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An Analysis of the Career Development Items in PISA 2012 and of their Relationship to the Characteristics of Countries, Schools, Students and Families



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An analysis of the career development items in PISA 2012 and of their relationship to the characteristics of countries, schools, students and families

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Contents

List of figures and tables.....	5
Summary	7
1 Introduction	9
2 Methodology.....	11
3 Results	13
3.1 Country means and standard deviations.....	13
3.1.1 Participation in career development activities.....	13
3.1.2 Perceived career development competence levels	15
3.1.3 Where perceived career development competence is acquired	16
3.2 Insights into between-country differences from responses to individual items.....	20
3.3 Country characteristics associated with between-country differences in participation and competence	21
3.4 Within-country differences in participation and competence.....	22
3.4.1 Differences that are significant in all or most countries, where differences are all in the same direction, and where differences follow a consistent pattern.....	22
3.4.2 Differences that are significant in all or most countries, but where the direction of differences, while consistent, varies from country to country.....	24
3.4.3 Differences that are significant and consistent in direction, but in a only limited number of countries.	25
3.4.4 Differences that are significant in either very few or no cases, that do not seem to follow a consistent pattern, or both.	25
3.5 Within-country correlations	27
4 Discussion	28

Annex 1 Career-related items included in the PISA 2012 Education Career questionnaire 37

Annex 2 Background variables included in the analysis..... 38

Annex 3 Summary of the significance of within-country differences between means..... 42

Annex 4 Relating PISA to what we know about national career development services: case studies
of Finland and Luxembourg 51

1 What the data shows 51

1.1 Finland..... 51

1.2 Luxembourg 52

2 Descriptions of national systems provided by national experts 53

2.1 Career education and guidance in schools in Finland 53

2.2 Guidance and counselling in education and training in Luxembourg..... 53

List of figures and tables

Figures

Figure 1	Participation in career development activities.....	14
Figure 2	Country means and standard deviations for participation in career development activities	15
Figure 3	Perceived career development competence	16
Figure 4	Participation in career development activities and perceived career development competence.....	16
Figure 5	School and out of school as sources of perceived career development competence	18
Figure 6	Relative importance of school and out of school sources for the acquisition of perceived career development competence	19
Figure 7	Participation in career development activities and the relative importance of the school for the acquisition of perceived career development competence.....	19
Figure 8	Country differences on four participation items.....	20
Figure 9	Differences in participation between top, two middle and bottom quartiles of the perseverance scale when measured at the school and individual levels	23
Figure 10	Relationship between selected career scales and selected background variables for selected countries.....	26

Tables

Table 1	Variance in participation in career development activities.....	30
Table 2	Item response proportions: Participation.....	31
Table 3	Item response proportions: Total competences	32
Table 4	Item response proportions: Competences acquired at school.....	33
Table 5	Item response proportions: Competences acquired out of school	34
Table 6	Between-country correlations between career-related scales and indicators	35
Table 7	Average within country correlations between career-related scales and indicators	36

Summary

PISA 2012 provides a unique opportunity to examine national differences in career development outcomes and to relate these differences to the characteristics of individuals, of their families, and of schools. Using the career-related items in the Education Career questionnaire, four scales were constructed that reflect 15 year-olds' participation in career development activities, the range of career-related competences that they assess themselves as having acquired, and their judgements about whether these competences had been acquired at school, out of school, or both. Data was available for 22 countries, fourteen of them members of the European Lifelong Guidance Policy Network. The study has the potential to illuminate a number of policy issues that are important for the Network. In particular, it helps to shed light on ways in which individual characteristics, family characteristics and some structural features of schools and school systems are associated with career management skills, and upon the role that schools and agencies outside of the school can play in promoting career management skills.

There are wide differences between countries in the extent to which 15 year-olds participate in career development activities, in the extent to which they see themselves as having acquired career-related competences, and in the extent to which they have acquired these competences at school and out of school. There are also wide differences between countries in the variability of each of these measures. Some of these differences are a function of national characteristics such as socioeconomic status levels and the proportion of students from disadvantaged family backgrounds. Others are a function of national differences in students' attitudes to the relevance of school to life after school.

An important finding from the analysis is that within countries, differences in career development participation and in self-assessed career-related competence are more strongly related to the personality and attitudinal characteristics of students than they are to students' socio-economic background or to their achievement levels. Nevertheless there are suggestions from the analysis that structural features of

school systems do have an impact upon career-related outcomes. These include the proportion of students in vocational programmes, which in turn may be a function of factors such as the size and starting point of vocational education, and the streaming of students by achievement level and social background into particular types of schools or programmes. These suggestions seem well worth exploring in more detail. It is also notable that these structural features of school systems seem to be more strongly related to career development outcomes than factors related to the climate of individual schools such as resource levels or student-teacher relations.

However it is important to be both realistic and cautious about these findings. Even where differences in career-related outcomes are significantly related to the characteristics of students, of their family backgrounds or of their schools, the correlations are generally quite small, with single vari-

ables accounting for quite small proportions of the variance in participation or competence. This suggests the need for caution in judging the impact of policy-relevant variables upon career development outcomes. However even if single variables have relatively low correlations, taken together they may account for a substantially larger proportion of the variance in career development outcomes. And so it seems worthwhile undertaking a further stage of analysis in which multidimensional modelling is used to explore the extent to which combinations of variables can account for outcomes.

Despite the need for caution about the strength of the relationships revealed by the study, it does highlight the important role that schools can play in developing career management skills, whilst at the same time pointing to the significant challenges that exist in a number of countries in realising the potential that schools have in this regard.



Introduction

The OECD has been conducting its PISA (Programme for International Student Assessment) survey at three-yearly intervals since 2000. Whilst national comparisons of 15 year-olds' achievement in mathematics, reading and science have been a main focus of both media commentary and public policy analysis, the survey is also valuable for the wealth of background information that it collects on students, their family circumstances and their schools, and for the different topics that are explored in each survey in addition to the primary focus upon student achievement. In 2012 one area that was explored was career development, affording a rare opportunity to gain quantitative data that can provide comparative perspectives on the link between career development and public policy issues. Such comprehensive information is generally not available from other sources. While some career-related items were included in the 2006 survey, and were completed by all participating coun-

tries, they were limited in scope¹, and no detailed comparative analysis of them appears to have been conducted.

For those interested in the relationship between career development and public policy, the 2012 PISA survey is of potential value for two reasons. First, it obtained career development-related information directly from students. This allows results to be cross-referenced against a range of policy-relevant background information on the characteristics of students and their families, as well as against information on the characteristics of the schools attended by students. Second, it gathered career-related information in an organised and systematic way that

¹ The 2006 survey sought only schools' perspective, not students', making it impossible to clearly relate career development issues to student characteristics; and it focused largely on school-business links and on whether and how career guidance was provided by schools, rather than on the types of career development activities provided by the school or participated in by students, or on the acquisition of career-related competences.

allows light to be shed upon three dimensions that are important for career development policy:

- The types of career development activities that students participate in such as visiting a job fair and searching the internet for information about careers (nine items²);
- Students' reports of the types of career-related competences that they had acquired such as how to find information on jobs and how to prepare for a job interview (six items); and
- For each of the six career-related competences, whether these had been acquired at school or out of school.

The inclusion of items that assess students' self-reported career competences is of particular interest given the priority that the European Lifelong Guidance Policy Network (ELGPN) has attached in its work programme to a better understanding of the policy issues associated with the development of career management skills³, and in particular the importance that it attaches to developing a better understanding of the ways in which career management skills can be promoted in schools.

PISA 2012's career-related items were included in the Education Career questionnaire⁴, which participating countries had the option of completing or not completing. The option of completing the Education Career questionnaire was taken up by 22 of the 65 countries and economies⁵ that took part in PISA 2012. They are: Australia; Austria; Belgium; Canada;

Croatia; Denmark; Finland; Hong Kong-China; Hungary; Ireland; Italy; Korea; Latvia; Luxembourg; Macao-China; New Zealand; Portugal; Serbia; Shanghai-China; Singapore; Slovak Republic; and Slovenia. Fourteen of the 22 are members of the ELGPN⁶, and whilst to some extent this limits the opportunity to gain detailed comparative perspectives among ELGPN member countries, the participation of eight Asian and Oceanic countries does provide a potential opportunity for interesting cross-cultural perspectives to be shed upon a number of issues that related to career development and public policy.

In 2012 the ELGPN resolved that its work programme for 2013-14 should explore the possibility of co-operation with the OECD on the PISA survey. This paper is a first step towards realising that objective. The purpose of the paper is to provide an initial exploration of the potential of PISA 2012 to illuminate some links between career development and public policy, to explore national differences in patterns of 15 year-olds' participation in career development activities and their perceived career-related competences, and to suggest priorities for further analysis. It provides a first-level analysis of the relationship between career development and the characteristics of schools and of students and their families, and does not try to examine either interaction between variables or to partial out the absolute impact of individual variables once the impact of others has been taken into consideration. Its focus is upon general patterns and trends rather than upon trying to understand individual countries.

² And an additional country-specific item that is not included in this analysis.

³ Career management skills refer to a range of competences that provide structured ways for individuals and groups to gather, analyse, synthesise and organise self, educational and occupational information, as well as the skills to make and implement decisions and transitions.

⁴ The relevant items from the Education Career questionnaire are shown in Annex 1.

⁵ For the sake of convenience countries will be used throughout this paper to include the economies that participated (Hong Kong-China, Macao-China and Shanghai-China).

⁶ Seventeen ELGPN member countries and one observer country took part in PISA 2012 but did not complete the Education Career Questionnaire, and one (Malta) did not take part in PISA 2012.



Methodology

Four scales were constructed from the career-related items in PISA 2012, in each case using a simple sum of the relevant items⁷. The four scales, which form the core of the analysis, measure:

- The total number of career-related activities that students have participated in;
- The range or diversity of career-related competences that they have acquired, expressed as the total number that have been acquired⁸;

- The range or diversity of career-related competences acquired at school, expressed as the total number that have been acquired; and
- The range or diversity of career-related competences acquired out of school, expressed as the total number that have been acquired.

Each of the four scales was related to three sets of variables:

- A set of variables that describe the characteristics of the schools that students attend such as their size, the type of geographical community in which they were located, their average achievement levels in mathematics and problem solving, and the level of their resources;
- A set of variables that describe students' personal characteristics such as their achievement in mathematics, perseverance, whether they were taking part in a vocational education pro-

⁷ The option of using a principal components and/or factor analysis to construct the scales was explored, but it was found that all the items seemed to receive loadings of approximately similar magnitude, indicating that the simple sum would do just as well. A simple sum of the relevant items also has the advantage of simplifying the interpretation of scale scores when compared to factor scores, or when compared to the scales constructed using Rasch analysis commonly developed for other PISA material, all of which have a mean of zero and a standard deviation of one.

⁸ As students could tick that any of the six career-related competences could be acquired either at school, out of school, in both locations, or never, the total number of career-related competences acquired was obtained by subtracting the number of never responses from six.

gramme at school, and their attitudes towards school; and

- A set of variables that describe the characteristics of students' families and social background such as their socioeconomic status and migrant status.

The full set of variables, and the rationale for including each one, can be found in Annex 2. In brief, the variables were selected for the analysis to reflect a combination of what it might be reasonable to expect from other areas of social inquiry about the impact of aggregate national characteristics, school characteristics, individual characteristics and family characteristics upon participation and outcomes in areas such as education, training and employment, as well as to reflect the types of variables that the career development literature suggests may be related to participation in career development services and to outcomes from the career development process. For example it is well known that socioeconomic status influences both access to and the equity of outcomes from education, that educational achievement influences labour market outcomes, and that career development outcomes are influenced by individual characteristics such as decision making skills.

Some of the variables described in Annex 2 can both describe the characteristics of schools and the characteristics of students or their families. For

example: values for mathematics achievement and socioeconomic status can be attached to individual students, as well as to schools based upon the average value of all students in a school; and attitudes to school can be both an individual characteristic, and, when aggregated over all students in a school, can reflect the climate of a school. This type of difference allows some insight to be gained into the relative impact of individual characteristics and institutional characteristics upon career development participation and outcomes. As a result average school values were calculated for the following variables: achievement in mathematics; achievement in problem solving; socioeconomic status; migrant status; participation in vocational education programmes; perseverance; openness to problem solving; attitudes to school (learning outcomes); and attitudes to school (learning activities)⁹.

Finally, although the main focus of the analysis is descriptive, case studies were carried out of Finland and Luxembourg by national experts on career development to explore the extent to which the patterns of results revealed by the analysis could be explained by what is known from other sources about the characteristics of those countries' career development services, and to help demonstrate ways in which a combination of quantitative and qualitative data can help to increase understanding of national career development systems.

⁹ The latter two are measures of the extent to which students believe that school has prepared them for adult life and taught them things that could be useful in a job.



Results

3.1 Country means and standard deviations¹⁰

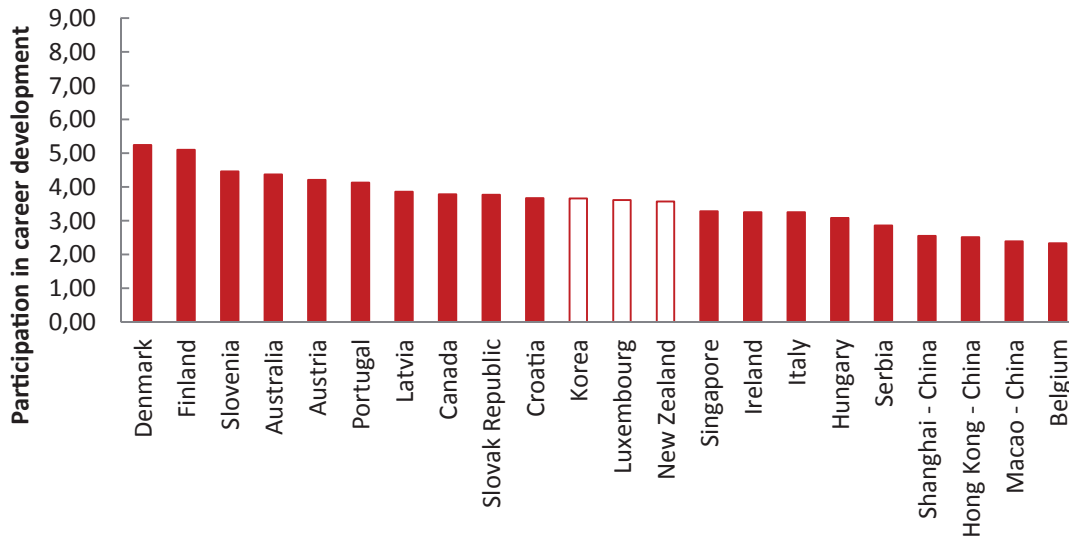
3.1.1 Participation in career development activities

There is considerable variation both between and within countries in the extent to which 15 year-olds participate in career development activities. Participation is highest in Denmark and Finland, and lowest in Belgium, Macao, Hong Kong and Shanghai. In the latter group of countries participation levels are under half the levels observed in Denmark and Finland (Figure 1). And Denmark and Finland are the only two countries where 15 year-olds indicate that they have taken part in more than half of all the activities in the scale.

Similar average levels of participation are associated with wide variation in participation within countries (Figure 2). For example:

- Denmark combines a high level of participation with relatively low variation in participation. This suggests that services are provided relatively evenly throughout the country. A similar but weaker combination of high participation and low variation can be seen in Canada and Latvia;
- In Finland, Australia, Austria, Slovenia and the Slovak Republic above average participation is accompanied by wide variation in participation levels;
- In Serbia and Macao participation is low, but there is considerable variation in participation levels, implying that some 15 year-olds receive relatively high levels of service despite low overall levels; and

¹⁰ To reduce the size of this paper all statistical details of means, standard deviations, mean differences and correlations have not been included, but can be found on the ELGPN website at <http://elgpn.eu>.

Figure 1: Participation in career development activities

Solid bars are significantly different from the 22 country average; unfilled bars are not

- In Hong Kong, Shanghai and Belgium participation levels are low, and so is the variation in participation.

