

Programme for International  
Student Assessment

# PISA 2022

Assessing creative thinking  
for a better future

Lisa De Bortoli  
Catherine Underwood



Australian Council for Educational Research



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*PISA 2022. Assessing creative thinking for a better future*

Lisa De Bortoli and Catherine Underwood

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The data contained in this report is consistent with data provided by the OECD as of 1 November 2023. There is the potential for minor revisions to the data in this report; please check the online version of the report at [www.acer.org/pisa](http://www.acer.org/pisa) for any revisions.

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# Acknowledgements

The funding for Australia's participation in PISA 2022 was provided jointly by the Australian Government and the state and territory governments. All of Australia's share of the international overheads and half of the basic funding for PISA within Australia was contributed by the Australian Government Department of Education, while each state and territory government education department provided funding proportionate to the enrolments of 15-year-old students in their schools.

In Australia, PISA is managed by a team from the Australian Council for Educational Research (ACER) and guided by the International Assessments Joint National Advisory Committee (IAJNAC). ACER wishes to thank the IAJNAC members for their interest and commitment throughout PISA 2022. Their involvement included reviewing the frameworks and assessment items, assisting with the implementation of PISA in schools from their state or territory, and providing valuable information to ensure the continued success of PISA 2022 in Australia.

The undertaking of the PISA 2022 cycle was a collaborative effort undertaken in unprecedented times with the 2021 field trial taking place during the COVID-19 global pandemic, and the main survey taking place as schools were re-establishing the daily school routine following periods of remote learning due to lockdowns.

A national assessment such as PISA could not be successful without the cooperation of school systems and sectors, principals, teachers, students and parents and our dedicated team of test administrators. While Australia was not able to fully satisfy the internationally set response criteria for PISA 2022, ACER gratefully acknowledges the assistance of education system officials Australia-wide, and the principals, teachers and students in the participating schools who so generously gave their time and support to the project.



# Executive summary

The Programme for International Student Assessment (PISA) is an international comparative study of student performance directed by the Organisation for Economic Co-operation and Development (OECD). PISA measures the cumulative outcomes of education by assessing how well 15-year-olds,<sup>1</sup> who have nearly completed compulsory schooling in most participating educational systems, are prepared to use their knowledge and skills in particular areas to meet real-world opportunities and challenges.

In addition to measuring students' knowledge and skills in the core areas of reading, mathematics and science, PISA also includes an innovative domain in each assessment cycle to capture new or emerging competencies that are important for the future. Creative thinking was assessed as an innovative domain for the first time in PISA 2022.

In Australia, PISA is managed by the Australian Council for Educational Research and is jointly funded by the Australian Government and all state and territory governments. PISA is a key part of Australia's National Assessment Program.

This report presents the creative thinking results for Australia as a whole, for the Australian states and territories and for the other groups in PISA 2022. Differences in results are only reported if tests of statistical significance showed that these were likely to be real differences; that is, differences were unlikely to be caused by chance.

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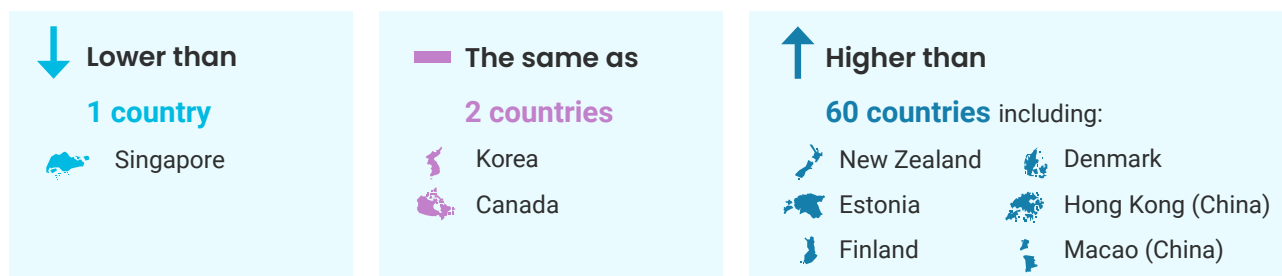
<sup>1</sup> Students who were aged between 15 years and 3 (complete) months and 16 years and 2 (complete) months at the time of the assessment.

## Part A Student performance and proficiency in creative thinking

### Australia's results in an international context

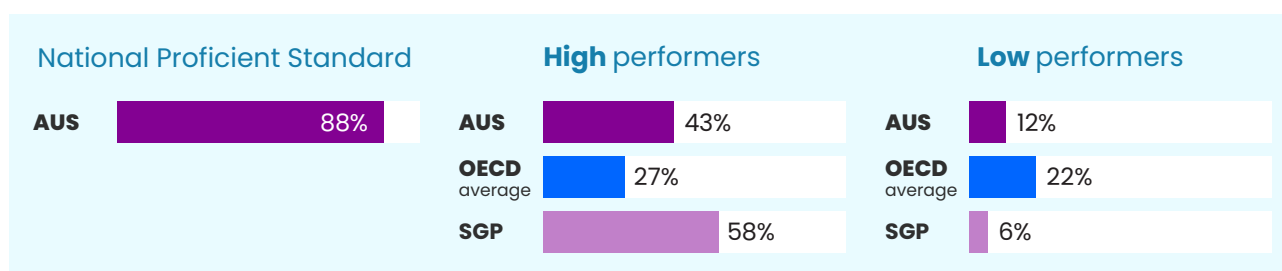
- ▶ 64 countries and economies participated in the PISA 2022 creative thinking assessment.
- ▶ Singapore was the highest performing country, achieving a mean score of 41 score points.
- ▶ Australia achieved a mean score of 37 score points, which was higher than the OECD average of 33 points.

#### Australia's performance was:



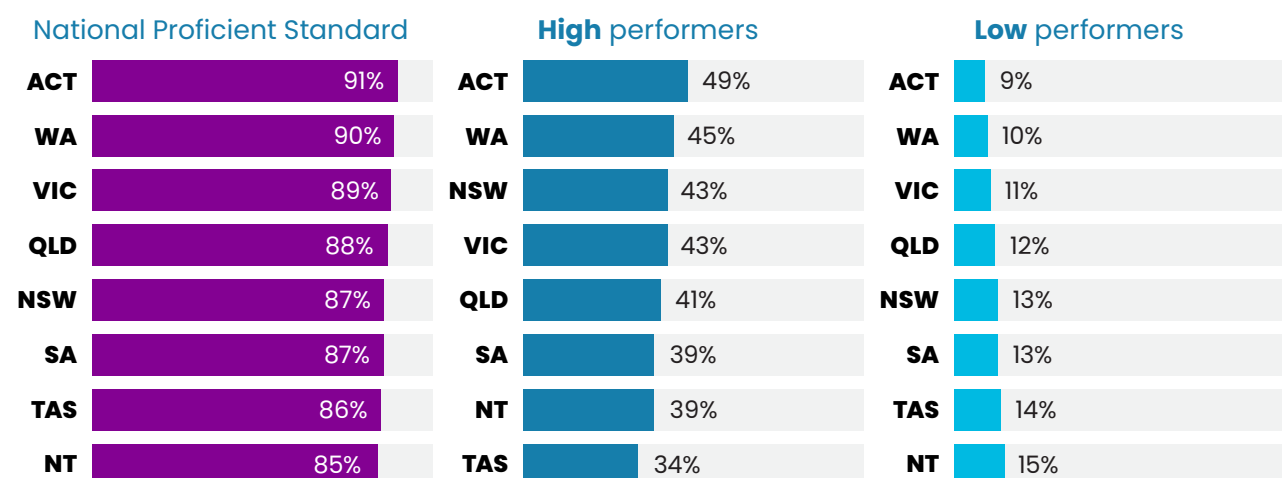
Australia's proportion of high performers was higher than the OECD average, but lower than Singapore's.

Australia's proportion of low performers was lower than the OECD average, but higher than Singapore's.



### Australia's results in a national context: State and territory

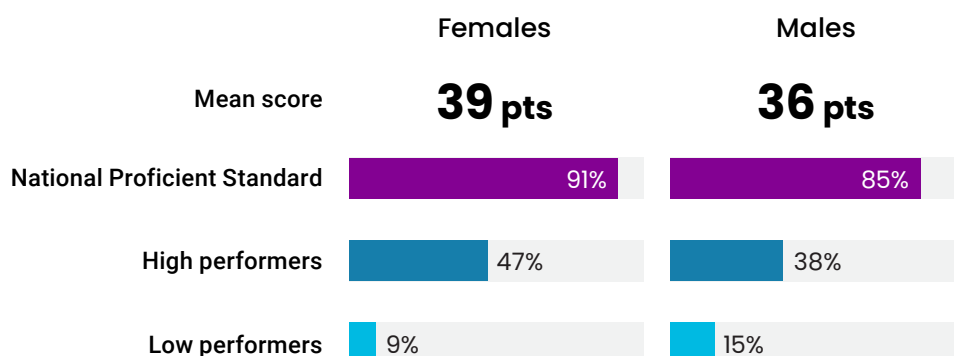
- ▶ Students in the Australian Capital Territory performed at a similar level to students in Western Australia and at a higher level than students in all other jurisdictions.
- ▶ Students in Western Australia performed higher than students in South Australia and Tasmania.
- ▶ Students in Victoria and New South Wales performed higher than students in Tasmania.



