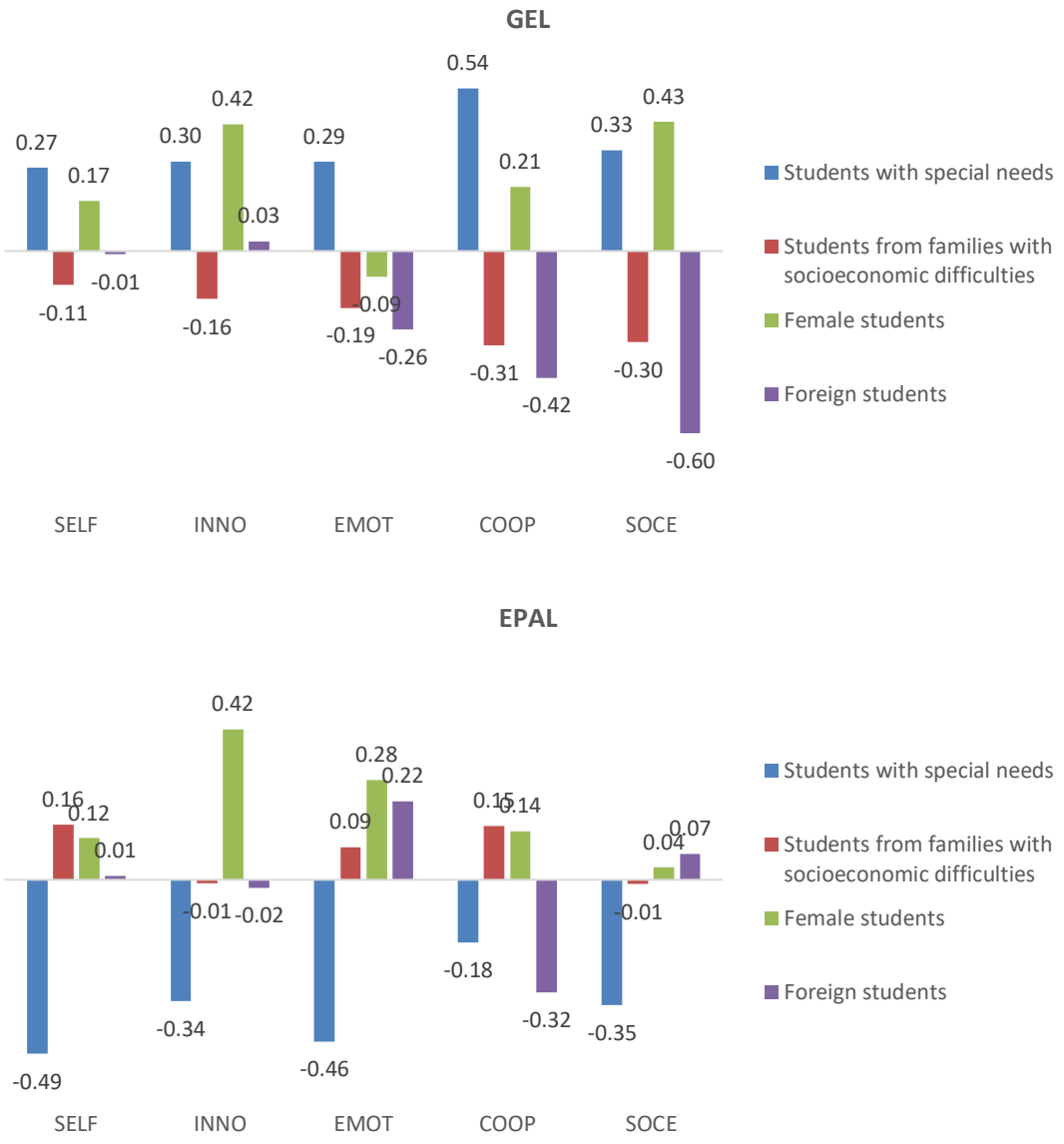
The share of students with special needs is negatively correlated with all BESSI domains in the EPAL schools, reaching -0.49 in the Self-Management domain, while it is positively correlated with all BESSI domains in the GEL schools, reaching 0.54 in the cooperation domain (Figure 5.10). According to the regression results (Appendix, Table 7.7-Table 7.11), the association with Self-Management, Innovation and Cooperation skills is positive and statistically significant for GEL boys.

As for the share of students from families with socioeconomic difficulties (Figure 5.10), the correlation coefficients are negative for all BESSI domains in GEL schools, while for EPAL schools, they are positive in Self-Management, Emotional Resilience and Cooperation skills. Including the share of students from families with socioeconomic difficulties in the regression models (Appendix, Table 7.7-Table 7.11), the relationship appears negative and statistically significant at 1% only with Cooperation skills among GEL girls.

Regarding the share of female students in GEL schools (Figure 5.10), the correlation coefficients are positive with all students' soft-skills scores, except that of Emotional

Resilience. For EPAL schools, the relationship with all soft-skills scores is positive across all soft-skill domains. Analyzing the association of the share of female students at schools through regression analysis (Appendix, Table 7.7-Table 7.11), Cooperation skills and Self-Management skills are positively related and statistically significant at 1% for the total sample. Among EPAL boys, the relationship with Cooperation skills is positive and statistically significant at 1%. Among GEL boys, the impact on Cooperation skills is positive but not statistically significant. However, among EPAL girls, the relationship with Innovation skills is negative and statistically significant at 5%.

Figure 5.10: Correlations of BESSI domains weighted means with shares of various student types in school unit by school type



Source: Student and Director surveys

The share of foreign students is negatively correlated with Emotional Resilience (-0.26), Cooperation (-0.42) and Social Engagement (-0.60) in GEL schools (Figure 5.10). In EPAL schools, the only significant negative correlation is recorded in the Cooperation score (-0.32),

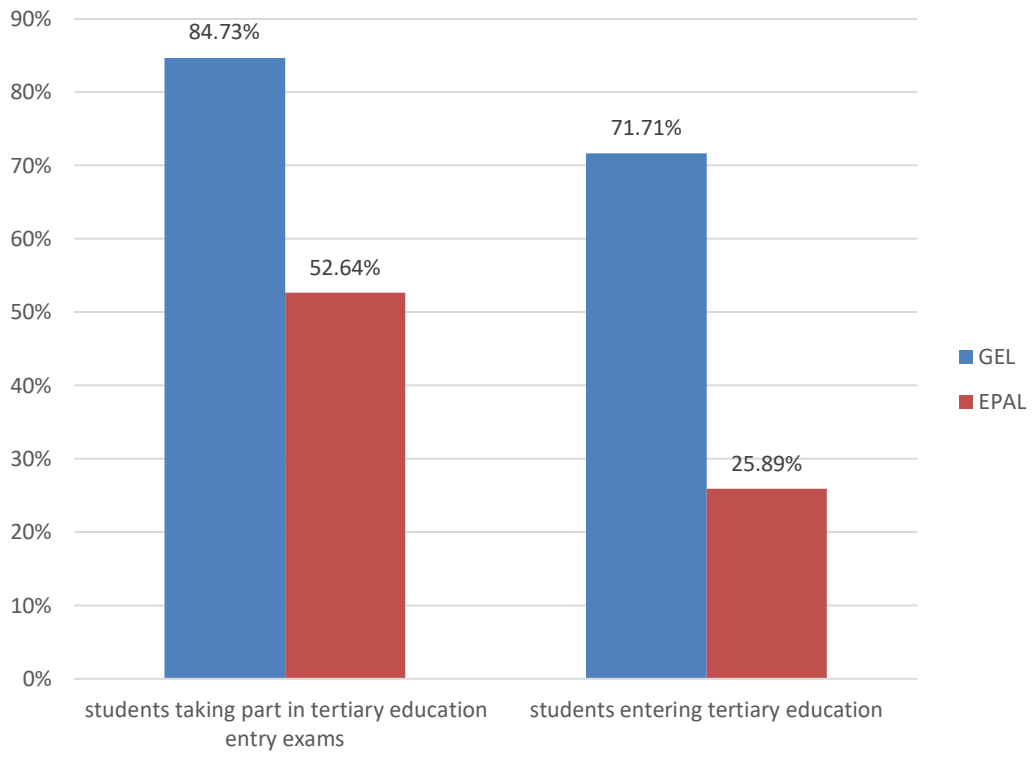
while the correlation is positive in the Emotional Resilience domain. By including the share of foreign students in our model (Appendix, Table 7.7-Table 7.11), we observe that the association with Cooperation skills is negative and statistically significant at 5% among EPAL girls and EPAL boys.

5.3 School performance

5.3.1 DESCRIPTIVE ANALYSIS

Most of the students take exams to enter tertiary education in both school types (84.73% of students in GEL schools and 71.71% in EPAL schools - Figure 5.11). Higher success rates in the exams are reported by the GEL schools in relation to the EPAL schools. In the GEL schools, more than half of the students enter tertiary education according to the student directors (52.64%) while in the EPAL schools, this share is limited to about ¼ of the students.

Figure 5.11: Students and tertiary education by school type, weighted percentages



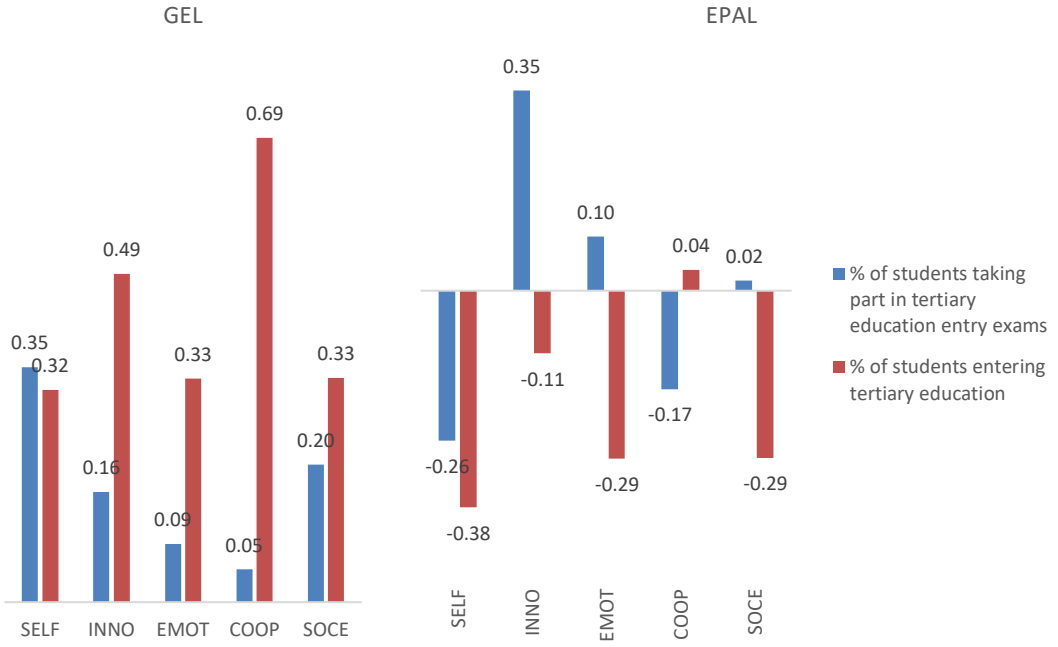
Source: Director survey

5.3.2 RELATION WITH SOFT SKILLS

In GEL schools, all BESSI domains are positively correlated with the share of students entering tertiary education (Figure 5.12) and especially in Cooperation and Innovation skills, where the correlation coefficients reach 0.69 and 0.49 respectively. By contrast, the relationship between BESSI domains and tertiary exam results is less clear in EPAL schools. Controlling for the influence of other variables in a multiple regression setting (Appendix, Table 7.7-Table

7.11), we can observe that the share of students entering tertiary education has a positive and statistically significant association at 5% with Innovation skills among EPAL girls, Emotional Resilience among GEL boys at 5% and Cooperation skills in the total sample and especially among boys studying in EPAL schools at 5%.

Figure 5.12: Correlations of BESSI domains weighted means with tertiary education by school type



Source: Student and Director surveys

5.4 Educational program and activities

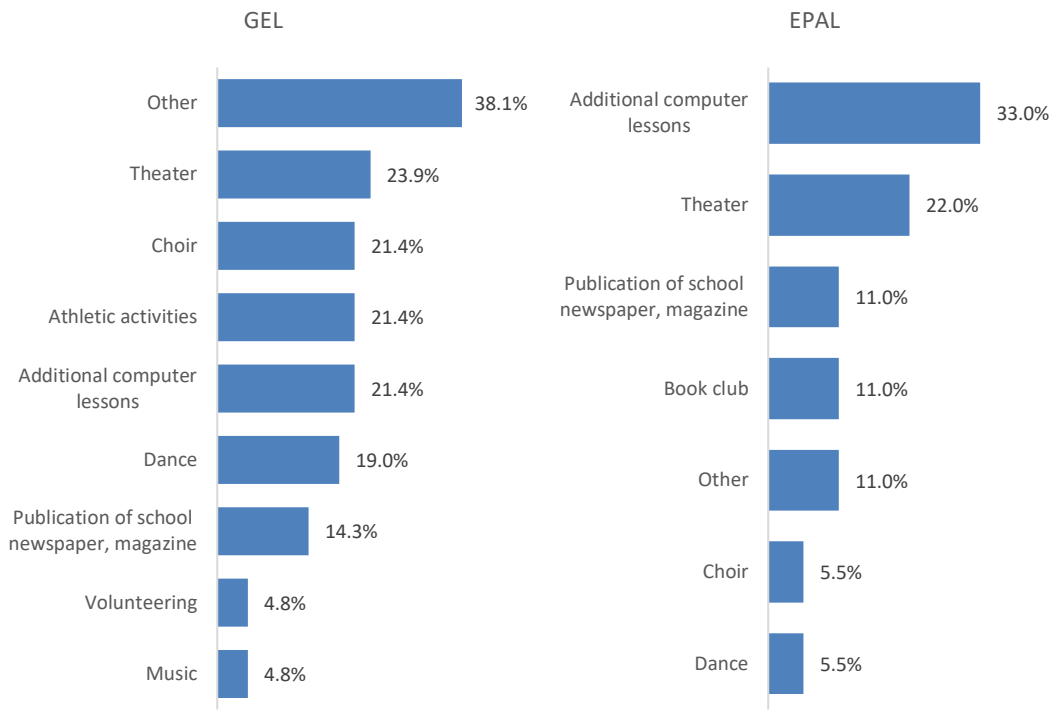
5.4.1 DESCRIPTIVE ANALYSIS

As for afternoon activities taking place at school (Figure 5.13), 24% of the GEL schools have theater lessons and 21% have choir, athletic activities, or additional computer lessons. By contrast, 33% of the EPAL schools offer additional computer lessons and 22% theater lessons. By combining the above categories into one composite indicator (Appendix, Table 7.12), on average, the GEL schools tend to have more afternoon activities compared to EPAL schools (Figure 5.14). In addition, 87% of the GEL schools include preparatory programs for students with mother language other than Greek, while 89% of the EPAL schools provide additional teaching to those students (Figure 5.15). As for career advice, almost 50% of the GEL schools and 95% of the EPAL schools offer such advice (Figure 5.16).

Regarding soft skills development (Figure 5.17), 87.2% of the GEL schools develop soft skills by means of general school practices and 84.7% by organizing extracurricular activities. In EPAL schools, 90.9% of schools request teachers to promote this as part of their work and 83.6% by providing feedback and advice to parents. A specifically dedicated separate classes

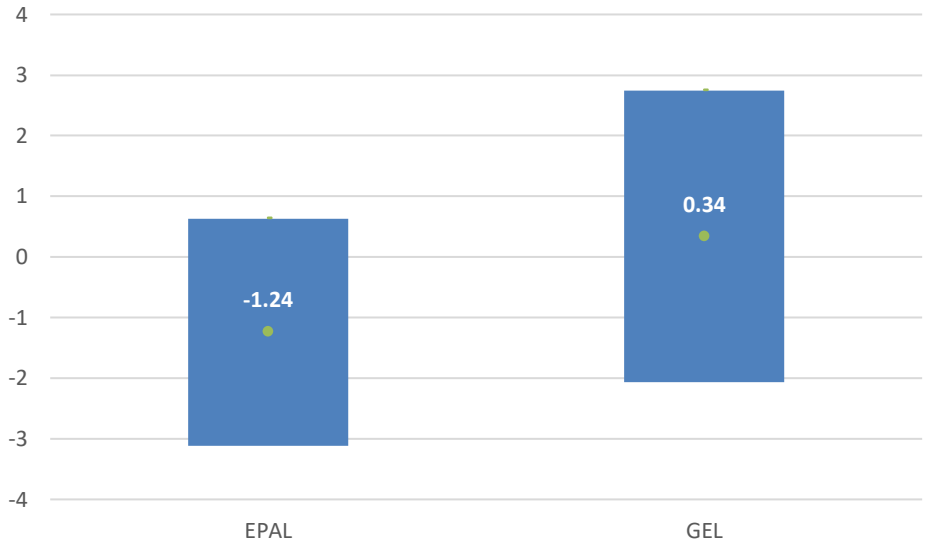
or school activities to develop soft skills seems to be a less popular method both in GEL and EPAL schools (10.2% in GEL schools and 12.1% in EPAL schools).

Figure 5.13: Afternoon activities at school, by school type, weighted percentages



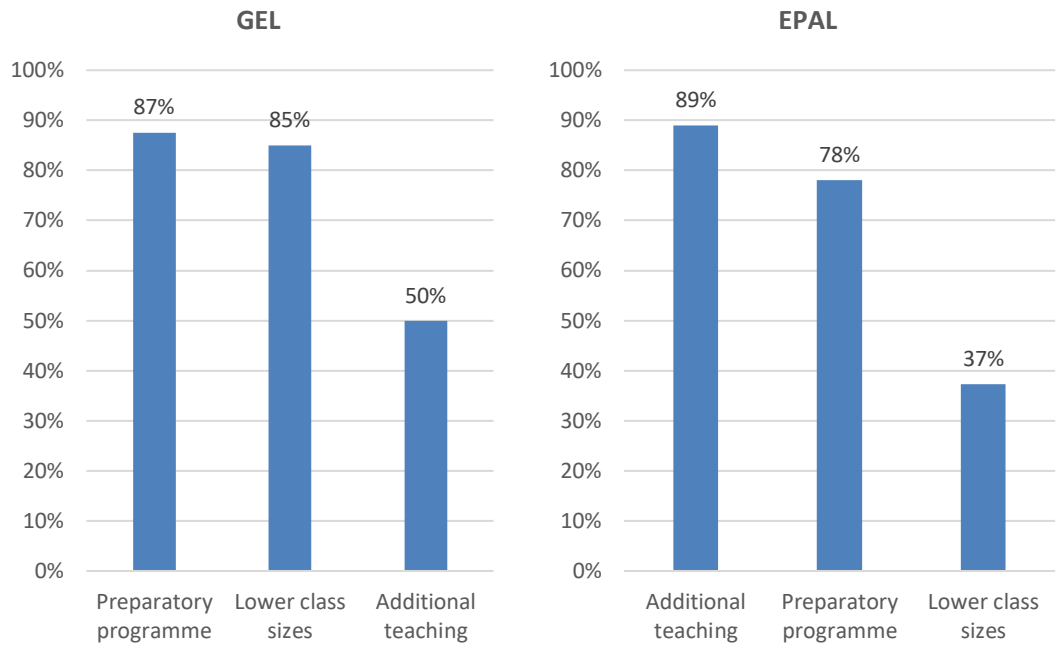
Source: Director survey

Figure 5.14: Afternoon activities index, weighted means and 95% confidence intervals



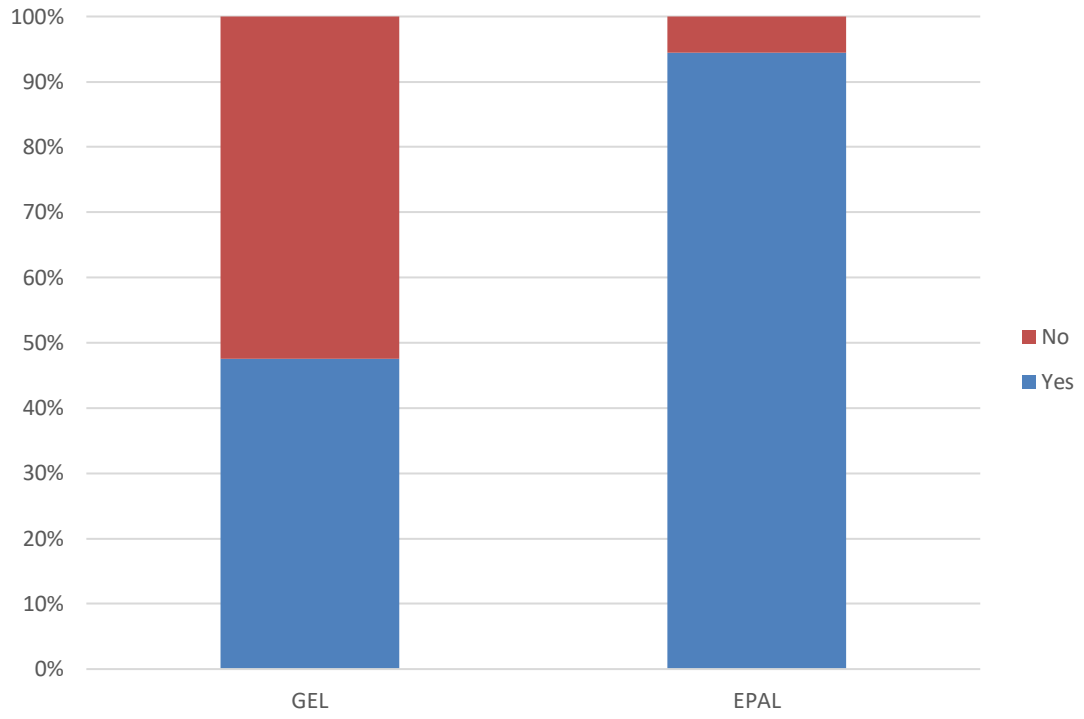
Source: Director survey

Figure 5.15: Support activities to students with mother language other than Greek by school type, weighted percentages



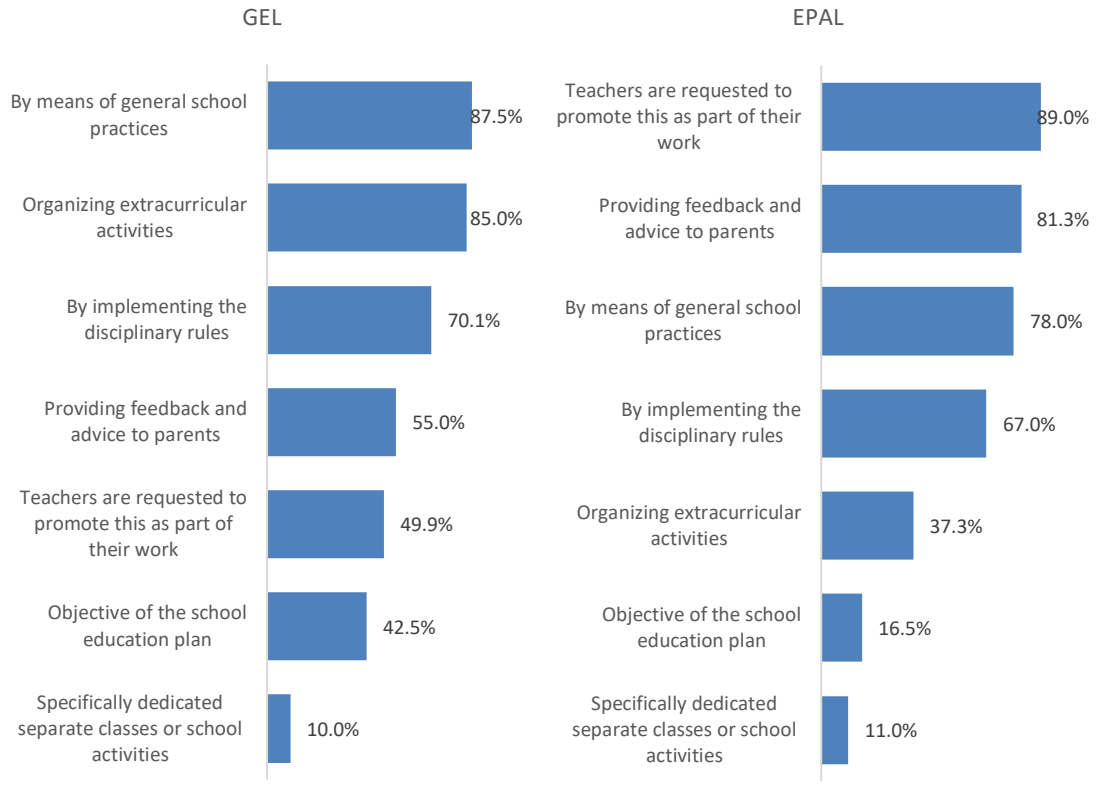
Source: Director survey

Figure 5.16: Schools providing career advice to students by school type, weighted percentages