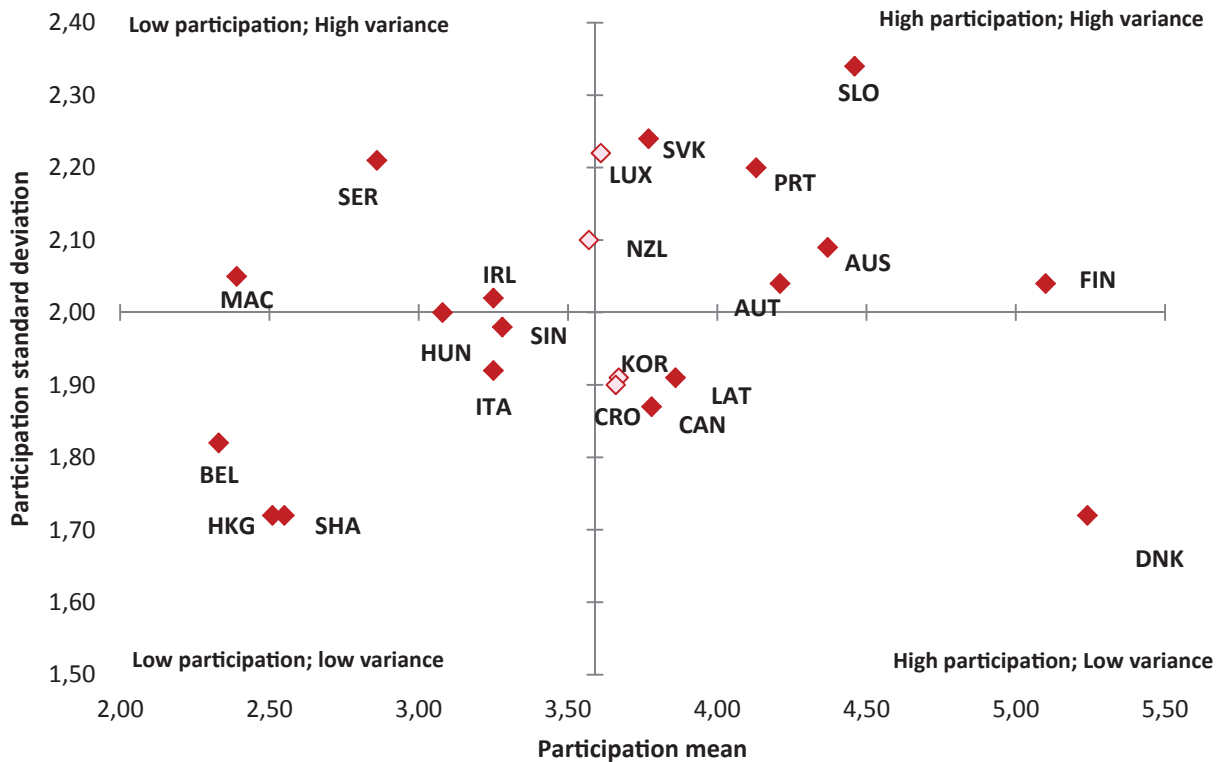
In all countries, variation in levels of participation within schools is much greater than variation in levels of participation between schools: on average, over the 22 countries, variation within schools is more than ten times as great as variation between schools (Table 1)¹¹.

In many countries schooling remains relatively undifferentiated in terms of school types or pro-

gramme options up until the end of compulsory schooling. However in Austria, Hungary, Luxembourg and the Slovak Republic students are streamed into different types of schools and/or programmes at a relatively early age, and the number of educational programmes available to 15 year-olds tends to be greater than in other countries. In Australia, a large private school sector differentiates students by socio-economic status at a relatively early age. In these countries between-school variation is higher than in other countries, but it is still far smaller than variation in participation within schools.

¹¹ However it should be noted that some of the items included in the participation scale are related to activities that do not necessarily belong to schools' duties, increasing the likelihood that the main source of variation is the individual behaviour regardless of school.

Figure 2: Country means and standard deviations for participation in career development activities



Solid points are significantly different from the 22 country average; lightly shaded points are not

3.1.2 Perceived career development competence levels

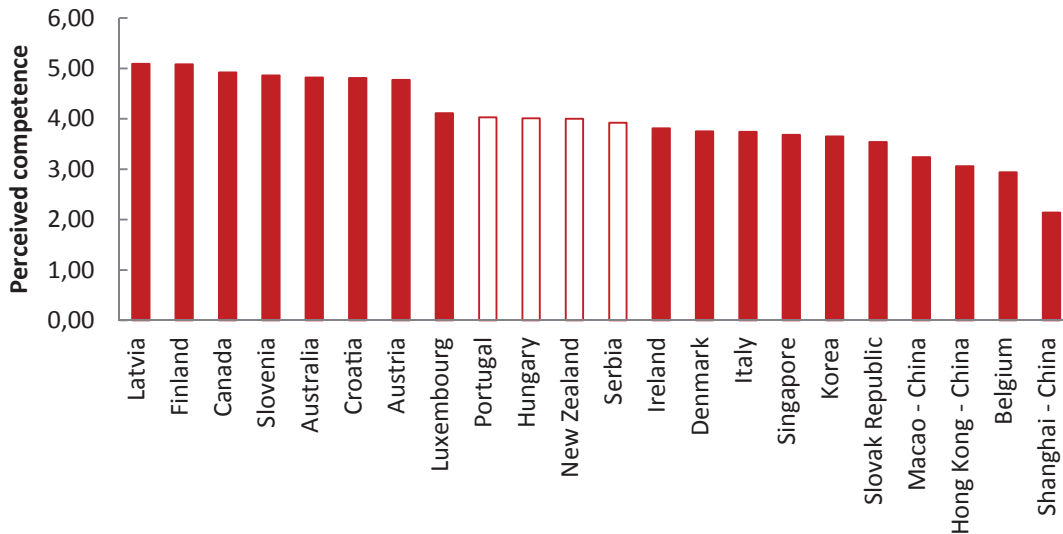
15 year-olds report that they have acquired competence in many dimensions of career development in Latvia, Finland, Canada, Croatia, Slovenia, Australia and Austria, and in fewer dimensions of career development in Shanghai, Belgium, Hong Kong and Macao (Figure 3).

At the country level there is a very strong relationship between perceived career development competence and participation in career development activities (Figure 4): in countries where participation is high, perceived competence also tends to be high,

and vice versa. Almost half of the variation between countries in perceived competence can be accounted for by participation levels, and vice versa.

A simple correlation does not indicate causation: it could be that 15 year-olds who believe that they have acquired more career development competences are more likely to participate in career development activities than those who believe that they have acquired fewer. Equally, participation in career development activities such as job visits, talking to careers advisors and searching for career information could lead to more career development competences being acquired.

Figure 3: Perceived career development competence



Solid bars are significantly different from the 22 country average; unfilled bars are not

Figure 4: Participation in career development activities and perceived career development competence

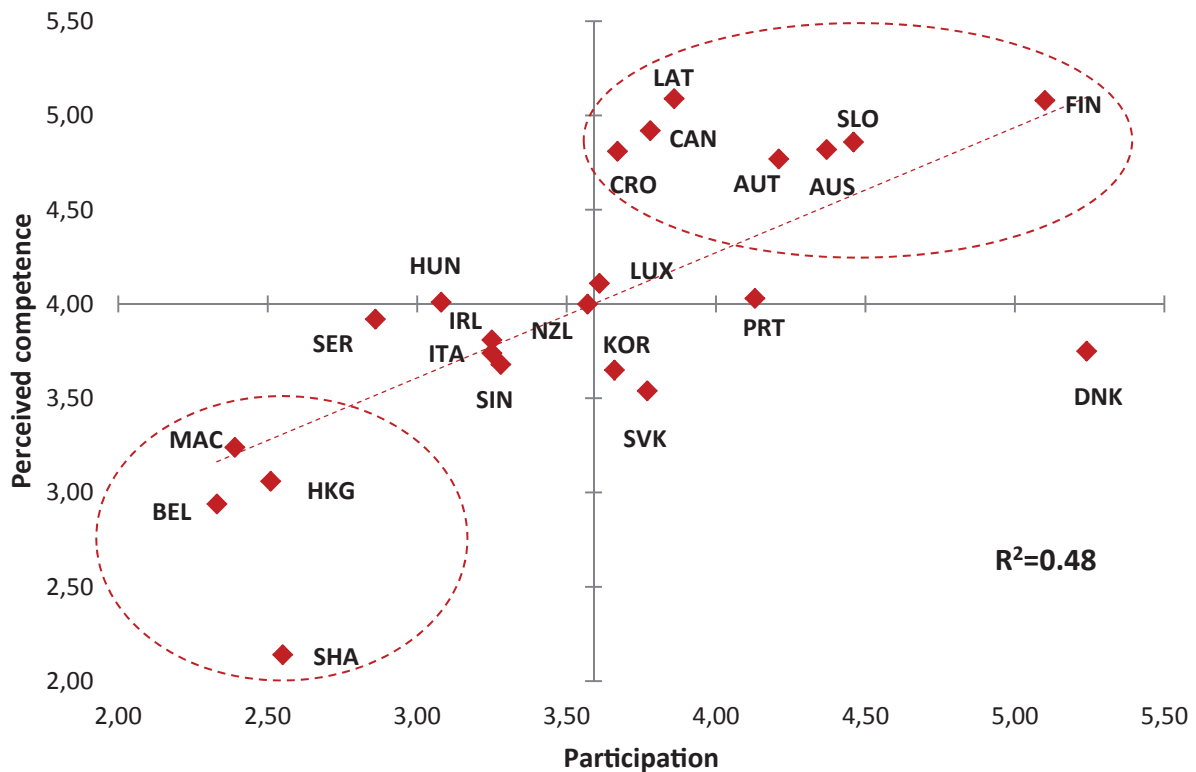


Figure 4 highlights two significant clusters of countries: in Latvia, Canada, Croatia, Austria, Australia, the Slovak Republic and Finland both participation and perceived competence tend to be high; and in Macao, Belgium, Hong Kong and Shanghai both participation and perceived competence tend to be low. All other countries other than Denmark tend to cluster close to the mean on both scales. And Denmark is somewhat of an outlier, with a high rate of participation but average perceived competence. Some insights into these differences can be obtained from country differences in responses to individual items in each scale. These are discussed in Section 3.2. The detailed case studies of Finland and Luxembourg in Annex 4 help to illustrate ways in which a combination of quantitative data and qualitative data on institutional arrangements can help to clarify and explain such different patterns of outcomes.

The correlation between participation in career development activities and perceived career development competence is high but not perfect: a given level of participation in career development activities can be associated with wide variation in perceived career development competence. This may have implications for the quality of career development services. For example:

- Denmark and Finland both have high participation levels. However perceived career development competence is well above average in Finland yet slightly below average in Denmark;
- Participation levels are about average in the Slovak Republic and Latvia, but perceived competence is somewhat below average in the Slovak Republic yet well above average in Latvia.
- Shanghai and Serbia both have low levels of participation, but perceived competence is very low in Shanghai, yet about average in Serbia.

3.1.3 Where perceived career development competence is acquired

School was rated as a more important source for the acquisition of career development competence than sources outside the school in only five countries: Finland; Canada; Ireland; Austria; and Australia (Figures 5 and 6). In Finland school was seen as substantially more important than out of school sources; in the other four countries the margin in favour of school was much smaller. In Hungary, Denmark, Serbia, Shanghai, Macao and Belgium out of school sources were judged twice or more as important as school. This suggests that in most of the participating countries schools play a smaller role than out of school sources in developing career-related competences. In few of the participating countries is this likely to be due to the existence of large and well developed careers services located outside of schools that provide services to 15 year-old school students¹².

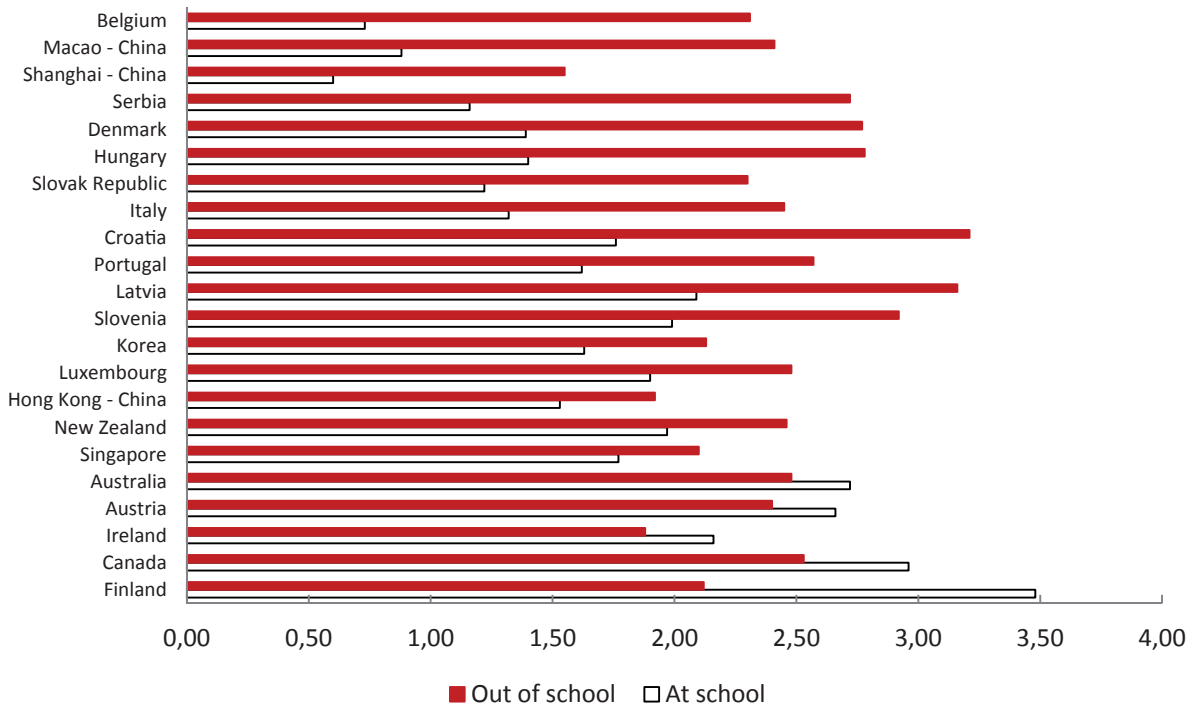
Given the ways in which the scales were constructed it is not surprising that both scores for the relative importance of the school and scores for the relative importance of out of school sources are positively correlated with overall scores for perceived career development competence. However the relationship was somewhat stronger for the school than for out of school sources (a correlation coefficient of 0.82 compared to 0.64)¹³. And so this may suggest that the relatively greater importance of out of school sources in many countries reflects the relatively weakly developed state of in-school services, but that where services in schools are well developed, competence levels are likely to be higher. The discussion of responses to individual items in the scales in Section 3.2 tends to reinforce this interpretation. And it should also be noted that four of the five countries in which in-school sources are rated as

¹² Perhaps with the exception of Denmark and New Zealand.

¹³ However note that these correlations are between aggregate national scores. When the same correlations are carried out using individual data somewhat smaller coefficients result, but nevertheless they still favour the greater importance of school sources.

more important than out of school sources (Australia, Austria, Canada and Finland) fall in the cluster of countries in Figure 4 in which both participation and total competence levels are high.

Figure 5: School and out of school as sources of perceived career development competence



Countries are arranged in order of the relative importance of school as a source for perceived career competence, as measured by the ratio of the school score divided by the out of school score, where Finland has the highest score and Belgium the lowest.

A similar message about the relative importance of schools in the career development process seems to emerge when looking at participation in career development activities. While 15 year-olds assess out of school sources as more important than the school for the acquisition of perceived career development competence in 17 of the 22 countries, the correlation with participation levels is much stronger (0.66) for ratings of the importance of the school than it is for ratings of the importance of out of school sources (0.35). Figure 7 suggests an even stronger underlying relationship, showing that all countries

cluster closely around the trend line fitted to the data with two sets of exception: at high participation levels the school is rated as more important in Finland and less important in Denmark than might be expected on the basis of the underlying trend; and at middle levels of participation the school is rated as more important in Canada and less important in the Slovak Republic than would be expected on the basis of the underlying trend¹⁴.