## Australia's results for the different demographic groups

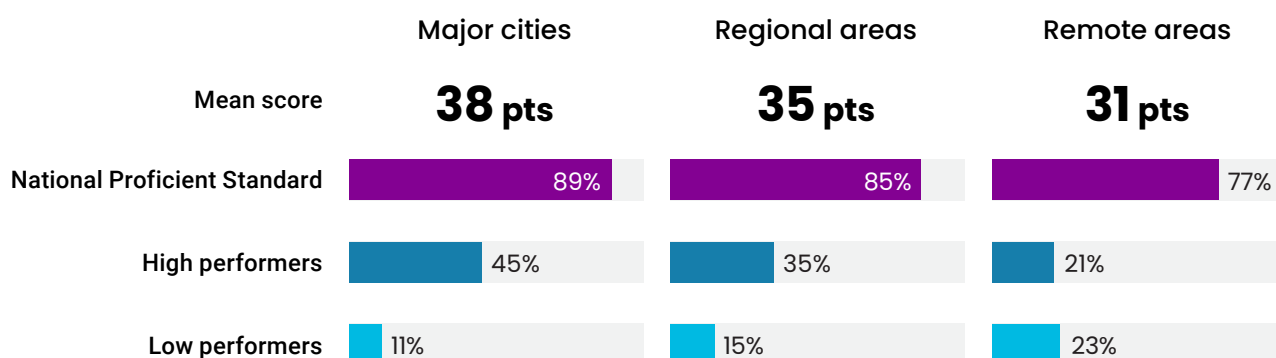
### Gender

- ▶ Female students performed higher than male students in creative thinking.
- ▶ More female students attained the National Proficient Standard than male students.
- ▶ There were more female high performers than male high performers.
- ▶ There were fewer female low performers than male low performers.



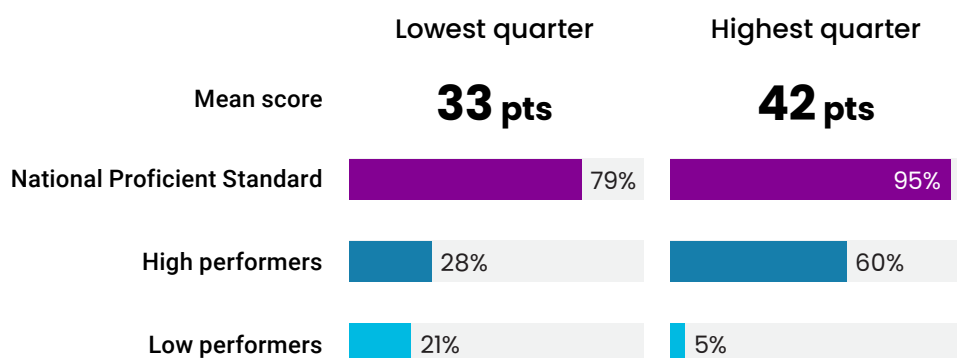
### Geographic location

- ▶ Students in major city schools performed higher than students in regional schools, who in turn, performed higher than students in remote schools.
- ▶ There were more students in major city schools who attained the National Proficient Standard than in regional and remote schools, while there were similar proportions of students who attended the National Proficient Standard in regional and remote schools.
- ▶ There were more high performers in major cities than in regional and remote schools, and there were more high performers in regional schools than in remote schools.
- ▶ There were fewer low performers in major city schools than in regional and remote schools, while there were similar proportions of low performers in regional and remote schools.



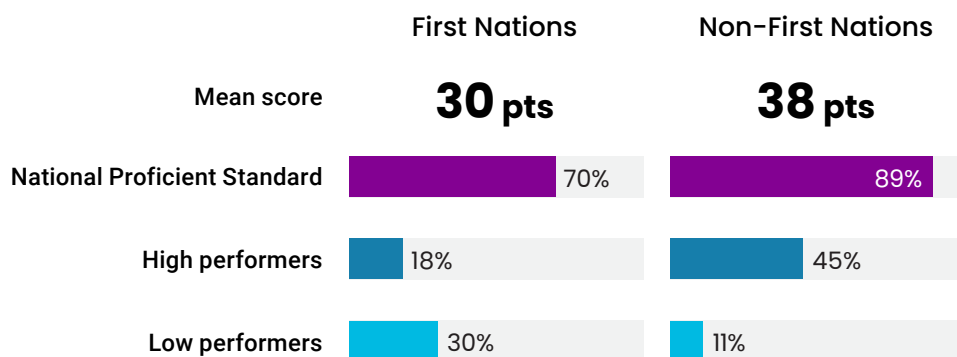
### Socioeconomic background

- ▶ Students from higher socioeconomic backgrounds performed higher than students from lower socioeconomic backgrounds.
- ▶ More students attained the National Proficient Standard with each increment in socioeconomic background quarter.
- ▶ With each increment in socioeconomic background quarter, there were more high performers and fewer low performers.



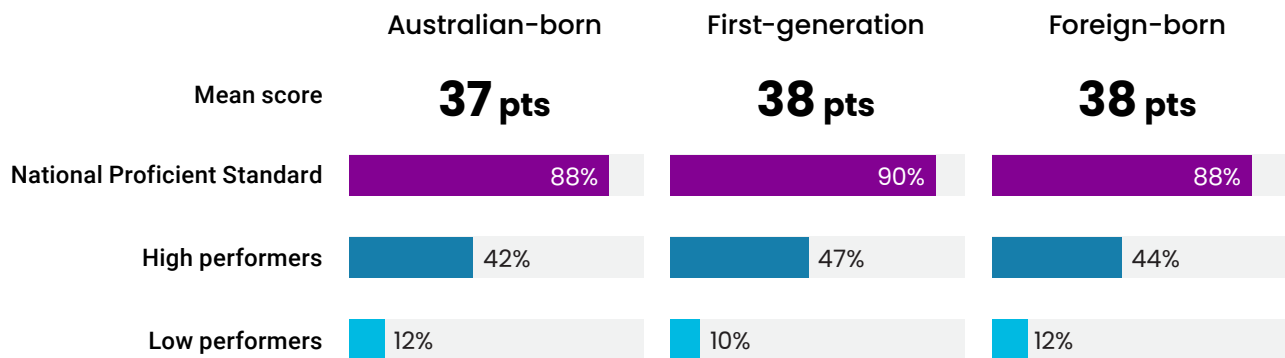
### First Nations background

- ▶ First Nations students performed lower than non-First Nations students.
- ▶ Fewer First Nations students attained the National Proficient Standard than non-First-Nations students.
- ▶ There were more low-performing and fewer high-performing First Nations students than non-First Nations students.



## Immigrant background

- ▶ Australian-born students performed lower than first-generation students, while the performances of first-generation and foreign-born students and Australian-born and foreign-born students were similar.
- ▶ Similar proportions of students attained the National Proficient Standard across the immigrant background groups.
- ▶ There were more high-performing first-generation students than Australian-born students, but there were similar proportions of high-performing first-generation students and foreign-born students. The proportions of high-performing Australian-born students and foreign-born students were similar.
- ▶ There were similar proportions of low-performing students the across the immigrant background groups.



## Part B Students' beliefs and attitudes towards creative thinking

This section presents the results of 15 countries (11 OECD countries and 4 partner economies) for comparison with Australia on various student characteristics.

↑	Australia's mean index score is significantly higher than comparison country/OECD average
—	Australia's mean index score is not significantly different to comparison country/OECD average
↓	Australia's mean index score is significantly lower than comparison country/OECD average

### Australia's results in an international context: Students

#### Creative self-efficacy

↑	OECD average
↑	12 of the comparison countries (e.g. Hong Kong (China), Macao (China), Latvia and Estonia)
↓	Canada
—	Portugal

#### Openness to intellect

—	OECD average
↑	10 of the comparison countries (e.g. Latvia, Belgium, Poland, and Macao (China))
↓	Portugal, Canada and Singapore
—	Chinese Taipei

#### Fostering and support of creative thinking in school and classroom environment

↑	OECD average
↑	7 of the comparison countries (e.g. Poland, Belgium, Latvia and Estonia)
↓	Singapore, Chinese Taipei, Portugal and Canada
—	Hong Kong (China), Korea, and Macao (China)

#### Participation in creative thinking activities at school

↓	OECD average
↑	Poland, Portugal and Belgium
↓	8 of the comparison countries (e.g. Chinese Taipei, Korea and Macao (China))
—	Singapore, Latvia and New Zealand

#### Imagination and adventurousness

—	OECD average
↑	5 of the comparison countries (e.g. Poland, Denmark and Hong Kong (China))
↓	Portugal, Canada, and Korea
—	New Zealand, Latvia, and Estonia

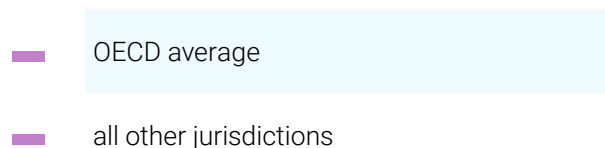


## Australia's results from a state and territory context: Students

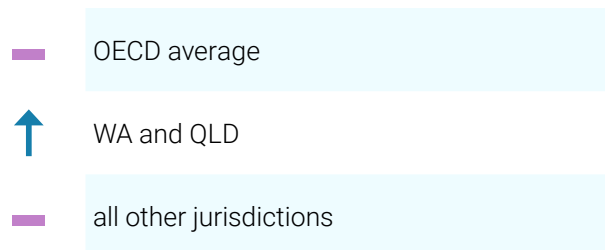
↑	jurisdiction's mean index score is significantly higher than comparison jurisdiction(s)/OECD average
—	jurisdiction's mean index score is not significantly different to comparison jurisdiction(s)/OECD average
↓	jurisdiction's mean index score is significantly lower than comparison jurisdiction(s)/OECD average

### Students in the Australian Capital Territory

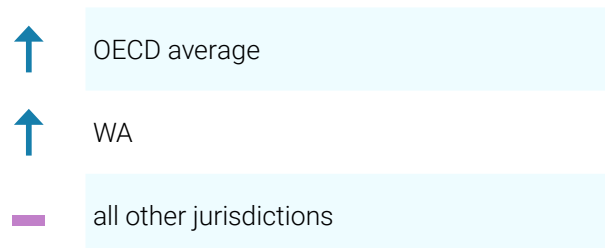
#### Creative self-efficacy



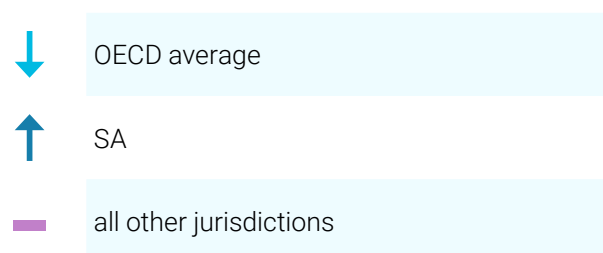
#### Openness to intellect



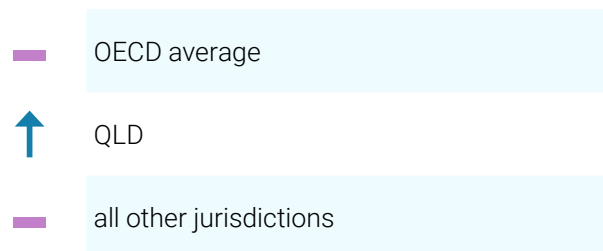
#### Fostering and support of creative thinking in school and classroom environment