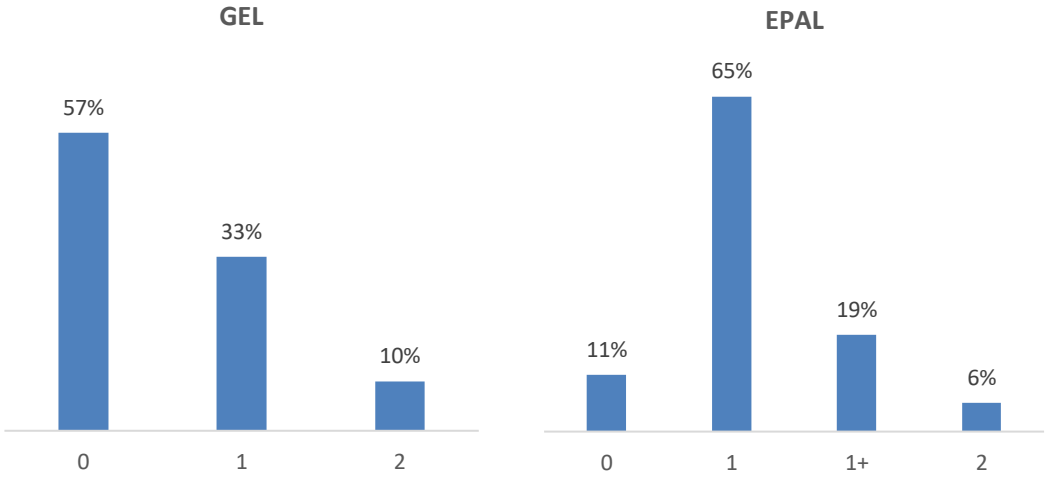
Source: Director survey

Figure 5.17: Actions to develop teachers' soft skills by school type, weighted percentages



Source: Director survey

Figure 5.18: Number of psychologists at schools by school type, weighted percentages

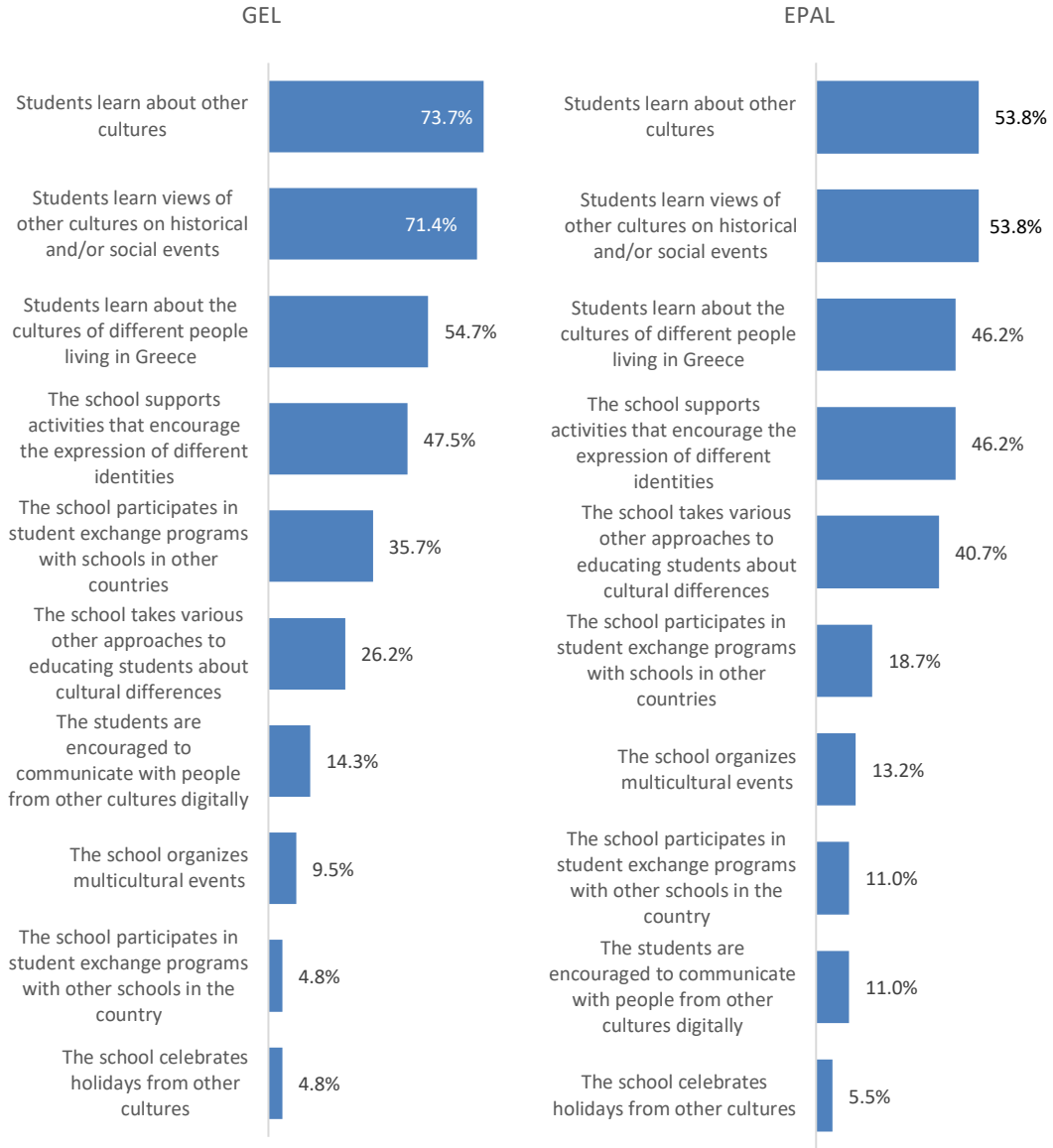


Source: Director survey

The presence of psychologists is reported by the directors to be more common in EPAL schools compared to GEL schools (Figure 5.18). More than half of the GEL schools answered that they do not provide such a service and 33% have one psychologist. In EPAL schools, 89% of the schools reported having at least one psychologist.

Schools also develop practices to inform students about multicultural issues both in GEL and EPAL schools (Figure 5.19). In particular, 7 to 10 GEL schools help students to learn about other cultures while as for EPAL, this share is reported at 53.8%.

Figure 5.19: Practices to inform students on multicultural issues by school type, weighted percentages



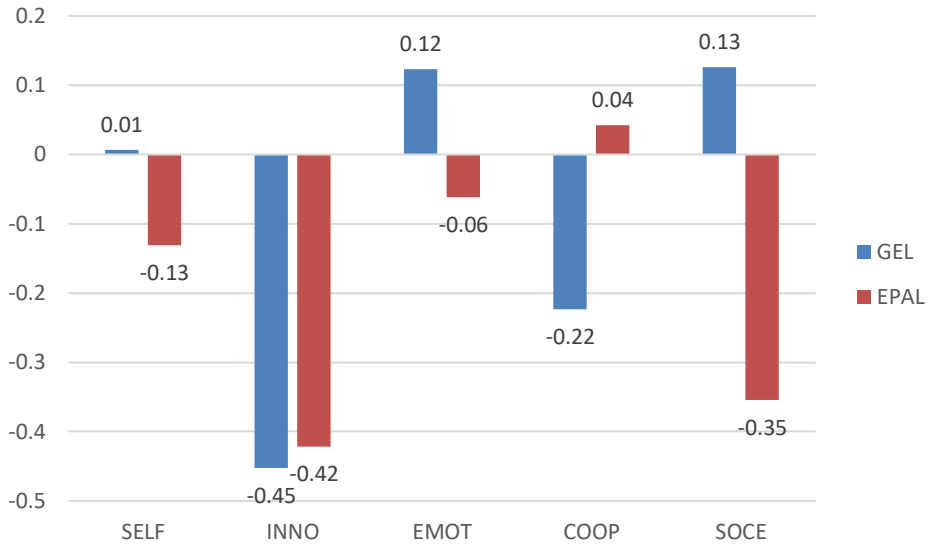
Source: Director survey

5.4.2 RELATION WITH SOFT SKILLS

The correlations between afternoon activities at GEL schools and students soft-skills domains are positive for Self-Management skills (0.01), Emotional Resilience (0.12) and Social Engagement (0.17 - Figure 5.20). For EPAL schools, the offer of afternoon activities is positively related to Cooperation skills (0.02) and negatively to the other soft-skill domains. After controlling for afternoon activities at schools and career advice to students in regression

analysis (Appendix, Table 7.7-Table 7.11), we observe that the association of Cooperation skills with the aggregate index of afternoon activities is positive and statistically significant at 5% for EPAL students (among both girls and boys). For the total sample, although the association with Cooperation skills is selected by LASSO procedure and the estimate is positive, it is not statistically significant. As for career advice, it is statistically significant and negatively related to Self-Management skills for the total sample.

Figure 5.20: Correlations of BESSI domains weighted means with Afternoon activities index by school type



Source: Student and Director surveys

5.5 Staff availability and training

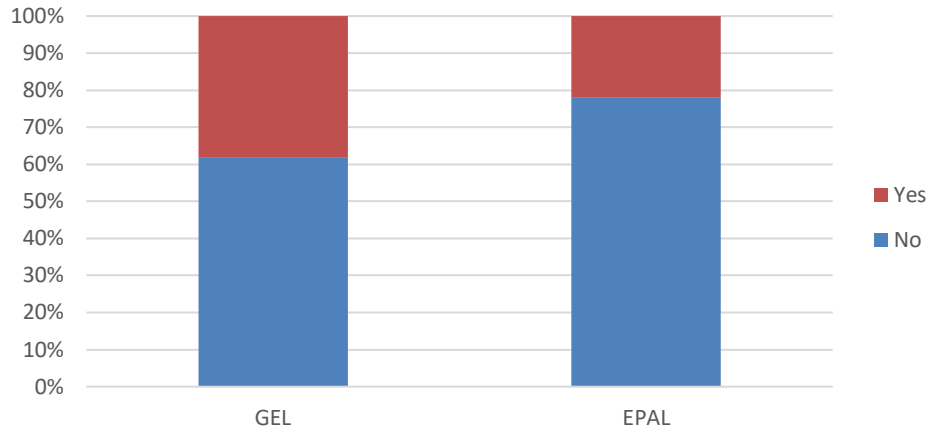
5.5.1 DESCRIPTIVE ANALYSIS

As for teachers training, only 38% of GEL schools and 22% of EPAL schools reported that they provided vocational and educational training to their teachers in the past three months (Figure 5.21). For GEL schools, 24% of the schools reported that teachers were trained on the school premises and 32% provided training out of school. For EPAL schools, only 11% of the schools provided in-school soft-skills training with 30% providing out-of-school training (Figure 5.22).

5.5.2 RELATION WITH SOFT SKILLS

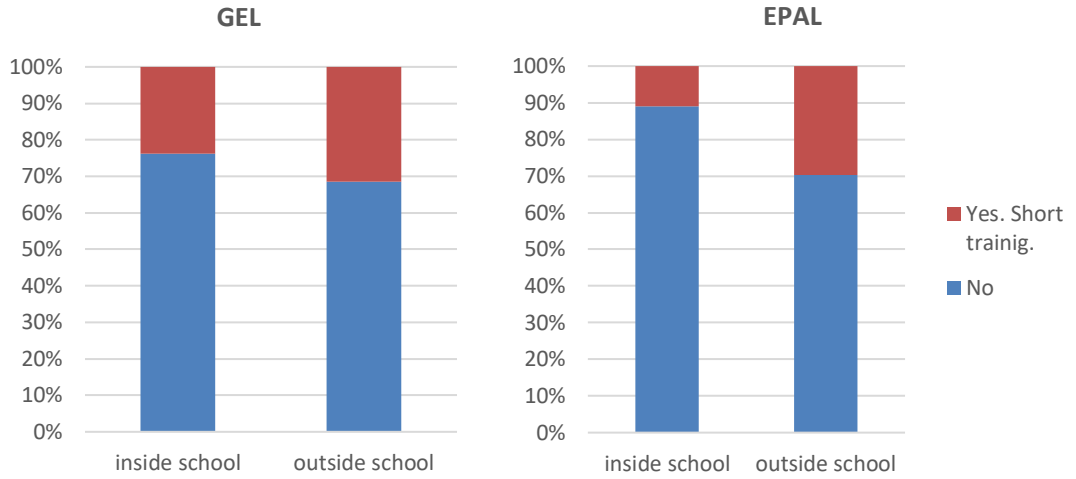
By inserting teachers soft skills training school in our regression model (Appendix, Table 7.7-Table 7.11), we observe that schools offering teachers soft skills training inside school has a negative and statistically significant impact on Self-management, Innovation, Emotional Resilience and Cooperation skills among EPAL girls. However, Cooperation skills are positively influenced by teachers soft skills training inside school among EPAL boys at 5% level of significance.

Figure 5.21: VET participation of teachers in past three months by school type, weighted percentages



Source: Director survey

Figure 5.22: Schools offering teachers soft skills training in/outside school by school type, weighted percentages



Source: Director survey

As for teachers soft skills training outside school, there is a positive effect on Self-Management and Emotional Resilience for total sample and among EPAL boys. The positive effect on Self-Management is statistically significant at 1% for total sample and EPAL boys. The effect on Emotional Resilience is statistically significant at 10% for total sample and 5% among EPAL boys. Also, there is a positive influence on Cooperation skills among EPAL boys at 1% level of significance. However, the effect with Innovation skills is negative among EPAL girls.

5.6 Digital infrastructure

5.6.1 DESCRIPTIVE ANALYSIS

Most schools seem to consider their digital infrastructure as sufficient, yet there may be some gap in technical staff availability in both GEL and EPAL schools (Figure 5.23). In particular, the share of schools agreeing or strongly agreeing that the computers connected to Internet and the digital platform for online teaching are satisfactory, reached 86% and 74% in GEL schools and 100% and 78% in EPAL schools respectively. By contrast, schools with insufficient technical staff are at 60% in the GEL sample and 46% in the EPAL sample.

We combined the above categories into one composite indicator (Appendix, Table 7.12), where a high value indicates sufficient digital infrastructure and low values weak infrastructure. One average, EPAL schools report to have better digital infrastructure compared to GEL schools (0.34 for EPAL schools and -0.37 for GEL schools). The data for GEL schools range from -1.47 to 0.74, indicating there is a great variability in digital infrastructure among GEL schools. By contrast, the mean indicator in EPAL schools has a lower confidence interval, from -0.33 to 1.00 points.

5.6.2 RELATION WITH SOFT SKILLS

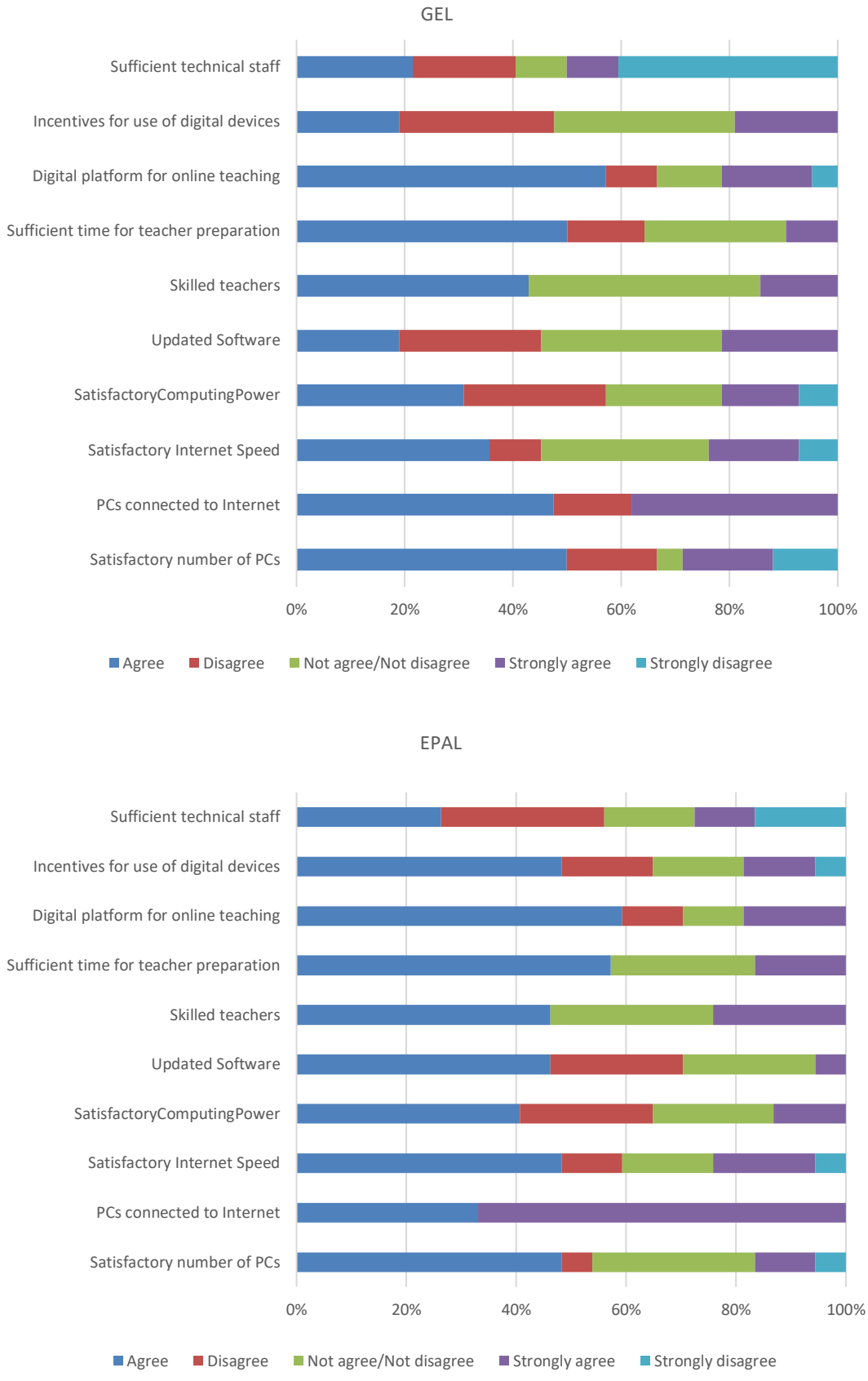
Regarding the relationship between digital infrastructure and BESSI domains (Figure 5.25), Innovations skills and Emotional Resilience are positively correlated with Digital infrastructure index for both GEL and EPAL schools. Particularly, the correlations of Innovations skills are 0.23 for GEL schools and 0.11 for EPAL schools, while those of Emotional Resilience is 0.41 for GEL schools and 0.57 for EPAL schools. Also, a sufficient digital infrastructure is positively associated with Cooperation (0.52) in GEL schools and Self-Management in EPAL schools (0.33). According to the regression analysis (Appendix, Table 7.7-Table 7.11), although the aggregate index of digital infrastructure is selected by the LASSO process for Self-management among EPAL girls with a positive sign in the regression, the estimate is not statistically significant. Among EPAL boys, the association with Cooperation skills is negative and statistically significant.

5.7 Other obstacles to the learning process

5.7.1 DESCRIPTIVE ANALYSIS

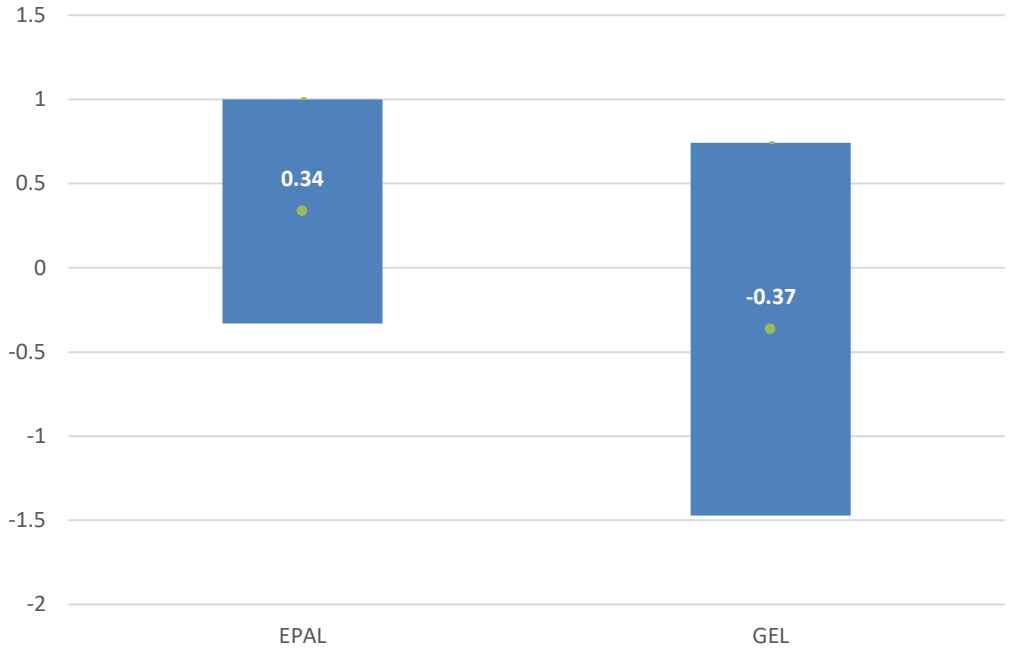
Regarding the obstacles to the learning process, GEL schools are mainly affected by weak attendance in classes - more than 50% of schools answered that this phenomenon affects too much or a lot their school (Figure 5.26). By contrast, substance abuse by students seems not to be a major problem in GEL schools, as 55% of the schools answered that they are not affected. As for EPAL schools, their main issues are student absences (84% of schools are affected too much or a lot - Figure 5.26), weak attendance (89% of schools are affected too much and a lot) and lack of respect of students to teachers (76% of schools are affected too much and a lot).