¹⁴ National case studies that combine quantitative and qualitative data of the sort provided in Annex 4 may help to explain such differences.

Figure 6: Relative importance of school and out of school sources for the acquisition of perceived career development competence

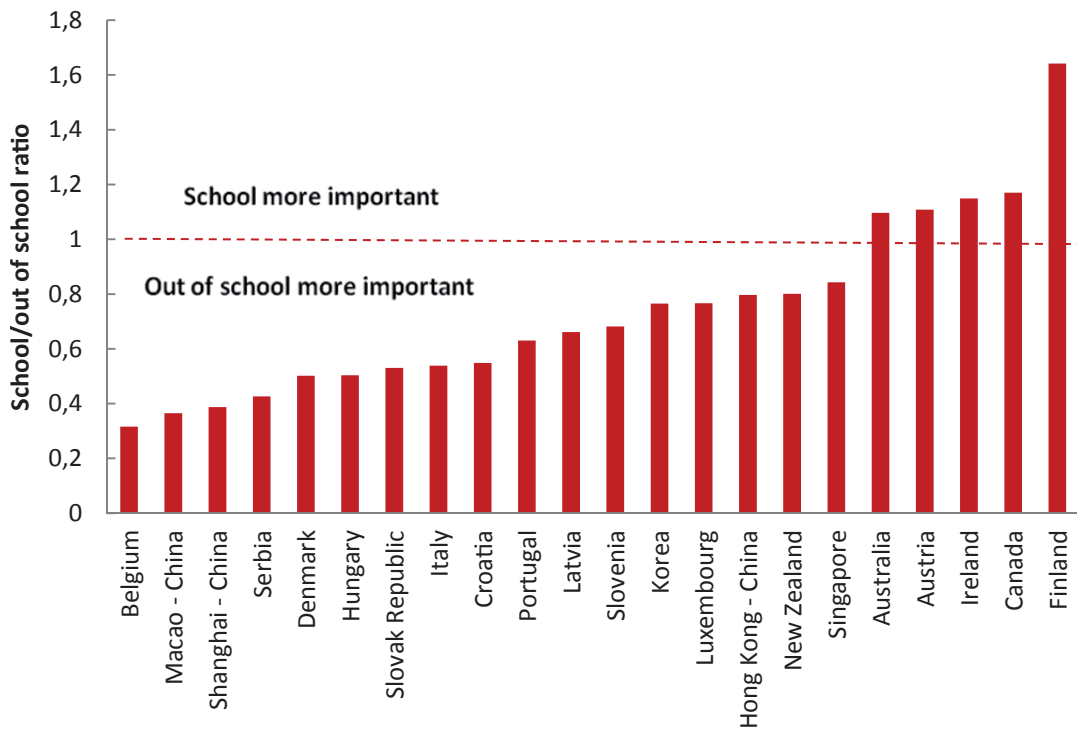
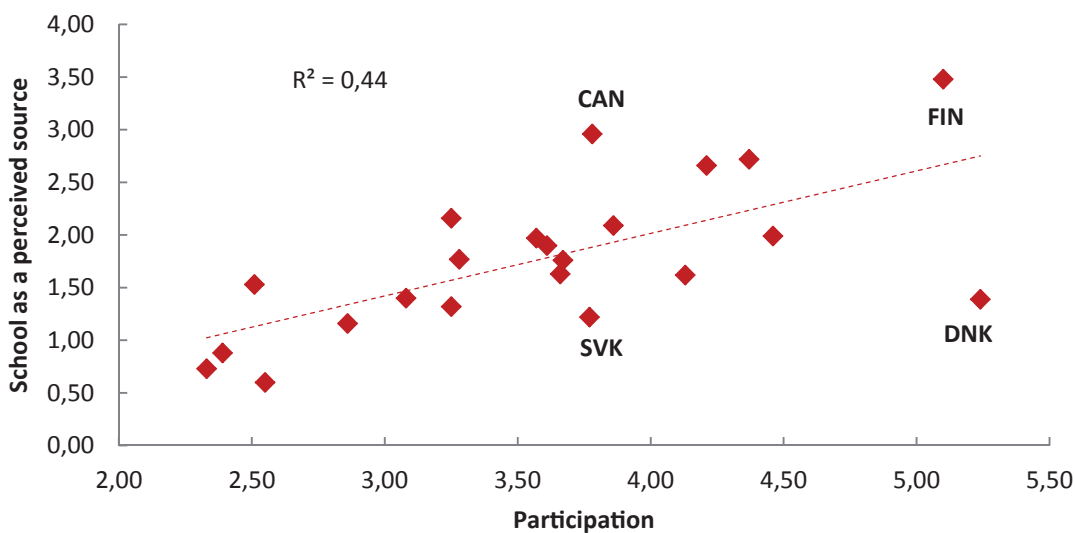


Figure 7: Participation in career development activities and the relative importance of the school for the acquisition of perceived career development competence

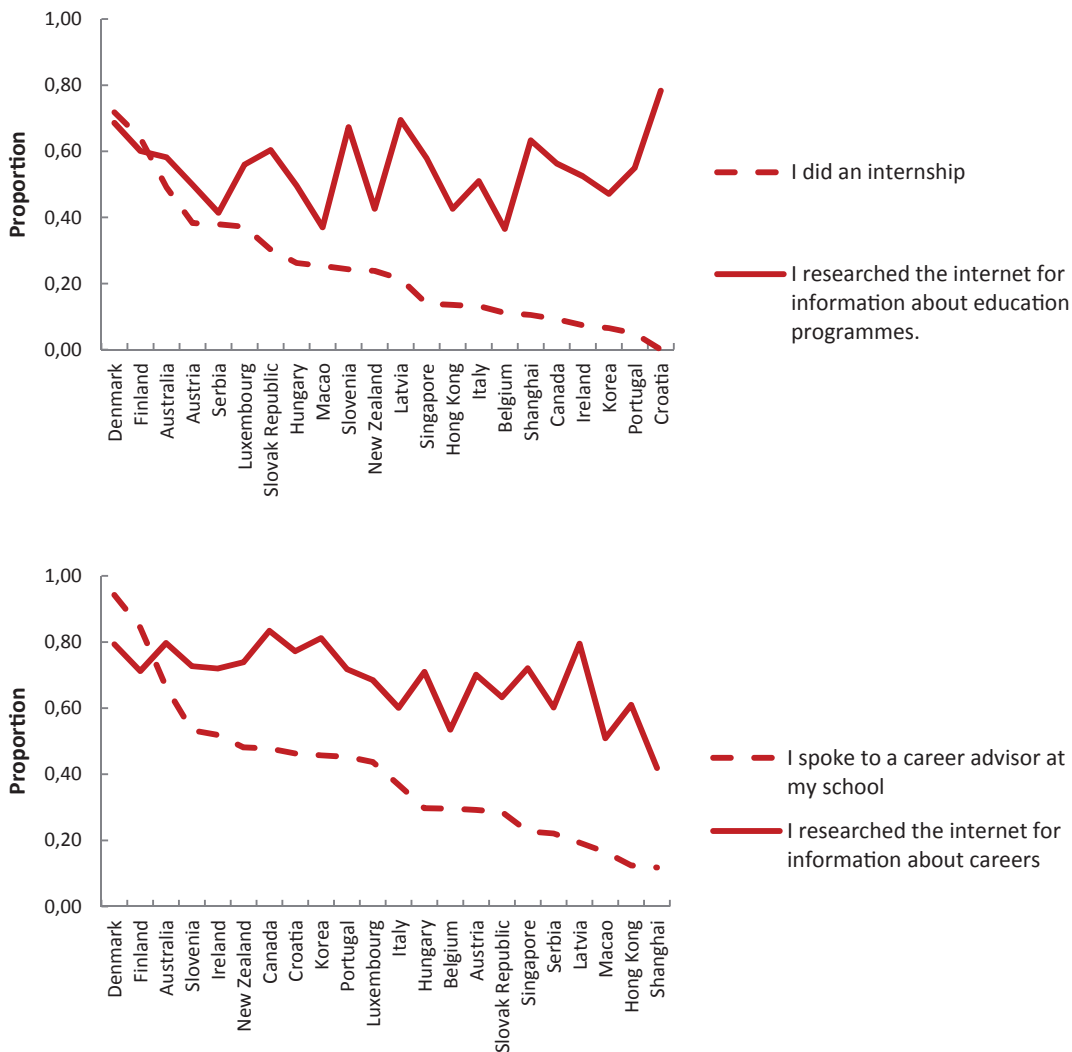


3.2 Insights into between-country differences from responses to individual items

Tables 2, 3, 4 and 5 show the proportion of students in each country who answered each item on each of the four scales. Given the correlation between participation in career development activities and self-assessed career competence shown in Figure 4 above, differences between countries on the participation items in Table 2 are of particular interest. In brief, they show that fairly high proportions of students in all countries take part in activities that they can

relatively easily undertake by themselves (searching the internet for information about careers and courses) and that on these items differences between countries are relatively small. However much larger differences are found for activities such as visiting job fairs, speaking to a careers advisor in school, or doing an internship that generally require institutional support and intervention, and systematic organisation. And on these items highest response rates are typically found in those countries where both participation rates and competence levels are high. Figure 8 illustrates these differences for four selected participation items

Figure 8: Country differences on four participation items



These differences reinforce the suggestion that the formal organisation of career development activities is an important factor in the development of career-related competence. A particularly interesting finding from the responses to the individual competence items is that in almost all countries a high proportion of students rate themselves as competent in finding information on jobs and courses and in searching for a job. However in most cases far fewer assess themselves as competent in the skills involved in actually obtaining a job (writing a resumé, preparing for a job interview) and finding information on student financing.

3.3 Country characteristics associated with between-country differences in participation and competence

Table 6 shows correlations between the four career development scales and a set of national economic indicators, socioeconomic indicators, indicators of the structure of national education systems, school resource indicators, school climate indicators, and indicators of personal characteristics. The table can be interpreted as suggesting the types of national characteristics that are associated with high (or low) national participation in career development, and with high (or low) perceived career-related competence. The results fall into four main clusters:

- Correlations that are significant, and that clearly seem to make sense in terms of what is known about the correlates of career development, or in terms of messages from other areas of the social sciences about the correlates of social advantage.
 - In countries where young people take a positive view of their schools' relevance to post-school life, and have positive views about the payoff from working hard at school, 15 year-olds are more likely to take part in activities that will help orient

themselves to their life after school, and to believe that they have many of the skills needed to select and navigate post school careers¹⁵.

- Participation and perceived career competence are higher in countries that have higher levels of socioeconomic status, in countries that have fewer 15 year-olds who come from disadvantaged backgrounds, and in countries where parental education levels are higher.
- Correlations that are significant, but that are likely to be a reflection of joint correlations between the career scales, the national characteristics, and other variables. Some of these correlations, given some of the patterns of within country differences discussed in Section 3.3, are likely to be the outcome of structural features of national school systems. For example the negative correlation between PISA achievement scores and acquired career competences is likely to be the result of lower achievers tending, in some countries, to cluster in schools where career services are more strongly concentrated, or because lower achievers tend to leave school earlier than high achievers and may focus upon work-related decisions at an earlier age, rather than because there is any causal link between low achievement and acquiring more career-related competences. A similar argument may apply in the case of disciplinary climate: in many of the Asian economies that participated, classroom discipline is high, and there is a strong emphasis on academic success, and it is likely that both classroom discipline and career outcomes are mediated through a strong emphasis upon academic success, and strong parental support for good examination results

¹⁵ Although whether more positive attitudes result from greater participation or greater participation results from more positive attitudes is not clear from a simple correlation

at the expense of a focus upon career choice and career satisfaction. National case studies of the sort provided in Annex 4 may help to illuminate such relationships.

- Correlations that are significant, but which are difficult to explain in terms of correlations between the career scales, national characteristics and other intervening variables. This is the case, for example, with the significant negative correlations observed between the career scales and school size and geographical location, with participation and/or competence tending to be higher in countries with smaller average school sizes and in countries where a larger share of schools are located in smaller communities, and competence tending to be higher in countries with greater teacher shortages.
- Correlations that are not significant. 103 of the 132 correlations are not significant, including nearly all of the indicators of school resources and school climate: countries with better resourced schools and more positive school climates do not, on the present evidence, appear to achieve better career-related outcomes.

Within-country analysis of the relationship between the four career scales and other variables helps to clarify some of these questions.

3.4 Within-country differences in participation and competence

Within each country, the relationship between the four career-related scales and other variables was examined in two ways:

- By testing the significance of differences between the means for each category of each of the variables describing the characteristics of schools, of individuals and of their fami-

lies (for example the significance of differences between participation levels in schools attaching low, medium and high importance to students' social and emotional development, and the significance of differences in the number of competences acquired between the bottom, two middle, and top quartiles of national mathematics scores); and

- By correlating each career scale with each variable. High levels of statistical significance can conceal low actual differences that have limited practical meaning when sample sizes are high, and so calculating correlations allows the strength of relationships, or the amount of variance accounted for, to be tested.

The outcomes of the significance tests, which are summarised in Annex 3, fall into four categories, whose key findings are summarised below

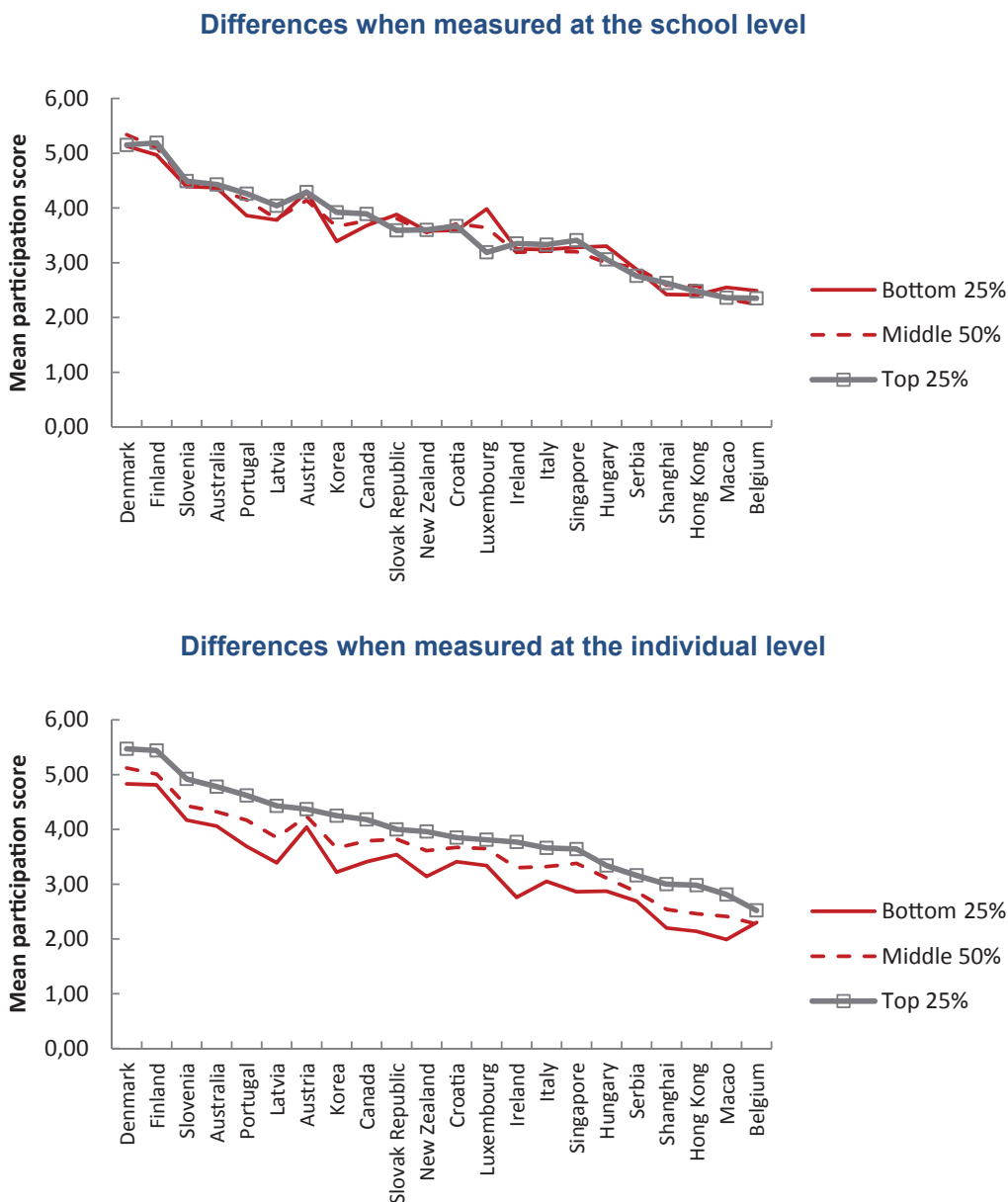
3.4.1 Differences that are significant in all or most countries, where differences are all in the same direction, and where differences follow a consistent pattern¹⁶.