#### Participation in creative thinking activities at school



#### Imagination and adventurousness



## Students in New South Wales

### Creative self-efficacy



OECD average



QLD, WA and VIC



all other jurisdictions

### Openness to intellect



OECD average



WA, QLD, SA and VIC



all other jurisdictions

### Fostering and support of creative thinking in school and classroom environment



OECD average



WA and QLD



all other jurisdictions

### Participation in creative thinking activities at school



OECD average



all other jurisdictions

### Imagination and adventurousness



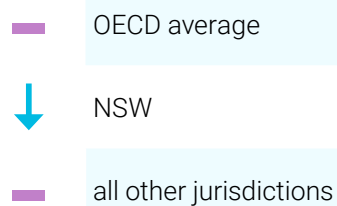
OECD average



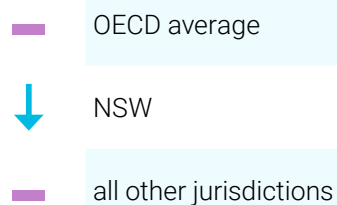
all other jurisdictions

## Students in Victoria

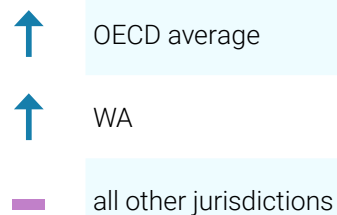
### Creative self-efficacy



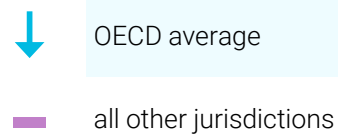
### Openness to intellect



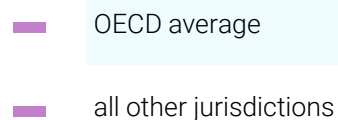
### Fostering and support of creative thinking in school and classroom environment



### Participation in creative thinking activities at school

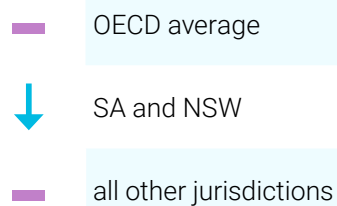


### Imagination and adventurousness

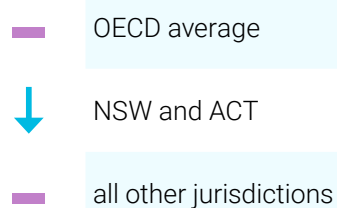


## Students in Queensland

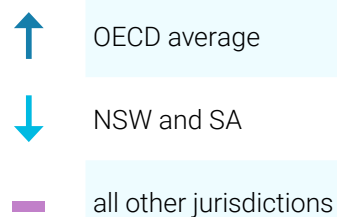
### Creative self-efficacy



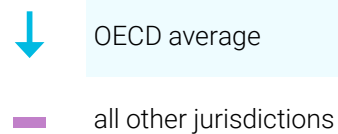
### Openness to intellect



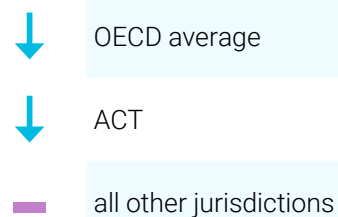
### Fostering and support of creative thinking in school and classroom environment



### Participation in creative thinking activities at school

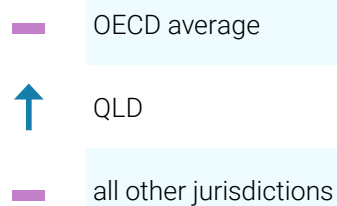


### Imagination and adventurousness

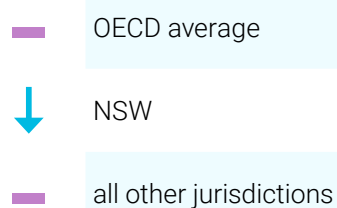


## Students in South Australia

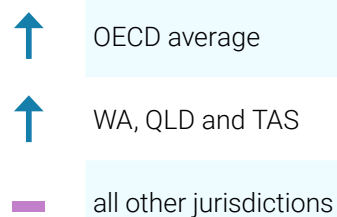
### Creative self-efficacy



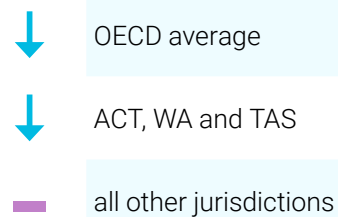
### Openness to intellect



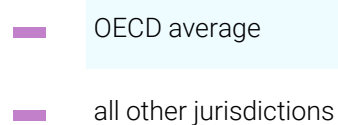
### Fostering and support of creative thinking in school and classroom environment



### Participation in creative thinking activities at school

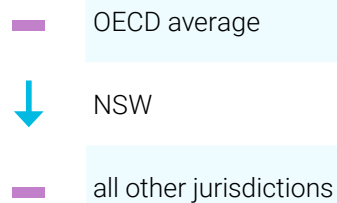


### Imagination and adventurousness

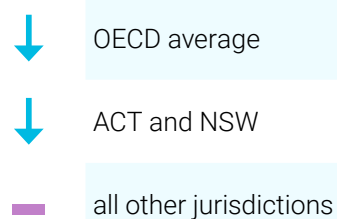


## Students in Western Australia

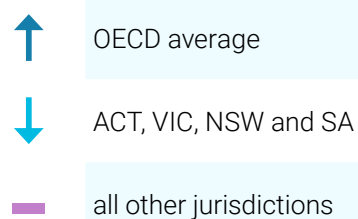
### Creative self-efficacy



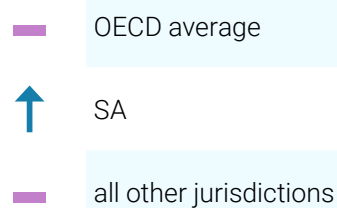
### Openness to intellect



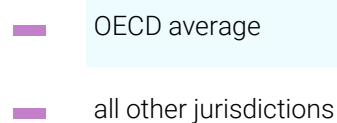
### Fostering and support of creative thinking in school and classroom environment



### Participation in creative thinking activities at school



### Imagination and adventurousness



## Students in Tasmania

### Creative self-efficacy

- OECD average
- all other jurisdictions

### Openness to intellect

- OECD average
- all other jurisdictions

### Fostering and support of creative thinking in school and classroom environment

- ↑ OECD average
- ↓ SA
- all other jurisdictions

### Participation in creative thinking activities at school

- OECD average
- ↑ SA
- all other jurisdictions

### Imagination and adventurousness

- OECD average
- all other jurisdictions

## Students in the Northern Territory

### Creative self-efficacy

- OECD average
- all other jurisdictions

### Openness to intellect

- OECD average
- all other jurisdictions

### Fostering and support of creative thinking in school and classroom environment

- OECD average
- all other jurisdictions

### Participation in creative thinking activities at school

- OECD average
- all other jurisdictions

### Imagination and adventurousness

- OECD average
- all other jurisdictions



## Australia's results for the different demographic groups: Students

### Gender

More male than female students reported:

- ▶ greater creative self-efficacy
- ▶ more openness to intellect
- ▶ greater fostering and support of creative thinking in their school and class environment.

More female than male students reported:

- ▶ greater participation in creative activities at school
- ▶ greater imagination and adventurousness.

### Socioeconomic background

More students from advantaged socioeconomic backgrounds than disadvantaged backgrounds reported:

- ▶ greater creative self-efficacy
- ▶ more openness to intellect
- ▶ greater fostering and support of creative thinking in their school and class environment
- ▶ greater participation in creative activities at school
- ▶ more imagination and adventurousness.

### Geographic location of schools

More students in major city schools than students in regional or remote schools reported:

- ▶ greater creative self-efficacy
- ▶ more openness to intellect
- ▶ more imagination and adventurousness.

More students in regional schools than in remote schools also reported this.

More students in major city schools than students in regional schools reported greater fostering and support of creative thinking in their school and class environment. More students in regional schools than in remote schools also reported this.

### First Nations background

More non-First Nations than First Nations students reported:

- ▶ greater creative self-efficacy
- ▶ more openness to intellect
- ▶ greater fostering and support of creative thinking in their school and class environment
- ▶ more imagination and adventurousness.

More First Nations than non-First Nations students reported greater participation in creative activities at school.

### Immigrant background

More first-generation students than Australian-born students reported:

- ▶ greater creative self-efficacy
- ▶ more openness to intellect
- ▶ more imagination and adventurousness.

More foreign-born students than Australian-born and first-generation students reported:

- ▶ more openness to intellect
- ▶ greater fostering and support of creative thinking in their school and class environment
- ▶ more participation in creative activities at school.

## Part C Teachers' beliefs and attitudes towards creative thinking

This section presents the results of 4 countries for comparison with Australia on various teacher characteristics.