Figure 5.23: Digital infrastructure, weighted percentages



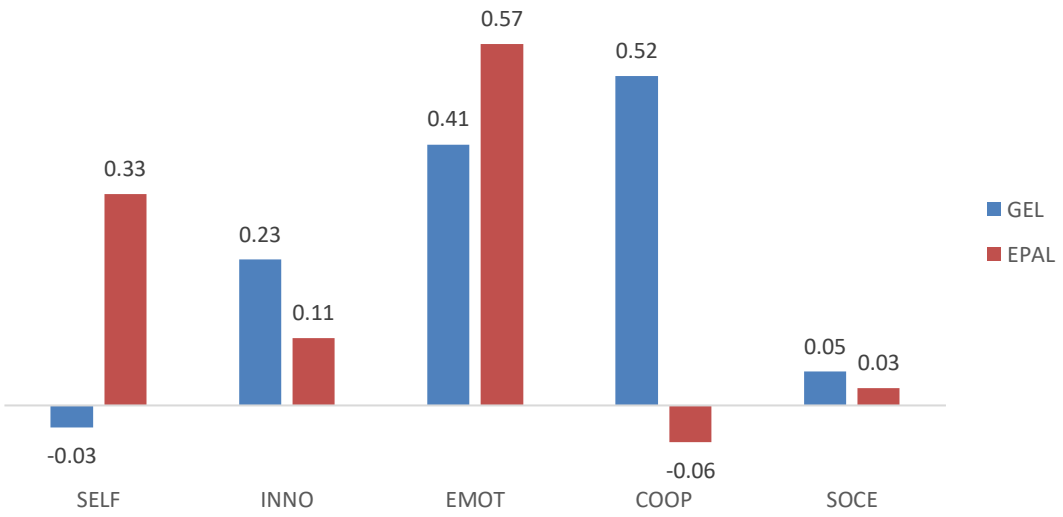
Source: Director survey

Figure 5.24: Digital infrastructure index, weighted means and 95% confidence intervals



Source: Director survey

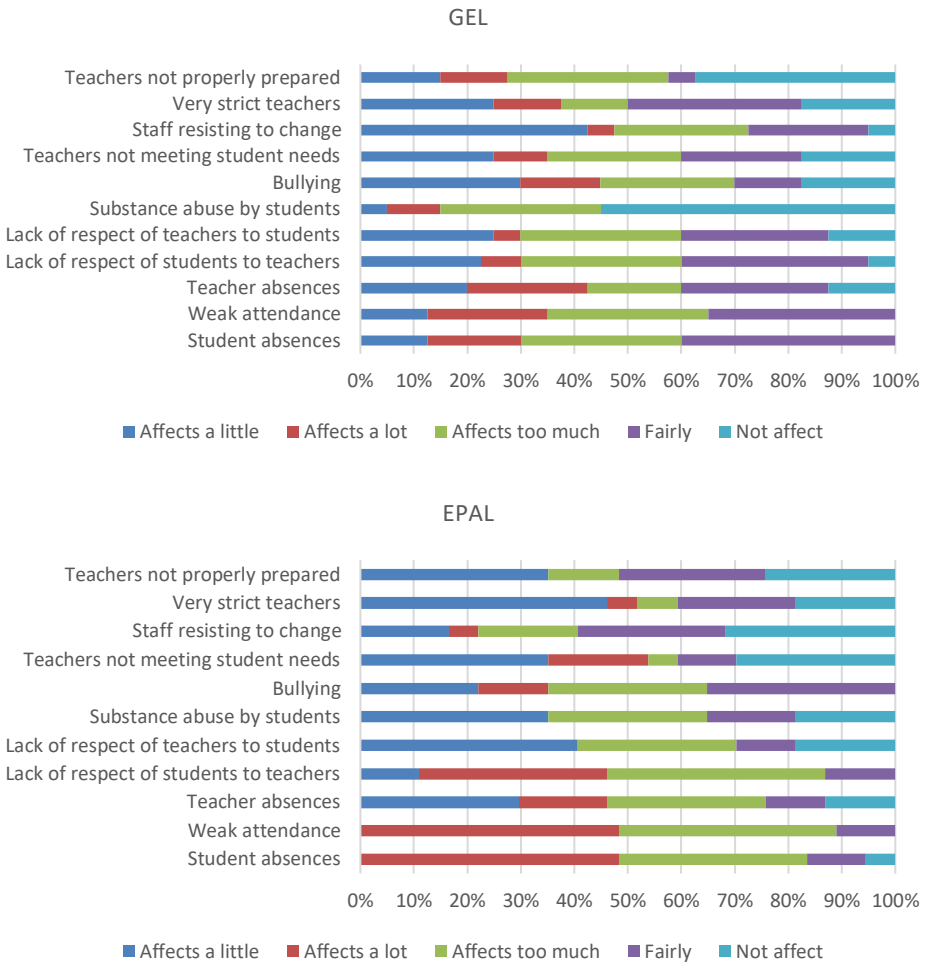
Figure 5.25: Correlations of BESSI domains weighted means with Digital infrastructure index by school type



Source: Student and Director surveys

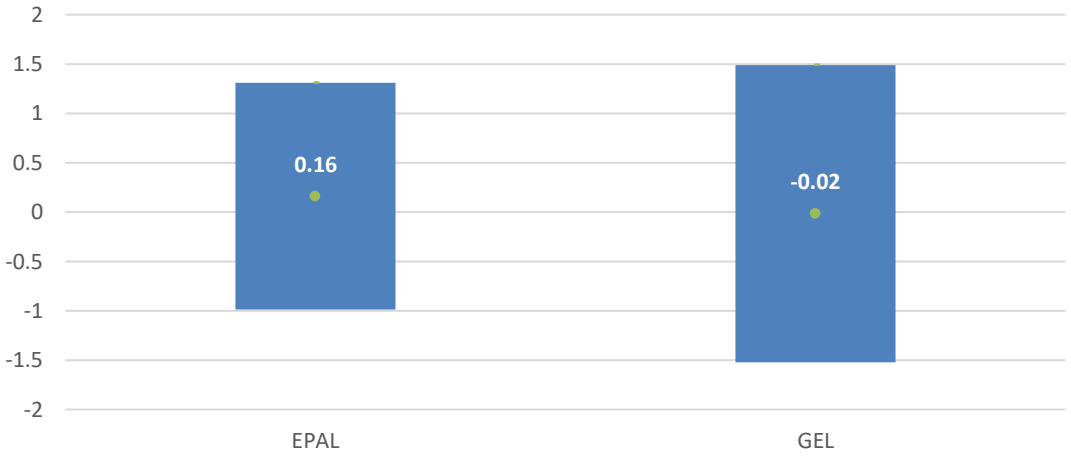
By combining the above categories into one (Appendix, Table 7.12), we constructed a normalized weighted index, where a high value indicates more barriers to the learning process. On average, EPAL schools (0.16 - Figure 5.27) tend to have more obstacles to the learning process compared to GEL schools (-0.02). However, the range of values for GEL schools has a significant fluctuation (from 1.49 to -1.52).

Figure 5.26: Obstacles to the learning process at GEL schools, weighted percentages



Source: Director survey

Figure 5.27: Obstacles to the learning process index, weighted means and 95% confidence intervals

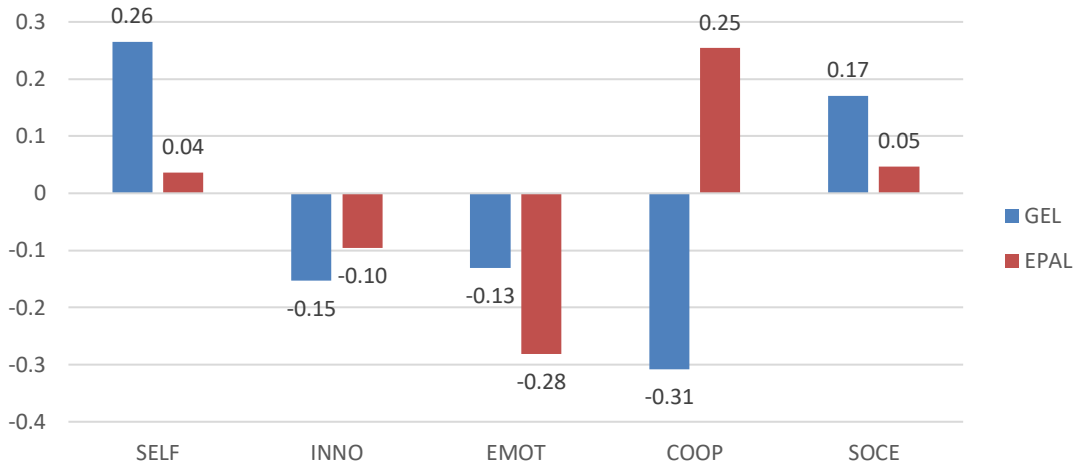


Source: Director survey

5.7.2 RELATION WITH SOFT SKILLS

As for the obstacles to the learning process and soft skills in GEL schools (Figure 5.28), the aggregate index is negatively correlated to Innovations skills (-0.15), Emotional Resilience (-0.13) and Cooperation (-0.31). In EPAL schools, the obstacles appear to negatively affect Innovations skills (-0.10) and Emotional Resilience (-0.28). Including the aggregate index of obstacles in the regression model (Appendix, Table 7.7-Table 7.11), we observe that there is a positive and statistically significant association of obstacles with Self-management among GEL boys and with Cooperation skills among EPAL boys at 10%.

Figure 5.28: Correlations of BESSI domains weighted means with Obstacles index by school type



Source: Student and Director survey

6. CONCLUSIONS

The survey of the soft skills of the high-school students in Greece showed that the students in the country report to be more extrovert, expressive and conversational and less organized compared to their high-school peers in the US. In particular, the Greek sample has considerably higher scores in conversation skills, adaptability and expressive skill and considerably lower scores in organization skills. Meanwhile, the significantly lower artistic skills and innovation scores provides an indication of a possible lag in courses that stimulate the development of corresponding skills in the Greek education system.

Another characteristic of the Greek high-school students is the relatively low score in emotional resilience and in particular in anger management and stress regulation skills. This result provides some indications that the emphasis on tertiary education and the preparations for exam-based entry may be making the Greek high-school students feel less able to regulate their stress and anger. This finding is also backed by the significantly lower level of life satisfaction and psychological wellbeing among year 3 GEL students, compared to both year 3 EPAL students and year 1 GEL students.

Regarding other key differences between EPAL and GEL students and schools, we can observe that high-school vocational education students in Greece tend to have lower socioeconomic status, as their parents tend to have lower education attainment level, lower occupational status, and fewer household possessions. They also tend to hold reduced aspirations to continue their studies and achieve higher occupational status in their 30s. The reported instances of bullying also tend to be higher among EPAL students, while they also report lower global awareness and cognitive ability scores. Meanwhile, EPAL schools tend to have higher share of associate teachers, teachers with postgraduate degrees, lower class sizes, fewer students per teacher, higher share of students with special needs, from families with socioeconomic difficulties, with a different mother tongue or from a foreign country. They also have a lower share of female students. Furthermore, higher share of EPAL schools tend to offer career advice or cooperate with psychologists, compared to GEL schools.

The evident advantages enjoyed by GEL students across a variety of indicators do not seem to transpire in higher soft skills when the influence of various contextual covariates is controlled for in a multivariate regression setting. In particular, when controlling for student characteristics, the soft-skill scores tend to be lower in GEL schools in the innovation skills domain (at the 1% level of significance), while the association with school type is negative but statistically insignificant in the remaining soft-skill domains. Controlling for school-level characteristics, GEL schools are associated with lower soft skills on average in the Self-Management, Emotional Resilience and Cooperation domains, while their association is statistically insignificant in the other two domains.

Regarding the development of soft skills from grade 1 to grade 3 among the EPAL students, positive and statistically significant results are only observed among EPAL boys in the innovation skills domain and among EPAL girls in the self-management domain when controlling for school characteristics. By contrast, there are stronger indications on soft-skills development among GEL students, as the coefficient on year 3 students is positive and

statistically significant among GEL girls in the innovation skills, emotional resilience, and cooperation domains and among GEL boys in the emotional resilience and cooperation domains.

Regarding the remaining factors that seem to affect the level of soft skills, the self-management domain seems to be associated positively with the wellbeing of the students, their relations with teachers, the household possessions in their home, and their awareness of global issues. Regarding school level characteristics, the average level of self-management skills in the student population appears to be positive associated with the property values in the school neighborhood, the ratio of students per teacher, the average class size, the share of female students and the provision of out-of-school training on soft skills to the teaching staff. Negative association of school characteristics with self-management skills among the students is recorded in the provision of career advice services and in the share of highly educated teachers.

In the innovation domain, the student-level factors that appear to be positively related include awareness of global issues, home possessions, relationship with parents, experiencing higher frequency of bullying, and cognitive ability. Among the school-level factors, positive association is recorded in the total sample only for the property value indicator.

Correspondingly, in the emotional resilience domain, the factors that seem to have a positive and statistically significant association with the level of soft skills include wellbeing, good relations with teachers and experiencing bullying, while the association is negative for experiencing test anxiety and relations with parents. At the school level, the list of positive factors includes the property value in the school neighborhood and out-of-school training of teachers.

Moving on to the cooperation domain, positive association is recorded for relations with friends and teachers, the sense of belonging, wellbeing, experiencing bullying, being aware of global issues, and household possessions. At the school level, positive association is recorded with the share of female students, the average class size and the share of students that enter tertiary education, while the coefficient is negative for the share of highly educated teachers.

Lastly, in the social engagement domain, the list of positive factors includes wellbeing, the sense of belonging, having good relations with friends, being bullied, awareness of global issues, home possessions and property value in the school neighborhood. The list of negative factors is limited to experiencing test anxiety.

7. APPENDIX

Table 7.1: Two-sided t-test on difference in means between grade 3 and grade 1

BESSI domain	School type	Gender	Difference	p-value
Social Engagement	GEL	Male	-0.053	60.7%
		Female	0.091	19.4%
	EPAL	Male	0.089	26.3%
		Female	0.027	65.4%
Cooperation	GEL	Male	0.100	16.4%
		Female	0.082	12.0%
	EPAL	Male	0.086	14.6%
		Female	0.052	58.8%
Self-management	GEL	Male	0.038	60.1%
		Female	0.108	14.5%
	EPAL	Male	0.072	16.4%
		Female	0.218	1.2%
Innovation	GEL	Male	-0.013	84.5%
		Female	0.256	0.4%
	EPAL	Male	0.121	7.2%
		Female	0.083	33.7%
Emotional Resilience	GEL	Male	0.158	3.4%
		Female	0.128	7.1%
	EPAL	Male	0.004	93.5%
		Female	0.274	12.4%

Table 7.2: Regression results of Self-Management domain scores controlling for student characteristics

	Total sample	GEL girls	EPAL girls	GEL boys	EPAL boys
(Intercept)	3.348 ***	3.316 ***	3.476 ***	3.246 ***	3.394 ***
	(0.057)	(0.103)	(0.292)	(0.113)	(0.038)
ST_WELLBEING	0.069 ***	0.061 ***	0.057 *	0.076 ***	0.135 ***
	(0.011)	(0.019)	(0.025)	(0.023)	(0.033)
ST_BELONG	0.010	0.026			
	(0.012)	(0.018)			
ST_RELTEACH	0.053 ***	0.068 ***	0.117 **	0.018	0.025
	(0.010)	(0.016)	(0.041)	(0.016)	(0.020)
ST_RELPAR	-0.003 **	-0.002	-0.001	-0.005	-0.001
	(0.001)	(0.002)	(0.003)	(0.003)	(0.003)
ST_FRIENDS	0.020		0.060 **		0.047 *
	(0.015)		(0.022)		(0.025)
ST_HOMEPOS	0.015 **	0.028			
	(0.007)	(0.016)			
Grade 3	0.099 *	0.104	0.054	0.087	0.081
	(0.050)	(0.072)	(0.086)	(0.070)	(0.052)
Male	0.020				
	(0.036)				
Thessaloniki region	0.043		0.208 **		
	(0.030)		(0.063)		
GEL school	-0.047				
	(0.035)				
ST_COGN	0.005	-0.007		0.025	
	(0.011)	(0.021)		(0.020)	
ST_GLOBALMIND	0.074 ***	0.096 ***	0.041	0.059 *	0.081 ***
	(0.014)	(0.024)	(0.026)	(0.030)	(0.019)
ST_ANXTEST		0.004 *	-0.007 ***		
		(0.002)	(0.002)		
HISEI			0.002		
			(0.004)		
PAREDYRS			-0.018		
			(0.015)		
Degrees of freedom	1125	319	177	347	302

Source: Student survey. Note: (1) (***) indicates statistical significance at 1%, (**) at 5% and (*) at 10% (2) Numbers in parentheses are the standard errors.

Table 7.3: Regression results of Innovation skills domain scores controlling for student characteristics

	Total sample	GEL girls	EPAL girls	GEL boys	EPAL boys
(Intercept)	3.254 ***	2.943 ***	2.989 **	3.118 ***	3.532 ***
	(0.061)	(0.085)	(0.527)	(0.135)	(0.218)
ST_WELLBEING	0.014		0.026		0.090 **
	(0.016)		(0.032)		(0.034)
ST_ANXTEST	-0.000		-0.010 **		
	(0.002)		(0.003)		
ST_BULLY	0.029 **		0.018	0.034	0.038 *
	(0.014)		(0.026)	(0.022)	(0.017)
ST_BELONG	-0.010		0.012		-0.036
	(0.011)		(0.030)		(0.027)
ST_RELTEACH	0.020		0.077		0.028
	(0.015)		(0.046)		(0.021)
ST_RELPAR	0.003 *	0.004 *	0.007 **		
	(0.002)	(0.002)	(0.002)		
ST_FRIENDS	0.010		0.005		0.043
	(0.010)		(0.027)		(0.029)
HISEI	-0.002		0.001		-0.001
	(0.001)		(0.004)		(0.003)
ST_HOMEPOS	0.057 ***	0.036 ***	0.028	0.061 ***	0.059 ***
	(0.008)	(0.011)	(0.025)	(0.018)	(0.016)
Grade 3	0.153 ***	0.225 ***	0.049	0.038	0.168 *
	(0.047)	(0.070)	(0.102)	(0.071)	(0.080)
Male	-0.075				
	(0.052)				
GEL school	-0.115 ***				
	(0.027)				
ST_COGN	0.028 *	0.042 **	0.012	0.010	-0.003
	(0.014)	(0.018)	(0.055)	(0.022)	(0.032)
ST_GLOBALMIND	0.110 ***	0.153 ***	0.103 **	0.094 ***	0.052 *
	(0.014)	(0.024)	(0.029)	(0.025)	(0.024)
PAREDYRS			0.010		-0.023
			(0.025)		(0.017)
Thessaloniki region			0.138 *		
			(0.057)		
Degrees of freedom	1089	337	171	354	285

Source: Student survey. Note: (1) (***) indicates statistical significance at 1%, (**) at 5% and (*) at 10% (2) Numbers in parentheses are the standard errors

Table 7.4: Regression results of Emotional Resilience domain scores controlling for student characteristics

	Total sample	GEL girls	EPAL girls	GEL boys	EPAL boys
(Intercept)	2.760 ***	2.825 ***	2.804 ***	2.342 ***	3.149 ***
	(0.094)	(0.169)	(0.083)	(0.130)	(0.050)
ST_WELLBEING	0.128 ***	0.140 ***	0.118 ***	0.109 ***	0.165 ***
	(0.014)	(0.025)	(0.030)	(0.022)	(0.034)
ST_ANXTEST	-0.008 ***	-0.007 ***	-0.012 ***	-0.011 ***	
	(0.001)	(0.002)	(0.002)	(0.003)	
ST_BULLY	0.024 *			0.040 **	
	(0.013)			(0.017)	
ST_RELTEACH	0.044 ***	0.019	0.133 **	0.030	0.042 *
	(0.013)	(0.017)	(0.052)	(0.025)	(0.020)
ST_RELPAR	-0.005 ***	-0.005 ***		-0.005	-0.002
	(0.002)	(0.002)		(0.003)	(0.002)
ST_FRIENDS	0.008		0.051 *		
	(0.012)		(0.026)		
HISEI	0.001	0.001			
	(0.002)	(0.002)			
ST_HOMEPOS	0.004				
	(0.010)				
Grade 3	0.177 ***	0.178 **	0.108	0.236 ***	0.024
	(0.042)	(0.064)	(0.139)	(0.064)	(0.070)
Male	0.218 ***				
	(0.047)				
Thessaloniki region	-0.159 **	-0.215 **		-0.206 ***	0.167 **
	(0.060)	(0.097)		(0.055)	(0.070)
GEL school	-0.028				
	(0.055)				
ST_COGN	0.017	-0.002		0.029 *	
	(0.011)	(0.015)		(0.015)	
ST_GLOBALMIND	0.026	0.024		0.041	0.046 **
	(0.019)	(0.026)		(0.024)	(0.018)
ST_BELONG		0.020			
		(0.022)			
PAREDYRS				0.036 ***	
				(0.011)	
Degrees of freedom	1115	318	187	336	306

Source: Student survey. Note: (1) (***) indicates statistical significance at 1%, (**) at 5% and (*) at 10% (2) Numbers in parentheses are the standard errors

Table 7.5: Regression results of Cooperation domain scores controlling for student characteristics

	Total sample	GEL girls	EPAL girls	GEL boys	EPAL boys
(Intercept)	3.552 ***	3.502 ***	3.593 ***	3.480 ***	3.444 ***
	(0.056)	(0.141)	(0.059)	(0.053)	(0.045)
ST_WELLBEING	0.033 **	0.104 ***	0.038	0.028	0.099 ***
	(0.016)	(0.029)	(0.042)	(0.020)	(0.029)
ST_BULLY	0.026 ***				
	(0.009)				
ST_BELONG	0.067 ***	0.048	0.121 **	0.077 ***	0.050
	(0.010)	(0.029)	(0.041)	(0.022)	(0.028)
ST_RELTEACH	0.023 **	0.016	0.009		0.018
	(0.010)	(0.019)	(0.026)		(0.018)
ST_RELPAR	-0.001	0.002			
	(0.001)	(0.003)			
ST_FRIENDS	0.063 ***	0.079 ***	0.020	0.056 **	0.075 ***
	(0.013)	(0.019)	(0.036)	(0.024)	(0.019)
ST_HOMEPOS	0.013 *			0.030 **	
	(0.007)			(0.012)	
Grade 3	0.110 ***	0.125	-0.007	0.137 **	0.128
	(0.036)	(0.079)	(0.091)	(0.063)	(0.074)
Male	-0.112 ***				
	(0.033)				
GEL school	-0.017				
	(0.042)				
ST_COGN	0.013	0.014			
	(0.010)	(0.030)			
ST_GLOBALMIND	0.060 ***	0.030	0.039	0.075 ***	0.033
	(0.015)	(0.022)	(0.029)	(0.022)	(0.023)
ST_ANXTEST		0.003			0.004
		(0.002)			(0.002)
PAREDYRS		-0.007			
		(0.010)			
Thessaloniki region		0.103	0.210 **	-0.084	0.096
		(0.070)	(0.069)	(0.074)	(0.065)
Degrees of freedom	1110	284	184	337	289

Source: Student survey Note: (1) (***) indicates statistical significance at 1%, (**) at 5% and (*) at 10% (2) Numbers in parentheses are the standard errors

Table 7.6: Regression results of Social Engagement domain scores controlling for student characteristics

	Total sample	GEL girls	EPAL girls	GEL boys	EPAL boys
(Intercept)	3.238 ***	3.018 ***	3.153 ***	3.236 ***	3.141 ***
	(0.091)	(0.187)	(0.134)	(0.037)	(0.071)
ST_WELLBEING	0.069 ***	0.151 ***	0.082 *	0.032	0.150 ***
	(0.016)	(0.031)	(0.041)	(0.025)	(0.029)
ST_ANXTEST	-0.003 *		-0.011 ***	-0.005	-0.002
	(0.002)		(0.002)	(0.003)	(0.002)
ST_BULLY	0.082 ***	0.036 **	0.040 *	0.092 ***	0.040 **
	(0.014)	(0.014)	(0.021)	(0.020)	(0.012)
ST_BELONG	0.109 ***	0.091 **	0.090 **	0.126 ***	0.095 ***
	(0.014)	(0.029)	(0.038)	(0.025)	(0.025)
ST_RELPAR	-0.002	-0.000			
	(0.001)	(0.003)			
ST_FRIENDS	0.036 ***	0.034 *	0.039	0.043 *	0.038 **
	(0.011)	(0.017)	(0.027)	(0.021)	(0.016)
HISEI	0.000	0.002	0.004		
	(0.001)	(0.003)	(0.003)		
ST_HOMEPOS	0.016 *				0.024
	(0.008)				(0.018)
Grade3	0.099 **	0.156	-0.060	0.031	0.173
	(0.037)	(0.106)	(0.054)	(0.060)	(0.099)
Male	-0.041				
	(0.046)				
Thessaloniki region	-0.008	0.168 **	0.284 ***		0.143
	(0.054)	(0.071)	(0.044)		(0.080)
GEL school	-0.022				
	(0.043)				
ST_GLOBALMIND	0.058 ***	0.043 *	0.076 ***	0.045 *	0.041 **
	(0.014)	(0.021)	(0.019)	(0.021)	(0.017)
ST_COGN		0.003	-0.031		
		(0.030)	(0.035)		
ST_RELTEACH				-0.026	
				(0.026)	
Degrees of freedom	1095	286	177	325	289