Only four variables show significant and consistent differences among categories in all or most countries. Each measures attitudinal and personality characteristics rather than the characteristics of schools or the socioeconomic characteristics of students and their families; and in each case more widespread significant differences, and larger differences seem to emerge when they are measured at the individual level than when they are measured at the aggregate school level. For example:

¹⁶ In other words in all cases the top category (for example the highest achievers) scores higher on the relevant career scale than the two middle quartiles which in turn score higher than the bottom quartile, or vice versa. Inconsistent patterns occur when, for example, the middle category scores lower than both the top and bottom quartiles.

- Differences in participation between students with more and less positive attitudes to school (learning outcomes) are significant in all except two countries; however when school averages are compared, differences are significant in only five countries; and
- Differences in participation between students in the bottom, two middle and top perseverance quartiles are significant in all countries, however when school averages are compared differences are significant in only four countries. Figure 9 illustrates this contrast between differences at the individual and school levels.

Figure 9: Differences in participation between top, two middle and bottom quartiles of the perseverance scale when measured at the school and individual levels¹



1. Countries are ranked from top to bottom by the participation score of the top perseverance quartile.

The largest differences, in terms of both the number of countries where differences are significant and the size of the differences, are found for perseverance and openness for problem solving: participation in career development and career-related competences are greater for students who are more persevering and have greater openness for problem solving than for students whose scores are lower on these scales. In the case of attitudes to school (learning outcomes) and attitudes to school (learning activities) differences are significant in many countries, but the number of countries is fewer than for perseverance and openness for problem solving, and the size of the differences tends to be smaller. However where differences are significant, all favour higher participation in career development and greater perceived career competences being associated with more positive attitudes to what is learned at school, to working hard at school, and to believing that these matter for post-school life.

Figures 10.1 and 10.2 show examples of the type of differences that are significant in all or most countries, where differences are all in the same direction, and where differences follow a consistent pattern.

3.4.2 Differences that are significant in all or most countries, but where the direction of differences, while consistent, varies from country to country.

This set of results suggests some interesting relationships between career development and structural and institutional arrangements within national education systems such as the size and starting point of vocational education, and the streaming of students by achievement level and social background into particular types of schools or programmes. However they say little about the relationship between career development and school climate or school resourcing issues.

Countries in this category of results fall into two broad groups. On the one hand there is a group of

countries in which higher participation and higher competence are associated with lower achievement levels, to a lesser extent with lower socioeconomic status, and with participation in vocational education programmes rather than other types of programmes. This pattern appears whether achievement and socioeconomic status are measured at the aggregate school level or at the individual level. Included in this group of countries, although with differences among them, are Austria, Belgium, Hungary, Italy, Luxembourg, the Slovak Republic and Slovenia. All have quite large upper secondary vocational education systems¹⁷; and it is also common for young people in these countries to be streamed into vocational tracks, or into the types of schools that lead largely into vocational tracks, at a relatively early age, and for this streaming to be relatively strongly related to socioeconomic status and achievement. In some, higher participation and competence are also associated with a poorer disciplinary climate and lower parental expectations of schools, factors that may be a function of students' achievement levels or socioeconomic status. Within this group of countries patterns can be complex. Hungary, for example, exhibits a pattern of higher participation being associated with lower achievement and lower socioeconomic status, but has a relatively small upper secondary vocational track. However in Hungary the impact of socioeconomic status upon achievement is among the highest in the OECD: it is the second highest, after the Slovak Republic, of the countries in the present study¹⁸.

Not all countries with relatively large upper secondary education vocational programmes show this pattern however. For example, in Denmark and Finland, where the choice between a general or vocational track tends to be delayed, there tends to be a positive correlation between achievement and

¹⁷ See OECD (2013) *Education at a Glance*, Table C1.3.

¹⁸ In PISA 2012 23% of the variance in maths achievement in Hungary is explained by socioeconomic status, compare to an OECD average of 15%. For the Slovak Republic it is 25%.

socioeconomic status on the one hand, and career development participation and competence on the other. Rather than lower achievers and students from lower socioeconomic status backgrounds showing higher participation and competence, it is the higher achievers and those from higher socioeconomic status backgrounds.

The second group of countries consists of those in which higher achievement, and to a lesser extent higher socioeconomic status tend, although with exceptions, to be associated with higher participation in career development and with higher career-related competence. This group of countries includes Canada, Denmark, Finland, Ireland, Korea, Macao, New Zealand, Portugal and Shanghai. They tend to be countries where upper secondary vocational tracks are small, or, where relatively large as in Denmark and Finland, streaming either by programme type or by socioeconomic status and achievement tends to be delayed and low. Within this group of countries there also tends to be an association between higher parental expectations, a better disciplinary climate, and stronger career-related outcomes.

In addition to there being different patterns of career outcomes as a function of some key background variables, these variables in turn can have different patterns of relationships to the different career-related scales. In particular, patterns associated with competences acquired at and out of school can differ. For example student socioeconomic status seems to be much more strongly related the number of competences acquired out of school than to the number of competences acquired at school: in all countries except Belgium, Finland and Slovenia students from higher socioeconomic status backgrounds tend to acquire more out of school competences than do students from lower socioeconomic status backgrounds. For competences acquired at school, differences tend to favour those from lower socioeconomic status backgrounds. The pattern of more out of school competences being acquired by those from higher socioeconomic status backgrounds emerges both when socioeconomic status is measured at the

individual level and at the aggregate school level, but is stronger in the former case.

Figures 10.3 and 10.4 show examples of the type of differences that are significant in all or most countries, but where the direction of differences, while consistent, varies from country to country.

3.4.3 Differences that are significant and consistent in direction, but in a only limited number of countries.

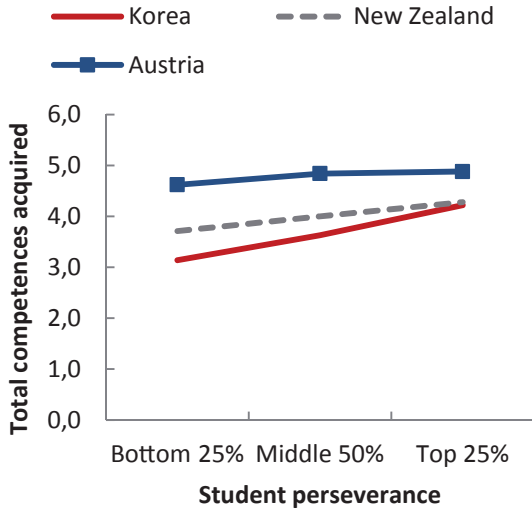
In these cases the results carry limited general lessons, even though they may be quite relevant for the particular countries. For example students in schools with fewer tertiary-qualified teachers report higher participation, more acquired competences and/or more school-acquired competences in seven countries, all except one of which have relatively large numbers of 15 year-old students taking part in vocational programmes. This pattern is likely to be the result of tertiary-qualified teachers being less common in schools with large vocational education programmes, and does not seem to suggest that having few tertiary qualified teachers necessarily helps to raise career development participation or competence.

3.4.4 Differences that are significant in either very few or no cases, that do not seem to follow a consistent pattern, or both.

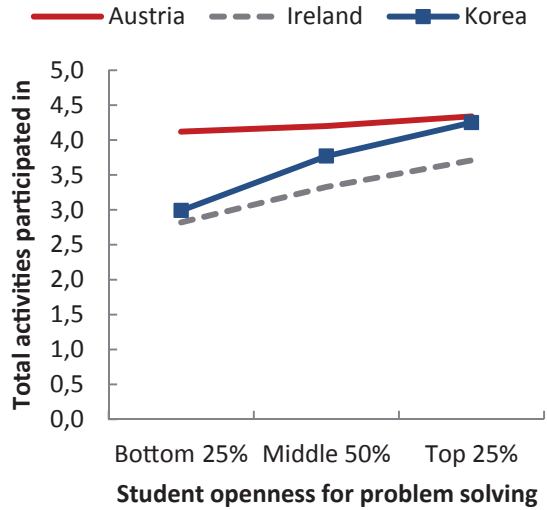
These results appear of limited relevance either overall or for individual countries. For example neither teacher shortages nor the overall level of schools' educational resources appear to bear any relationship either to the number of career-related activities that students participate in, or to the number of competences that they report acquiring in school; and although the relationship with student teacher ratios seems slightly stronger, it is still weak.

Figure 10: Relationship between selected career scales and selected background variables for selected countries¹

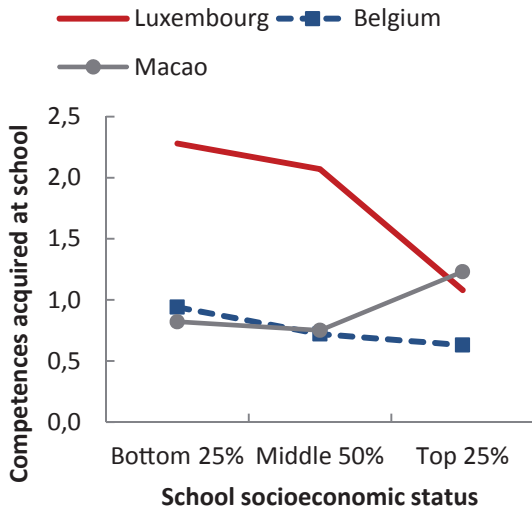
10.1 Student perseverance and total competences



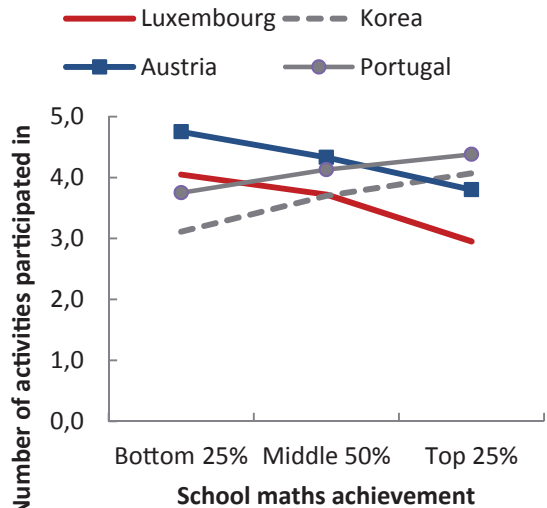
10.2 Student openness for problem solving and participation



10.3 School socioeconomic status and competences acquired at school



10.4 School maths achievement and participation



1. The countries selected are those at the top, middle and bottom of the range of differences between the bottom and top 25% on each scale.

3.5 Within-country correlations

Where the career-related scales show significantly different values for different categories of the background variables, the differences are often quite small in absolute terms. Figure 9, for example, shows that in Austria the difference between the number of competences acquired by the most and least persevering students is quite small, as is the differences in participation between the students who are most and least open for problem solving. And so the practical significance of differences may be quite small even when they are statistically significant. In order to assess the practical significance of the observed mean differences, correlations were obtained between each career-related scale and each background variable for each of the 22 countries. Table 7 shows the averages of these within-country correlations. All averages are small. At 0.18, even the largest shows that on average only three percent of within country variance on a career-related scale could be accounted for by a background variable. In the case of the indica-

tors that measure personality and attitudinal factors some within-country correlations can be as high as 0.28 (between openness for problem solving and participation in Korea) but even in this case no more than eight per cent of the variance is accounted for.

And even for indicators where the correlations are towards the higher end of the observed range, they are far smaller, on average, for indicators that are measured at the aggregate school level than for indicators that are measured at the individual level such as perseverance. As an example, the average within-country correlations for attitudes to school (learning outcomes) and attitudes to school (learning activities) are 0.11 when measured at the individual level, but only 0.01 when measured at the aggregate school level.

Such findings tend to reinforce the findings from the analysis of mean differences that the impact of many of the structural and organisational features of schools upon career-related outcomes is much smaller than the impact of individual characteristics or the socioeconomic background of students.



Discussion

The analysis of the career-related items in PISA 2012 helps to illuminate a number of policy issues that are important for the ELGPN. In particular, it helps to shed light on ways in which individual characteristics, family characteristics and some structural features of schools and school systems are associated with career management skills, and upon the role that schools and agencies outside of the school can play in promoting career management skills. The results help to highlight the important role that schools can play in developing career management skills, whilst at the same time pointing to the significant challenges that exist in a number of countries in realising the potential that schools have in this regard. The results reinforce the potential value of rationally planned programmes to enhance career management skills. However these policy implications need to be seen against a finding that in all countries individual characteristics seem to play a more substantial role in career development outcomes than institutional or organisational factors.

Wide differences between countries exist in the extent to which 15 year-olds participate in career development activities, in the extent to which they see themselves as having acquired career-related competences, and in the extent to which they have acquired these competences at school and out of school. There are also wide differences between countries in the variability of each of these measures. However accounting for these between and within country differences is less simple than describing them.

Some of the differences between countries that intuitively seem to make sense are a function of national characteristics such as socioeconomic status levels and the proportion of students from disadvantaged family backgrounds. Others are a function of national differences in students' attitudes to the relevance of school to life after school. Participation and competence levels are generally higher where socioeconomic status is higher, where levels of disadvantage are low, and where students take a posi-

tive attitude towards the relevance of schools to their future. Other aggregate national characteristics associated with differences in participation and competence such as the proportion of students in private schools and the proportion of schools found in smaller communities are harder to account for. They may simply be statistical artefacts, or they may be a function of features of national career development arrangements that are better revealed by qualitative analysis.

Within countries, the analysis has shown that differences in career development participation and in perceived career-related competence are more strongly related to the personality and attitudinal characteristics of students than they are to students' socio-economic background or to their achievement levels. Although individual students' personal characteristics seem more influential than other types of factors, there are suggestions from the analysis that structural features of school systems have an impact upon career-related outcomes. These features include the proportion of students in vocational programmes, which in turn may be a function of factors such as the size and starting point of vocational education, and the streaming of students by achievement level and social background into particular types of schools or programmes. These suggestions seem well worth exploring in more detail. It is also notable that these structural features of school systems seem to be more strongly related to career development outcomes than factors related to the climate of individual schools such as resource levels or student-teacher relations¹⁹.

The lack of strong relationships in many countries between many policy-relevant variables and career development outcomes may not be a problem. It could be a sign that provision is fairly and equitably

distributed, and that students' or schools' characteristics do not matter a great deal, even if they are found to be significantly related to other outcomes from education. However the pattern of results could also imply that policy-induced interventions in career development are relatively weak in many countries. If, for example, attitudinal characteristics of students are the strongest driving force for participation and competence, it seems worth asking how well interventions are meeting the needs of students who have low perseverance, who have lower openness for problem solving, and poorer attitudes towards the relevance of school to post-school life.

Even where differences in career-related outcomes are significantly related to the characteristics of students, of their family backgrounds or of their schools, the correlations are generally quite small, with single variables accounting for quite small proportions of the variance in participation or competence. This also suggests caution in judging the impact of policy-relevant variables upon career development outcomes. However even if single variables have relatively low correlations, taken together they may account for a substantially larger proportion of the variance in career development outcomes. And so it seems worthwhile undertaking a further stage of analysis in which multidimensional modelling is used to explore the extent to which combinations of variables can account for outcomes. The present analysis suggests that the greatest benefit might be gained from analysis that includes individual characteristics (attitudinal and personality, achievement and socio-economic) as well characteristics that capture structural features of school systems such as the proportion of students in vocational programmes, school socioeconomic status and school achievement levels.