↑	Australia's mean index score is significantly higher than comparison country/OECD average
—	Australia's mean index score is not significantly different to comparison country/OECD average
↓	Australia's mean index score is significantly lower than comparison country/OECD average

### Australia's results in an international context: Teachers

#### Importance of developing student creativity

↓	OECD average
↑	Hong Kong (China) and Macao (China)
↓	Portugal and Korea




#### Importance of using creative pedagogies

↓	OECD average
↑	Hong Kong (China)
↓	Portugal, Macao (China) and Korea

#### Openness to creativity




↑	OECD average
↑	Korea, Hong Kong (China) and Macao (China)
—	Portugal

## Australia's results from a state and territory context: Teachers




	jurisdiction's mean index score is significantly higher than comparison jurisdiction(s)/OECD average
	jurisdiction's mean index score is not significantly different to comparison jurisdiction(s)/OECD average
	jurisdiction's mean index score is significantly lower than comparison jurisdiction(s)/OECD average

### Teachers in the Australian Capital Territory




#### Importance of developing student creativity

	OECD average
	QLD, WA and VIC
	all other jurisdictions

#### Importance of using creative pedagogies




	OECD average
	QLD
	all other jurisdictions

#### Openness to creativity





	OECD average
	QLD
	all other jurisdictions

### Teachers in New South Wales




#### Importance of developing student creativity

	OECD average
	QLD
	all other jurisdictions

#### Importance of using creative pedagogies

	OECD average
	QLD
	SA
	all other jurisdictions

#### Openness to creativity

	OECD average
	WA and SA
	all other jurisdictions

## Teachers in Victoria

### Importance of developing student creativity



OECD average



QLD, WA and NSW



all other jurisdictions

### Importance of using creative pedagogies



OECD average



QLD



SA



all other jurisdictions

### Openness to creativity



OECD average



WA and SA



all other jurisdictions

## Teachers in Queensland

### Importance of developing student creativity



OECD average



NSW, TAS, SA, VIC and ACT



WA and NT

### Importance of using creative pedagogies



OECD average



NT



all other jurisdictions

### Openness to creativity



OECD average



ACT, TAS, WA and SA



all other jurisdictions

## Teachers in South Australia

### Importance of developing student creativity



OECD average



QLD and WA



all other jurisdictions

### Importance of using creative pedagogies



OECD average



NT and ACT



all other jurisdictions

### Openness to creativity



OECD average



QLD, NT, NSW and VIC



all other jurisdictions

## Teachers in Western Australia

### Importance of developing student creativity



OECD average



SA, VIC and ACT



all other jurisdictions

### Importance of using creative pedagogies



OECD average



QLD



SA



all other jurisdictions

### Openness to creativity



OECD average



QLD, NSW and VIC



all other jurisdictions

## Teachers in Tasmania

### Importance of developing student creativity



OECD average



QLD



all other jurisdictions

### Importance of using creative pedagogies



OECD average



QLD



SA



all other jurisdictions

### Openness to creativity



OECD average



QLD



all other jurisdictions

## Teachers in the Northern Territory

### Importance of developing student creativity



OECD average



all other jurisdictions

### Importance of using creative pedagogies



OECD average



all other jurisdictions

### Openness to creativity



OECD average



SA



all other jurisdictions

## Australia's results for the different demographic groups: Teachers

### Gender

More female teachers than male teachers reported:

- ▶ greater creative values in the importance of developing student creativity
- ▶ higher importance on using creative pedagogies
- ▶ greater openness to creativity.

### Socioeconomic background

More teachers of students from advantaged socioeconomic backgrounds than disadvantaged backgrounds reported

- ▶ greater creative values in the importance of developing student creativity
- ▶ greater openness to creativity.

## Part D Principals' beliefs and attitudes towards creative thinking

This section presents the results of 12 countries (8 OECD countries and 4 partner economies) for comparison with Australia on various school characteristics.

↑	Australia's mean index score is significantly higher than comparison country/OECD average
—	Australia's mean index score is not significantly different to comparison country/OECD average
↓	Australia's mean index score is significantly lower than comparison country/OECD average

### Australia's results in an international context: Principals

#### School environments where student creativity is encouraged by teachers and through school activities

- ↑ OECD average
- ↑ Hong Kong (China) and Macao (China)
- ↓ 6 of the comparison countries (e.g. Latvia, Korea and Portugal)
- 6 of the comparison countries (e.g. Canada, Finland and Singapore)

#### Creative activities offered in school

- ↑ OECD average
- ↑ all 12 comparison countries
- 1 comparison country (Macao (China))

#### Orientation towards openness and creativity

- ↑ OECD average
- ↑ 6 of the comparison countries (e.g. Hong Kong (China), Poland and Belgium)
- ↓ Macao (China) and Canada
- 6 of the comparison countries (e.g. Singapore, New Zealand and Finland)

## Australia's results from a state and territory context: Principals

↑	jurisdiction's mean index score is significantly higher than comparison jurisdiction(s)/OECD average
—	jurisdiction's mean index score is not significantly different to comparison jurisdiction(s)/OECD average
↓	jurisdiction's mean index score is significantly lower than comparison jurisdiction(s)/OECD average

### Principals in the Australian Capital Territory

#### School environments where student creativity is encouraged by teachers and through school activities

- ↑ OECD average
- QLD
- ↑ all other jurisdictions

#### Creative activities offered in school

- ↑ OECD average
- ↑ all other jurisdictions

#### Orientation towards openness and creativity

- ↑ OECD average
- ↑ TAS, WA and NT
- all other jurisdictions

### Principals in New South Wales

#### School environments where student creativity is encouraged by teachers and through school activities

- OECD average
- ↑ NT, VIC and WA
- ↓ ACT
- all other jurisdictions

#### Creative activities offered in school

- ↑ OECD average
- ↓ all other jurisdictions

#### Orientation towards openness and creativity

- OECD average
- all other jurisdictions



## Principals in Victoria

### School environments where student creativity is encouraged by teachers and through school activities



OECD average



NT



SA, TAS, NSW, QLD and ACT



WA

### Creative activities offered in school



OECD average



NSW



ACT and NT



all other jurisdictions

### Orientation towards openness and creativity



OECD average



all other jurisdictions

## Principals in Queensland

### School environments where student creativity is encouraged by teachers and through school activities



OECD average



NT, VIC and WA



all other jurisdictions

### Creative activities offered in school



OECD average



NSW



ACT and NT



all other jurisdictions

### Orientation towards openness and creativity



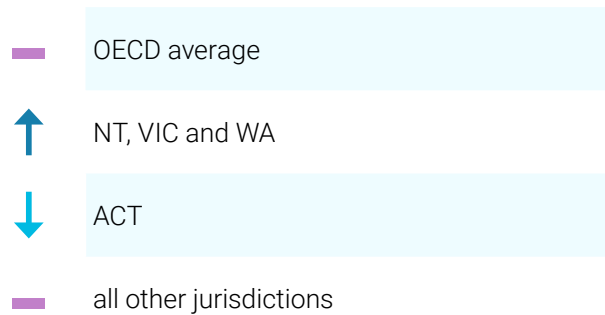
OECD average



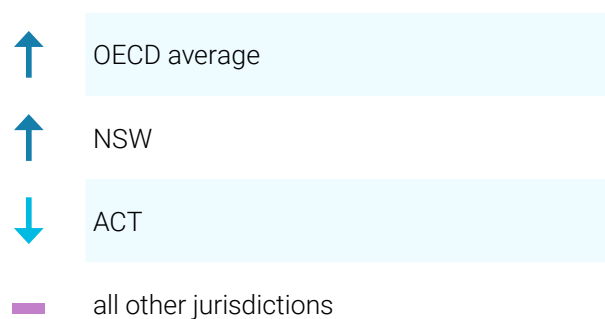
all other jurisdictions

## Principals in South Australia

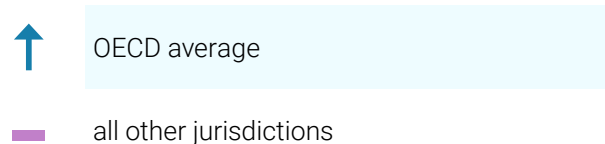
School environments where student creativity is encouraged by teachers and through school activities



Creative activities offered in school

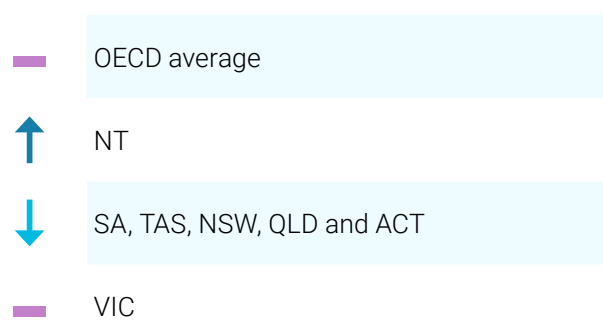


Orientation towards openness and creativity

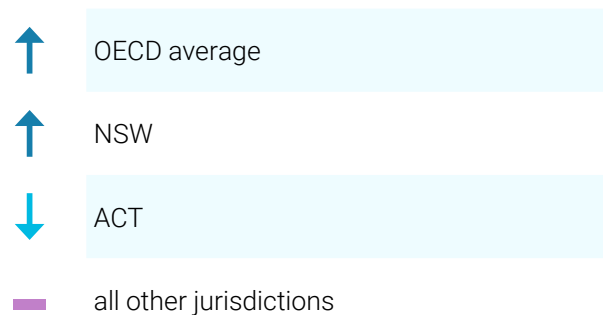


## Principals in Western Australia

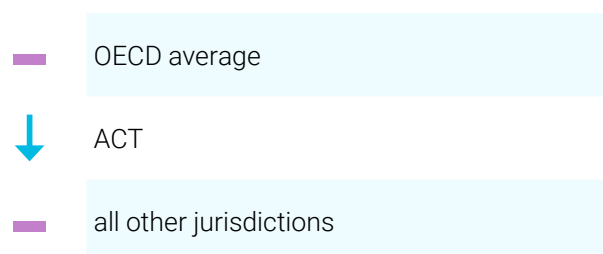
School environments where student creativity is encouraged by teachers and through school activities