Source: Student survey. Note: (1) (***) indicates statistical significance at 1%, (**) at 5% and (*) at 10% (2) Numbers in parentheses are the standard errors

Table 7.7: Regression results of Self-Management domain scores controlling for school characteristics

	Total sample	GEL girls	EPAL girls	GEL boys	EPAL boys
(Intercept)	2.990 ***	3.297 ***	3.160 ***	3.265 ***	3.464 ***
	(0.126)	(0.032)	(0.108)	(0.042)	(0.134)
Grade 3	0.104	0.128	0.224 **	0.040	0.047
	(0.060)	(0.080)	(0.081)	(0.072)	(0.054)
Male	0.053				
	(0.045)				
Thessaloniki region	0.184 ***		0.255 **		
	(0.032)		(0.080)		
GEL school	-0.331 ***				
	(0.058)				
Average Class Size	0.005 *				
	(0.003)				
Obstacles	0.005			0.019 *	
	(0.004)			(0.009)	
Property value	0.084 ***				-0.259 ***
	(0.019)				(0.067)
SC036Q01Yes	-0.129 ***				
	(0.032)				
Students per Teacher	0.024 **		0.014		0.034 **
	(0.008)		(0.017)		(0.012)
Highly Educated Teachers, share	-0.360 ***				
	(0.096)				
Female students, share	0.522 ***				
	(0.153)				
SC072Q01Yes. Short training	-0.063		-0.610 **	0.006	
	(0.056)		(0.258)	(0.062)	
SC072Q02Yes. Short training	0.203 ***	0.107			0.191 ***
	(0.043)	(0.076)			(0.052)
Digital Infrastructure			0.051		
			(0.044)		
Afternoon activities			0.014		
			(0.009)		
SC025Q01				2.014 ***	
				(0.293)	
Degrees of freedom	876	277	160	286	305

Source: Student and Director survey. Note: (1) SC036Q01: career advice to students, SC072Q01: Teachers training soft-skills in school, SC072Q02: Teachers training soft-skills outside school, SC025Q01: share of students with special needs, (2) (***) indicates statistical significance at 1%, (**) at 5% and (*) at 10% (3) Numbers in parentheses are the standard errors

Table 7.8: Regression results of Innovation skills domain scores controlling for school characteristics

	Total sample	GEL girls	EPAL girls	GEL boys	EPAL boys
(Intercept)	3.127 ***	3.204 ***	3.806 ***	2.958 ***	3.146 ***
	(0.074)	(0.043)	(0.540)	(0.068)	(0.042)
Grade 3	0.133 **	0.256 ***	0.122	0.031	0.121 *
	(0.052)	(0.080)	(0.108)	(0.073)	(0.064)
Male	-0.092 **				
	(0.039)				
GEL school	0.002				
	(0.040)				
Property value	0.075 **		-0.290	0.099 ***	
	(0.036)		(0.308)	(0.033)	
Thessaloniki region			-0.044		
			(0.233)		
Average Class Size			-0.001		
			(0.007)		
Highly Educated Teachers, share			0.574 *		
			(0.245)		
Afternoon activities			-0.014		
			(0.018)		
SC032Q01			1.032 **		
			(0.329)		
Female students, share			-1.650 **		
			(0.495)		
SC072Q01Yes. Short training			-0.561 ***		
			(0.044)		
SC072Q02Yes. Short training			-0.419 **		
			(0.122)		
SC025Q01				1.157 **	
				(0.438)	
Degrees of freedom	1264	346	160	334	351

Source: Student and Director survey. Note: (1) SC032Q01: shares of students entering tertiary education, SC072Q01: Teachers training soft-skills in school, SC072Q02: Teachers training soft-skills outside school, SC025Q01: share of students with special needs, (2) (***) indicates statistical significance at 1%, (**) at 5% and (*) at 10% (3) Numbers in parentheses are the standard errors

Table 7.9: Regression results of Emotional Resilience domain scores controlling for school characteristics

	Total sample	GEL girls	EPAL girls	GEL boys	EPAL boys
(Intercept)	2.627 ***	2.191 ***	2.684 ***	2.810 ***	3.459 ***
	(0.062)	(0.136)	(0.096)	(0.165)	(0.100)
Grade 3	0.139 ***	0.090	0.286	0.167 *	-0.057
	(0.050)	(0.058)	(0.175)	(0.092)	(0.060)
Male	0.459 ***				
	(0.047)				
GEL school	-0.097 *				
	(0.049)				
Property value	0.080 ***	0.045			-0.315 ***
	(0.026)	(0.036)			(0.059)
SC072Q02Yes. Short training	0.103 *				0.125 **
	(0.052)				(0.045)
Thessaloniki region		-0.138 **		-0.155 **	
		(0.054)		(0.063)	
Students per Teacher		0.049 ***			0.032 **
		(0.012)			(0.011)
SC072Q01Yes. Short training		0.088	-0.807 *	0.097	
		(0.090)	(0.385)	(0.067)	
Highly Educated Teachers, share			0.235		
			(0.170)		
SC032Q01				0.546 **	
				(0.197)	
SC025Q01					-0.192
					(0.161)
Degrees of freedom	1076	270	171	249	286

Source: Student and Director survey. Note: (1) SC032Q01: shares of students entering tertiary education, SC072Q02: Teachers training soft skills outside school, SC025Q01: share of students with special needs, (2) (***) indicates statistical significance at 1%, (**) at 5% and (*) at 10% (3) Numbers in parentheses are the standard errors

Table 7.10: Regression results of Cooperation domain scores controlling for school characteristics

	Total sample	GEL girls	EPAL girls	GEL boys	EPAL boys
(Intercept)	3.162 ***	3.441 ***	3.285 ***	3.170 ***	3.458 ***
	(0.161)	(0.118)	(0.198)	(0.205)	(0.090)
Grade 3	0.100 *	0.063	0.009	0.129 *	0.024
	(0.049)	(0.064)	(0.103)	(0.072)	(0.055)
Male	-0.077				
	(0.053)				
GEL school	-0.288 ***				
	(0.068)				
Average Class Size	0.015 ***	0.013 **			0.018 ***
	(0.005)	(0.005)			(0.002)
Obstacles	0.009				0.012 *
	(0.006)				(0.005)
Foreign students, share	-0.090		-0.921 **		-0.284 **
	(0.091)		(0.287)		(0.067)
Highly Educated Teachers, share	-0.464 ***	-0.410 ***			-0.608 ***
	(0.134)	(0.109)			(0.064)
Afternoon activities	0.000		0.027 **		0.009 **
	(0.003)		(0.008)		(0.002)
SC032Q01	0.305 **				0.323 **
	(0.108)				(0.057)
Female students, share	0.630 ***			0.261	0.699 ***
	(0.146)			(0.386)	(0.053)
SC072Q02Yes. Short training	0.055		-0.035		0.322 ***
	(0.038)		(0.078)		(0.035)
Property value		0.044 **		0.056 *	-0.302 ***
		(0.019)		(0.030)	(0.047)
SC026Q01		-0.469 ***			
		(0.091)			
Thessaloniki region			0.084		
			(0.099)		
Digital Infrastructure			-0.100		-0.024 **
			(0.049)		(0.007)
Students per Teacher			0.084 **		
			(0.024)		
SC025Q01			0.550	1.600 ***	
			(0.438)	(0.369)	
SC072Q01Yes. Short training			-0.507 **		0.165 **
			(0.177)		(0.029)
Degrees of freedom	804	270	148	290	305

Source: Student and Director survey, Note: (1) SC032Q01: shares of students entering tertiary education, SC072Q01: Teachers training soft-skills in school, SC072Q02: Teachers training soft-skills outside school, SC025Q01:

share of students with special needs, SC026Q01: share of students from families with socioeconomic difficulties, (2) (***) indicates statistical significance at 1%, (**) at 5% and (*) at 10% (3) Numbers in parentheses are the standard errors

Table 7.11: Regression results of social engagement domain scores controlling for school characteristics

	Total sample	GEL girls	EPAL girls	GEL boys	EPAL boys
(Intercept)	2.988 ***	2.908 ***	3.263 ***	3.340 ***	3.251 ***
	(0.108)	(0.077)	(0.090)	(0.054)	(0.037)
Grade 3	0.050	0.105	0.027	-0.053	0.089
	(0.070)	(0.073)	(0.060)	(0.103)	(0.078)
Male	0.065				
	(0.038)				
GEL school	-0.031				
	(0.062)				
Average Class Size	0.005				
	(0.005)				
Obstacles	0.009				
	(0.008)				
Property value	0.079 **	0.131 ***			
	(0.031)	(0.038)			
SC072Q01Yes. Short training	0.056				
	(0.065)				
SC072Q02Yes. Short training	-0.008				
	(0.048)				
Degrees of freedom	877	346	202	367	351

Source: Student and Director survey. Note: (1) SC072Q01: Teachers training soft-skills in school, SC072Q02: Teachers training soft-skills outside school, (2) (***) indicates statistical significance at 1%, (**) at 5% and (*) at 10% (3) Numbers in parentheses are the standard errors

Table 7.17: Construction of OECD indicators

Indicators	Questions
Household possessions	Availability of 14 household items at home Number of possessions and books at home.
Psychological wellbeing	I have felt cheerful and in good spirits. I have felt calm and relaxed. I have felt active and vigorous. I have woken up feeling fresh and rested. My daily life has been filled with things that interest me.
Test anxiety	I often worry that it will be difficult for me taking a test. Even if I'm well prepared for a test I feel very anxious. I get very tense when I study for a test.
School belonging	I feel like an outsider (or left out of things) at school. I make friends easily at school. I feel like I belong at school. I feel awkward and out of place in my school. Other students seem to like me. I feel lonely at school.
Exposure to bullying	Other students make fun of me. I was threatened by other students. Other students took away or destroyed things that belong to me. I got hit or pushed around by other students. Other students spread nasty rumors about me.
Student-teacher relations	Most of my teachers treated me fairly. I got along well with most my teachers. Most my teachers were interested in my wellbeing.
Perceived relations with friends	My friends understand me. My friends accept me as I am. My friends are easy to talk to. My friends respect my feelings.
Perceived relations with parents	I get upset easily with my parents. It is hard for me to talk with my parents. I feel angry with my parents.
Global Awareness	Climate change and global warming. Global health (e.g., epidemics). International conflicts. Causes of poverty. Equality between men and women in different parts of the world.
Socioeconomic status	Parents' highest level of education. Parents' highest occupational status. Household possessions

Table 7.12: Construction of schools' characteristics indicators

Indicators	Questions
Afternoon activities	Choir
	Theater
	Dance
	Athletic activities
	Additional computer lessons
	Publication of school newspaper, magazine
	Volunteering
	Music
	Book club
	Other
Digital Infrastructure	Satisfactory number of PCs
	PCs with Internet
	Satisfactory Internet speed
	Satisfactory computing power
	Updated software
	Skilled teachers
	Sufficient time for teacher preparation
	Digital platform for online teaching
	Incentives for use of digital devices
	Technical staff
Obstacles	Student absences
	Weak attendance
	Teacher absences
	Lack of respect of students to teachers
	Lack of respect of teachers to students
	Substance abuse by students
	Bullying
	Teachers not meeting student needs
	Staff resisting to change
	Very strict teachers
	Teachers not properly prepared

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FOUNDATION FOR ECONOMIC & INDUSTRIAL RESEARCH

Study on Soft Skills in Vocational Education and Training in Greece

Background note

September 2023

The value judgements and policy suggestions contained in this study reflect the views of the researchers and do not necessarily correspond to the opinions of the governance or the management of IOBE.

The study was carried out by Svetoslav Danchev, Odysseas Mamalis, Nikos Paratsiokas, Konstantinos Peppas, Yakinthi Pountouraki and Foteini Stroubakou, under the supervision of the Director General of IOBE, Professor N. Vettas. The researchers would like to thank the directors, the teaching staff and the students of the schools that took part in the survey for their time and effort, and the representatives of the World Bank for their support with invaluable insights. Any errors or omissions are solely borne by the authors.

The Foundation for Economic and Industrial Research (IOBE) is a private, non-profit, public-benefit, research organisation. It was established in 1975 with the dual purpose of promoting research on current problems and prospects of the Greek economy and of generating reliable analysis and proposals of high value to policy makers.

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1. INTRODUCTION

The main scope of the study is the measurement of soft (socio-emotional) skills of non-compulsory secondary education students in Greece. The aim is to compare the levels of these skills among students attending the country's general and vocational high schools and to contrast them with the needs of the labor market in Greece.

The study also seeks to promote further the understanding of the characteristics and factors that influence the formation and development of the students' soft skills. In order to do this, the study captures a snapshot of the soft skills of pupils of different grades, exploring also the key factors that are believed to strengthen or hinder the development of these skills in the wider student environment (their home, school, and peer community). Understanding the conditions and practices that encourage or hinder the development of these skills is considered to be of particular importance, as — based on the literature — these are considered to act as key pillars that promote lifelong learning and thus enable individuals to adapt to changing labor market conditions.

Given the significant information gap in the development of soft skills, especially as opposed to cognitive skills, this study attempts to help fill this gap by identifying policies and practices related to the development of these skills. The ultimate goal is to provide better support to the development of the social and emotional skills of the students. This is based on the premise that a holistic approach — promoting both cognitive and non-cognitive skills — is best suited to enabling the students to reach their full potential.

The study has five key deliverables. This deliverable is a background paper on the importance of "soft skills" for the labor market outcomes among VET graduates in Greece. The other four deliverables of the study include:

- Instrument to measure "soft skills" and contextual questionnaire adapted to the Greek context (and in Greek language) and preparation of questionnaire to be addressed to the school directors.
- Single database including the data collected from the student survey
- Field report with the results from the application of the instrument to measure "soft skills" and the corresponding data analysis.
- Note with the findings from consultations with key stakeholders.

This report is structured as follows. A brief review of the literature findings on the importance of soft skills for labor market outcomes is presented in Chapter 2. Chapter 3 explores historical data on VET school graduates, in order to examine how the supply of skills from VET schools has changed over time to reflect the changes in the labor market. Analysis exploring differences in skills, employability and wages of vocational and general secondary education graduates is presented in Chapter 4. Chapter 5 concludes with the main findings from this report.

2. THE IMPORTANCE OF SOFT SKILLS FOR LABOUR MARKET OUTCOMES

Social-emotional skills such as critical thinking, decision-making and the ability to communicate and collaborate are associated with success in school (measured using grades in main subjects). The strengthening of social-emotional skills promotes social competence, improves decision-making and the emotional abilities of individuals. They are also resources for people in their daily lives to find solutions to the problems they face, manage difficult tasks, and make better decisions. In particular, regarding decision-making, the stress factor is important (Porcelli and Delgado, 2017), as reduced levels lead to better and more rational decision-making (Allwood and Salo, 2012). Such a change could affect students through the acquisition of necessary skills in the long run.

Economists are increasingly focused on the importance of soft skills for labor market success. In particular, social skills such as leadership, communication, teamwork and other interpersonal skills are becoming increasingly rewarded in the labor market. In the US, jobs requiring higher levels of social interaction grew by 12 percentage points as a share of the US labor force between 1980 and 2012 (Deming, 2017). The growing importance of social skills can explain other trends in educational outcomes and the labor market, such as the narrowing or in some cases reversal of gender gaps in completed education and earnings (Picker, 2015). Therefore, it is necessary to understand whether the education system provides students with the required set of soft skills.

In addition, the "New Skills Agenda for Europe", presented by the European Commission in July 2020, recommends the need to promote the development of basic skills including life skills, soft skills and technology and science skills in the teaching of Europeans students. In a rapidly changing and highly interconnected world, people should possess basic skills that enable them to effectively manage daily challenges. Additionally, the European Commission officially announced that 2023 is the European Year of Skills. As the demand for new capabilities in the EU gathers pace, reskilling and upskilling will enable the business landscape to become more competitive.

Educational systems in many EU countries are characterized by the strong presence of vocational education and training (VET) institutions. Of the 17.5 million students enrolled in upper secondary education in the European Union in 2019, almost half of them were enrolled in a vocational track, of which at least 2 million were enrolled in work-based programs. VET institutions are therefore central in the process of skill formation in the EU. Identifying the professional competences that will be demanded in the future and adjusting the provision of VET services accordingly is poised to become more challenging, making many training programs ineffective (Mckenzie 2019; Kluve et al 2019).

VET graduates with professional competences might enjoy favorable labor market outcomes in the short term, but in the long-term, having a stronger set of foundational skills—numeracy, literacy, and socio-emotional or “soft” skills— seem to produce better results (Hanushek and Woessmann, 2017, Hampf and Woessmann, 2016; Hanushek et al. (2017), Krueger and Kumar, 2004).

Therefore, VET systems should ensure an adequate set of socio-emotional skills among their graduates to promote equality, social mobility and long-term development. This is particularly important for VET systems, as the characteristics of the students who attend them often differ compared to the students in general education.

In Greece, these skills are considered particularly important by firms and vocational education graduates. A recent study that monitors the transition to the job market of vocational training graduates, particularly graduates of Vocational Training Institutes, shows that in addition to professional-technical skills, soft skills such as creativity, communication, adaptability and teamwork, are also considered important skills by employers and VET graduates alike (EOPPEP, 2021). A study on employment in the Greek tourism sector indicates that teamwork, adaptability and effective customer service are among the main skills that employers are seeking based on data from online job advertisements (Deloitte and INSETE, 2023).

3. VET GRADUATES IN GREECE

3.1 Introduction

Compulsory education in Greece starts at the age of 4 and ends at the age of 15. It includes the following stages:

- Primary education
  - Pre-schools (for children between 4 and 6 years old)
  - Primary schools (for children between 6 and 12 years old)
- Lower secondary education (for children between 12 and 15 years old)

After the completion of compulsory education, the adolescents can enter the labor market or continue their studies to upper secondary education. Upper secondary education includes two types of schools, namely the general upper secondary school (GEL) and vocational upper secondary schools (EPAL). There are day and evening GEL and EPAL. There are also a number of private upper secondary schools (almost all of the GEL type). We should mention here that vocational upper secondary schools (EPALs) were established with Law No 3475/2006 and replaced the technical vocational schools (TEEs). In practice, this Law restored the older technical vocational high schools (TELs) and technical vocational schools (TESs).

Studies in GEL schools last for three years. They include common core subjects and optional subjects of specialization. Attendance at the EPAL school also lasts for three years. However, after the completion of their secondary cycle of studies, the EPAL students can attend an "apprenticeship class" – an optional post-secondary cycle with 1 year duration. The post-secondary-apprenticeship class includes apprenticeship with on-the-job training and specialization laboratory courses offered in School Laboratory or laboratory centers. The completion of the apprenticeship class leads to a certificate of level 5 (EQF 5) of the European Qualification Framework.

At the institutional level, the education system in Greece is quite centralized. The Ministry of Education takes the key decisions regarding the curricula of school units, the recruitment of staff and funding. The remaining sections in this chapter present basic figures on the upper secondary education in Greece during the period 2001-2019, the evolution of EPAL specializations between 2008 and 2019 and the skills mismatch in the Greek labor market as evident from the latest CEDEFOP report on the European Skills Index.

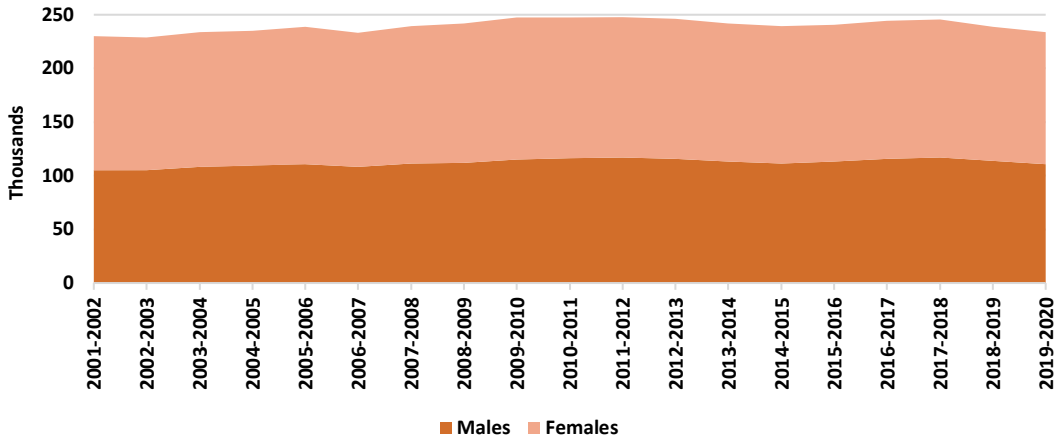
3.2 Key figures of upper secondary education in Greece

3.2.1 GENERAL UPPER SECONDARY SCHOOLS

The number of students enrolled in general upper secondary schools (GELs) increased during period 2001-2011 and then it started to decline (Figure 3.1). Overall, from 2001 until 2019, the number of students increased by 1.5% (or about 3,400), i.e., from about 230,200 in 2001 to about 233,600 in 2019 (compound annual growth rate of +0.2%). During that period, the number of female students (53.2%, on average, of total student population during period 2001-2019) was greater than the number of male students (46.8%, on average), although we

observe a drop in the number of female students by 2.0% (from 125,200 to 122,700) or by 0.3% on average per annum. By contrast, the number of male students increased from 104,900 in 2001 to 110,900 in 2019 (+5.7% overall or +0.7% per annum).

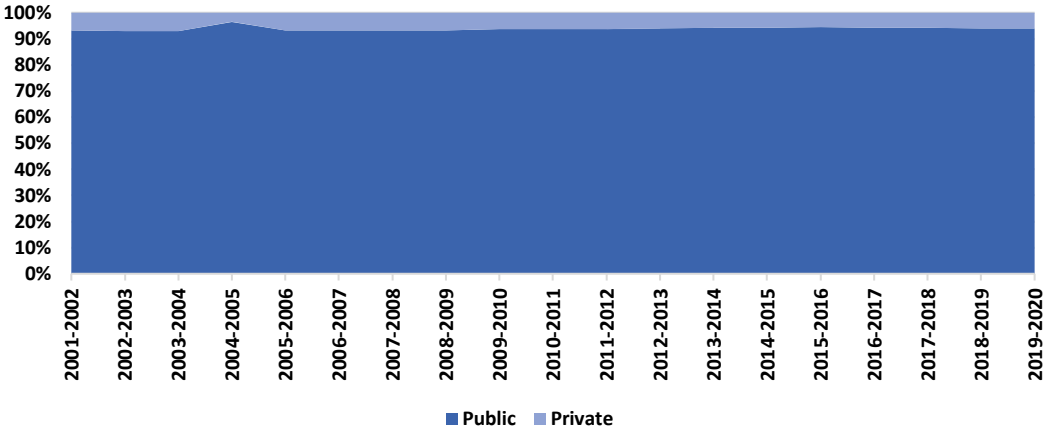
Figure 3.1: Number of students in general upper secondary schools (GELs) in Greece, by gender, end of school years 2001/2002-2019/2020



Source: ELSTAT

The vast majority of GEL students attended public (state-owned) schools. In particular, on average 93.8% of all students during the period 2001-2019 attended public GELs, with the corresponding percent rising marginally from 93.1% in 2001 to 94.0% in 2019 (Figure 3.2). The number of students attending public schools increased by 2.4% (from 214,400 in 2001 to 219,006 in 2019), while the number of students attending private schools decreased over the same period from about 15,800 to 14,100 (-11.0% in total).