¹⁹ Despite this overall pattern of results, there are some countries where types of variables that, overall, are not strongly related to career outcomes do seem to have a stronger impact.

Table 1: Variance in participation in career development activities

	Variance		
	Between schools	Within schools	Total
Australia	0.51	3.81	4.32
Austria	0.47	3.70	4.17
Belgium	0.22	3.11	3.33
Canada	0.31	3.19	3.50
Denmark	0.33	2.61	2.94
Finland	0.22	3.92	4.14
Hong Kong - China	0.13	2.83	2.96
Croatia	0.15	3.49	3.64
Hungary	0.56	3.52	4.08
Ireland	0.26	3.82	4.08
Italy	0.20	3.46	3.66
Korea	0.33	3.27	3.60
Luxembourg	0.59	4.39	4.98
Latvia	0.31	3.37	3.68
Macao - China	0.13	4.09	4.22
New Zealand	0.39	4.07	4.46
Portugal	0.35	4.52	4.87
Shanghai - China	0.17	2.80	2.97
Singapore	0.15	3.76	3.91
Serbia	0.20	4.69	4.89
Slovak Republic	0.53	4.48	5.01
Slovenia	0.40	5.09	5.49
Average	0.31	3.73	4.04

Table 2: Item response proportions: Participation

	I did an internship	I attended job shadowing or work-site visits	I visited a job fair	I spoke to a career advisor at my school	I spoke to a career advisor outside of my school	I completed a questionnaire to find out about my interests and abilities	I researched the internet for information about careers	I went on an organised tour in an education institution.	I researched the internet for information about education programmes.
Australia	0.49	0.30	0.52	0.66	0.16	0.62	0.80	0.27	0.58
Austria	0.38	0.54	0.57	0.29	0.25	0.71	0.70	0.32	0.50
Belgium	0.11	0.20	0.15	0.30	0.14	0.38	0.54	0.18	0.37
Canada	0.09	0.34	0.40	0.48	0.12	0.77	0.83	0.21	0.56
Croatia	0.00	0.33	0.24	0.46	0.24	0.54	0.77	0.31	0.78
Denmark	0.72	0.52	0.25	0.94	0.18	0.63	0.79	0.57	0.69
Finland	0.64	0.43	0.38	0.84	0.08	0.70	0.71	0.74	0.60
Hong Kong	0.14	0.28	0.04	0.12	0.09	0.66	0.61	0.18	0.43
Hungary	0.26	0.24	0.07	0.30	0.23	0.48	0.71	0.32	0.50
Ireland	0.07	0.39	0.11	0.52	0.11	0.63	0.72	0.17	0.53
Italy	0.13	0.28	0.24	0.37	0.22	0.55	0.60	0.36	0.51
Korea	0.07	0.38	0.13	0.46	0.26	0.89	0.81	0.21	0.47
Latvia	0.21	0.35	0.35	0.19	0.25	0.72	0.80	0.30	0.70
Luxembourg	0.37	0.43	0.24	0.44	0.18	0.51	0.69	0.23	0.56
Macao	0.25	0.18	0.09	0.17	0.14	0.59	0.51	0.09	0.37
New Zealand	0.24	0.34	0.41	0.48	0.16	0.61	0.74	0.18	0.43
Portugal	0.05	0.46	0.33	0.45	0.46	0.75	0.72	0.37	0.55
Serbia	0.38	0.26	0.19	0.22	0.19	0.48	0.60	0.16	0.41
Shanghai	0.11	0.24	0.03	0.12	0.08	0.64	0.42	0.29	0.63
Singapore	0.14	0.19	0.20	0.23	0.17	0.69	0.72	0.37	0.58
Slovak Republic	0.30	0.42	0.31	0.29	0.20	0.49	0.63	0.57	0.60
Slovenia	0.24	0.33	0.31	0.53	0.29	0.66	0.73	0.73	0.67
Mean	0.25	0.34	0.25	0.40	0.19	0.62	0.69	0.32	0.55

Table 3: Item response proportions: Total competences

	How to find information on jobs I am interested in	How to search for a job	How to write a résumé	How to prepare for a job interview	How to find information on education programs	How to find information on student financing
Australia	0.92	0.91	0.88	0.81	0.81	0.52
Austria	0.89	0.88	0.94	0.87	0.79	0.45
Belgium	0.81	0.60	0.44	0.34	0.56	0.30
Canada	0.94	0.90	0.89	0.80	0.80	0.61
Croatia	0.92	0.82	0.80	0.68	0.92	0.69
Denmark	0.93	0.80	0.35	0.50	0.85	0.41
Finland	0.93	0.91	0.74	0.87	0.91	0.74
Hong Kong	0.76	0.53	0.53	0.36	0.55	0.33
Hungary	0.79	0.72	0.78	0.57	0.71	0.51
Ireland	0.85	0.77	0.66	0.51	0.71	0.39
Italy	0.80	0.73	0.54	0.45	0.73	0.56
Korea	0.83	0.83	0.47	0.42	0.72	0.40
Latvia	0.95	0.89	0.89	0.77	0.88	0.71
Luxembourg	0.87	0.74	0.71	0.62	0.74	0.53
Macao	0.76	0.62	0.50	0.44	0.57	0.41
New Zealand	0.88	0.84	0.67	0.55	0.65	0.47
Portugal	0.81	0.72	0.61	0.55	0.79	0.58
Serbia	0.85	0.72	0.64	0.57	0.63	0.58
Shanghai	0.65	0.23	0.32	0.18	0.63	0.17
Singapore	0.83	0.68	0.51	0.52	0.74	0.46
Slovak Republic	0.70	0.57	0.72	0.49	0.68	0.46
Slovenia	0.93	0.83	0.87	0.69	0.87	0.73
Mean	0.84	0.74	0.66	0.57	0.74	0.50

Table 4: Item response proportions: Competences acquired at school

	How to find information on jobs I am interested in	How to search for a job	How to write a résumé	How to prepare for a job interview	How to find information on education programs	How to find information on student financing
Australia	0.53	0.45	0.49	0.41	0.49	0.26
Austria	0.36	0.39	0.71	0.61	0.34	0.16
Belgium	0.25	0.05	0.09	0.07	0.18	0.07
Canada	0.58	0.44	0.56	0.45	0.52	0.36
Croatia	0.27	0.19	0.47	0.28	0.29	0.23
Denmark	0.47	0.11	0.10	0.07	0.45	0.13
Finland	0.54	0.52	0.57	0.60	0.65	0.51
Hong Kong	0.36	0.17	0.31	0.17	0.31	0.21
Hungary	0.19	0.11	0.42	0.20	0.23	0.20
Ireland	0.40	0.33	0.48	0.29	0.39	0.18
Italy	0.24	0.14	0.23	0.16	0.26	0.25
Korea	0.38	0.45	0.22	0.18	0.28	0.11
Latvia	0.28	0.20	0.68	0.44	0.28	0.20
Luxembourg	0.40	0.27	0.36	0.29	0.30	0.16
Macao	0.14	0.08	0.17	0.14	0.17	0.16
New Zealand	0.49	0.37	0.32	0.19	0.34	0.21
Portugal	0.30	0.21	0.28	0.24	0.35	0.22
Serbia	0.21	0.12	0.26	0.17	0.15	0.21
Shanghai	0.17	0.04	0.13	0.06	0.14	0.06
Singapore	0.35	0.22	0.29	0.27	0.37	0.24
Slovak Republic	0.19	0.11	0.38	0.18	0.20	0.13
Slovenia	0.33	0.19	0.55	0.31	0.31	0.22
Mean	0.34	0.24	0.36	0.26	0.32	0.20

Table 5: Item response proportions: Competences acquired out of school

	How to find information on jobs I am interested in	How to search for a job	How to write a résumé	How to prepare for a job interview	How to find information on education programs	How to find information on student financing
Australia	0.47	0.51	0.42	0.41	0.35	0.23
Austria	0.55	0.53	0.24	0.29	0.46	0.27
Belgium	0.59	0.53	0.32	0.24	0.37	0.19
Canada	0.50	0.55	0.40	0.40	0.36	0.29
Croatia	0.66	0.63	0.33	0.40	0.66	0.46
Denmark	0.60	0.68	0.20	0.39	0.54	0.25
Finland	0.48	0.47	0.18	0.34	0.34	0.26
Hong Kong	0.55	0.42	0.27	0.21	0.33	0.15
Hungary	0.60	0.60	0.35	0.34	0.49	0.30
Ireland	0.47	0.45	0.18	0.20	0.33	0.18
Italy	0.54	0.57	0.27	0.26	0.45	0.28
Korea	0.47	0.41	0.26	0.24	0.45	0.29
Latvia	0.70	0.70	0.23	0.34	0.63	0.53
Luxembourg	0.50	0.46	0.33	0.29	0.44	0.33
Macao	0.61	0.52	0.31	0.28	0.39	0.24
New Zealand	0.50	0.54	0.37	0.37	0.36	0.27
Portugal	0.53	0.53	0.32	0.31	0.48	0.37
Serbia	0.60	0.56	0.34	0.36	0.44	0.34
Shanghai	0.48	0.18	0.18	0.11	0.49	0.10
Singapore	0.51	0.47	0.21	0.25	0.40	0.22
Slovak Republic	0.48	0.43	0.31	0.27	0.45	0.29
Slovenia	0.57	0.60	0.29	0.34	0.53	0.47
Mean	0.54	0.51	0.29	0.30	0.44	0.28

Table 6: Between-country correlations between career-related scales and indicators²⁰

	Participation in career development	Career competences:		
		Total acquired	Acquired at school	Acquired out of school
<u>Country economic indicators</u>				
GDP	-0.052	-0.087	0.143	-0.273
Spending on education	0.199	0.076	0.215	-0.110
<u>Country socioeconomic indicators</u>				
Socioeconomic status	0.631	0.443	0.561	0.070
Share of students with a disadvantaged background	-0.583	-0.428	-0.519	-0.059
Parents' education level	0.382	0.417	0.482	0.095
Immigrant status	-0.324	-0.102	-0.019	-0.059
Parents' employment	0.404	0.117	0.284	-0.118
Family structure	-0.089	-0.137	-0.102	-0.210
Equity (Variance in mathematics performance explained by SES)	0.144	-0.052	-0.176	0.142
<u>Indicators of the structure of country education systems</u>				
School size	-0.385	-0.403	-0.189	-0.482
Geographical location (village to large city)	-0.519	-0.497	-0.250	-0.536
Private schools (share of all students in private))	-0.484	-0.475	-0.292	-0.382
Competition between schools for students	-0.444	-0.389	-0.354	-0.136
Horizontal stratification between schools	-0.369	-0.098	-0.363	0.189
Students in vocational programmes (%)	-0.093	0.124	-0.175	0.341
<u>School resource indicators</u>				
Teacher shortage	-0.280	-0.430	-0.190	-0.475
Student-teacher ratio	-0.247	-0.202	0.025	-0.335
Educational resources	-0.152	-0.091	0.117	-0.289
Teacher quality	0.150	-0.060	0.181	-0.296
Teacher-student relations	-0.094	-0.230	-0.049	-0.262
<u>School climate indicators</u>				
Curriculum and assessment autonomy	-0.191	-0.311	-0.117	-0.358
Parental expectations of school	0.020	-0.146	0.045	-0.281
Extracurricular activities	-0.353	-0.066	0.044	-0.127
Importance of social and emotional development	-0.296	-0.358	-0.401	-0.181
Sense of belonging to school	0.291	0.441	0.285	0.386
Disciplinary climate	-0.456	-0.562	-0.400	-0.484
Parental involvement	-0.156	-0.258	-0.353	-0.017
<u>Indicators of personal characteristics</u>				
PISA mathematics	-0.295	-0.537	-0.148	-0.730
PISA problem solving	-0.211	-0.348	0.048	-0.683
Perseverance	-0.072	0.126	0.161	-0.003
Openness for problem solving	0.143	0.271	0.125	0.290
Attitudes to school: Learning outcomes	0.526	0.647	0.582	0.351
Attitudes to school: Learning activities	0.447	0.538	0.526	0.317

²⁰ Correlations of 0.423 are significant at the five percent level and correlations of 0.571 at the one per cent level (two tailed tests). Significant correlations are shown by shaded cells

Table 7: Average within country correlations between career-related scales and indicators

	Participation	Total competences acquired	Acquired at school	Acquired out of school
School-related characteristics				
School location	-0.01	0.00	-0.04	0.04
Public or private school	0.00	-0.02	0.00	-0.01
School competition	0.00	0.00	-0.01	0.01
Parental expectations of school	-0.01	-0.01	-0.03	0.01
Extracurricular activities	-0.02	-0.02	-0.01	0.00
Importance attached to social and emotional development	0.01	0.01	0.02	-0.01
Teacher quality	-0.03	-0.02	-0.03	0.02
School SES	-0.01	-0.03	-0.06	0.04
School maths score	-0.03	-0.06	-0.06	0.02
School problem solving score	-0.03	-0.03	-0.03	-0.03
Attitudes to school: learning outcomes	0.02	0.01	0.05	-0.03
Attitudes to school: learning activities	0.02	0.01	0.02	-0.01
Sense of belonging at school	0.01	0.00	0.03	-0.01
Disciplinary climate	-0.03	-0.03	-0.02	-0.02
Student-teacher relations	0.04	0.03	0.06	-0.03
School size	0.00	0.00	0.00	-0.01
Curriculum and assessment autonomy	0.01	0.00	0.01	0.02
Teacher shortages	0.01	0.02	0.02	0.02
Student-teacher ratio	0.02	-0.01	-0.02	0.00
Educational resources	-0.01	-0.01	-0.01	-0.01
Parental involvement	0.00	-0.01	0.00	-0.01
% of vocational students in school	0.06	0.06	-0.08	-0.01
% of immigrants in school	0.01	0.01	0.01	0.00
Perseverance (school average)	0.04	0.04	0.04	0.00
Openness for problem solving (school average)	0.03	0.02	0.00	0.04
Student and family-related characteristics				
Maths score	0.01	-0.03	-0.02	0.02
Problem solving score	0.00	-0.02	-0.02	0.01
Perseverance	0.14	0.14	0.09	0.09
Openness for problem solving	0.18	0.18	0.11	0.11
Attitudes to learning outcomes	0.11	0.08	0.16	-0.04
Attitudes to learning activities	0.11	0.08	0.13	-0.01
SES	0.09	0.04	-0.01	0.08
Immigrant status	0.01	0.02	0.00	0.01
Parent education level	0.06	-0.01	-0.02	0.06
Family structure	0.01	0.00	0.02	-0.01
Parent employment	0.03	0.01	-0.01	0.02
Resilience	-0.03	-0.03	0.00	-0.03
Gender	-0.02	0.05	-0.01	0.04
Participation in vocational programmes	0.07	0.07	0.09	-0.01

Annex 1: Career-related items included in the PISA 2012 Education Career questionnaire

EC03: Have you done any of the following to find out about future study or types of work? (Please tick one box in each row.)

	Yes	No, never
a) I did an internship		
b) I attended job shadowing or work-site visits		
c) I visited a job fair		
d) I spoke to a career advisor at my school		
e) I spoke to a career advisor outside of my school.		
f) I completed a questionnaire to find out about my interests and abilities		
g) I researched the internet for information about careers		
h) I went on an organised tour in an ISCED 3-5 institution		
i) I researched the internet for information about ISCED 3-5 programmes		
j) <country specific item>		

EC04: Which of the following skills have you acquired? (Please tick all that apply.)

	Yes, at school	Yes, out of school	No, Never
a) How to find information on jobs I am interested in			
b) How to search for a job			
c) How to write a résumé or a summary of my qualifications.			
d) How to prepare for a job interview			
e) How to find information on ISCED 3-5 programs I am interested in.			
f) How to find information on student financing (e.g. student loans or grants).			