Creative activities offered in school

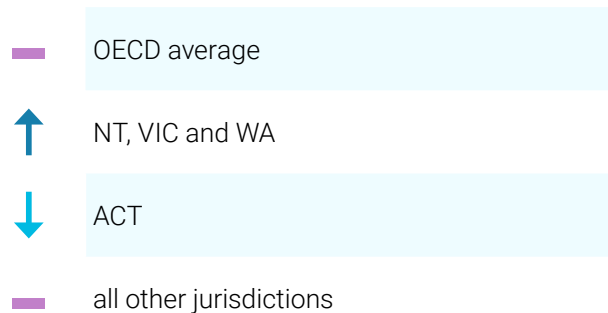


Orientation towards openness and creativity

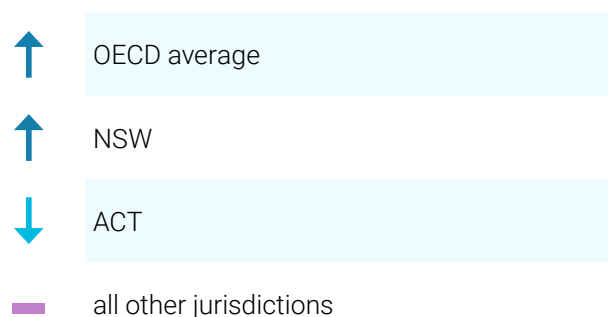


## Principals in Tasmania

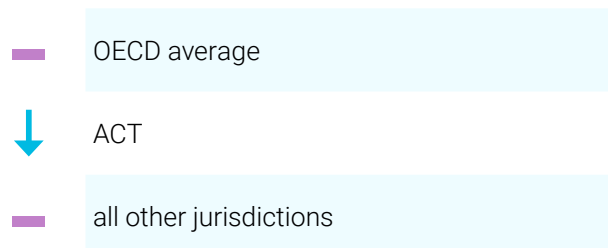
### School environments where student creativity is encouraged by teachers and through school activities



### Creative activities offered in school

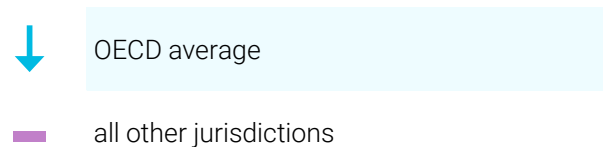


### Orientation towards openness and creativity

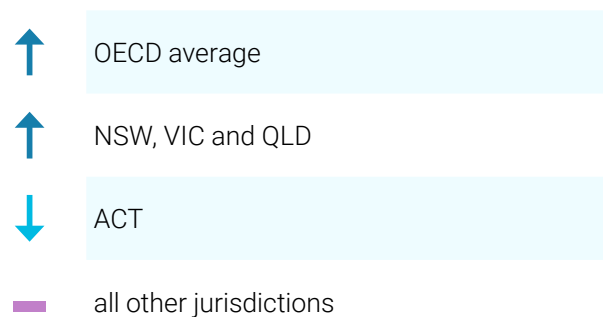


## Principals in the Northern Territory

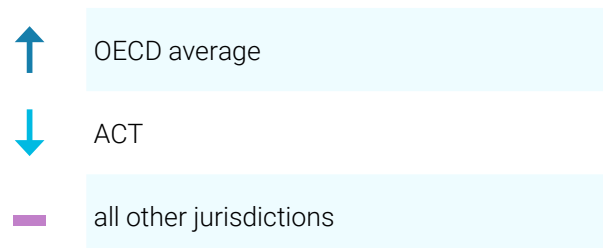
### School environments where student creativity is encouraged by teachers and through school activities



### Creative activities offered in school



### Orientation towards openness and creativity



## Australia's results for the different demographic groups: Principals

### Gender

More principals of female than male students reported a greater orientation toward school openness to creativity.

### Socioeconomic background

More principals of students from advantaged socioeconomic backgrounds than disadvantaged backgrounds reported:

- ▶ greater school environments where student creativity is encouraged by teachers and through school activities
- ▶ greater orientation toward school openness to creativity.

More principals of students from disadvantaged socioeconomic backgrounds than advantaged backgrounds reported more creative activities were offered in their schools

### Geographic location of schools

More principals of students in major city schools than students in regional areas reported a greater orientation toward school openness to creativity.

More principals of students in regional areas than students in remote areas reported:

- ▶ more creative activities were offered in their schools
- ▶ greater orientation toward school openness to creativity.

More principals of students in major city schools than students in remote areas reported:

- ▶ greater school environments where student creativity is encouraged by teachers and through school activities
- ▶ more creative activities were offered in their schools
- ▶ greater orientation toward school openness to creativity.

# Reader's guide

## Target population for PISA

This report uses '15-year-olds' as shorthand for the PISA target population. In practice, the target population was students aged between 15 years and 3 (complete) months and 16 years and 2 (complete) months at the beginning of the assessment period, and who were enrolled and attending an educational institution full-time or part-time. As most students are 15-year-olds, it has become the default shorthand for the population.

## Participating countries and economies

Sixty-four countries and economic regions participated in the PISA 2022 creative thinking innovative domain, including 28 OECD countries, and 36 non-OECD member countries and economic regions. Economic regions are required to meet the same PISA technical standards as participating countries, although results for an economic region are only representative of the region assessed and not of the country. For convenience, this report refers to these economic regions as countries.

## Australia's non-response bias

There are strict criteria on population coverage, response rates and sampling procedures. For initially selected schools, a minimum response rate of 85% (weighted) was required and a minimum rate of 80% (weighted) was required for selected students. Countries that obtained an initial school response rate between 65% and 85% could still obtain an acceptable school response by the use of replacement schools. Schools with a student participation response rate lower than 50% were not regarded as participating schools.

Twelve PISA 2022 countries/economies (Australia, Canada, Denmark, Hong Kong (China), Ireland, Jamaica, Latvia, the Netherlands, New Zealand, Panama, the United Kingdom, and the United States) did not meet one or more of the sampling technical standards.<sup>1</sup>

Australia successfully achieved the required school response rate; however, for the first time in the history of Australia's participation in PISA, Australia did not achieve the required student response rate. Australia achieved a 76% student response rate. Other countries who did not meet the required student response rate included Canada (77%), Hong Kong (China) (75%) and New Zealand (72%).<sup>2</sup>

Low response rates may affect the results, in which case they are biased. However, this depends on how many and on which students were absent during testing. When mostly low-performing students are absent, the results are likely to be biased upwards. When absenteeism is not related to achievement, the results are unlikely to be biased.

For PISA, the effect of non-response is partly corrected by adjusting the student weights for non-response. For example, in Australia more students in government schools were absent during PISA testing than students in Catholic or independent schools. Without weight adjustments for this selective non-response, it is likely to cause a positive bias in the national mean performance.

<sup>1</sup> Ireland and the United States did not participate in the creative thinking assessment.

<sup>2</sup> In this report, countries who did not meet one or more of the sampling technical standards are annotated with asterisks.

Adjustment of weights is designed to correct for non-response bias sufficiently if the participation rates meet the international standards. When the participation rates drop below these standards, countries are required to perform a non-response bias analysis to show that the results are not biased. The best way to do this is to compare participating students with non-participating students on a performance measure other than PISA performance (because PISA scores are not available for the non-participants). This was not possible for Australia because students do not have a universal student ID, making it impossible to match them, for example, to their NAPLAN results. However, the non-response bias analysis Australia undertook was deemed technically sound.

Given that the school response rate standard was met in Australia, the student response rate was close to the international standard and weight adjustments substantially reduced the risk of bias in the results as shown by non-response bias analysis, it is unlikely that the PISA results for Australia are inaccurate. However, it is not possible to exclude the possibility of a small upward bias. Hence, care should be taken when interpreting the results.

## Standard errors

PISA assesses a subset or sample of 15-year-olds so that inferences about the entire population of 15-year-olds can be obtained. In this report, each sample average is presented with an associated standard error. The confidence interval, which can be calculated using the standard error, indicates that there is a 95% chance that the actual population average lies within plus or minus 1.96 standard errors of the sample average.

## Statistical significance

Tests for statistical significance indicate whether observed differences between results occur because they are 'real' or if they have occurred because of sampling error, or chance. An 'insignificant' or 'not significant' result should be ignored because it may not reflect real differences, while a 'significant' result refers to the statistical nature of the difference and indicates the difference is worth noting.

Significance does not imply any judgement about absolute magnitude or educational relevance. It is not to be confused with the term 'substantial', which is qualitative and based on judgement rather than statistical comparisons. A difference may appear substantial but not be statistically significant (due to factors that affect the size of the standard errors around the estimate, for example) while another difference may seem small but reach statistical significance because the estimate was more accurate.

The term 'significant' is used to describe a difference that meets the requirements of statistical significance at the 0.05 level, indicating that the difference is real, and would be found in at least 95 analyses out of 100 if the comparisons were to be repeated.

In this report, all reported differences and changes are statistically significant, unless specifically stated otherwise. References to 'no difference or not different' mean that the statistical requirement for significance was not met.

## Creative thinking performance

Students' performance in creative thinking is summarised on a single creative thinking scale.<sup>3</sup> The creative thinking scale ranges from 0 to 60 points; 60 points represents the maximum score across all 32 items in the creative thinking test-item pool. Thus, scores on this scale reflect students' estimated performance (that is, the sum of partial and full credit responses) as if they had taken a hypothetical test comprising all 32 items from the pool.

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<sup>3</sup> The PISA creative thinking scale is a different scale from the PISA core (reading, mathematics and science) assessment domain scale.

## Interpreting differences in scores on the creative thinking scale

- ▶ A 1-score-point difference is equivalent to approximately 0.10 of the OECD standard deviation in creative thinking performance. This is considered a *small* difference.
- ▶ A 1-to-3-score-point difference is considered a *moderate* difference in creative thinking performance.
- ▶ A 3-score-point difference is equivalent to approximately 0.25 of the OECD standard deviation in creative thinking performance. This is considered a *large* difference.

## OECD average

An OECD average was calculated for the creative thinking assessment domain and metacognitive constructs and is presented for comparative purposes. The OECD average corresponds to the arithmetic average of the respective country estimates and can be used to compare a country on a given indicator with a typical OECD country.

## PISA indices

The measures that are presented as indices summarise student, teacher and principal responses to a series of related items constructed based on previous research. In describing students or teachers for example in terms of each characteristic (e.g. creative self-efficacy, creative values) scales for creative thinking were constructed on which the OECD average was given an index value of zero, and about two-thirds of the OECD population were given between -1 and +1 (the index has a mean of zero and a standard deviation of 1). Negative values on an index do not necessarily imply that students responded negatively to the underlying items. Rather, a student with a negative score responded less positively than students on average across OECD countries.