Figure 3.2: Number of students in GELs in Greece, public and private schools, percentage of total, end of school years 2001/2002-2019/2020



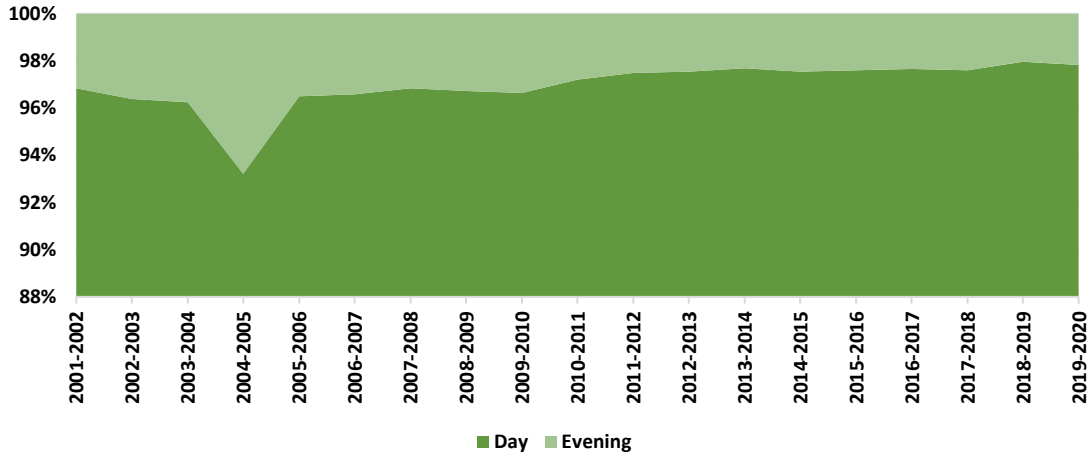
Source: ELSTAT

The percentage of students attending private school fell below 6.0% after 2012, when the domestic financial crisis reached its peak intensity, forcing many students to leave private

schools and enroll in public schools, as a result of the reduction of their family income. However, we observe a rebound of the share of private school students (above 6.0%) in 2018 and 2019, most likely as a result of the economic stabilization and recovery in the years prior to the outburst of the pandemic.

Regarding the breakdown of day and evening GELs (Figure 3.3), on average, during the period 2001-2019, 97.0% of all students attended day GELs, with their number rising from 222,900 to 228,600 (+2.5% or +5,700 in total). The percentage of students attending an evening GEL during the same period decreased from 3.2% to 2.2% and the number of students dropped significantly from 7,300 to 5,100 (-30.2% or -2,200 overall). The gradual drop of the share of students attending evening GELs probably demonstrates a shifting preference of mature students to vocational education (as also evident in the increase in the share of students attending evening EPALs) to acquire practical skills for the labor market through a speedier path.

Figure 3.3: Number of students in general upper secondary schools (GELs) in Greece, day and evening schools, end of school years 2001/2002-2019/2020

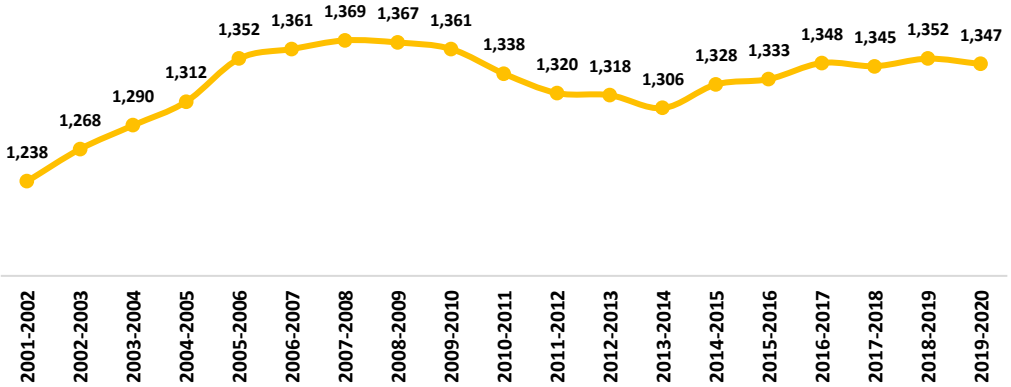


Source: ELSTAT

The number of schools increased from 1,238 in 2001 to 1,369 in 2007 (+131 units or +10.6%), but after that their number declined to 1,306 in 2013 (-63 units or -4.6% compared with 2007). This can be explained with the debt crisis, which the resources allocated to the education sector and lead to the closure and merging of schools at all levels of education. However, in 2013 the number of schools increased again and in 2014-2019 it fluctuated around 1,342 units (Figure 3.4). The vast majority of GELs are public (92.8% on average during period 2001-2019) and of the day type (94.6% on average).

The number of teaching staff followed a similar trend with the number of schools over the examined period (Figure 3.5). In particular, the number of teaching staff increased from 25,700 in 2001 to 31,000 in 2009 (+5,400 or +20.9%), but after the outburst of the financial crisis their number fell to about 23,400 in 2014. After 2014 and until 2019 the number of teaching staff stabilized at about 23,800.

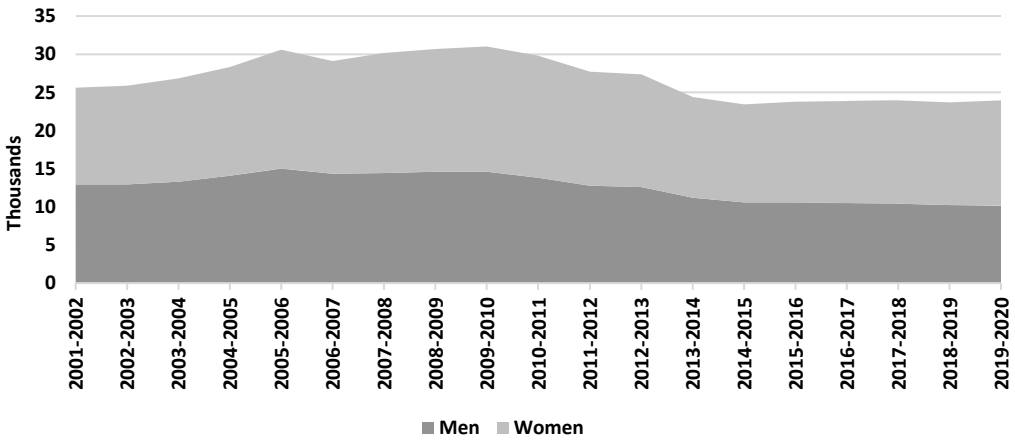
Figure 3.4: Total number of general upper secondary schools (GELs) in Greece, end of school years 2001/2002-2019/2020



Source: ELSTAT

Regarding the gender composition of the teaching staff in GELs, more than half (53.3% on average during period 2001-2019) are women, while their number increased by 8.0%, from 12,700 to 13,700. By contrast, the number of male teachers dropped significantly, by 21.3% (from 12,900 to 10,200) over the same period. As in the case of students, 92.9% (on average during period 2001-2019) of teaching staff are in public GELs and 97.8% in day GELs.

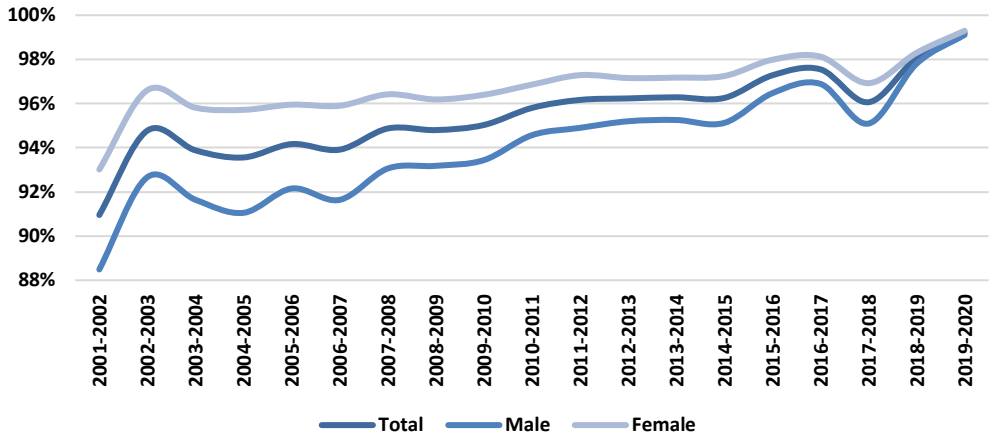
Figure 3.5: Number of teaching staff in GELs in Greece, by gender, end of school years 2001/2002-2019/2020



Source: ELSTAT

The analysis for the key figures of GELs concludes with the analysis of three structural indicators - study completion rate, number of students per teacher and number of students per school. The study completion rate (i.e., the share of enrolled students that successfully completed their upper secondary education) increased from 91.0% in 2001 to 99.1% in 2019 in the total sample (Figure 3.6). The rate is higher for female students (96.8% on average in 2001-2019, against 94.1% for male students). The number of graduates increased from 73,500 on average in 2001-2008 to about 77,000 on average in 2009-2019.

Figure 3.6: Graduation rate in GELs in Greece, end of school years 2001/2002-2019/2020



Source: ELSTAT, **Data processing:** IOBE

Table 3.1: Students per teacher and students per school in GEL in Greece, end of school years 2001/2002-2019/2020

School year	Students/Teacher			Students/School unit		
	Total	Public	Private	Total	Public	Private
2001-2002	9.0	9.1	7.9	266.6	301.0	82.6
2002-2003	8.8	8.9	8.0	245.1	274.3	78.5
2003-2004	8.7	8.8	7.7	237.1	258.3	74.7
2004-2005	8.3	8.6	4.1	215.5	233.7	69.7
2005-2006	7.8	7.8	7.5	203.6	217.6	64.9
2006-2007	8.0	8.0	7.5	198.1	198.3	179.0
2007-2008	8.0	8.0	7.9	202.7	204.5	88.5
2008-2009	7.9	7.8	8.4	199.7	200.8	102.5
2009-2010	8.0	7.9	8.6	205.2	206.4	95.0
2010-2011	8.3	8.3	8.6	219.7	220.5	112.0
2011-2012	9.0	9.0	8.4	230.9	231.8	112.3
2012-2013	9.0	9.0	8.5	236.0	236.2	157.0
2013-2014	9.9	10.1	8.1	233.8	234.0	169.0
2014-2015	10.2	10.3	8.5	225.3	225.5	176.0
2015-2016	10.1	10.3	7.6	223.4	224.0	91.5
2016-2017	10.3	10.5	7.6	222.9	223.0	145.0
2017-2018	10.3	10.5	7.5	220.8	221.5	68.0
2018-2019	10.1	10.3	7.6	236.2	238.2	37.3
2019-2020	9.8	10.0	7.6	252.0	254.0	52.0

Source: ELSTAT, **Data processing:** IOBE

The ratio of students per teacher fluctuated around 8.4 students in 2001-2012, growing to 10.1 students per teacher, on average, in 2013-2019. This ratio is higher in public schools (9.1 on average) than in private schools (7.8 on average). Finally, the number of students per school fluctuated significantly over the examined period. It decreased from 266.6 students in 2001 to 199.7 students in 2008, increased to 236.0 students in 2012, fell again in 2017 to 220.8

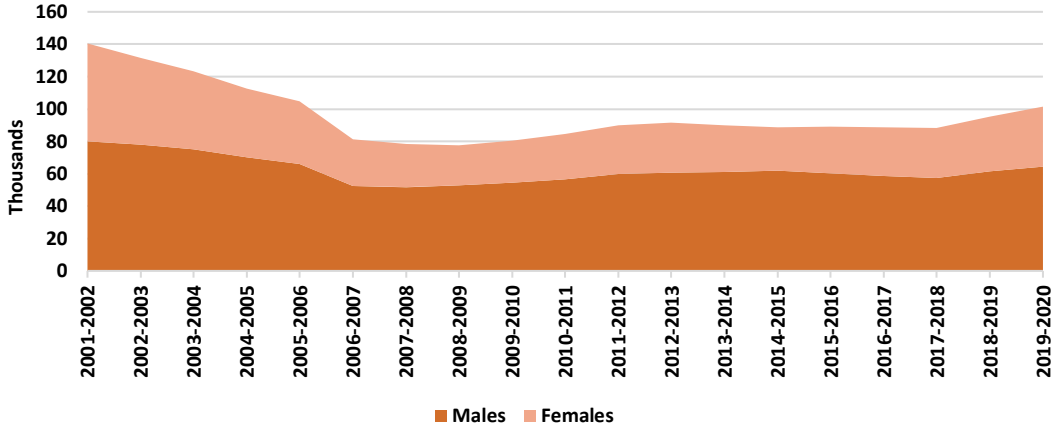
students and increased once more in 2019 to 252.0 students. The values of this indicator are more than twice as high, on average, in public schools (231.8 students per school) compared to private ones (102.9 students per school).

3.2.2 VOCATIONAL UPPER SECONDARY SCHOOLS

The number of students enrolled in EPALs declined sharply from 140,500 in 2001 to 80,500 in 2009 (-60,000 or -42.7%). From 2009 onwards, the number of students has been growing, reaching 101,600 in 2019 (+21,100 or +26.3% in 2009-2019). Overall, between 2001-2019, the number of EPAL students dropped by 27.7% or by 4.0% annually (in CAGR terms).

Contrary to GELs, in EPALs the vast majority of students are boys. In particular, in 2001-2019 64.9% of the total number of students, on average, were male and the rest 35.1% female. This figure probably indicates that the specializations offered from EPALs to students are more attractive to the male high-school student population.

Figure 3.7: Number of students in vocational upper secondary schools (EPALs) in Greece, by gender, end of school years 2001/2002-2019/2020

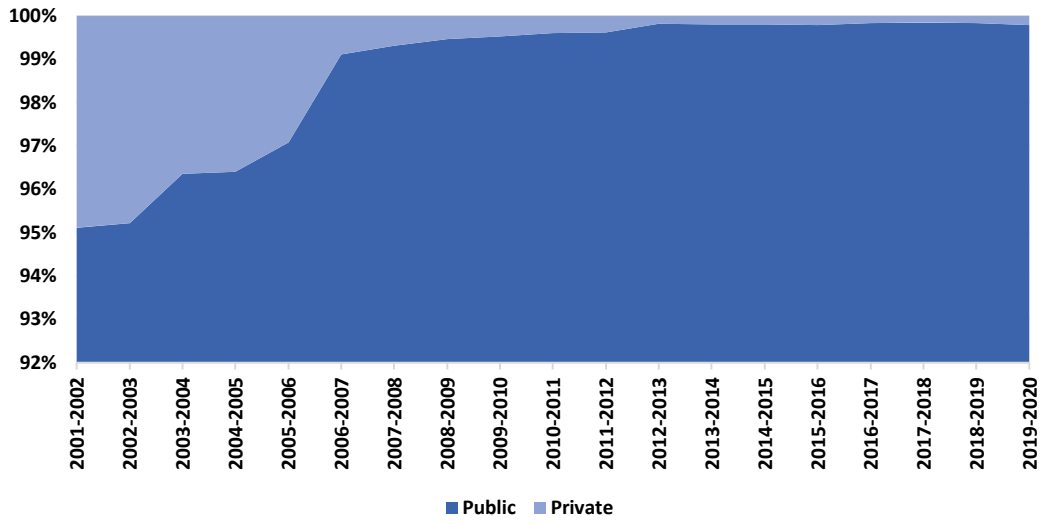


Source: ELSTAT

As in the case of GELs, the vast majority of the students attended public and day schools. On average, 98.7% of all students in EPALs in 2001-2019 attended public schools. The rate increased from 95.1% in 2001 to 99.8% in 2019 (Figure 3.8). The number of students that attended public EPALs decreased by 24.2% (from 133,600 in 2001 to 101,400 in 2019), while the number of students attending private EPALS decreased over the same period from 6,900 to about 200 (-97.0%).

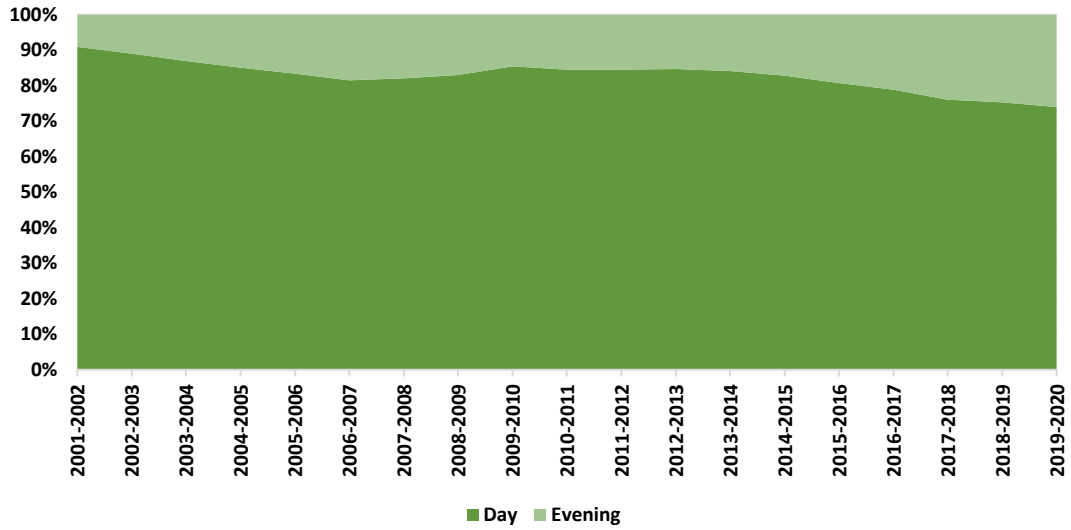
On average, during the period 2001-2019, 84.0% of all EPAL students attended day schools. Their number dropped from 127,800 to 75,200 (-41.2% or -52,600 - Figure 3.9). Meanwhile, the percentage of students attending an evening EPAL during the same period increased from 9.0% to 17.2% and their number more than doubled from 12,700 to 26,400 (+107.8% or +13.700). It is worth noting that the percentage of students attending an evening EPAL (17.2% on average) is much higher than in GELs (3.0%).

Figure 3.8: Number of students in EPALs in Greece, public and private schools, end of school years 2001/2002-2019/2020



Source: ELSTAT

Figure 3.9: Number of students in EPALs in Greece, day and evening schools, end of school years 2001/2002-2019/2020

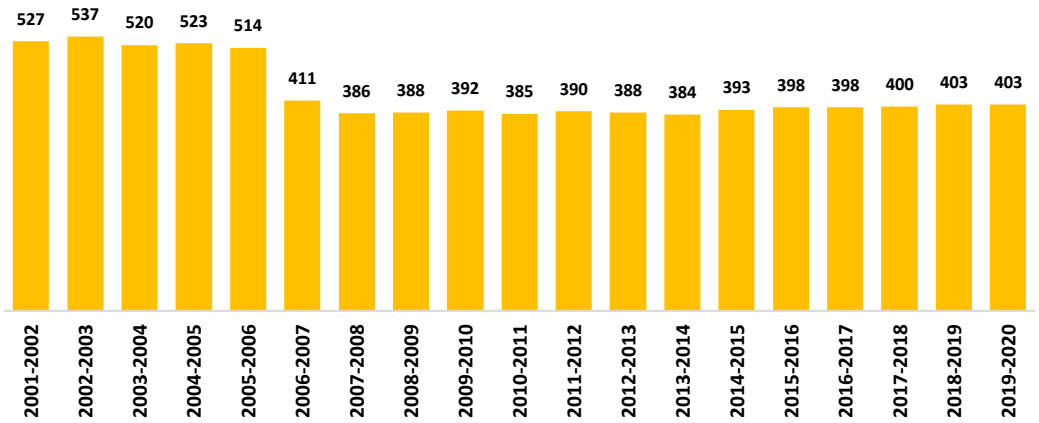


Source: ELSTAT

The number of vocational schools fluctuated around 524 in 2001-2005 and then it dropped to 411 in 2006 (Figure 3.10). This development is due to the implementation of Law No 3475/2006, with which Technical Vocational Schools (TEEs) were abolished and replaced with vocational upper secondary schools (EPALs). In 2007, the number dropped further to 386 schools and since then it has followed a mild upward trend. In 2019, the number of EPALs reached 403 schools. As in the case of GELs, the vast majority of EPAL schools are public (96.2%, on average) and of the day type (94.6%).

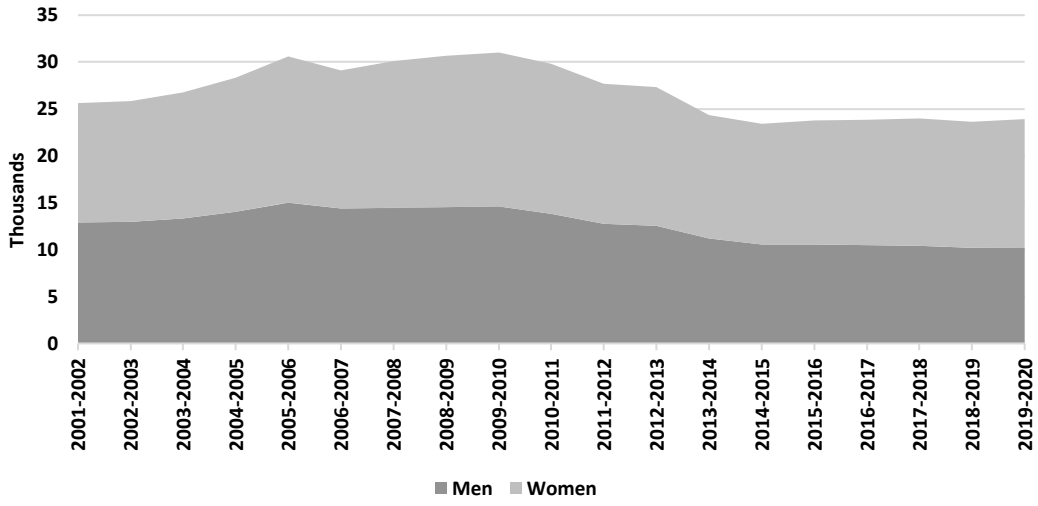
With respect to the teaching staff (Figure 3.11), there is a notable difference in their gender composition compared to the GELs. In particular, the share of male teaching staff has been higher in EPAL (52.8%, on average in 2001-2019, against 46.7% in GELs). Meanwhile, this percentage decreased form 54.2% in 2001 to 45.7% in 2019, as the number of male teachers dropped from 11,200 to 5,500 (-51.0% or -5,700). The same period we also observe a milder decrease in the number of female teachers from 9,500 to 6,500 (-3,000 or -31.0%), resulting in their share to the total teaching staff growing from 45.8% to 54.3%. The decrease in the number of teaching staff between 2009 and 2014 can be attributed to the financial crisis and the fiscal consolidation process, resulting in severe restrictions in hirings in the public sector, including education.