Annex 2: Background variables included in the analysis

2.1 Characteristics of schools

Variable	Description	Comments and relevant questions
Size	The total number of 15 year-olds enrolled in the school	Does school size restrict or facilitate participation in career development services?
Geographical location	Village; small town; town; city; large city	Do smaller communities have fewer opportunities for participation in career development services than larger ones?
Socio-economic status	Average ESCS index	Do schools whose students have higher average levels of socioeconomic resources have higher levels of participation in career development services and do their students have higher levels of career-related competence?
Public or private	Government; government-dependent private; government-independent private	Do public and private schools differ in students' participation in career development services and in the extent to which they, as opposed to outside organisations, help to develop career-related competence?
Achievement level (mathematics)	Average mathematics score of the school	Do schools with more able students provide different levels of career development services than schools with less able students? How do schools' levels of career-related competence relate to achievement levels?
Achievement level (problem solving)	Average problem solving score of the school	Do schools with more able students provide different levels than schools with less able students? How do schools' levels of career-related competence relate to achievement levels? Are the associations between career-related indexes stronger for mathematics achievement or for problem solving achievement?
Curriculum and assessment autonomy	Index of school responsibility for curriculum and assessment	Does school autonomy over the curriculum favour participation in career-related activities or not?
Horizontal stratification (1)	Index of horizontal stratification between schools	The overall degree of horizontal stratification is related to academic inclusion, which is of general interest in relation to career service access and provision, as well as career-related competences
Horizontal stratification (2): vocational and general	Percentage of students enrolled in general, vocational/pre-vocational and modular programmes	The relationship between pathways, and in particular vocational pathways, and access to career development is a key policy issue.
School competition	The number of schools with which the school competes for students (two or more; one; none)	Participation in career-related activities and the school's role in developing career-related competences might be expected to be greater where competition between schools is greater if career services were part of a school's marketing strategy
Resources: teacher shortages	Index of teacher shortage	Does a lack of teachers hinder participation in career development services?
Resources: student-teacher ratio	Total number of 15 year-olds and total number of teachers	Do large average class sizes impede participation in career development services?

Resources: educational resources	Index of quality of schools' educational resources	
Resources: teacher quality	Proportion of teachers with ISCED 5A	
Parental expectations of the school	Principals' reports that pressure for high academic standards comes from many/a minority of/very few parents	Is the extent of parental orientation towards the future positively related to the extent to which students participate in career-related activities and to the role of the school in developing career-related competences.
Parental involvement	Proportion of parents participating in various school-related activities	Parental involvement might be seen to be related to school-community links and in turn to participation in career development activities
Extracurricular activities	Principal's report of extracurricular activities offered by the school	Schools with a wide range of extracurricular activities might be expected to develop a higher level of social and personal skills in students and to have greater participation in career-related activities and to play a greater role in developing career-related competences
		The index of extracurricular mathematics activities at school seems less relevant to career-related competences than the suggested index
The importance that teachers attach to students' social and emotional development	Principal's report of mathematics teachers' consensus on the importance of social and emotional development compared to mathematical skills and knowledge	Participation in career-related activities might be expected to be higher in schools that attach greater importance to social and emotional development
Attitudes towards school: learning outcomes	Students' reports of the relevance of what they have learned at school to post-school life	A measure of the extent to which students believe that school has prepared them for adult life and taught them things that could be useful in a job
Attitudes towards school: learning activities	Students' reports of the relevance of working hard at school to post-school outcomes	A measure of the extent to which students believe that school has prepared them for adult life and taught them things that could be useful in a job
Engagement with and at school: sense of belonging	Students' reports of the extent to which they feel comfortable and happy at school	A measure of school climate
Disciplinary climate	Student reports of the frequency of factors such as classroom noise that disrupt learning	A measure of school climate
Teacher-student relations	Student reports of how well they get along with their teachers	A measure of school climate

2.2 Characteristics of students

Variable	Description	Relevant questions and comments
Gender	Male or female	Gender is almost universally found to be related to career development outcomes such as occupational choice.
Achievement in mathematics	PISA mathematics score	Do high achieving students participate in career development activities to a greater or lesser extent than low achieving students? Do they have higher levels of career-related competence?
Problem solving skills	PISA problem solving score	General problem solving skills might be expected to be positively related to perceived career-related competences
Resilience	Disadvantaged students who demonstrate high achievement (compared to: disadvantaged students who do not demonstrate high achievement; and advantaged students who demonstrate low achievement)	Do resilient students participate in career development activities and show greater levels of career-related competence than less resilient students? Do they have higher levels of career-related competences (as might be suggested by the literature on resilience)? Are their career-related differences between advantaged students who perform well and poorly in mathematics?
Drive and motivation ²¹ : perseverance	Students' willingness to persist rather than give up when confronted with problems	Perseverance might be expected to be related positively to level of career-related competences
Drive and motivation: openness to problem solving	Students' confidence in their ability to understand and solve problems	Openness to problem solving might be expected to be related positively to level of career-related competences
Attitudes towards school: learning outcomes	Students' reports of the relevance of what they have learned at school to post-school life	A measure of the extent to which students believe that school has prepared them for adult life and taught them things that could be useful in a job
Attitudes towards school: learning activities	Students' reports of the relevance of working hard at school to post-school outcomes	A measure of the extent to which students believe that school has prepared them for adult life and taught them things that could be useful in a job

²¹ Of the dimensions of drive and motivation included in the PISA 2012 analytical framework perseverance and openness to problem solving are general in focus and appear the most relevant to career-related issues. The other dimensions in the framework are relatively specific to mathematical drive and motivation.

2.3 Characteristics of students' families and social background

Variable	Description	Comments
Socioeconomic status	The level of the economic, social and cultural resources of the student's family	Do students from more advantaged families have higher levels of participation in career development services and do they have higher levels of career-related competence than students from less advantaged families?
Immigrant status	Native-born students compared to those with an immigrant background. NOTE: For some analyses PISA distinguishes between native-born students and first- and second-generation immigrant students ²² . Given the relatively small number of immigrants in some of the countries that completed the education experience questionnaire an initial analysis based on a simple immigrant-non-immigrant comparison seems justified.	Do students from immigrant families have higher or lower levels of participation in career development services than native born students? Do they have higher or lower levels of career-related competence? Are they more or less likely to have learned career-related competence in or outside of the school?
Parents' education level	Highest level of education completed by mother or father	Do students with more highly educated parents have higher levels of participation in career development services and do they have higher levels of career-related competence than students with less highly educated parents?
Family circumstances: family structure	Students from single parent families compared to students from other types of families	Do students from single parent families have higher or lower levels of participation in career development services than students from other types of families? Do they have higher or lower levels of career-related competence? Are they more or less likely to have learned career-related competence in or outside of the school?
Family circumstances: parental work status	Father working compared to not working; mother working compared to not working	Do students from families where one or more parents are not working have higher or lower levels of participation in career development services than students whose parents are working? Do they have higher or lower levels of career-related competence? Are they more or less likely to have learned career-related competence in or outside of the school?

²² Non-immigrant students (those without an immigrant background, sometimes referred to as native students, who were born in the country where they were assessed by PISA or who had at least one parent born in that country); second-generation students (who were born in the country of assessment but whose parents are foreign-born); and first-generation students (foreign-born students whose parents are also foreign-born).

Annex 3: Summary of the significance of within-country differences between means

School related factors

School location

Participation	Significant for Austria, Finland, Hungary, Slovak Republic; trend tends to favour higher participation in smaller communities.
Total competences	Perceived competence levels are higher in larger communities in Belgium and in smaller communities in Croatia; the relationship between community size and competence is inconsistent in Australia, Canada and Denmark.
At school	Students in schools located in smaller communities report more competences acquired at school than do students in schools located in larger communities in Croatia, Luxembourg, Latvia, Serbia and the Slovak Republic; The relationship is inconsistent in Canada.
Out of school	Students in schools located in larger communities tend to report that they acquire more competences out of school than students in smaller communities in Denmark, Croatia, Latvia, Portugal, Serbia, the Slovak Republic and Slovenia; in Australia, Austria and Canada higher levels of competences acquired out of school are reported in schools in mid-sized communities.

Public or private school

Participation	Not significant for any country.
Total competences	Perceived competence is higher in private schools in Belgium and Canada.
At school	Students who attend private schools report more competences acquired at school than do students attending public schools in Hong Kong and Luxembourg; in Singapore students who attend public schools report more competences acquired at school than do students who attend private schools.
Out of school	In Belgium and Luxembourg students in public schools report that they acquire more competences out of school than students in private schools.

School competition

Participation	Less competition is associated with more participation in Austria, Italy and Singapore; more competition with more participation in Portugal; not clear for Macao.
Total competences	Perceived competence is: lower in schools that compete with two or more other schools in Austria, Italy and Singapore; higher in schools that compete with others in Shanghai; and inconsistently related to competition in Macao and Singapore
At school	Attending a school that competes with two or more other schools for students is associated with lower competence in Austria. In Luxembourg, Macao and Singapore the relationship is inconsistent.
Out of school	In Australia, Shanghai and the Slovak Republic students in schools that compete with two or more other schools for students report that they have acquired more competences out of school than students in schools that compete with fewer others.

Parental expectations of school

Participation	Higher expectations are associated with lower participation in Korea, Luxembourg, Macao; low expectations with more participation in Belgium and Hungary.
Total competences	Lower parental expectations for high academic performance is associated with higher perceived competence in Australia, Austria, Belgium, Hungary, Ireland and Italy; high parental expectations for high academic performance is associated with higher perceived competence in Korea, Luxembourg and Macao.
At school	Students attending schools where parents have low expectations of the school report more competences acquired at school than students attending schools where parents have high expectations in Austria, Belgium, Ireland, Italy and Singapore; in Luxembourg and Macao higher parental expectations are associated with greater competence.
Out of school	Students in schools whose parents have high expectations have more competences acquired out of school in Korea, but fewer of competences in Belgium.

Extracurricular activities

Participation	Low values are associated with more participation in Austria, Hungary, Italy, Luxembourg, Slovenia; high values with high participation in Shanghai.
Total competences	Fewer extracurricular activities being offered is associated with higher perceived competence in Austria, Croatia, Hungary, Italy, Luxembourg and Slovenia; the availability of more extracurricular offerings is associated with higher competence in Shanghai.
At school	Students attending schools that offer fewer extracurricular activities report higher levels of school-acquired competence than students attending schools that offer more extracurricular activities in Austria, Croatia, Luxembourg, New Zealand and Serbia; in Macao, Shanghai and Singapore greater competence tends to be associated with schools offering more extracurricular activities; in Italy the relationship is inconsistent.
Out of school	Students in schools that offer fewer extracurricular activities report more competences acquired out of school in Denmark, Macao and Slovenia but fewer in New Zealand and Shanghai; the relationship is inconsistent in Luxembourg.

Importance attached to social and emotional development

Participation	Higher importance is associated with higher participation in Luxembourg and Slovak Republic.
Total competences	Attaching high importance to social and emotional development is associated with higher perceived competence in Italy and Luxembourg.
At school	Students attending schools that attach high importance to social and emotional development report higher school-acquired competence than do students attending schools where these are given lower importance in Hungary, Italy, Luxembourg, and Singapore; in Macao, greater school-acquired competence is reported in schools that attach lower importance to social and emotional development.
Out of school	Students in schools that attach a high importance acquire more competences out of school in Macao.

Teacher quality

Participation	Having fewer ISCED 5A qualified teachers is associated with higher participation in Austria, Hungary, Italy, Luxembourg and Slovenia.
Total competences	A lower proportion of tertiary-qualified teachers is associated with higher perceived competence in Austria, Belgium, Denmark, Italy and Luxembourg.
At school	Students attending schools with fewer tertiary-qualified teachers report more school-acquired competence than students in schools with more tertiary-qualified teachers in Austria, Belgium, Italy and Luxembourg.
Out of school	Students in schools that have a high proportion of tertiary-qualified staff acquire more competences out of school than those in schools with fewer in Latvia.

School SES

Participation	Lower average school SES is associated with more participation in Austria, Hungary, Italy, Luxembourg, Serbia, Slovak Republic and Slovakia; higher average school SES associated with higher participation in Hong Kong, Korea, Macao, Portugal and Shanghai.
Total competences	Higher competence is associated with a lower average SES in Australia, Austria, Belgium, Croatia, Hungary, Ireland, Italy and Luxembourg; higher competence is associated with a lower average SES in Korea and Macao; in Finland the relationship is inconsistent.
At school	More school-acquired competences are reported by students in schools with a low average SES than in schools with a higher average SES in Austria, Belgium, Croatia, Hungary, Ireland, Italy, Luxembourg, Latvia, New Zealand, Serbia and the Slovak Republic.
Out of school	Students in schools with a high average SES acquire more competences out of school in Korea, Latvia, Luxembourg, New Zealand, Portugal, Shanghai, Serbia and the Slovak Republic; the relationship is inconsistent in Australia and Slovenia.

School maths score

Participation	Lower maths achievement is associated with higher participation in Austria, Belgium, Hungary, Italy, Luxembourg, Slovak Republic and Slovenia; higher maths achievement associated with higher achievement in Canada, Finland, Korea, Portugal and Shanghai.
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Annexes

Total competences	Higher perceived competence is associated with lower average maths achievement in Australia, Austria, Belgium, Croatia, Hungary, Ireland, Italy and Luxembourg and the Slovak Republic; higher perceived competence is associated with higher average maths achievement in Korea; in Canada, Shanghai, Singapore and Slovenia the relationship is inconsistent.
At school	Students in schools with lower average maths scores report more school-acquired competences than students in schools with higher average scores in Austria, Belgium, Croatia, Hungary, Ireland, Italy, Luxembourg, New Zealand, Shanghai, Serbia and the Slovak Republic; in Korea and Macao more school-acquired competences tend to be reported by students in schools with higher average maths scores.
Out of school	Students in schools with high average maths scores acquire more competences out of school than do students in schools with low average maths scores in Croatia, Korea, Latvia, Luxembourg, New Zealand, Shanghai and the Slovak Republic; students in schools with low average maths scores acquire more competences out of school than do students in schools with high average maths scores in Belgium and Macao.

School problem solving score

Participation	Lower problem solving scores are associated with higher participation in Austria, Belgium, Hungary, Italy, Slovak Republic and Slovenia; higher scores associated with higher participation in Finland, Korea, Portugal and Shanghai; inconsistent pattern in Macao.
Total competences	Higher perceived competence is associated with lower average maths achievement in Australia, Austria, Belgium, Croatia, Hungary, Ireland and Italy; higher perceived competence is associated with higher average maths achievement in Korea.
At school	Students in schools with lower average problem solving scores report more school-acquired competences than students in schools with higher average scores in Austria, Belgium, Croatia, Hungary, Ireland, Italy, Luxembourg, New Zealand, Shanghai, Serbia and the Slovak Republic; in Korea and Macao more school-acquired competences tend to be reported by students in schools with higher average problem solving scores.
Out of school	Students in schools with high average problem solving scores acquire more competences out of school than do students in schools with low average maths scores in Korea, Shanghai and Serbia; students in schools with low average maths scores acquire more competences out of school than do students in schools with high average maths scores in Belgium and Macao.

Attitudes to school: learning outcomes

Participation	Schools with more positive attitudes are associated with higher participation in Canada, Hong Kong, Portugal and Singapore; less positive attitudes associated with higher participation in Luxembourg; inconsistent pattern in Macao.
Total competences	Higher perceived competence is associated with more positive attitudes in Croatia and Hong Kong; lower perceived competence is associated with more positive attitudes in Hungary.
At school	Schools where students on average tend to report that what they have learned at school is relevant to post-school life report more school-acquired competences than students in schools where they do not in Denmark, Finland, Hong Kong, Croatia, Korea, Luxembourg, Latvia, Macao, Shanghai and Singapore.
Out of school	Students in schools where there are poor attitudes toward the relevance of what has been learned to post-school life tend to acquire more out of school competences than students in schools where they are positive in Hungary, Latvia, Macao and Slovenia.

Attitudes to school: learning activities

Participation	More positive attitudes are associated with higher participation in Belgium, Korea, New Zealand and Portugal; less positive attitudes with higher participation in Hungary and Luxembourg; inconsistent pattern in Macao and Singapore.
Total competences	Higher perceived competence is associated with less positive attitudes in Canada, Hungary and Luxembourg; higher perceived competence is associated with more positive attitudes in Korea; in Macao the relationship is inconsistent.
At school	Schools where students on average tend to report that working hard at school is relevant to post-school life report more school-acquired competences than students in schools where they do not in Korea and Macao; In Italy and Luxembourg levels of school-acquired competence are likely to be higher in schools where students are less likely to report that working hard is relevant to post-school life; in Canada, Macao, New Zealand and Singapore the relationship tends to be inconsistent.