The indices are based on all categories for each item, whereas the reported percentages are collapsed into fewer categories. Due to this and the weighting of responses, a ranking based on the value of the indices will sometimes not exactly correspond to one based, say, on the average of the percentages.

Information about teacher characteristics was collected through the Teacher Questionnaire, which was completed by a sample of mathematics teachers and a sample of non-mathematics teachers. School characteristics were collected through the School Questionnaire, which was completed by the principal. In this report, responses from principals were weighted so they are proportionate to the number of 15-year-olds enrolled in the school, while responses from teachers were weighted based on the final school weights from student sampling<sup>4</sup>.

## Rounding of figures

Because of rounding, the totals in the text may not exactly correspond to some numbers and percentages in the figures and tables. Totals, differences and averages are always calculated using exact numbers and are rounded only after calculation. When standard errors have been rounded to one or two decimal places and the value 0.0 or 0.00 is shown, this does not imply that the standard error is zero, but that it is smaller than 0.05 or 0.005 respectively.

## Sample surveys

PISA is a sample survey and is designed and conducted so that the sample provides reliable estimates about the population of 15-year-old students. The PISA 2022 sample was a two-stage stratified sample. The first stage involved the sampling of schools in which 15-year-old students could be enrolled. The second stage of the selection process involved randomly sampling students within the sampled schools.

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<sup>4</sup> For more detail about the teacher weights please refer to the *OECD PISA 2022 Technical report* (OECD, 2024a).

The following variables were used in the stratification of the school sample: jurisdiction; school sector; geographic location; sex of students at the school; and a socioeconomic background variable (based on the Australian Bureau of Statistics' *Socio-economic indexes for areas*, which consists of 4 indexes that rank geographic areas across Australia in terms of their relative socioeconomic advantage and disadvantage (Australian Bureau of Statistics, 2011)).

## Definition of background characteristics

A number of definitions used in this report are particular to the Australian context, as well as many that are relevant to the international context. This section provides an explanation for those that are not self-evident.

### Jurisdictions

Collectively, Australian states and territories are also generally referred to as jurisdictions.

### First Nations background

First Nations background data were derived from the Student Questionnaire, which asked students whether they identified as being of Aboriginal and/or Torres Strait Islander descent. For the purpose of this report, data for the 2 groups are presented together under the term 'First Nations students'.

### Socioeconomic background

Two measures are used by the OECD to represent elements of socioeconomic background.

The first is the highest level of the father's and mother's occupations and is known as the highest international social and economic index (HISEI), which is coded in accordance with the International Labour Organization's International Standard Classification of Occupations.

The second measure is the index of economic, social and cultural status (ESCS), which was created to capture the wider aspects of a student's family and home background. The ESCS is based on 3 indices:

- ▶ the highest occupational status of parents (HISEI)
- ▶ the highest educational level of parents in years of education (PARED)
- ▶ home possessions (HOMEPOS).

The HOMEPOS index comprises all items on the indices of family wealth (WEALTH); cultural resources (CULTPOSS); and, access to home educational and cultural resources and books in the home (HEDRES).

There have been some adjustments to the computation of ESCS over the PISA cycles.

### Geographic location

Participating schools were coded using the *ABS Australian statistical geography standard (ASGS)* (ABS, 2011). The following categories are used to report geographic location using the ASGS:

- ▶ major cities, which includes all major cities of Australia
- ▶ regional areas, which includes all inner regional and outer regional areas in Australia
- ▶ remote areas, which includes all remote and very remote areas in Australia.

Prior to PISA 2022, participating schools were coded using the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) Schools Geographic Location Classification.



## Immigrant background

Immigrant background is derived from students' self-report of the country in which they and their parents were born. For the analysis in this report, immigrant background is defined by the following categories:

- ▶ Australian-born students – students born in Australia with both parents born in Australia
- ▶ first-generation students – students born in Australia with at least one parent born overseas
- ▶ foreign-born students – students born overseas with both parents also born overseas.

## Language background

Language background is derived from students' self-report of the language they speak at home most of the time. For the analysis in this report, language background has been defined as:

- ▶ students who speak English at home
- ▶ students who speak a language other than English at home.

## Reporting of country results

Sixty-four countries and economic regions participated in the creative thinking innovative domain assessment in PISA 2022. Economic regions are required to meet the same PISA technical standards as participating countries, although results for an economic region are only representative of the region assessed and not of the country. For convenience, this report refers to these economic regions as countries (see Chapter 1 for further detail).

This report compares the results of Australian students with the 39 countries that performed higher than the lowest performing OECD country (Columbia) when reporting on performance in the creative thinking assessment.

For the purposes of international comparisons with Australia on various student and school characteristics, 14 countries have been reported (11 OECD countries; 4 partner economies).

The selection of countries was based on each country's performance in creative thinking relative to Australia's. The countries included in the report are those that performed:

- ▶ significantly higher than Australia: Singapore
- ▶ not significantly different from Australia: Canada\* and Korea\*
- ▶ significantly lower than Australia: Hong Kong (China), Macao (China), Chinese Taipei, Portugal, Poland, Belgium, Latvia\*, Denmark\*, Finland, Estonia, and New Zealand\*.

For the purposes of comparison with Australia on various teacher characteristics, 4 countries have been reported (2 OECD countries; 2 partner economies). Overall, 18 countries participated in the Teacher Questionnaire.

The selection of countries was based on countries' participation in the Teacher Questionnaire and each country's performance in creative thinking relative to Australia's. The countries included in the report are those that performed:

- ▶ not significantly different from Australia: Korea
- ▶ significantly lower than Australia: Hong Kong (China), Macao (China) and Portugal.

The average across all OECD countries (referred to as the OECD average) has also been reported for added comparison.

While data for Australia, Hong Kong (China), Canada, Denmark, Latvia, and New Zealand did not meet one or more of the PISA technical standards, the OECD deemed the data for the 5 countries to be accepted however there may be a small residual bias either upward or the direction of a possible bias could not be determined. The countries listed here are annotated in the report with an asterisk.

Where a country is not included in reported indices, this is due to the data not being available as underlying data was either not collected or were withdrawn at the request of the country.

# 1

## Introduction

The Programme for International Student Assessment (PISA) is an international comparative assessment of student performance directed by the Organisation for Economic Co-operation and Development (OECD). PISA measures how well 15-year-olds,<sup>1</sup> who are nearing the end of their compulsory schooling in most participating educational systems, are prepared to use the knowledge and skills in particular areas to meet real-life opportunities and challenges.

In addition to measuring students' skills in the core areas of mathematics, science and reading, PISA was the first large-scale international assessment to assess creative thinking. This report focuses on the findings from the creative thinking assessment in PISA 2022.

### 1.1 Measuring creative thinking

Creative thinking is an essential skill for navigating the complexities of the modern world. As societies face unprecedented challenges, from technological advancements to global issues such as climate change, the ability to think creatively is increasingly crucial. Creativity enables individuals to approach problems from new perspectives, generate innovative solutions, and adapt to changing circumstances. (OECD, n.d.).

The creative thinking assessment in PISA plays a role in shaping the future of education and allows participating countries and economies to benchmark their students' creative abilities against those of other nations. This offers a global perspective on how creativity is being fostered in education. It also measures how students are developing creative thinking skills to ensure that students are better prepared for the challenges of the modern world, both in their personal lives and in their future careers.

<sup>1</sup> For more information about the target population for PISA, please refer to the Reader's guide.

## 1.2 An overview of PISA

### What are the main goals of PISA?

From the mathematics, science and reading data obtained in each cycle of PISA, education systems have access to a breadth and depth of information about the outcomes of their educational approach. This data helps to answer several important questions related to education:

- ▶ How well prepared are young adults to meet the challenges of the future?
- ▶ What skills do young adults have that will help them adapt to change in their lives? Are they able to analyse, reason and communicate their ideas effectively?
- ▶ Are some ways of organising schools and school learning more effective than others?
- ▶ What influence does the quality of school resources have on student outcomes?
- ▶ What educational structures and practices maximise the opportunities of students from disadvantaged backgrounds?

### What does PISA assess?

PISA assesses the domains of mathematics, reading and science. It also assesses an innovative domain in each cycle. An innovative domain goes beyond these traditional academic subjects and focuses on a 21st century skill and competence to provide a more comprehensive outlook on students' 'readiness for life'. In PISA 2022, creative thinking was the innovative domain.

### What did participants do?

#### Students

Students completed a 2-hour computer-based test and a 45-minute Student Questionnaire:

- ▶ **Test:** Typically, 94% of students received a test form that consisted of 60 minutes of mathematics and another 60 minutes that consisted of one of reading, science or creative thinking, while 6% of students received a test form that consisted of reading and mathematics.
- ▶ **Questionnaire:** Students completed a questionnaire about their family background, attitudes towards learning, the availability and use of information and communications technology (ICT), and engagement, belief and attitudes towards creative thinking.