Figure 3.10: Total number of EPALs in Greece, end of school years 2001/2002-2019/2020



Source: ELSTAT

Figure 3.11: Number of teaching staff in EPALs in Greece, by gender, end of school years 2001/2002-2019/2020



Source: ELSTAT

Table 3.2: Students per teacher and students per school in EPALs in Greece, end of school years 2001/2002-2019/2020

School year	Students per teacher			Students per school		
	Total	Public	Private	Total	Public	Private
2001-2002	6.8	4.2	39.3	267	301	83
2002-2003	6.7	4.3	38.9	245	274	79
2003-2004	6.2	4.0	44.7	237	258	75
2004-2005	5.9	3.9	43.4	215	234	70
2005-2006	5.5	3.6	53.8	204	218	65
2006-2007	5.1	3.3	235.9	198	198	179
2007-2008	5.3	3.5	259.3	203	204	89
2008-2009	5.0	3.4	370.0	200	201	103
2009-2010	4.9	3.3	386.5	205	206	95
2010-2011	5.6	3.8	475.1	220	221	112
2011-2012	6.2	4.1	548.1	231	232	112
2012-2013	6.5	4.3	1,535.9	236	236	157
2013-2014	7.1	4.9	1,678.5	234	234	169
2014-2015	7.7	5.4	912.4	225	225	176
2015-2016	7.8	5.3	1,108.8	223	224	92
2016-2017	8.0	5.3	1,838.8	223	223	145
2017-2018	8.1	5.3	966.2	221	222	68
2018-2019	8.1	5.3	315.9	236	238	37
2019-2020	8.4	5.4	1,277.5	252	254	52

Source: ELSTAT, **Data processing:** IOBE. **Note:** Includes full-time permanent contract teachers.

3.3 EPAL specializations

Students that continue in vocational upper secondary schools have three available directions to choose from in year 1 (technological, services or naval), 12 available sectors in year 2 (mechanical engineering, vehicles, electronics, electricians, construction works, applied arts, informatics, financial and administrative services, health and welfare, agriculture-food-environment, Merchant Navy captain and Merchant Navy engineer) and 19 available specializations[1] in year 3. The analysis that follows focuses on specializations of EPAL graduates in 2008-2019 in total and by gender.

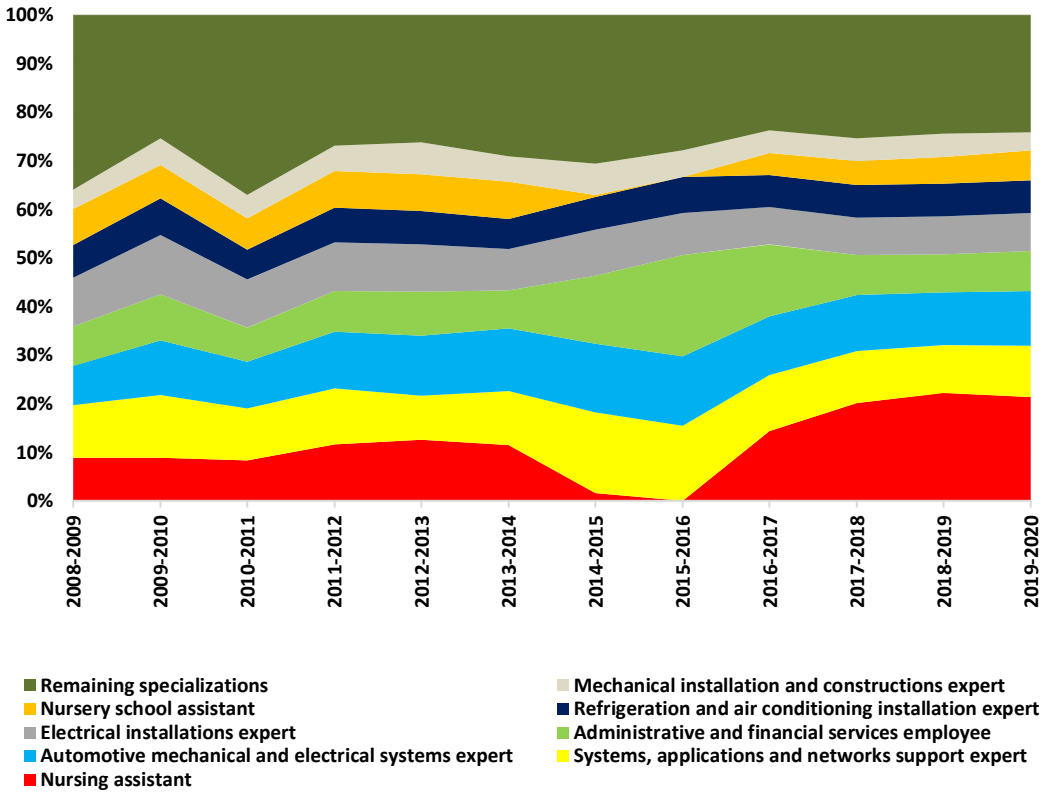
On average in 2008-2019, the specializations of Nursing assistant (11.8%), Systems, applications and networks support expert (11.7%), Automotive mechanical and electrical systems expert (11.7%) and Administrative and financial services employee (10.3%) had the highest shares of EPAL students (Figure 3.12). Next came the specializations of Electrical

[1] Mechanical installation and constructions expert, Refrigeration and air conditioning installation expert, Automotive mechanical and electrical systems expert, Electrical installations expert, Electronic computer systems and networks expert, Electronic communication systems experts, Structural engineering designer, Graphic arts, Systems applications and networks support expert, Administrative and financial services employee, Tourism firms employee, Nursing assistant, Nursery school assistant, Medical and biological laboratory assistant, Modern agriculture expert, Food technology and control expert, Landscape and environment projects expert, Merchant Navy captain, Merchant navy engineer.

installations expert (9.1%), Refrigeration and air conditioning installation expert (6.8%), Nursery school assistant (5.4%) and Mechanical installation and constructions expert (5.1%). Taking into consideration all the available specializations, more than half of the EPAL students (51.4%) prefer a specialization from the service direction, 41.7% choose a specialization from the technological direction, 2.3% followed a specialization from naval direction and the rest 3.7% hold a general education degree.

Over time, there are significant fluctuations in the shares of the various specializations. The greater increase in shares in 2008-2019 is observed in Nursing assistant (+12.5 percentage points (pp), i.e., from 8.8% in 2008 to 21.3% in 2019), Tourism specialization (+3.3 pp, i.e., from 2.2% to 5.5%), Automotive mechanical and electrical systems expert (+3.2 pp, from 8.1% to 11.2%) and in Modern agriculture expert (+2.4 pp, from 1.1% to 3.5%). By contrast, the strongest decrease is observed in EPAL graduates without a specialization (-4.8 pp, from 4.8% to 0.0%) and in Electrical installations expert (-2.2 pp, from 10.0% to 7.8%) and Nursery school assistant (-1.3 pp, from 7.4% in 2008 to 6.1% in 2019).

Figure 3.12: Share of specializations of total sample of EPAL graduates in Greece (end of school years 2008/2009-2019/2020)



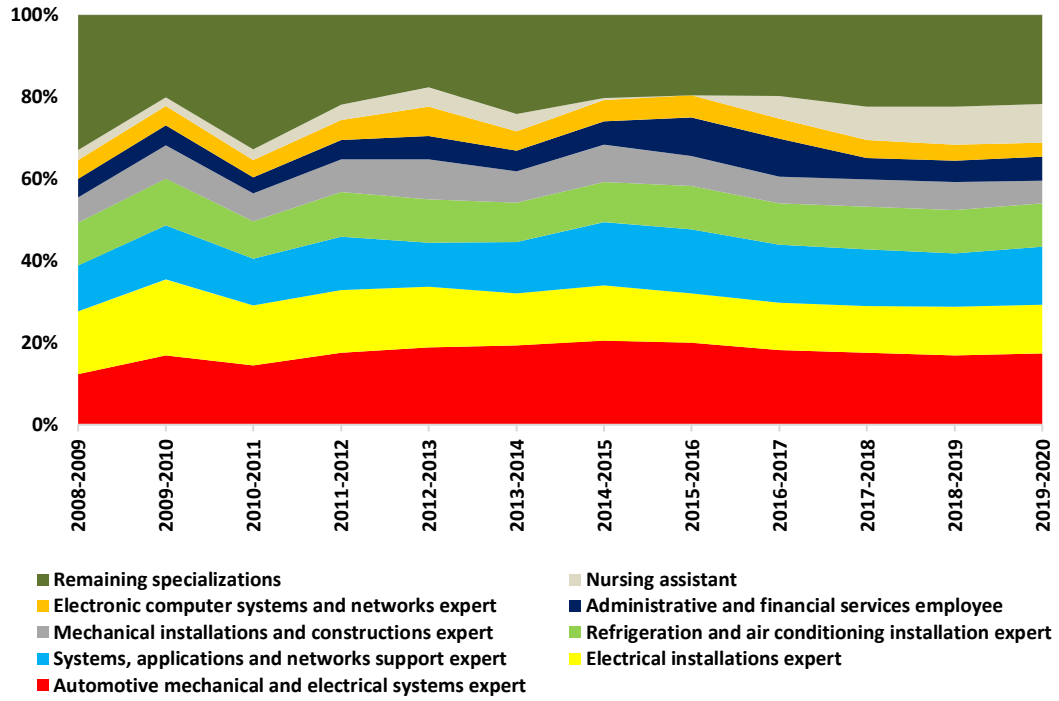
Source: ELSTAT, **Data processing:** IOBE

Among the male EPAL graduates, the most sought-after specializations remain almost the same as in the overall population of EPAL graduates, but their ranking changes (Figure 3.13). About 17.5% of the male graduates were Automotive mechanical and electrical systems experts, 13.6% Electrical installations experts, 13.2% Systems, applications and networks support experts and 10.3% Refrigeration and air conditioning installation experts. Next in the

top 8 of specializations among the male EPAL graduates came Mechanical installations and constructions expert (7.4%) and Administrative and financial services (5.8%). The only difference with the total sample regarding the sought-after specializations is that Electronic computer systems and networks expert (4.8%) comes in place of the Nursery school assistant. As in the total population of EPAL graduates, Nursing assistant comes at the 8th position (4.4%). The rest of the available specializations accounted for 22.9% of the male EPAL graduates in 2008-2019.

The greatest increase in shares in 2008-2019 among the male EPAL graduates is observed in Nursing assistant (+7.1 pp, from 2.4% to 9.5%), Automotive mechanical and electrical systems expert (+5.0 pp, from 12.3% to 17.4%), Tourism (+3.2 pp, from 1.4% to 4.6%), Systems, applications and networks support expert (+3.1 pp, from 11.2% to 14.3%) and Modern agriculture expert (+3.0 pp, from 1.2% to 4.2%). By contrast, apart from the EPAL graduates with a general education degree (-5.0 pp, from 5.0% to 0.0%), the specializations with the strongest drop in shares include Electrical installations expert (-3.5 pp, from 15.3% to 11.8%), Electronic communication systems experts (-1.9 pp, from 1.9% to 0.0%) and Electronic computer systems and networks expert (-1.2 pp, from 4.7% to 3.5%).

Figure 3.13: Share of specializations of male EPAL graduates in Greece (end of school years 2008/2009-2019/2020)



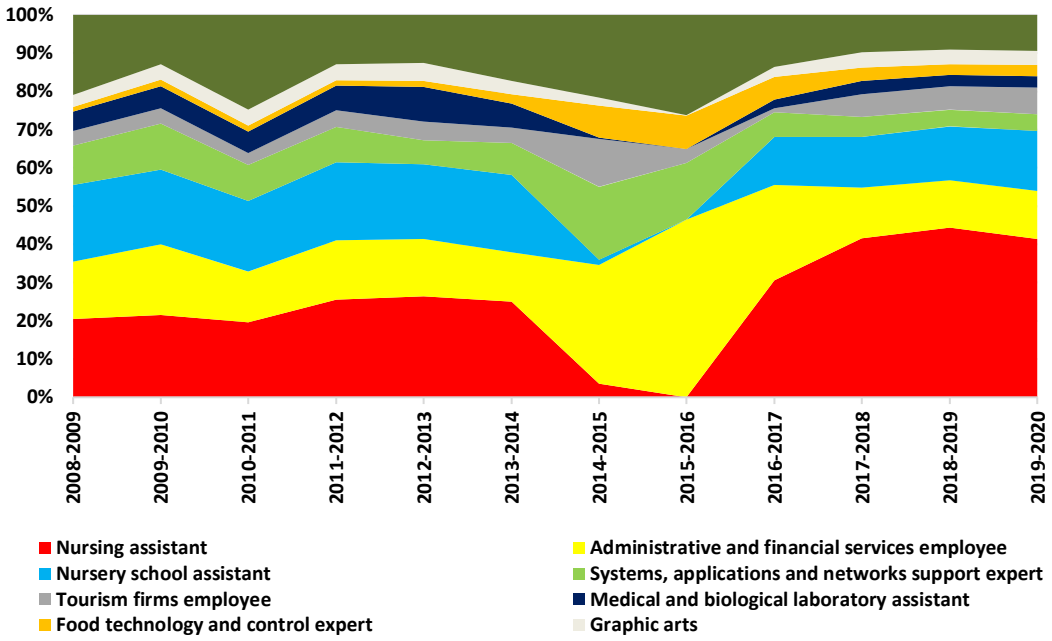
Source: ELSTAT, **Data processing:** IOBE

Contrary to the male graduates, more than 8 to 10 (84.1%) female EPAL graduates prefer specializations included in the services cycle (Figure 3.14). In particular, the female graduates in 2008-2019 had stronger preferences for the specializations of Nursing assistant (25.0%), Administrative and financial services employee (19.2%), Nursery school assistant (14.6%), Systems, applications and networks support expert (9.2%), Tourism (5.0%), Medical and

biological laboratory assistant (4.2%), Food technology and control expert (3.5%) and Graphic arts (3.3%). The rest of the specializations account for 15.9% of the total sample of female graduates.

In this category of graduates, the largest share increase is observed in the specializations of Nursing assistant (+21.0 pp, from 20.5% in 2008 to 41.5% in 2019), Tourism export (+3.3 pp, from 3.7% to 7.0%), Food technology and control expert (+1.9 pp, from 1.1% to 3.0%) and Modern agriculture expert (+1.4 pp, from 0.9% to 2.3%), whereas the largest decrease is observed in Systems, applications and networks support expert (-6.0 pp, from 10.3% to 4.3%), Nursery school assistant (-4.6 pp, from 20.2% to 15.7%) and general education degree (-4.3 pp, from 4.3% in 2008 to 0.0% in 2019).

Figure 3.14: Share of specializations of female EPAL graduates in Greece (end of school years 2008/2009-2019/2020)



Source: ELSTAT, **Data processing:** IOBE

4. VOCATIONAL EDUCATION AND THE LABOUR MARKET

4.1 Introduction

This chapter explores the link between the education system and the needs of the labor market. The role of vocational education is to provide the skills needed in the labor market in a more targeted and speedier way. How successfully it fulfils this role can be assessed by comparing the level of skills in Greece with that of other countries and by looking at the extent to which the supply and demand for skills are matched in the Greek labor market. As the supply of skills concerns all graduates, irrespective of their education path (vocational or general) and level (primary, secondary, post-secondary, tertiary), it is also instructive to examine the associations between achieved education and labor market outcomes, such as employment and wages.

4.2 Skills mismatch and development in the Greek education system

4.2.1 EUROPEAN SKILLS INDEX

Greece, along with other countries of the European South such as Italy and Spain, ranks very low on the European Skills Index (ESI) of CEDEFOP. In particular, Greece ranks 3rd to last in the EU for 2022, with a value of 22.5 in the aggregate index, ahead of Spain with 19.1 points and Italy with 15.1 points (Figure 4.1).[2] Czechia tops the chart with 70.0 points, followed by Finland (67.0) and Estonia (63.3).

The aggregate skill index consists of three pillars: development, activation and matching of skills. Skill development represents the education and training activities of a country and their immediate effect on the abilities and skills which are developed within or outside of standard education. Greece holds the 4th worse place in this specific indicator, with a value of 35.0, ahead of Bulgaria (33.3), Romania (29.3) and Cyprus (26.1). Finland is way ahead in this pillar, with 82.9 points, followed at a distance by Estonia (67.8) and Denmark (65.6).

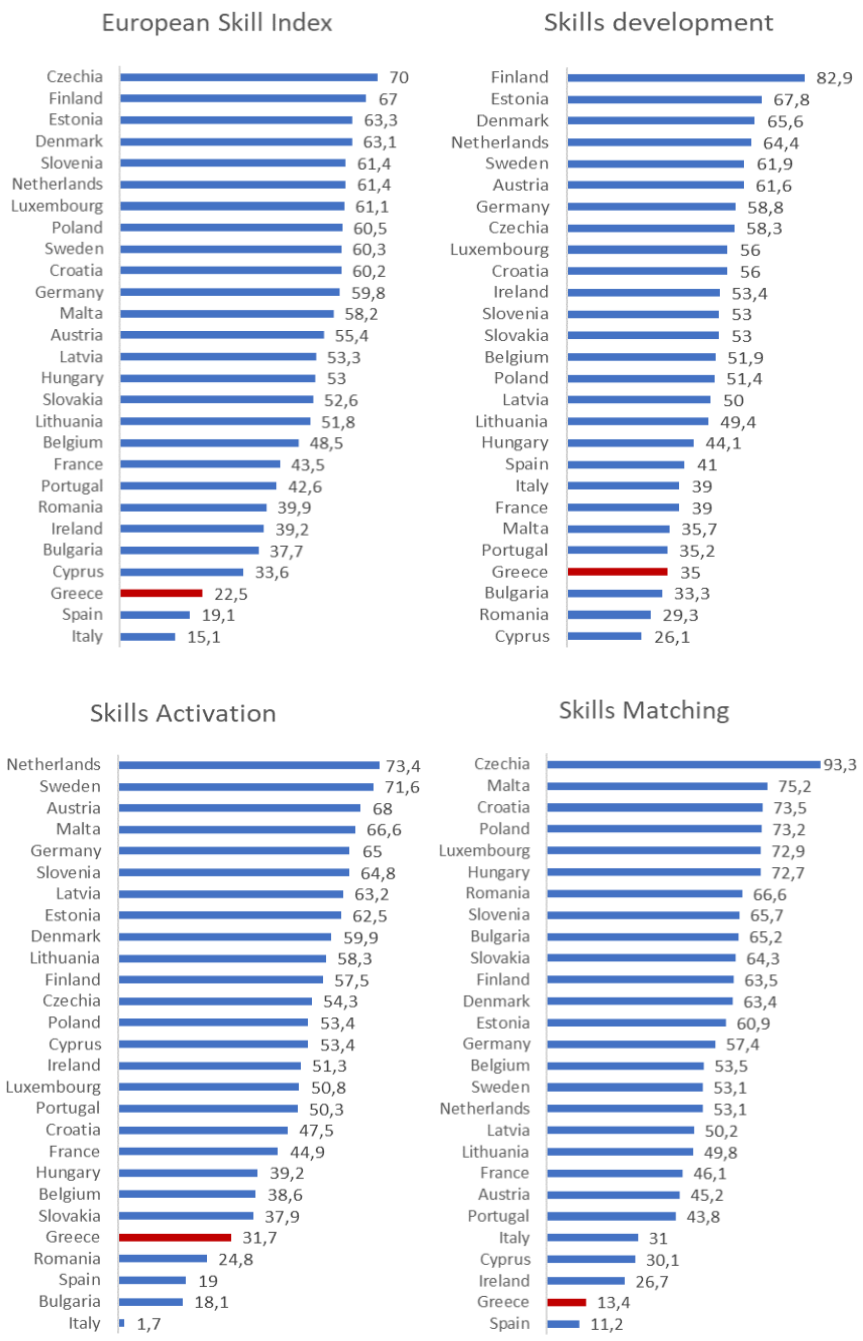
The skill development index can be further deconstructed into two parts - basic education and training & other education. Basic education is less relevant to the scope of this study, as it includes indicators, such as pre-primary pupil-to-teacher ratio, upper secondary attainment and reading, math and science scores. In training and other education, Greece ranks 2nd to last, with 19.5 points (Figure 4.2), ahead only of Cyprus (14.1 points). In this indicator, the leading countries are Finland (83.7) and the Netherlands (74.8).

In part, the low ranking of the country in this index is a result of the low percentage of high school education students who are receiving vocational training. In this particular metric, Greece is ranked fifth from the bottom, with 20.9 points, ahead of Malta (18.4), Ireland (18.3),

[2] The ESI measures the "distance to the ideal" performance of each country. The ideal performance corresponds to the highest achieved level in an individual indicator achieved by any country over a period of 7 years. The ideal performance is scaled to be 100 and the scores of all countries are then computed and compared to that.

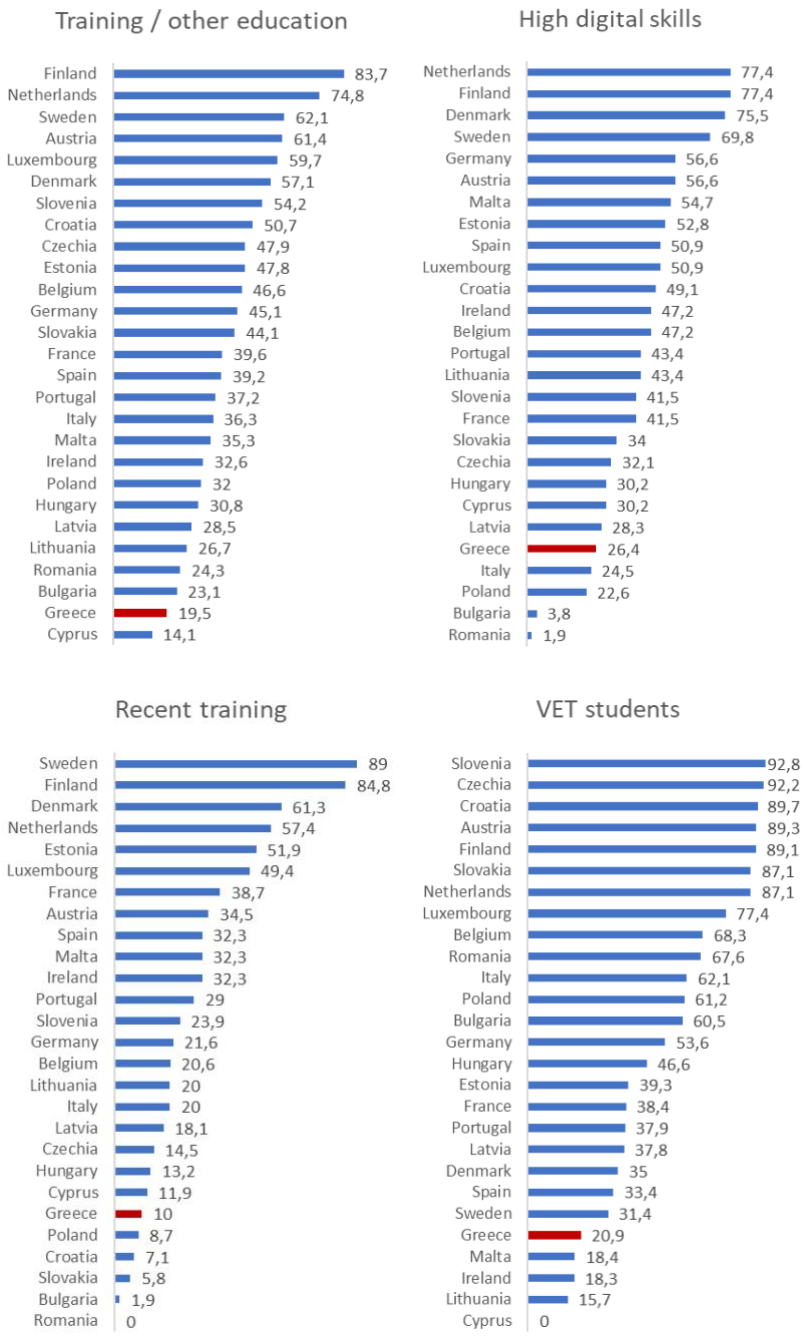
Lithuania (15.7) and Cyprus (0). By contrast, the highest share of vocational education students is recorded in countries of Central and Eastern Europe - Slovenia (92.8), Czechia (92.2) and Croatia (89.7). Greece ranks low in the other two indicators of the training and other education group - 6th from the bottom in terms of the percentage of people aged 25-64 who stated that they participated in training activities during the last 4 weeks before they responded to the survey and 5th from the bottom in the digital skills indicator.