Out of school	Students in school where working hard is seen to be relevant to post-school lie acquire more competences out of school than students in schools where it is not in Belgium, Canada and Korea but fewer in Hungary and Macao.
<u>Sense of belonging at school</u>	
Participation	A higher sense of belonging is associated with higher participation in Korea, Macao and Portugal; lower sense of belonging with higher participation in Luxembourg.
Total competences	A low sense of belonging at school is associated with higher perceived competence in Hungary and Luxembourg a high sense of belonging at school is associated with higher perceived competence in Korea.
At school	Students in schools with a stronger average sense of belonging at school tend to report more school-acquired competences than students in schools where this is low in Finland, Italy, Latvia, Macao and New Zealand; in Luxembourg higher competence is associated with schools that have a lower average sense of belonging;
Out of school	Students in schools where there is a low sense of belonging acquire more out of school competences than students in schools where there is a higher sense of belonging in Australia, Finland and Slovenia; in Italy the relationship is inconsistent.
<u>Disciplinary climate</u>	
Participation	Poorer disciplinary climate is associated with more participation in Belgium, Croatia, Hungary, Italy, Luxembourg and Shanghai; better disciplinary climate associated with more participation in Korea and Slovenia; inconsistent pattern in Portugal and Shanghai.
Total competences	A poorer disciplinary climate tends to be associated with higher perceived competence in Austria, Belgium, Hungary, Italy, Macao, Shanghai, the Slovak Republic and Slovenia; a better disciplinary climate tends to be associated with higher perceived competence in Korea.
At school	Levels of school-acquired competence are higher in schools with a poorer disciplinary climate in Belgium, Croatia, Italy, New Zealand, Shanghai and the Slovak Republic; levels of school-acquired competence are higher in schools with a better disciplinary climate in Korea and Latvia; in Luxembourg the relationship is inconsistent.
Out of school	Students in schools where disciplinary climate is poor acquire more out of school competences than students in schools where it is good in Belgium and Hungary but fewer in Luxembourg; in Slovenia the relationship is inconsistent.
<u>Student-teacher relations</u>	
Participation	More positive student-teacher relations are associated with higher participation in Austria, Belgium, Canada, Italy, Korea, Luxembourg and Macao.
Total competences	Good student-teacher relationships tend to be associated with higher perceived competence in Croatia, Ireland, Italy, Korea, Luxembourg, Macao and Serbia;
At school	School-acquired competences are higher in schools with better student-teacher relations in Austria, Denmark, Belgium, Finland, Croatia, Italy, Korea, Luxembourg, Latvia, Macao, Serbia and the Slovak Republic but higher in schools with the worst student-teacher relations in Shanghai.
Out of school	Students in schools where student-teacher relations are poor acquire more out of school competences than students in schools where they are good Austria, Finland, Luxembourg, Luxembourg, Latvia and Slovenia.
<u>School size</u>	
Participation	Inconsistent patterns, but tending to favour more participation in smaller schools in Austria and Denmark; inconsistent pattern in Luxembourg; higher participation in larger schools in Shanghai.
Total competences	Perceived competence tends to be higher in students attending the largest schools in Austria Shanghai and in the smallest schools in Belgium and Luxembourg.
At school	Perceived competence tends to be higher in smaller schools Ireland, Latvia and Serbia; they are higher in larger schools in Shanghai; in Luxembourg the relationship is inconsistent.
Out of school	Students in large school acquire more out of school competences in Latvia; in Australia and Shanghai the relationship is inconsistent.

Curriculum and assessment autonomy

Participation	Higher participation is associated with less autonomy in Belgium; inconsistent patterns in Canada, Luxembourg and Macao; higher participation is associated with more autonomy in Shanghai.
Total competences	Low autonomy is associated with higher competence in Belgium, high autonomy with high competence in Luxembourg and Shanghai, and in Croatia the relationship is inconsistent.
At school	Greater autonomy is associated with greater School-acquired competence in Shanghai; the relationship is inconsistent in Canada, Luxembourg and Singapore.
Out of school	In Belgium, Luxembourg, Croatia and Slovenia the relationship is inconsistent.

Teacher shortages

Participation	Fewer shortages are associated with more participation in Belgium; inconsistent patterns in Luxembourg and Latvia.
Total competences	Higher shortages are associated with higher competence in Australia, Belgium and Luxembourg; lower shortages are associated with higher competence in Canada.
At school	School-acquired competences are higher in schools with fewer shortages in Canada; in Luxembourg, Singapore, Macao and Serbia the relationship is inconsistent.
Out of school	In Belgium and Luxembourg students acquire more out of school competences in schools where there are high teacher shortages.

Student-teacher ratio

Participation	Fewer teachers per student is associated with higher participation in Croatia, Italy, Luxembourg and Slovenia; more students per teacher associated with higher participation in Portugal.
Total competences	Low student-teacher ratios tend to be associated with higher competence in Belgium, Croatia, Italy, Luxembourg and Singapore; lower student-teacher ratios tend to be associated with higher competence in Australia.
At school	School-acquired competences are highest in schools with the lowest student-teacher ratios Belgium, Italy, Luxembourg and the Slovak Republic; in Shanghai they are highest in schools with the highest student-teacher ratios.
Out of school	Students acquire more out of school competences in schools where there is a high student-teacher ratio in Australia, Denmark, Latvia, New Zealand and Serbia; in Luxembourg and Shanghai the relationship is inconsistent.

Educational resources

Participation	All insignificant other than small differences in favour of more participation associated with higher resources in Shanghai.
Total competences	Poorer educational resources tend to be associated with higher competence in Luxembourg.
At school	School-acquired competences are highest in schools with the lowest educational resources in Singapore.
Out of school	The relationship is not significant in any country.

Parental involvement

Participation	Low parental participation is associated with higher participation in Austria; inconsistent patterns in Belgium and Luxembourg.
Total competences	Lower parental involvement tends to be associated with higher competence in Austria, Belgium, Italy and Luxembourg.
At school	School-acquired competences are highest in schools with the lowest parental involvement in Austria, Belgium and Italy; in Luxembourg the relationship is inconsistent.
Out of school	The relationship is not significant in any country.

Student- and family-related factors

Maths score

Participation	Lower maths scores are associated with higher participation in Austria, Hungary, Italy, Luxembourg, the Slovak Republic, and to a lesser extent Slovenia; higher maths scores are associated with higher participation in Canada, Finland, Hong Kong, Ireland, Korea, New Zealand and Portugal; inconsistent patterns are found in Belgium, Denmark and Shanghai.
Total competences	Lower maths scores are associated with higher competence in Australia, Austria, Belgium, Hungary, Italy, Luxembourg, New Zealand, Singapore, the Slovak Republic and Slovenia; higher maths scores are associated with higher competence in Finland and Korea; in Shanghai the relationship is inconsistent.
At school	Students with the lowest maths scores have the highest school-acquired competences in Australia, Austria, Belgium, Croatia, Hungary, Italy, Luxembourg, New Zealand, Shanghai, Serbia and the Slovak Republic; in Denmark, Finland, Hong Kong and Portugal students with the highest maths scores have the highest school-acquired competences; in Canada and Macao the relationship is inconsistent.
Out of school	Students with high maths scores acquire more out of school competencies than students with low maths scores in Canada, Denmark, Finland, Hong Kong a, Croatia, Hungary, Ireland, Italy, Korea, Luxembourg, Latvia, Macao, New Zealand, and Portugal; students with low maths scores acquire more out of school competencies than students with high maths scores in Austria, Belgium, Hungary, Italy, Luxembourg and the Slovak Republic.

Problem solving score

Participation	Lower problem solving scores are associated with higher participation is associated with in Austria and Hungary; higher problem solving scores are associated with higher participation in Finland, Korea and Shanghai.
Total competences	Lower problem solving scores are associated with higher competence in Australia, Austria, Belgium, Hungary and Italy; higher problem solving scores are associated with higher competence in Korea and Shanghai.
At school	Students with the lowest problem solving scores have the highest school-acquired competences in Austria, Belgium, Hungary, Italy, Serbia and the Slovak Republic; in Canada students with the highest problem solving scores have the highest school-acquired competences.
Out of school	Students with high problem solving scores acquire more out of school competencies than students with low problem solving scores in Finland, Korea and Shanghai; students with problem solving scores acquire more out of school competencies than students with high problem solving scores in Austria and Hungary.

Perseverance

Participation	Greater perseverance is associated with higher participation in all countries (although with some inconsistency for Croatia).
Total competences	Greater perseverance is associated with higher competence in all countries
At school	In all countries students with the highest perseverance levels have the highest level of school-acquired competences.
Out of school	Higher levels of perseverance are associated with the acquisition of more out of school competencies in all countries.

Openness for problem solving

Participation	Greater openness for problem solving is associated with higher participation is associated with in all countries except Austria.
Total competences	Greater openness for problem solving is associated with greater competence in all countries except Austria.
At school	In all countries except Singapore students with the highest levels of openness for problem solving have the highest level of school-acquired competences.
Out of school	Greater openness for problem solving is associated with the acquisition of more out of school competencies in all countries except Austria.

Attitudes to learning outcomes

Participation	More positive attitudes are associated with higher participation in all countries except Serbia and the Slovak Republic.
Total competences	More positive attitudes towards the relevance of what has been learned at school to post-school life are associated with higher competence in all countries except Hungary, New Zealand, Portugal, Serbia, the Slovak Republic and Slovenia.
At school	In all countries students who regard what they have learned at school as relevant to post-school life have the highest level of school-acquired competences.
Out of school	Positive attitudes to the relevance of what is learned at school to post-school life are associated with the acquisition of more out of school competences in all countries.

Attitudes to learning activities

Participation	More positive attitudes are associated with higher participation in all countries.
Total competences	More positive attitudes towards the relevance of working hard at school to post-school life are associated with higher competence in all countries except Ireland, New Zealand, Portugal, Singapore and Slovenia.
At school	In all countries except Ireland students who regard working hard at school as relevant to post-school life have the highest level of school-acquired competences.
Out of school	Positive attitudes to the importance of working hard at school for post-school life are associated with the acquisition of more out of school competences in all countries.

Socioeconomic status

Participation	Higher SES is associated with higher participation in Australia, Canada, Denmark, Finland, Hong Kong, Ireland, Korea, Latvia, Macao, New Zealand, Portugal, Shanghai, Singapore and Serbia; low SES is associated with low participation in Belgium and Italy; low SES is associated with high participation in Austria and Luxembourg.
Total competences	Higher socio-economic status is associated with higher competence in Canada, Denmark, Finland, Hong Kong, Korea, New Zealand, Macao, Shanghai and Serbia; a similar but slightly inconsistent relationship is found in the Slovak Republic.
At school	Students from lower SES families have the highest school-acquired competences in Austria, Croatia, Hungary, Italy, Luxembourg and Latvia; those from higher SES families have higher school-acquired competences in Finland and Macao.
Out of school	Coming from a high SES family is associated with the acquisition of more out of school competences in Australia, Canada, Denmark, Finland, Hong Kong – China, Ireland, Korea, Latvia, Macao, New Zealand, Portugal, Shanghai, Singapore and Serbia; in Austria, Belgium, Croatia, Italy and the Slovak Republic the relationship is inconsistent.

Immigrant status

Participation	Immigrant status is associated with higher participation in Belgium, Canada, Italy and Luxembourg; immigrant status is associated with lower participation in Finland.
Total competences	Immigrant status is associated with higher competence in Belgium, Canada, Denmark and Italy.
At school	Students from migrant backgrounds have the highest school-acquired competences in Canada and Italy, and the lowest in Finland and Singapore.
Out of school	Canada, Belgium, Italy and Luxembourg migrant students acquire more out of school competences; in Finland they acquire fewer.

Parent education level

Participation	Higher parental education levels are associated with higher participation in Australia, Belgium, Canada, Denmark, Finland, Hong Kong, Ireland, Italy, Korea, Latvia, Macao, New Zealand, Portugal, Shanghai, Singapore and Serbia.
Total competences	Having more highly educated parents is associated with greater competence in Canada, Denmark, Finland, Korea, Macao and Shanghai.
At school	Students with the best-educated parents have the highest school-acquired competences in Finland and Macao; those whose parents have the lowest education levels have the highest school-acquired competences in Croatia, Ireland and Luxembourg.

Out of school In Canada, Hong Kong, Croatia, Ireland, Korea, Luxembourg, Latvia, Macao, New Zealand, Portugal, Shanghai, Serbia and the Slovak Republic the children of more highly educated parents acquire more out of school competences.

Family structure

Participation Not significant for any country

Total competences Having a family consisting of two parents is associated with lower competence in Belgium and higher competence in Canada.

At school In Canada students from two-parent families have higher highest school-acquired competences than those from other types of families.

Out of school In Belgium the children of two parent families acquire fewer out of school competences than children from other types of families.

Parental employment

Participation Higher parental employment levels are associated with higher participation in Australia, Denmark, Finland, Latvia, Portugal and Shanghai.

Total competences Having both parents employed is associated with higher competence in Australia and lower competence in Belgium; the relationship tends to be inconsistent in Macao but favours lower competence when no parents are employed.

At school Students from families where no parents work have the highest school-acquired competences in Belgium, Luxembourg, Serbia and the Slovak Republic; students from families where both parents work have the highest school-acquired competences in Denmark and Finland.

Out of school Having no working parents is associated with the acquisition of fewer out of school competences in Australia, Croatia, Macao, Shanghai and Serbia.

Resilience (High achievement associated with a low SES background)

Participation Resilient students are less likely to participate in Austria, Belgium, Canada, Hungary, Italy, Luxembourg, Latvia, Macao, Shanghai, Serbia and Slovenia. In these same countries low achievers from high SES backgrounds are more likely to participate.

Total competences Resilient students (high achievers who come from low SES backgrounds) have lower perceived competence in Australia, Austria, Belgium, Canada, Finland, Hungary, Luxembourg, Macao, New Zealand, Shanghai, Singapore and Serbia. In these same countries low achievers from high SES backgrounds are likely to report higher levels of competence.

At school High achievers from low SES families tend to have high school-acquired competences in Finland, Hong Kong and Singapore; low achievers from high SES families tend to have high school-acquired competences in Finland, Hong Kong and Singapore.

Out of school Low achieving high SES students acquire more out of school competences than high achieving low SES students in Australia, Canada, (Hong Kong), Ireland, Korea, Latvia, Singapore and Slovenia.

Gender

Participation Females are more likely to participate in Canada, Finland, Hong Kong, Ireland, Korea, Latvia and New Zealand; males are more likely to participate in Italy and Serbia

Total competences Males report greater competence in Austria, Belgium, Croatia, Hungary, Italy, Luxembourg, Latvia, Portugal, Singapore, Serbia, the Slovak Republic and Slovenia. In Hong Kong females report greater competence.

At school Females have higher school-acquired competences than males in Canada, Finland, Hong Kong and Ireland; in Belgium, Italy, Serbia and the Slovak Republic males have higher school-acquired competences than females.

Out of school Males acquire more out of school competences than females in Canada, Croatia, Hungary, Ireland, Italy, Luxembourg, Singapore, Serbia, the Slovak Republic and Slovenia.

Participation in vocational programmes

Participation Participation in vocational programmes associated with higher participation in Australia, Austria, Croatia, Hungary, Ireland, Italy, Luxembourg, Latvia, Shanghai, Serbia and Slovenia; participation in vocational programmes associated with lower participation in Korea and the Slovak Republic.

Annexes

Total competences	Participation in vocational programmes is associated with higher competence in Australia, Austria, Belgium, Croatia, Hungary, Ireland, Italy, Luxembourg, Portugal, Shanghai and Slovenia; participation in vocational programmes is associated with lower competence in Korea.
At school	Students in vocational programmes have higher school-acquired competences than students in other programmes in Australia, Austria, Belgium, Croatia, Hungary, Ireland, Italy, Luxembourg, Portugal, Shanghai and Slovenia; in Korea they have lower school-acquired competences.
Out of school	Students in vocational programmes acquire fewer out of school competences than students in other programmes in Ireland, Korea, Shanghai and Serbia, but more in the Slovak Republic and Slovenia.