#### Principals and teachers

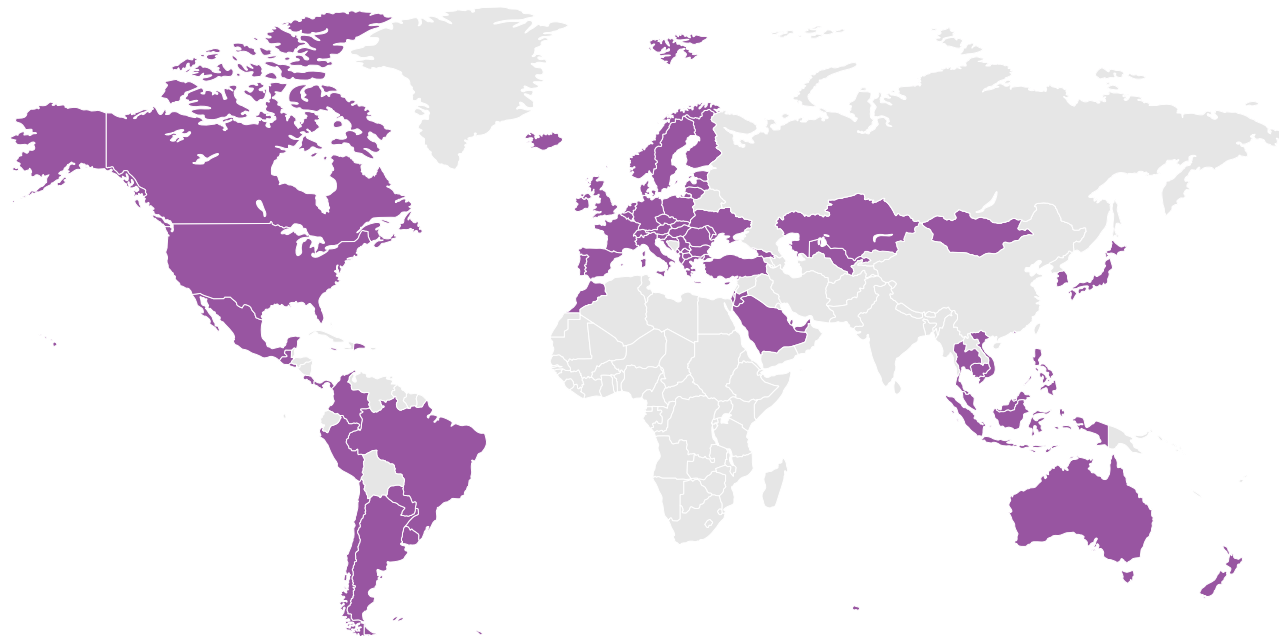
Principals (or the principal's designate) from participating schools completed a 45-minute online School Questionnaire that collected descriptive information about school characteristics, the quality of the school's teaching and educational resources, decision-making processes, instructional practices and school and classroom climate, how schools foster and support creativity among students, and the professional development of teachers in relation to creative thinking.

Teachers from participating schools completed a 40-minute online Teacher Questionnaire. There were 2 questionnaire versions: one for mathematics teachers and the other for non-mathematics teachers. The questionnaires asked teachers about their training, professional development, their teaching practices, their beliefs about the importance of creative thinking and the methods they use to foster creativity.

## Who participates in PISA?

### Countries

Although, 81 countries and partner economies participated in PISA 2022, including 37 OECD<sup>2</sup> countries and 44 partner countries or economies, students from 64 countries and economies participated in the PISA 2022 creative thinking assessment (Figure 1.1).



OECD countries			Partner countries/economies		
Australia	Greece	Norway	Albania	Indonesia	Paraguay
Austria	Hungary	Poland	Argentina	Jamaica	Peru
Belgium	Iceland	Portugal	Baku (Azerbaijan)	Jordan	Philippines
Canada	Ireland	Slovak Republic	Brazil	Kazakhstan	Qatar
Chile	Israel	Slovenia	Brunei Darussalam	Kosovo	Romania
Colombia	Italy	Spain	Bulgaria	Macao (China)	Saudi Arabia
Costa Rica	Japan	Sweden	Cambodia	Malaysia	Serbia
Czech Republic	Korea	Switzerland	Chinese Taipei	Malta	Singapore
Denmark	Latvia	Türkiye	Croatia	Moldova	Thailand
Estonia	Lithuania	United Kingdom	Cyprus	Mongolia	Ukrainian regions*
Finland	Mexico	United States	Dominican Republic	Montenegro	United Arab Emirates
France	Netherlands		El Salvador	Morocco	Uruguay
Germany	New Zealand		Georgia	North Macedonia	Uzbekistan
			Guatemala	Palestinian Authority	Viet Nam
			Hong Kong (China)	Panama	

\* 18 of 27 regions in Ukraine participated in PISA.

Notes: The economic regions (economies) of Chinese Taipei, Hong Kong (China) and Macao (China) participated in PISA 2022. Economic regions are required to meet the same PISA technical standards as other participating countries.

The countries that participated in Creative Thinking are highlighted in the table above.

**FIGURE 1.1** Countries that participated in PISA 2022 and their participation in the creative thinking assessment

<sup>2</sup> Luxembourg was the only OECD country who did not participate in PISA 2022.

PISA aims to be as inclusive as possible of the population of 15-year-old students in each country and strict guidelines are enforced about the percentage of schools and students that could be excluded. The exclusions could not exceed 5% of the nationally desired target population.

Twelve PISA 2022 countries or economies (Australia, Canada, Denmark, Hong Kong (China), Ireland, Jamaica, Latvia, the Netherlands, New Zealand, Panama, the United Kingdom, and the United States) did not meet one or more of the sampling Technical Standards.<sup>3,4,5</sup>

The school response rate standard was met in Australia and the student response rate was close to the international standard and weight adjustments, which substantially reduced the risk of bias in the results as shown by non-response bias analysis. It is unlikely that the PISA results for Australia are inaccurate. However, it is not possible to exclude the possibility of a small upward bias. Hence, care should be taken when interpreting the results.

## Students

Internationally, approximately 690,000 students took part in PISA 2022, representing about 29 million 15-year-old students. In Australia, 13,437 students from 743 schools participated. The number of participating schools and students by state and territory and school sector are shown in Tables 1.1 and 1.2.

**TABLE 1.1** Number of Australian PISA 2022 schools, by state and territory and school sector

State/Territory	School sector			
	Government	Catholic	Independent	Total
ACT	27	9	11	47
NSW	101	44	29	174
VIC	68	30	26	124
QLD	79	24	26	129
SA	58	19	22	99
WA	57	20	26	103
TAS	28	10	11	49
NT	8	4	6	18
<b>Australia</b>	<b>426</b>	<b>160</b>	<b>157</b>	<b>743</b>

Note: numbers are based on unweighted data.

Of the Australian PISA schools, 85% were coeducational, 8% were all-female, and 7% were all-male, with the following sector breakdowns:

- ▶ 2% (16 schools) were single-sex schools from the government sector
- ▶ 8% (60 schools) were from the Catholic sector
- ▶ 4% (33 schools) were from the independent sector.

<sup>3</sup> Ireland and the United States did not participate in the creative thinking assessment.

<sup>4</sup> For more information about countries who did not meet the sampling standards, please refer to the Reader's guide.

<sup>5</sup> In this report, countries who did not meet one or more of the sampling technical standards are annotated with asterisks.

**TABLE 1.2** Number of Australian PISA 2022 students, by state and territory and school sector

School sector		State/Territory								Total
		ACT	NSW	VIC	QLD	SA	WA	TAS	NT	
Government	N students	516	1,686	1,155	1,258	890	998	385	164	7,052
	Weighted N	2,759	46,554	36,787	34,533	10,400	15,944	3,520	1,442	151,939
Catholic	N students	240	924	571	456	357	395	193	118	3,254
	Weighted N	1,528	20,541	16,000	9,772	3,401	5,515	1,240	302	58,299
Independent	N students	253	590	500	536	439	493	196	124	3,131
	Weighted N	876	16,002	14,481	11,348	4,099	6,731	936	485	54,958
Total	N students	1,009	3,200	2,226	2,250	1,686	1,886	774	406	13,437
	Weighted N	5,163	83,097	67,268	55,653	17,900	28,190	5,696	2,229	265,196

Note: N students is based on the achieved (unweighted) sample; weighted N is based on the number of students in the target population represented by the sample.

As the sample is age-based in PISA, students come from various year levels. The majority of students were from Year 10; the remaining students from Years 9 or 11. As shown in Table 1.3, there were some variations to the year-level composition of the sample in the different states and territories because of differing school starting ages.

**TABLE 1.3** Percentage of Australian PISA 2022 students, by state and territory and year level

State/Territory	Year level					
	7	8	9	10	11	12
ACT			13	82	5	^
NSW		^	11	84	5	
VIC		^	19	79	1	^
QLD			4	86	10	
SA		^	8	89	3	
WA			1	87	12	
TAS			32	68	^	
NT			8	84	8	
<b>Australia</b>		^	11	83	6	^

^ denotes percentages < 1

Note: percentages are based on the achieved (unweighted) sample; the state and territory totals are reported as whole numbers without rounding off decimal places.

Table 1.4 shows the number of Australian female and male students who participated in PISA 2022 by state and territory. There were equal proportions of female and male students in Queensland and the Northern Territory. There were more male than female students in the Australian Capital Territory and Tasmania (48% female; 52% male) and in Victoria, South Australia, and Western Australia (49% female, 51% male). There were more female students than male students in New South Wales (51% female; 49% male).

**TABLE 1.4** Number and percentage of Australian PISA 2022 students, by state and territory and gender

Gender		State/Territory								Total
		ACT	NSW	VIC	QLD	SA	WA	TAS	NT	
Females	<b>N students</b>	480	1,639	1,068	1,128	766	906	371	199	6,557
	<b>Weighted N</b>	2,465	42,557	32,675	27,856	8,691	13,924	2,750	1,125	132,043
	<b>Weighted (%)</b>	48	51	49	50	49	49	48	50	50
Males	<b>N students</b>	522	1,559	1,154	1,119	920	977	400	207	6,858
	<b>Weighted N</b>	2,676	40,498	34,466	27,711	9,209	14,225	2,929	1,104	132,818
	<b>Weighted (%)</b>	52	49	51	50	51	51	52	50	50

Note: N students is based on the achieved (unweighted) sample; weighted N is based on the number of students in the target population represented by the sample.

Table 1.5 shows the number and percentages of Australian PISA 2022 students for the following demographic groups:<sup>6</sup>

Geographic location: 75% of the students attended schools in major cities, 24% attended schools in regional areas and the remaining 1% of students attended schools in remote areas.

First Nations background: 5% of the students identified as being a First Nations student and 95% of students identified as a non-First Nations student.

Immigrant background: 52% of the students were Australian-born, 34% were first-generation students and over 14% were foreign-born students

Language spoken at home: 86% of students indicated that English was spoken at home most of the time, while 14% of students indicated they spoke a language other than English at home most of the time.