Figure 4.1: Composite Skills Indices ESI of the CEDEFOP, 2022



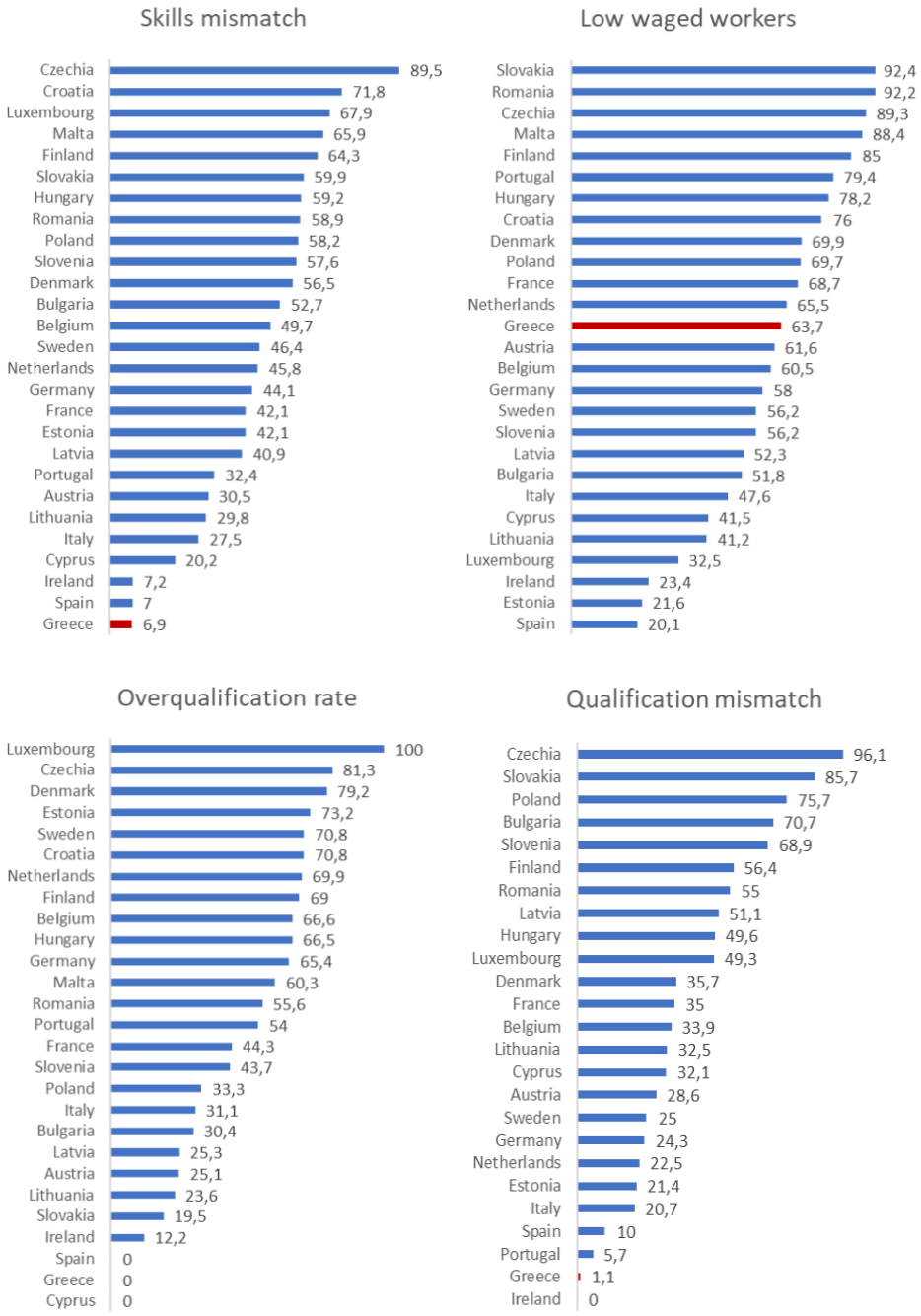
Source: CEDEFOP European Skills Index

Figure 4.2: Training and other education indices of the CEDEFOP, 2022



Source: CEDEFOP European Skills Index. Note: The indicator on computer skills is calculated based on the percentage of 16-74 year old who successfully complete at least 5 out of 6 exercises in a Eurostat survey, the indicator for recent training is calculated on the basis of the percentage of the population aged 25-64 who declare that they have received formal or non-formal education or training in the four weeks prior to the survey, the indicator for VET students is calculated on the basis of the percentage of upper secondary school students (ISCED level 3) participating in vocational education programs and finally the indicator for training - other education is obtained by compiling the values of the three indicators mentioned above.

Figure 4.3: Skills matching indices of CEDEFOP, 2022



Source: CEDEFOP European Skills Index. Note: The indicator for low-paid tertiary education graduates is calculated on the basis of the percentage of ISCED11 education level 5 to 8 graduates receiving no more than 2/3 of the national intermediate gross hourly wage, the tertiary education graduates' overqualification index is calculated on the basis of the percentage of tertiary education graduates (with ISCED11 education level 5 or 6) aged 25-34 employed in occupations not corresponding to codes 1-3 of the Statistical Classification of Occupations (senior management, professionals and technicians), the qualification mismatch index is calculated on the basis of the degree to which employees have the level of education corresponding to the occupation they practice in the sector they are employed in, and finally the skills mismatch index is derived as a composite indicator of the three sub-indicators mentioned above.

The second pillar of ESI - skill activation - includes indicators of the transition from education to work, together with labor market activity rates for different groups of the population, to identify those which have a greater or lesser representation in the labor market. Greece occupies the 5th lowest spot in the ranking based on this specific indicator, with a value of 31.7, ahead of Romania (24.8), Spain (19.0), Bulgaria (18.1) and Italy (only 1.7). The Netherlands is on top here, with 73.4 points, followed by Sweden (71.6) and Austria (68.0). This low ranking of Greece can be explained by the low activity rates in the age bands of 20-24 and 25-29 years old and by the low percentage of recent graduate in employment, despite the rather good performance of Greece in terms of keeping students in the education system.

The third pillar of ESI - skill matching - documents the extent to which skills are effectively matched in the labor market. Greece occupies the second worst place in the EU, with a value of 13.4 points, ahead only of Spain (11.2). The by far best performer in this pillar is Czechia, with 93.3 points, followed by Malta (75.2) and Croatia (73.5).

The skill matching index can be further deconstructed into skill utilization and skill mismatch. While the country's low performance in skills utilization is largely influenced by macroeconomic factors and the fact that the financial crisis led to much deeper and persistent negative effects on the labor market in Greece (high share of long-term unemployment), the low ranking on the skills mismatch index has more pronounced structural characteristics.

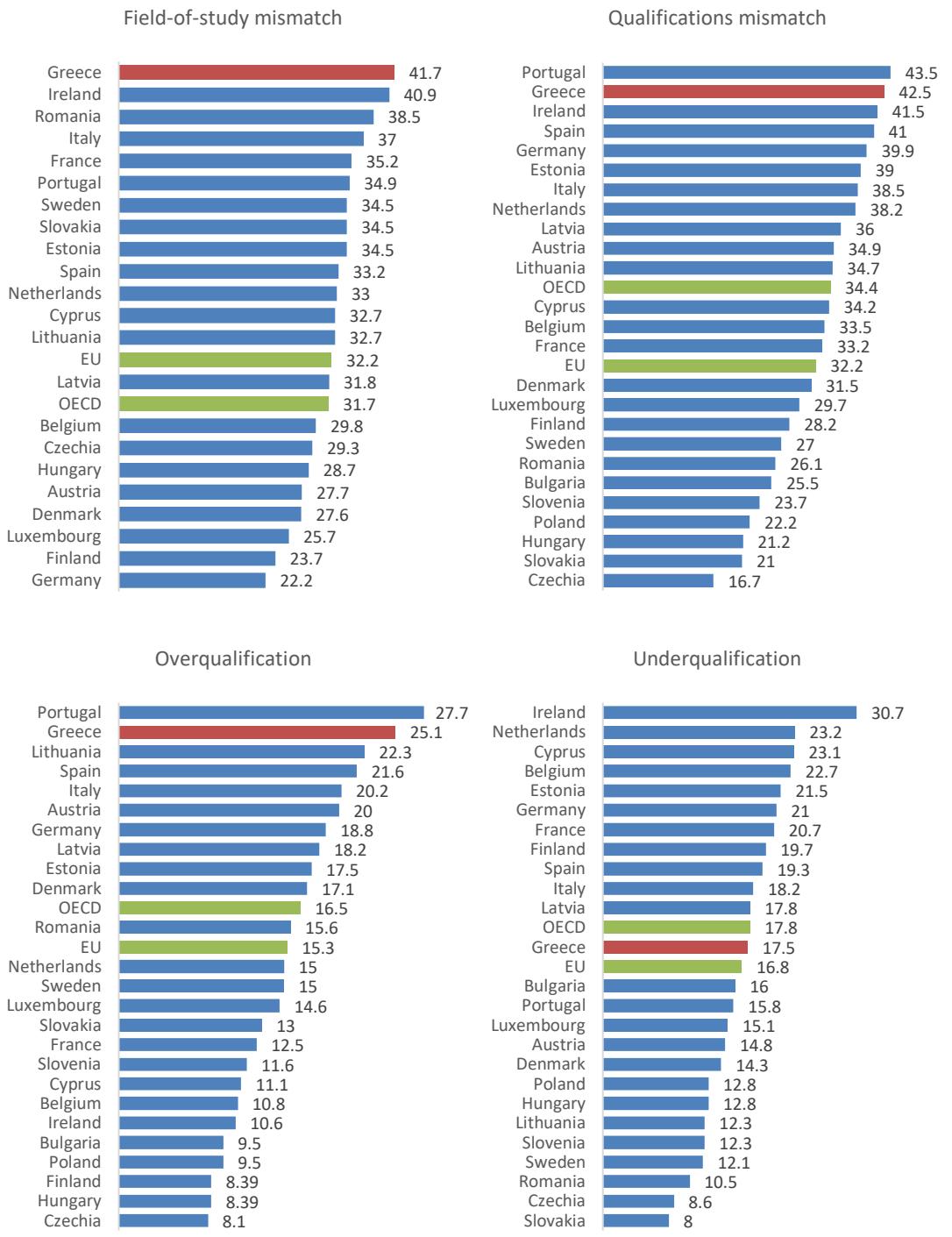
More specifically, Greece records the worst possible performance in the index of over-qualified tertiary education graduates with zero points in the relevant index, sharing the same place with Cyprus and Spain. Luxembourg tops the chart with 100 points, followed by Czechia (81.3) and Denmark (79.2). In the index for qualifications mismatch, measuring the degree to which the employees have the level of education corresponding to the occupation they practice in their sector of employment, Greece is in the penultimate place, with only 1.1 points, ahead of Ireland (0 points). Here too, countries of Central and Eastern Europe (Czechia with 96.1, Slovakia with 85.7 and Poland with 75.7 points) lead the pack. Greece performs substantially better (13th position) in terms of the indicator that measures the percentage of workers with educational attainment of ISCED levels 5-8 earning less than 2/3 of the median national hourly wage in the total number of workers. The best performing countries here are Slovakia (92.4), Romania (92.2) and Czechia (89.3), while at the bottom of this ranking are Spain (20.1), Estonia (21.6) and Ireland (23.4).

4.2.2 FIELD-OF-STUDY AND QUALIFICATION MISMATCH

The poor performance of Greece in terms of matching the demand and supply for skills in its labor market is confirmed in indicators published in the OECD Skills for Jobs database. It contains indicators on mismatch in terms of fields of study and qualification levels, estimated using data from labour force and household surveys (LFS in the EU). The indicators refer to the year 2019 for most countries. Apart from data on participating OECD countries, the database also contains results for a number of non-OECD EU member state (Bulgaria, Cyprus and Romania). In this section, we focus on comparing the results for Greece with those for other EU countries featured in the database.

With 41.7%, Greece tops the ranking of 22 EU countries with available data for 2019 on the percentage of workers that have completed a field of study that does not match their job's requirements (Figure 4.4). Next in the ranking come Ireland (40.9%) and Romania (38.5%). The best performance in this indicator is observed in Germany (22.2%) and Finland (23.7%), countries with well-developed vocational education and training systems.

Figure 4.4: Field-of-study and qualifications mismatch per EU country, percentage of workers, 2019



Source: OECD Skills for Jobs database

The performance of Greece in terms of the qualifications mismatch indicator is only marginally better, as the country comes second in the relevant ranking of 25 EU member states with available data for 2019. In particular, 42.5% of the workers in Greece have a qualification that does not match their job's requirements, against 32.2% on average in the EU. Only Portugal has a worse performance in terms of this indicator (43.5%) in the OECD database, with the best performance recorded in countries of Central and Eastern Europe (Czechia, Slovakia, Hungary, Poland, Slovenia, Bulgaria and Romania).

The qualifications mismatch in Greece comes mostly from overqualification of its workers. With 25.1% of its workforce overqualified, Greece comes second in the ranking, again topped only by Portugal (27.7%). Regarding the percentage of underqualified workers, Greece comes close to the EU average (17.5% against 16.8%), ranking 12th among the 25 EU countries with available data.

The high share of overqualified workers in Greece, performing tasks that do not match their field of study, can be explained with the relatively open tertiary education and rather underdeveloped vocational education and training. The above data provides indications that the preference of many Greek households to university degrees over vocational skills does not correspond well to the realities of the domestic labour market, substantiating the need for upgrading the domestic vocational education system.

4.3 Skills of the adult population and vocational education

It is also instructive to examine the extent to which the domestic education and training system provides sufficient fundamental skills to the labor force in the country. This issue can be approached by analyzing data from the Survey of Adult Skills, collected as part of The Programme for the International Assessment of Adult Competencies (PIAAC) of the OECD. It measures proficiency of adults in literacy, numeracy and problem solving in technology-rich environments and gathers contextual data on the survey participants. The survey is administered in 10-year cycles, with the currently available results referring to the first cycle of the program.[3] Greece took part in the second round of the survey's first cycle in 2014-2015.

In this section, we first present key results for Greece in comparison with other participating countries from the EU. We then compare the survey results across adults with upper secondary and post-secondary education, depending on whether they followed a vocational or general track.

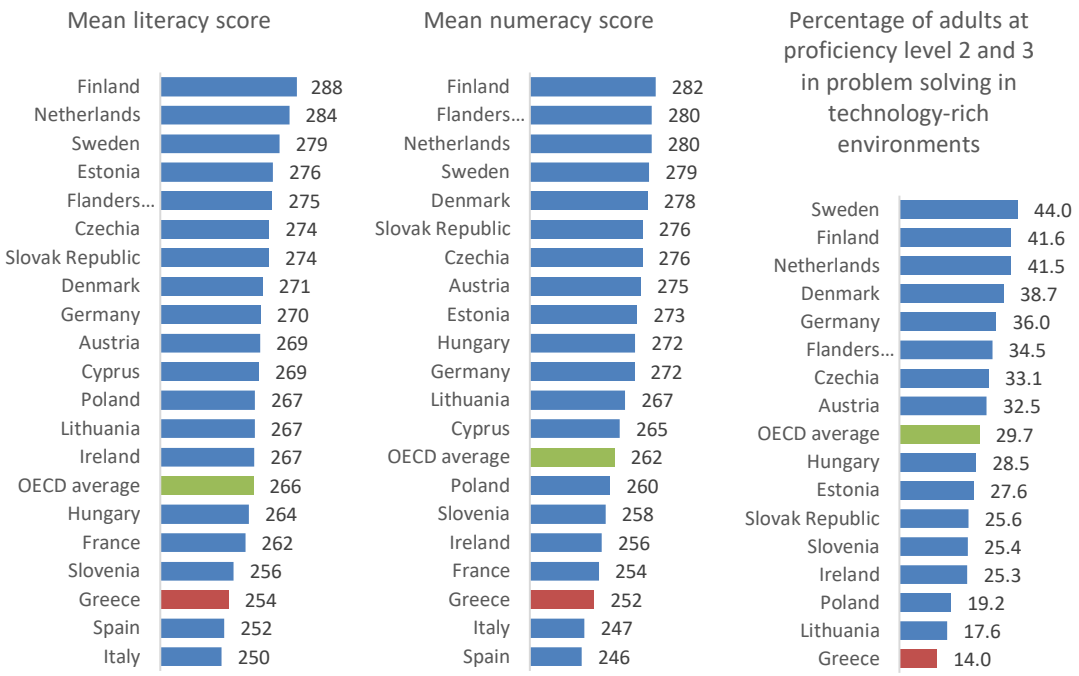
4.3.1 INTERNATIONAL COMPARISONS

The adult population in Greece performs significantly below the OECD average across all three domains of PIAAC (Figure 4.5). In particular, the mean score for literacy for Greece is 254 points, compared to 266 on average for the OECD. Compared to the other 19 EU member

[3] The results of the second cycle are expected to be published in 2024.

states that took part in the survey, Greece is ranked third from the bottom, above Spain (252 points) and Italy (250 points).

Figure 4.5: Key results from the first cycle of PIAAC per participating EU countries



Source: OECD PIAAC. Note: For Belgium, the survey covers the region of Flanders only.

The performance of Greece is similar in the numeracy domain. With 252 points, against 262 on average in the OECD, Greece is placed third from the bottom in this ranking too, again above Italy (247 points) and Spain (246 points). The performance of Greece in the third domain - problem solving in technology-rich environments - is also discouraging. While no data is readily available on mean scores per country in this domain, only 14,0% of the adults in Greece manage to obtain proficiency level 2 or higher, compared with 29,7% on average in the OECD. Here Greece ranks last among 16 participating EU member states.

4.3.2 SKILLS AND VOCATIONAL EDUCATION

Across subgroups within the Greek sample, there are significant differences in mean proficiency scores across the three skills domains of PIAAC. In particular, people with higher education level, as expected, tend to have higher literacy, numeracy and problem-solving skills (Table 4.1), yet there are some exceptions. In particular, the scores for literacy and numeracy skills for upper secondary and post-secondary graduates are almost identical (around 256 points and within the range of 252-254 points respectively), which in the case of the problem-solving domain also includes the graduates of technological education institutes (ISCED 5B, 256-260 points). It is also interesting to note that people with research degrees tend to have lower scores than holders of master's degrees, which may be coming from the low number (28 individuals) and high degree of heterogeneity within the research degree subsample.

Table 4.1: Mean scores per PIAAC skills domain and education category, Greece

Education category	N	Literacy		Numeracy		Problem solving	
Primary or less (ISCED 1 OR LESS)	690	230	(3.05)	221	(3.27)	219	(6.58)
Lower secondary (ISCED 2, ISCED 3C SHORT)	557	243	(3.47)	234	(2.88)	235	(3.04)
Upper secondary (ISCED 3A-B, C LONG)	1862	256	(1.63)	254	(1.55)	256	(1.97)
Post-secondary, non-tertiary (ISCED 4A-B-C)	532	256	(2.72)	252	(2.24)	260	(4.07)
Tertiary – professional degree (ISCED 5B)	412	264	(3.95)	268	(3.42)	258	(2.78)
Tertiary – bachelor degree (ISCED 5A)	656	272	(2.83)	281	(2.75)	271	(2.79)
Tertiary – master degree (ISCED 5A)	179	294	(3.77)	301	(3.92)	300	(6.19)
Tertiary – research degree (ISCED 6)	28	273	(9.16)	270	(13.06)	290	(11.30)

Source: OECD PIAAC, IOBE estimates. The figures in brackets contain the standard error of the mean scores.

Focusing on people who have completed upper secondary and post-secondary education, we can compare the skills of individuals that have opted to pursue vocational education either during or after their upper secondary education with those that pursued the general track of high school and did not proceed to study at a tertiary education institution (university or a technical education institute). The comparison shows that graduates of vocational upper secondary education achieve substantially lower scores across all three domains (Table 4.2). In literacy, their mean score (246 points) is much closer to the mean score of people who finished their studies at the lower secondary level (243) than to the score of their general-track peers (260 points). In numeracy and problem solving, the mean score of vocational-track high-school graduates (244 and 245 points respectively) is still closer to that of lower secondary education graduates (234 and 235 points) then general-track high-school graduates (259 and 260 points).

Table 4.2: Mean scores per PIAAC skills domain for general and vocational tracks, Greece

Education category	N	Literacy		Numeracy		Problem solving	
Upper secondary, non-vocational	1299	260	(1.91)	259	(1.84)	260	(1.98)
Upper secondary, vocational	563	246	(2.39)	244	(2.79)	245	(3.42)
Post-secondary, non-tertiary	532	256	(2.72)	252	(2.24)	260	(4.07)

Source: OECD PIAAC, IOBE estimates. The figures in brackets contain the standard error of the mean scores.

The poorer performance of the vocational-track high-school graduates in adult competencies is confirmed when we control for covariation across various demographic factors,[4] such as age, gender, and immigration status (Table 4.3). In particular, they tend to post lower scores compared to general-track students by 13 points for literacy, by 17 points for numeracy and by 16 points for problem solving skills, with the difference statistically significant at the 1% level. It is interesting to note that once we control for age, gender and immigrant status, the

[4] Using the function lm.sdf of the R package EdSurvey (Bailey et al. 2020), which performs linear regressions, taking fully into account the complex sample design of PIAAC and its plausible values. The analysis was performed with the full sample weight (spfwt0), while the variance was estimated with the jacknife method.

graduates of post-secondary education tend to have higher scores across the three domains, with the difference statistically significant (at the 1% level for numeracy and problem solving and at the 5% for numeracy), which was not the case in the simple comparison of mean scores across demographic groups.

Table 4.3: Results from regression analysis of PIAAC domain scores, Greece

Variable	Literacy	Numeracy	Problem solving
Intercept	244.37*** (6.475)	253.35*** (6.096)	271.82*** (5.916)
Post-secondary, non-tertiary	9.23*** (3.348)	9.55** (3.631)	17.14*** (5.803)
Upper secondary, vocational	-13.01*** (2.760)	-17.06*** (3.271)	-16.45*** (3.413)
Age	-0.02 (0.095)	0.00 (0.101)	-0.71*** (0.124)
Female	2.84 (2.441)	-9.74*** (2.857)	-1.91 (2.754)
2nd generation immigrants	25.83** (11.709)	23.49** (10.842)	1.08 (11.102)
Non-immigrant, both parents born in Greece	15.13** (5.529)	11.45** (5.122)	15.25** (5.956)
Non-immigrant, one foreign-born parent	28.24*** (8.041)	18.88** (8.382)	24.45*** (9.019)

Source: OECD PIAAC, IOBE estimates. *** indicates statistical significance at 1%, ** at 5% and * at 10%. The numbers in parentheses represent standard errors of the coefficient estimates.

Regarding the associations with the control variables, age is statistically significant factor only for problem solving in technology-rich environment, which highlights the difficulties for older generations to adopt digital technologies. Female participants tend to have higher literacy and lower numeracy and problem-solving scores, but the difference is statistically significant only in the numeracy domain. First generation immigrants[5] tend to have lower scores across the three domains, yet non-migrants that have both their parents born in Greece are not the category with the highest scores (controlling for education) within this subsample, with people from mixed families and second-generation immigrants posting higher scores on average (except for second generation immigrants in the problem-solving domain).

In order to make conclusions relevant to education policy, it is instructive to perform the above analysis across cohorts, given that people from older cohorts have received their education several decades ago and since then the education system has undergone significant changes. Breaking down the sample in five age cohorts, we observe that the coefficient on vocational education remains negative across all domains and cohorts, although it tends to decrease in value and lose its statistical significance in the 45-54 cohort, increasing again for the oldest cohort.