Annex 4. Relating PISA to what we know about national career development services: case studies of Finland and Luxembourg²³

One aim in analysing the PISA 2012 career development material has been to explore the extent to which it can shed light on, and be explained by, the characteristics of national career development systems. With this in mind, summaries have been developed of the patterns emerging from the PISA material in Finland and Luxembourg (see Tables A1–A3), and descriptive material on career development arrangements in the two countries has been provided by national experts.

The descriptions provided by national experts reveal a more unified approach to career development within secondary schools in Finland than in Luxembourg, and a stronger emphasis in Finland upon an approach that is embedded within the curriculum in Grades 1 through 9. The provision of services in Luxembourg is more diverse than in Finland and more services appear to be provided by agencies outside of the school, schools have a greater degree of autonomy in deciding whether to provide services and what types of services to provide, and there appears to be a relatively stronger emphasis upon information provision and individual advice than upon pedagogical or curriculum-embedded approaches.

These differences appear quite consistent with the picture that emerges from the PISA material. This showed:

- Higher levels of participation and of career-related competence in Finland than in Luxembourg;
- Greater variation in participation and competence, both within and between schools, in Luxembourg than in Finland;
- A stronger relationship between career-related outcomes and the characteristics of individual schools and student characteristics such as

socioeconomic status, in Luxembourg than in Finland; and

- A relatively greater role reported for non-school than for school sources in the development of career-related competence in Luxembourg than in Finland.

1. What the data shows

1.1 Finland

Levels of participation in Finland are significantly above the 22-country average, as are the total number of competences acquired by 15 year-olds and the number of competences acquired at school. The number of competences that students acquire out of school is, however, significantly lower than average, suggesting that in Finland schools play a stronger role in providing career services than in other countries (see also Section 3.1.3 above). The amount of variance between schools both in participation and in the number of competences acquired is not significantly different from the 22-country average. Within schools the amount of variation in the number of competences that students acquire is low, as is the amount of variance in the total number of competences acquired. The high participation levels, high competence levels, low variation between schools, and the strong role played by schools are likely to be a function of the fact, as described in 2.1 below, that career education is a compulsory part of the national curriculum, and that the curriculum reflects the acquisition of career management skills.

Reflecting low between school variance in the number of competences acquired, very few differ-

²³ The description of the national guidance system in Luxembourg was provided by Mr Jos Noesen from the Luxembourg Ministry of Education and Vocational Training.

ences in either participation or the number of competences acquired show a significant relationship to the characteristics of schools. However participation tends to be somewhat higher in smaller schools and in schools with higher maths and problem solving scores; students in low socioeconomic status schools tend to acquire more overall competences; and the number of competences acquired at school is higher in schools where students have a positive attitude towards learning outcomes, where there is a strong sense of belonging at school, and where student-teacher relations are positive. On the other hand where the sense of belonging at school is low and student-teacher relations are poor, students tend to acquire more competences out of school.

The relationship between individual scores on maths achievement, perseverance, openness for problem solving, and attitudes towards learning and participation and competences acquired is in nearly all cases significant. Socioeconomic status and parental education level are positively related to participation, to the number of competences acquired and to the number of school-acquired competences. Non-migrants tend to have higher participation and to acquire more competences at school than do migrants. Females tend to have higher levels of participation and to acquire more competences at school than do males.

1.2 Luxembourg

The number of competences acquired at school is somewhat higher than average, but nevertheless quite close to the 22 country mean. A major feature of the means and variances of the four scales is the fact that in Luxembourg variation in participation both within and between schools tends to be among the highest of the 22 countries. Variation between schools in the total number of competences acquired is also high, as is variation within schools in the number of competences acquired at school. This might imply that career

development services tend to be somewhat uneven both between and within schools. This high level of variation is likely to reflect the autonomy that schools have, as described in 2.2 below.

Reflecting relatively high within and between school variance, there are significant differences between schools both in participation and in the number of competences acquired as a function of many of the characteristics of schools (although in many cases the differences are not consistent in direction). For example outcomes differ as a function of: parental expectations; the number of extracurricular activities offered; attitudes towards learning (with poorer attitudes associated with higher participation and competences); and student-teacher relations (positively related to participation and school acquired competences, but negatively to out of school competences). Participation and the number of competences acquired are both negatively related to schools' level of achievement in maths and socioeconomic status.

Participation levels are higher, a greater total number of competences are acquired, and a greater number of competences are acquired at school, by individuals who have lower maths achievement, greater perseverance, greater openness for problem solving, and more positive attitudes towards the relevance of school to post-school life. Those from low socioeconomic status backgrounds acquire more competences at school than those from high socioeconomic status backgrounds. On the other hand more out of school competences are acquired by those with higher maths achievement and by those from higher socioeconomic status backgrounds. Males acquire more competences than females and more competences out of school.

Students in vocational programmes have higher levels of participation, acquire more competences, and more competences in school, than students who are not in vocational programmes.

2. Descriptions of national systems provided by national experts

2.1 Career education and guidance in schools in Finland

In Finland career education is a legally defined student entitlement and is a compulsory element in the curriculum, comprising 76 hours of scheduled activities in students' timetables during Grades 7–9. Class-based activities are usually facilitated by trained school counsellors. In Grades 1–6, guidance is embedded in the work of the classroom teachers. In addition, there is an entitlement for individual guidance and group counselling, and work-experience periods.

The qualifications and competences of school counsellors are regulated. The school counsellors usually have either a Master's degree in school counselling or a 60 ECTS²⁴ postgraduate diploma in counselling.

Within the national core curricula career education is described as a mainstream strategy and a responsibility of all staff, and the goals and content of the 76 hours and individual guidance are outlined. The basic goals of the curriculum guidelines for guidance and counselling are: 1) To support personal growth and development of the students; 2) To promote the development of study skills and to help in learning difficulties and 3) To counsel and guide the students in educational and occupational orientation. The overall emphasis is on the acquisition of lifelong career management skills as a continuum focusing on self-knowledge, education and training options and the world of work.

The schools are required to provide a school-level plan of career education and guidance with allocation of tasks to different staff members. The local curriculum must include a description of how co-operation with the local labour market and business community is being implemented within the school.

Classroom visits by labour market representatives, visits to workplaces, project work, the use of different sectors' information materials and introduction-to-working-life periods are central parts of this co-operation. The instruction in the different subjects is to include modules that connect the knowledge and skills provided by the subject to the demands and possibilities of working life.

Pupils and their parents are to have the chance to receive information on the working approaches and possibilities of choice within basic education, and on the implications of these choices for the pupil's studies and future. School-specific issues concerning the provision of guidance and counselling services, pupil welfare and support services are to be explained to pupils and their parents or guardians. The parent or guardian must be given opportunities to discuss issues related to the pupil's studies and choices by meeting collectively with the teacher, study counsellor and pupil.

In addition to the career education in schools there are several Internet portals developed by the national education and employment authorities, municipalities, different regional actors, youth information centres, etc. to serve the information, advice and guidance needs of their primary client groups. Mostly these services are available in Finnish and Swedish, often also in English.

2.2 Guidance and counselling in education and training in Luxembourg

Guidance and counselling in Luxembourg is provided within schools, which have a large amount of autonomy, as well as by external services and activities. Throughout secondary education, pupils are supported by a diverse range of guidance, counselling and information activities: these may be organised at school, regional or national level, or for a certain domains of studies. The aim is to provide young people with tools to allow them to discover the environment, to understand it better and to give meaning to their education.

²⁴ European Credit Transfer and Accumulation System

These activities may include: developing and providing career information material including through websites²⁵, a documentation centre, careers events and student fairs, or information sessions for students and parents; discussions with employers or graduates of certain professional programmes; pedagogical projects at class or school level; organising internships or visits to different types of employers; implementing the approach of Education of Choices (éducation des choix) at school level; individual support and consultations, psychological testing and establishing competence profiles.

The different guidance activities are organised by a number of organisations:

- Secondary schools. However due to the secondary school's autonomy, the number, frequency and type of activities may be quite different from one school to another;
- The Centre for Educational Psychology and Guidance and the school's Services for Educational Psychology and Guidance;
- The Service for Vocational Guidance of the Agency for the Development of Employment;

- Services are also provided by the employers' and employees' chambers, the Local Youth Action, and the Centre for Documentation and Information on Higher Education.

In general, guidance and counselling in Luxembourg is marked by two recent trends:

- The cooperation of different institutions and services has been strengthened: in 2006, a Coordination Committee for several guidance services was created; joint projects, such as a common website (www.anelo.lu) have been initiated; and in September 2012 several services providing different kinds of guidance and counselling were moved together into a single Counselling Center; and
- A greater importance has been accorded to the development of pupils' decision making and career management skills. Rather than relying on "external" guidance only, pupils should be enabled to become aware of their strengths and weaknesses, to search for necessary information and to take their own decisions.

²⁵ For example www.anelo.lu

Table A1: Means and variances on the four career-related scales, Finland and Luxembourg

	Finland				Luxembourg			
	Mean	Variance			Mean	Variance		
		Between school	Within school	Total		Between school	Within school	Total
Participation	5.10	0.22	3.92	4.14	3.61	0.59	4.39	4.98
Total competences	5.08	0.10	1.77	1.87	4.11	0.18	3.22	3.40
At school	3.48	0.33	3.86	4.19	1.90	0.53	3.09	3.62
Out of school	2.12	0.15	3.46	3.61	2.48	0.07	3.49	3.56
Mean significantly higher than average								
Mean significantly lower than average								
One of the five largest variances (out of 22)								
One of the five smallest variances (out of 22)								

Table A2: Summary of mean differences on background characteristics for Finland

	Finland			
	Participation	Total competences acquired	Acquired at school	Acquired out of school
School-related characteristics				
School location	Small>large	ns	ns	ns
Public or private school	ns	ns	ns	ns
School competition	ns	ns	ns	ns
Parental expectations of school	ns	ns	ns	ns
Extracurricular activities	ns	ns	ns	ns
Importance attached to social and emotional development	ns	ns	ns	ns
Teacher quality	ns	ns	ns	ns
School SES	ns	Low>high	ns	ns
School maths score	High>low	ns	ns	ns
School problem solving score	High>low	ns	ns	ns
Attitudes to school: learning outcomes	ns	ns	High>low	ns
Attitudes to school: learning activities	ns	ns	ns	ns
Sense of belonging at school	ns	ns	High>low	Low>high
Disciplinary climate	ns	ns	ns	ns
Student-teacher relations	ns	ns	High>low	Low>high
School size	ns	ns	ns	ns
Curriculum and assessment autonomy	ns	ns	ns	ns
Teacher shortages	ns	ns	ns	ns
Student-teacher ratio	ns	ns	ns	ns
Educational resources	ns	ns	ns	ns
Parental involvement	ns	ns	ns	ns
Student and family-related characteristics				
Maths score	High>low	High>low	High>low	Low>high
Problem solving score	High>low	ns	ns	ns
Perseverance	High>low	High>low	High>low	High>low
Openness for problem solving	High>low	High>low	High>low	High>low
Attitudes to learning outcomes	High>low	High>low	High>low	Low>high
Attitudes to learning activities	High>low	High>low	High>low	ns
SES	High>low	High>low	High>low	ns
Immigrant status	Non mig>mig	ns	Non mig>mig	ns
Parent education level	High>low	High>low	High>low	ns
Family structure	ns	ns	ns	ns
Parent employment	More emp>less	ns	More emp>less	ns
Resilience	ns	High>low	High>low	ns
Gender	F>M	ns	F>M	ns
Participation in vocational programmes	na	na	na	na

Table A3: Summary of mean differences on background characteristics for Luxembourg

	Luxembourg			
	Participation	Total competences acquired	Acquired at school	Acquired out of school
School-related characteristics				
School location	ns	ns	Small>larger	ns
Public or private school	ns	ns	Priv>pub	Pub>priv
School competition	ns	ns	Inconsistent	ns
Parental expectations of school	High>low	High>low	High>low	ns
Extracurricular activities	Low>high	Inconsistent	Low>high	Inconsistent
Importance attached to social and emotional development	High>low	High>low	Low>high	ns
Teacher quality	Low>high	Lo	Low>high	ns
School SES	Low>high	Low>high	Low>high	High>low
School maths score	Low>high	Low>high	Low>high	High>low
School problem solving score	n.a.	ns	n.a.	na
Attitudes to school: learning outcomes	Low>high	Inconsistent	Low>high	ns
Attitudes to school: learning activities	Low>high	Inconsistent	Low>high	ns
Sense of belonging at school	Low>high	Low>high	Low>high	ns
Disciplinary climate	Inconsistent	ns	Inconsistent	Low>high
Student-teacher relations	High>low	High>low	High>low	Low>high
School size	Inconsistent	Inconsistent	Inconsistent	ns
Curriculum and assessment autonomy	Inconsistent	Inconsistent	Inconsistent	Inconsistent
Teacher shortages	Inconsistent	Inconsistent	Inconsistent	High>low
Student-teacher ratio	Inconsistent	Low>high	Inconsistent	Inconsistent
Educational resources	ns	Low>high	ns	ns
Parental involvement	Inconsistent	Low>high	Inconsistent	ns
Student and family-related characteristics				
Maths score	Low>high	Low>high	Low>high	High>low
Problem solving score	na	na	na	na
Perseverance	High>low	High>low	High>low	High>low
Openness for problem solving	High>low	High>low	High>low	High>low
Attitudes to learning outcomes	High>low	High>low	High>low	ns
Attitudes to learning activities	High>low	High>low	High>low	ns
SES	ns	ns	Low>high	High>low
Immigrant status	Mig>non mig	ns	ns	ns
Parent education level	ns	ns	Low>high	High>low
Family structure	ns	ns	ns	ns
Parent employment	ns	ns	Inconsistent	ns
Resilience	Inconsistent	Low>high	ns	ns
Gender	ns	M>F	ns	M>F
Participation in vocational programmes	Voc>other	Voc>other	Voc>other	ns

Key to Tables A2 and A3

High>low (etc): High scores on the characteristic receive higher scores on the scale than low scores on the characteristic e.g. high perseverance is associated with significantly higher participation than low perseverance

Inconsistent: Differences between categories are significant, but the direction is not linear e.g. mid SES > participation than high or low SES

n.s.: Not significant

n.a.: Not applicable



EUROPEAN LIFELONG GUIDANCE POLICY NETWORK (ELGPN) aims to assist the European Union Member States (and the neighbouring countries eligible for the Lifelong Learning Programme) and the European Commission in developing European co-operation on lifelong guidance in both the education and the employment sectors. The purpose of the Network is to promote co-operation and systems development at member-country level in implementing the priorities identified in EU 2020 strategies and EU Resolutions on Lifelong Guidance (2004; 2008). The Network was established in 2007 by the Member States; the Commission supports its activities under the Lifelong Learning Programme.

THE OECD HAS BEEN CONDUCTING ITS PISA (Programme for International Student Assessment) survey at three-yearly intervals since 2000. In addition to the primary focus upon student achievement in 2012 one area that was explored was career development. The option of completing the Education Career questionnaire was taken up by 22 of the 65 countries and economies that took part in PISA 2012 and fourteen of the 22 countries are members of the ELGPN.

The purpose of this ELGPN Research Paper is to provide an initial exploration of the potential of PISA 2012 to illuminate some links between career development and public policy, to explore national differences in patterns of 15 year-olds' participation in career development activities and their perceived career-related competences, and to suggest priorities for further analysis. It provides a first-level analysis of the relationship between career development and the characteristics of schools and of students and their families, and does not try to examine either interaction between variables or to partial out the absolute impact of individual variables once the impact of others has been taken into consideration. Its focus is upon general patterns and trends rather than upon trying to understand individual countries.

This Research Paper has been co-authored by Professor Richard Sweet, Dr Kari Nissinen and Dr Raimo Vuorinen in his role as the ELGPN Co-ordinator.