In particular, the individuals younger than 25 years old who have completed the vocational track of upper secondary education tend to have a lower literacy score by about 22.9 points on average, when we control for age within the cohort, gender, and immigration status (Table

[5] Individuals born abroad with foreign-born parents.

4.4). The difference, compared to general-track high-school graduates, falls to 12.9 points among those aged 25-34, 9.0 points in the 35-44 years old cohort, only 2.6 points in the 45-54 cohort and back to 14.4 points in the cohort of respondents aged 55 years or older. The difference is statistically significant at the 1% level of significance in the youngest cohort, at the 10% level for the cohorts 25-34 and 35-44 and not statistically significant for older cohorts.

Table 4.4: Results from regression analysis of PIAAC literacy scores per age cohort, Greece

Variable	Below 25	25-34	35-44	45-54	Above 54
Intercept	248.76*** (27.881)	191.05*** (24.026)	183.41*** (32.479)	254.70*** (48.286)	150.60* (84.612)
Post-secondary, non-tertiary	8.91 (9.680)	2.25 (6.268)	12.67* (6.757)	7.87 (7.505)	12.82 (10.770)
Upper secondary, vocational	-22.94*** (6.365)	-12.87* (6.705)	-9.02* (5.108)	-2.62 (6.370)	-14.35 (8.988)
Age	0.57 (1.278)	1.42* (0.762)	1.35* (0.769)	-0.03 (0.922)	1.49 (1.426)
Female	1.93 (6.459)	4.16 (5.086)	4.05 (4.785)	3.10 (4.337)	1.91 (6.541)
2nd generation immigrants	24.46 (16.730)	38.50 (62.507)	1.54 (14.975)	20.94 (30.174)	10.92 (25.655)
Non-immigrant, both parents born in Greece	4.78 (8.934)	23.38** (9.976)	16.52* (8.793)	3.03 (11.798)	20.93 (18.788)
Non-immigrant, one foreign-born parent	29.67** (12.032)	41.87** (15.897)	13.16 (24.213)	-4.88 (17.596)	23.65 (20.156)
Sample size	482	490	622	498	302

Source: OECD PIAAC, IOBE estimates. *** indicates statistical significance at 1%, ** at 5% and * at 10%. The numbers in parentheses represent standard errors of the coefficient estimates.

Table 4.5: Results from regression analysis of PIAAC numeracy scores per age cohort, Greece

Variable	Below 25	25-34	35-44	45-54	Above 54
Intercept	217.84*** (25.826)	216.21*** (23.611)	195.18*** (35.718)	211.45*** (42.226)	216.51*** (72.761)
Post-secondary, non-tertiary	0.64 (11.967)	6.99 (6.225)	9.80 (6.549)	11.30 (8.129)	9.87 (9.038)
Upper secondary, vocational	-29.43*** (6.958)	-21.02*** (6.532)	-6.15 (6.661)	-10.41 (7.544)	-20.33** (8.619)
Age	2.38* (1.301)	1.03 (0.788)	1.18 (0.881)	1.15 (0.791)	0.53 (1.212)
Female	-8.62 (6.335)	-7.95 (4.918)	-8.76 (5.887)	-8.82 (5.368)	-13.66** (5.889)
2nd generation immigrants	22.88 (17.234)	45.39 (38.428)	11.95 (12.457)	24.05 (21.599)	14.55 (25.146)
Non-immigrant, both parents born in Greece	2.94 (9.138)	18.90** (9.246)	14.75* (8.205)	-3.83 (9.898)	19.97 (20.338)
Non-immigrant, one foreign-born parent	19.17 (13.476)	36.63** (14.762)	-3.17 (28.277)	-1.66 (17.578)	19.81 (21.389)
Sample size	482	490	622	498	302

Source: OECD PIAAC, IOBE estimates. *** indicates statistical significance at 1%, ** at 5% and * at 10%. The numbers in parentheses represent standard errors of the coefficient estimates.

A similar pattern of cohort effects on the vocational education variable can be observed in the other two domains as well. In the youngest cohort, the difference in the numeracy scores between the vocational and general track of the high-school graduates stands on average

at -29.4, falling to -21.0 points in the 25-34 cohort, yet remaining statistically significant at the 1% level (Table 4.5). In contrast to literacy, in numeracy the smallest difference is observed among those aged 35-44 years old (-6.2 points). The coefficient grows in older cohorts, becoming statistically significant at the 5% level in the oldest cohort (-20.3 points).

In the problem-solving domain, the difference between the vocational and general track of high-school students stands at -22.2 points in the youngest cohort, falling gradually to -19.4 points in the 25-34 and -14.8 points in the 35-44 cohorts, without losing its statistical significance (Table 4.6). The lowest (and statistically insignificant) difference is observed among the 45-54 years old (-3.5 points), growing to -43.2 points in the oldest cohort, without regaining its statistical significance.

Table 4.6: Results from regression analysis of PIAAC problem-solving scores per age cohort, Greece

Variable	Below 25	25-34	35-44	45-54	Above 54
Intercept	240.26*** (36.499)	254.59*** (25.180)	220.18*** (43.993)	273.62*** (58.462)	336.55* (156.783)
Post-secondary, non-tertiary	9.68 (10.953)	11.94* (6.836)	18.72* (9.403)	14.43 (11.218)	61.06** (26.486)
Upper secondary, vocational	-22.23** (8.477)	-19.39*** (5.625)	-14.78** (7.316)	-3.53 (7.942)	-43.21 (24.140)
Age	0.88 (1.719)	-0.30 (0.799)	0.60 (1.113)	-0.56 (1.104)	-2.13 (2.452)
Female	0.97 (5.692)	4.00 (6.048)	-5.51 (5.909)	-6.97 (7.219)	-4.94 (12.878)
2nd generation immigrants	6.03 (13.292)	39.30 (30.081)	-11.89 (27.286)	-	2.36 (50.432)
Non-immigrant, both parents born in Greece	14.96 (8.871)	17.47 (10.120)	22.67* (12.409)	0.39 (16.517)	32.86 (42.053)
Non-immigrant, one foreign-born parent	33.89** (13.923)	27.19 (19.668)	23.15 (18.247)	10.73 (21.561)	37.00 (-)
Sample size	437	416	438	287	112

Source: OECD PIAAC, IOBE estimates. *** indicates statistical significance at 1%, ** at 5% and * at 10%. The numbers in parentheses represent standard errors of the coefficient estimates. The sample size is lower, as individuals who failed ICT core test, had no computer experience, or opted out from the computer-based assessment were not scored in terms of problem-solving in technology-rich environment.

Regarding the remaining variables, the coefficient on post-secondary education is positive across all cohorts and domains, however its statistical significance is limited to specific cohorts (35-44 for literacy and 25-34, 35-44 and above 54 for problem solving in technology-rich environment). Age tends to have a positive coefficient for literacy and numeracy skills within most cohorts, with statistically significant association in the 25-34 and 35-44 cohorts for literacy scores and in the youngest cohort for numeracy scores. Age within cohorts does not produce statistically significant association with problem solving in technology-rich environment in any age cohort. Regarding gender, female respondents tend to produce higher literacy scores and lower numeracy scores across all cohorts, but the difference is statistically significant only for numeracy in the oldest cohort. In problem-solving, the coefficient on female gender is positive for younger cohorts and negative for older cohorts (35 plus), but the difference is not statistically significant in any cohort. Lastly, first-generation migrants tend to

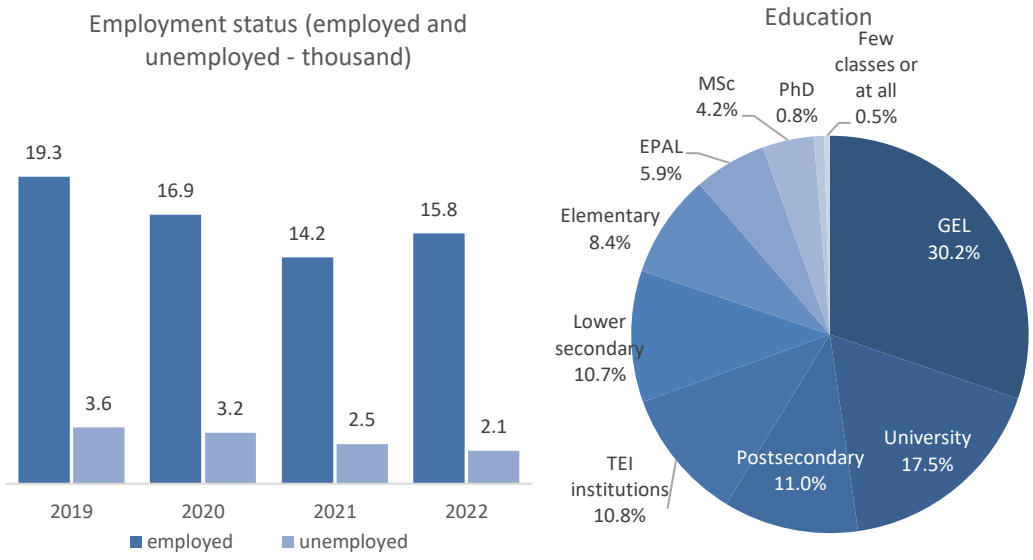
have lower scores across most domains and cohorts, although there are some exceptions (most notably in the 45-54 cohort), with the difference statistically significant in some of them.

The above analysis highlights the significant challenges for vocational education in Greece regarding fundamental cognitive skills of the students who opt to follow the vocational track at the upper secondary education level. The cohort analysis points to the possibility that this challenge has deteriorated in the past 2-3 decades, which may be linked to a deterioration in the ability of secondary vocational education school to attract students with adequate fundamental skills. It also provides an indication that more effort needs to be extended in EPAL schools at reasserting literacy, numeracy, and problem-solving skills, particularly among students from disadvantaged backgrounds.

4.4 Education attainment and labor market outcomes

This section examines the associations of education attainment and labor market outcomes in Greece, using data from the Labor Force Survey. The objective is to assess the relationship between employment and educational attainment and the effect of additional years of education on earnings, with a focus on EPAL graduates. In particular, we examine first whether the level of education is associated with higher likelihood of being employed against being outside the labor force but seeking a job (unemployed) and second with labor earning.

Figure 4.6: Structure of the sample



Source: ELSTAT Data processing: IOBE

The regression analysis is based on microdata from respondents to the Labor Force Survey which is carried out by the Hellenic Statistical Authority (ELSTAT) on a quarterly basis. The data cover the period between 2019 and 2022 (second quarter of each year). The sample size ranges from about 16,700 responses in the second quarter of 2021 to about 22,900 responses in the same quarter of 2019. The largest education category in the sample are GEL school

graduates (30.2%), followed by university graduate (17.5%) and people who have completed postsecondary studies (11.0%). EPAL graduates come seventh with 5.9% (Figure 4.6).

4.4.1 EMPLOYABILITY AND EDUCATIONAL ATTAINMENT

The associations of education and employment are tested with a logistic regression model (logit model):

$$\ln(\frac{p}{1-p}) = logit(p) = a_0 + a_1X_1 + \cdots + a_nX_n$$

where p is the probability that an individual is employed, X_1 to X_n are independent variables and α_0 to α_n are the estimated coefficients which show the intensity with which the independent variables correlate with the dependent variable.

In practice, the above model is estimated with algorithms where the dependent is a binary variable which equals 1 in case an individual is employed and 0 if an individual is unemployed (binary logistic regression). In addition to the level of education, socio-demographic variables such as age, gender, year of graduation, marital status, and type of work (permanent against temporary job) are also taken into account. The educational attainment of individuals is captured by 9 dummy variables each one corresponding to a specific level (those not enrolled in school or who have completed part of the primary education, primary education, low secondary education, upper secondary education, post-secondary non-tertiary-education, universities, technological education institutions - TEI, postgraduate studies and doctoral degree). GDP was also included as a control variable to take into account the variations in the economic cycle.

Table 4.7 presents the results of the econometric analysis in terms of odds ratios. Education attainment levels and employment have a positive and statistically significant relation. The estimated odds ratios are greater than unity on all education variables in the models considered, while across most education levels the odds to be employed increase as we move up the education attainment ladder.

In particular, individuals with a doctorate degree are more than 13 times more likely to be employed (against being unemployed) compared to people with very low educational attainment (no school or few years of primary education), when controlling for age, gender and nationality. The ratio falls to 8.7 for individuals with a Masters degree, 5.5 for those who have graduated from universities and 5.1 for TEI graduates.

With regard to upper secondary education, the odds of being employed are slightly higher for those who have graduated from GEL schools compared to individuals with vocational education. Individuals who have attended EPAL schools have from 2.5 to 2.9 higher probability of being employed compared to individuals with very low educational level. Respectively, the odds ratio for GEL graduates ranges between 3.0 and 3.4. The odds for GEL graduates to be employed are 19.4% higher compared to EPAL graduates.

The difference between the estimated coefficient of EPAL graduates and GEL graduates is negative in all three examined cases. The results of a Wald test on coefficient differences show

that the difference is statistically significant once we control for the gender of the respondents (columns 2 and 3).

Table 4.7: Estimated coefficients of logistic regression with education as explanatory variable

Odds ratio	(1)	(2)	(3)
Elementary	2.469** (0.021)	2.661*** (0.000)	2.422** (0.002)
Lower secondary	2.675*** (0.000)	2.811*** (0.000)	2.591*** (0.000)
GEL	3.152*** (0.000)	3.422*** (0.000)	3.011*** (0.000)
EPAL	2.951*** (0.000)	2.915*** (0.000)	2.521*** (0.000)
Post-secondary	2.886*** (0.000)	3.270*** (0.000)	2.814*** (0.000)
TEI institutions	5.164*** (0.000)	5.896*** (0.000)	5.063*** (0.000)
University	5.293*** (0.000)	6.337*** (0.000)	5.458*** (0.000)
Master's	8.705*** (0.000)	10.162*** (0.000)	8.694*** (0.000)
PhD	14.263*** (0.000)	15.470*** (0.000)	13.394*** (0.000)
Age	1.039*** (0.000)	1.040*** (0.000)	1.039*** (0.000)
Gender		1.841*** (0.000)	1.831*** (0.000)
Greek nationality			1.563*** (0.000)
GDP	1.000*** (0.000)	1.000*** (0.000)	1.000*** (0.000)
c	0,072*** (0.000)	0.046*** (0.000)	0.038*** (0.000)
W**ald test** for EPAL = GEL **P(>X2)**	0.130	0.000	0.000

Note: (***) indicates statistical significance at 1%, (**) at 5% and (*) at 10%. The numbers in parentheses represent p-values.

Additionally, the estimated coefficients indicate that post-secondary education does not increase the probability of finding a job relative to GEL graduates. In contrast, the odds of employment for individuals with post-secondary education are higher compared to EPAL graduates, once we control for gender. This might indicate that although EPAL schools and post-secondary education are oriented to vocational training, the skills and abilities obtained by post-secondary education, which includes the EPAL apprenticeship year and studies in vocational training institutes (IEK) provide higher chances of employment in the Greek labor market.

With regard to the control variables, the estimated coefficients are statistically significant. The odds ratio for gender and nationality are higher than unity implying that males and Greek citizens are more likely to be employed compared to women and foreigners. Age also slightly increases the probability of someone being employed.

4.4.2 EARNINGS AND EDUCATIONAL ATTAINMENT

The second step of our analysis involves a semi-logarithmic regression analysis between earnings and education where the dependent variable is the log of monthly wages:

$$\ln(w) = a + \beta_0 E + \beta_1 X + \varepsilon$$

where E stands for the educational attainment (nine categories indicating the level of education, with "few classes of primary education or none" serving as the reference category) and X is a vector of explanatory variables including gender, nationality, Gross Domestic Product (expressed in logarithms), occupation (one-digit ISCO-08 classification) and sector of economic activity (2-digit economic sectors of NACE Rev2) of working people in the sample.

According to Table 4.8 which shows the estimated coefficients of the regression of earnings on educational attainment, when age, gender and nationality are considered the coefficients of the dummies related to the level of education are positive and statistically significant, except for elementary and lower secondary education, while they also increase with higher educational attainment.

Table 4.8: Estimated coefficients of the regression between earnings and education

Log(earnings)	(1)	(2)	(3)	(4)	(5)	(6)
Elementary	-0.113 (0.545)	-0.073 (0.328)	-0.113 (0.667)	-0.039 (0.581)	-0.134 (0.067)*	-0.556 (0.409)
Lower secondary	-0.050 (0.629)	-0.017 (0.820)	-0.054 (0.472)	0.009 (0.901)	-0.094 (0.194)	-0.021 (0.752)
GEL	0.084 (0.267)	0.127* (0.086)	0.071 (0.344)	0.096 (0.163)	-0.019 (0.784)	0.035 (0.596)
EPAL	0.149* (0.053)	0.162*** (0.031)	0.100 (0.184)	0.124* (0.075)	0.007 (0.921)	0.066 (0.334)
Post-secondary	0.130* (0.091)	0.191*** (0.010)	0.127* (0.090)	0.147** (0.033)	0.008 (0.904)	0.065 (0.336)
TEI institutions	0.297*** (0.000)	0.354*** (0.000)	0.289*** (0.000)	0.247*** (0.000)	0.109 (0.133)	0.130 (0.055)
University	0.339*** (0.000)	0.412*** (0.000)	0.349*** (0.000)	0.332*** (0.000)	0.136* (0.061)	0.174** (0.011)
Master's	0.498*** (0.000)	0.550*** (0.000)	0.484*** (0.000)	0.425*** (0.000)	0.243*** (0.000)	0.237*** (0.000)
PhD	0.664*** (0.000)	0.685*** (0.000)	0.623*** (0.000)	0.631** (0.000)	0.382*** (0.000)	0.446*** (0.000)
Age	0.016*** (0.000)	0.016*** (0.000)	0.016*** (0.000)	0.013*** (0.000)	0.015*** (0.000)	0.013*** (0.000)
Male	-	0.181*** (0.000)	0.181*** (0.000)	0.131*** (0.000)	0.161*** (0.000)	0.116*** (0.000)
Greek	-	-	0.113*** (0.000)	0.009 (0.475)	0.062*** (0.000)	-0.007 (0.589)
GDP	-0.015 (0.821)	-0.046 (0.488)	-0.033 (0.615)	-0.001 (0.986)	0.030 (0.634)	-
Activity sector	-	-	-	Yes	-	Yes
Occupation	-	-	-	-	Yes	Yes
c	6.008*** (0.000)	5.741*** (0.000)	5.584*** (0.000)	5.597*** (0.000)	5.847*** (0.000)	6.091*** (0.000)

Note: (***) indicates statistical significance at 1%, (**) at 5% and (*) at 10%. The numbers in parentheses represent p-values.

In the case of upper secondary education, the earnings of employees who have graduated from EPAL schools are higher by 18% compared to those who have not completed primary education, while the earnings of individuals who have graduated from GEL schools are higher by 14% (when age and gender are considered). Additionally, the results indicate that the earnings of EPAL graduates are slightly higher compared to GEL graduates. According to the estimated regression coefficients, earnings for those who have attended EPAL schools are higher by 3.6% compared to individuals who have graduated from GEL schools. The difference is statistically significant (at the 5% level of statistical significance when we control for age and gender). The earnings of EPAL graduates remain higher compared to those who have attended GEL schools (by 2.8%) when we control for the sector of employment. The coefficients on education levels lower than university cease to be statistically significant once we control for occupation. This development indicates that the EPAL schools provide an earnings premium among upper secondary education graduates that have not continued with their education at post-secondary or tertiary level by helping them to get a job at better paid occupations.

Earnings are substantially higher for individuals with higher education. In the case of individuals with PhD or master's degree, earnings are twice as high on average compared to individuals who have not completed primary education. The premium decreases for graduates of the tertiary educational system (42% for university graduates and 34% in the case of employees who have graduated from TEI institutions when we control for age, gender, and nationality). The estimated coefficients decrease by about half when we control for occupation, which implies that half of the premium can be attributed to sorting effects of university education to occupations earning higher income and the other half to skills acquired at university. The earning are also higher for post-secondary compared to upper secondary education graduates, but the difference become statistically insignificant once we control for occupation.

Regarding the control variables, the estimated coefficients for age, gender and citizenship are statistically significant, indicating that older individual, men and Greek citizens enjoy higher earnings. The macroeconomic control variable does not appear to have a statistically significant association with earnings in the period under consideration.

5. CONCLUSIONS

The number of students enrolled in vocational upper secondary schools declined sharply from 140,500 in 2001 to about 80,000 in 2006, as a result of reforms in the vocational education system. The number has gradually grown ever since, to reach 101,600 students in 2019. As a result of the reforms and the subsequent economic crisis, the presence of private school providers in vocational education has all but disappeared. Meanwhile, the share of students enrolled in evening EPALs has gradually increased, from 9.0% in 2001 to 17.2% in 2019.

The number of teaching staff in EPALs peaked at around the start of the economic crisis (more than 30,000 people in 2009), to fall below 25,000 people since 2014 as a result of the fiscal consolidation measures that affected the education sector as well. As a result, the students per teacher ratio in EPAL public schools has grown to 5.4, from only 3.3 in 2009 and 4.2 in 2001.

The breakdown of students enrolled in various EPAL specializations has fluctuated significantly over time. The greater increase between 2008 and 2019 in the percentage of enrolled students in EPAL was recorded among Nursing assistants (+12.5 percentage points), followed by Tourism experts (+3.3 p.p.), Automotive mechanical and electrical systems experts (+3.2 p.p.) and Modern agriculture expert (+2.4 p.p.). By contrast, the strongest decrease was observed in EPAL graduates without a specialization (-4.8 p.p.), Electrical installations experts (-2.2 p.p.) and Nursery school assistants (-1.3 p.p.).

Despite the shifts in the EPAL specializations, the mismatch between the supply and demand of skills has remained high in Greece. In particular, Greece ranks 3rd from the bottom in the EU in the 2022 European Skills Index (ESI) of CEDEFOP. In the constituent elements of the indicator, Greece ranks fifth from the bottom in terms of the share of high-school education students who are receiving vocational training, 6th from the bottom in terms of the percentage of people aged 25-64 who participated in training activities during the last 4 weeks before responding to the survey, second to last in terms of the qualification mismatch indicator and at the very bottom in terms of the overqualification rate and the skills mismatch composite indicator. Greece also performs poorly in terms of field-of-study mismatch, topping the relevant ranking of EU countries, with 41.7% of the workers in the country having completed a field of study that does not match their job's requirements.

The performance of Greece in terms of adult competencies of the country's workforce is also discouraging. In rankings of EU countries that participated in the OECD PIAAC survey, Greece ranks third from the bottom in terms of mean literacy and numeracy scores. Vocational-track high-school graduates perform particularly poorly across the OECD PIAAC domains. The gap in their scores compared to general-track high-school graduates is higher for younger cohorts, which provides indications of deteriorating challenge for vocational high schools to attract students with adequate fundamental cognitive skills. The analysis of adult competencies highlights the need for vocational high schools to strengthen the fundamental literacy, numeracy, and problem-solving skills of their students, which holds particularly strongly for students coming from disadvantaged backgrounds.

Regarding the relationship between educational attainment and labor market outcomes, the EPAL graduates face lower probability of employment compared to people who have completed upper secondary education through the general track. However, once employed, the EPAL graduates tend to receive higher earnings, controlling for age, gender, and nationality. Once we control for occupation as well, the earnings differential ceases to be statistically significant. This result implies that having completed EPAL is not seen as a strong employability signal by the Greek employers, yet the EPAL graduates seem to enjoy earnings premium over GEL graduates by getting into occupations that tend to be better paid. This result points to the need for further strengthening of the employability of EPAL graduates through stronger relations of EPALs with larger employers and employer associations at the local level.

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