**TABLE 1.5** Number and percentage of Australian PISA 2022 students, for different demographic groups

Demographic group		N students	Weighted N	Weighted (%)
Geographic location	<b>Major cities</b>	9,730	198,537	75
	<b>Regional areas</b>	3,492	64,808	24
	<b>Remote areas</b>	215	1,851	1
Socioeconomic background	<b>Lowest quarter</b>	3,181	64,166	25
	<b>Second quarter</b>	3,207	64,103	25
	<b>Third quarter</b>	3,221	64,049	25
	<b>Highest quarter</b>	3,362	64,266	25
First Nations background	<b>First Nations</b>	701	13,654	5
	<b>Non-First Nations</b>	12,383	245,111	95
Immigrant background	<b>Australian-born</b>	6,758	128,931	52
	<b>First-generation</b>	4,138	85,901	34
	<b>Foreign-born</b>	1,731	34,962	14
Language spoken at home	<b>English</b>	11,352	222,419	86
	<b>Other language</b>	1,695	35,599	14

Note: N students is based on the achieved (unweighted) sample; weighted N is based on the number of students in the target population represented by the sample.

<sup>6</sup> For more information about the definition for each of the different demographic groups, please refer to the Reader's guide.

## How are results reported?

International comparative studies allow the similarities and differences between educational policies and practices to be observed. Policymakers, researchers and others can see what is possible for students to achieve and what environments are most likely to facilitate student learning.

### Mean scores and distribution of scores

As with similar international assessments, PISA results are reported as mean (average) scores, which provide a summary of student performance and allow for comparisons of the relative standing between different countries and different sub-groups. The OECD average for creative thinking is the mean of the data values across all OECD countries participating in this assessment.

The creative thinking scale ranges from 0 to 60 points, with 60 points representing the maximum score across all 32 items in the creative thinking test-item pool.

### Proficiency levels

PISA also provides a profile of students' performance using proficiency levels: categories that summarise the skills and knowledge that students can display. The performance scale is divided into levels of difficulty, referred to as proficiency levels. Students at a particular level not only typically demonstrate the knowledge and skills associated with that level, but also the proficiencies required at lower levels. The PISA creative thinking has 6 levels of proficiency; each level spans a range of 7 to 9 score points.

Students who attained a proficiency of Level 5 or 6 are considered high performers.

Level 3 is considered the baseline level of proficiency in creative thinking that students need to acquire to successfully participate in society. Consequently, the group of students who scored below Level 3 are considered low performers in this report.

Students who attained a proficiency of Level 3 or above are considered to have attained the National Proficient Standard.

Further details on the creative thinking proficiency levels are provided in Chapter 2.

## Organisation of the report

This report focuses on Australian students' performance in the PISA 2022 creative thinking assessment. Chapter 2 provides a brief overview of the creative thinking assessment framework and examples of the creative thinking items. Chapter 3 presents the results on Australian student performance in creative thinking. Chapters 4, 5 and 6 examine student, teacher and school background characteristics about creative thinking and how these relate to student performance.

## Further information

Further information about PISA Australia is available from the [national PISA website](#).



# 2

## The creative thinking assessment

In PISA 2022, creative thinking was assessed as an innovative domain for the first time. Like the PISA core domains, creative thinking is assessed using an instrument designed to provide data that is valid, reliable and interpretable.

This chapter is adapted or reproduced from *PISA 2022 Results (Volume III): Creative minds, creative schools* (OECD, 2024b). It provides a summary of the creative thinking assessment domain, including how it is defined and measured in PISA. The latter part of the chapter presents some of the released items from the assessment.

### 2.1 How is creative thinking defined and assessed in PISA?

Creative thinking in PISA 2022 is defined as ‘the competence to engage productively in the generation, evaluation and improvement of ideas that can result in original and effective solutions, advances in knowledge and impactful expressions of imagination’.

The definition encompasses the cognitive processes required to engage in creative work and is aligned with the concept of ‘little-c’ creativity, that is, a malleable capacity that can be developed through practice and that can be reasonably demonstrated in everyday contexts. In contrast, ‘big-C’ creativity is associated with intellectual or technological breakthroughs or artistic or literary masterpieces that require deep expertise in a given context.

## 2.2 Competency model of creative thinking

The competency model in the PISA framework for creative thinking focuses on 3 ideation processes that encompass the cognitive skills that are relevant to creative thinking in the classroom:

1. **Generate diverse ideas:** the ability to provide multiple ideas or solutions to a given problem or scenario
2. **Generate creative ideas:** the ability to generate original and useful ideas
3. **Evaluate and improve ideas:** the capacity to assess the quality of ideas, improve them, and select the most effective or appropriate ones.

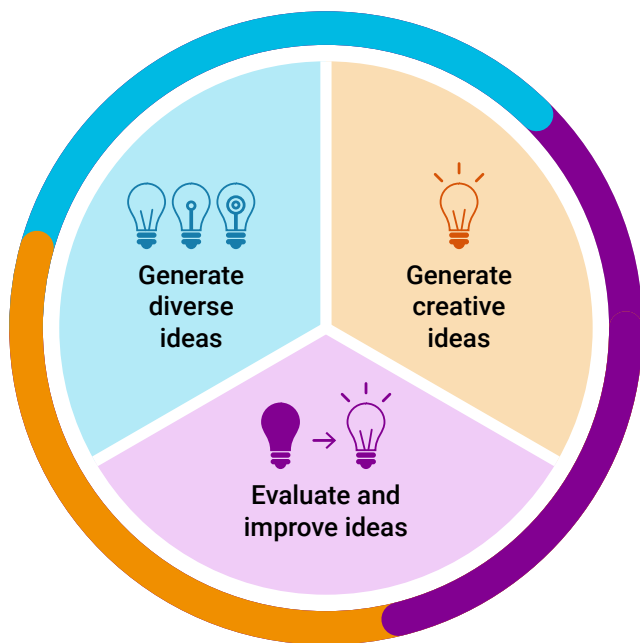


FIGURE 2.1 The PISA competency model for creative thinking<sup>1</sup>

The PISA definition of creative thinking emphasises the ideation processes that can be applied across various learning and problem-solving contexts. This includes contexts that demand imagination and expression, such as creative writing or the visual and performing arts, as well as situations where generating and refining ideas is essential for exploring problems or phenomena, or for designing innovative solutions.

## 2.3 Domains of creative thinking

Tasks in the PISA 2022 creative thinking assessment were situated in 4 different domain contexts:

1. **Written expression**, where students express their imagination in a variety of written formats (for example, students caption an image, propose ideas for a short story using a given text or visual as inspiration, or write a short dialogue between characters for a movie or comic book plot).
2. **Visual expression**, where students create visual compositions from a library of images and shapes using a simple graphic tool.
3. **Social problem-solving**, which involves understanding different perspectives and students suggested solutions for open problems that focus on issues affecting different groups within society (for example, wheelchair users) or affecting society at large (for example, the collection and use of waste materials).
4. **Scientific problem-solving**, where students engage with open problems that have a scientific or engineering basis and propose hypotheses to explain a given scenario, or to improve or generate new methods for solving.

<sup>1</sup> Source: *Thinking Outside the Box: The PISA 2022 Creative Thinking Assessment* (OECD, 2022).

These 4 domains represent reasonable and sufficiently diverse coverage of the different types of 'everyday' creative thinking activities in which 15-year-olds engage.

## 2.4 How is creative thinking proficiency reported in PISA?

The student scores on the creative thinking assessment are summarised according to a uni-dimensional scale that estimates students' overall creative thinking proficiency. The PISA creative thinking scale has been constructed differently from the PISA core assessment domains (mathematics, science and reading) and is a bounded scale between 0 and 60 score points.

The maximum score of 60 points reflects the total number of points possible in a hypothetical test comprising all 32 items from the creative thinking test-item pool. Thus, students' scores on the creative thinking scale can be interpreted as an estimate of what their total score might be (based on the sum of their partial and full credit responses) if they were to take a test with all 32 items from the pool.

This 2-digit scale addresses the relatively lower measurement precision of the creative thinking assessment compared to the PISA core assessments, given the smaller number of items in the creative thinking test-item pool. This approach to scaling the PISA creative thinking data also means that results are more sensitive to performance differences where there is more information available about students' performance in the assessment.

### Creative thinking proficiency levels

The PISA 2022 creative thinking scale is divided into 7 proficiency levels. Six levels are described based on the skills needed to successfully complete the tasks that are located within them; the seventh level refers to students who perform below Level 1. Level 1 is the lowest described level and Level 6 is the highest.

Students who placed at Level 5 or 6 (scoring 41 points or higher) are considered high performers. Level 3 is considered the baseline level of proficiency in creative thinking that students need to acquire to successfully participate in society. Consequently, the group of students who scored below Level 3 (less than 23 score points), that is those students who do not reach the baseline level of proficiency, are considered low performers in this report.

Figure 2.2 describes the skills and knowledge that are required at each of the creative thinking proficiency levels.

	Proficiency level	What students can typically do at each level
High performers	6	At Level 6, students can productively engage in creative idea generation, generating both original and diverse ideas for a wide range of expressive and problem-solving tasks including those in more complex, abstract and unfamiliar contexts. With respect to students at Level 5, students at this level can identify weaknesses in existing solutions to social or scientific problems, including those that are in less familiar contexts, and build on this understanding to suggest original and innovative ways to improve solutions. They can also generate several appropriate solution ideas for complex social and scientific problems that require more specific knowledge of the domain context and that have a more restricted range of solutions. For expressive tasks, students at Level 6 can create and improve more abstract visual designs, combining visual elements and representations in unexpected ways and conveying an original interpretation or iteration of an existing representation.
	<b>48 score points</b>	
	5	At Level 5, students can productively engage in creative idea generation, generating both original and diverse ideas for a range of expressive and problem-solving tasks. Students at Level 5 can think of several qualitatively different ways to express their imagination and to address familiar social and scientific problems. They can make several different idea associations, considering different interpretations and perspectives on the same issue or stimulus. For both simple and more abstract written expression tasks, they can use their imagination to create original written outputs that make unconventional associations between ideas or that add atypical details to elaborate creatively on common themes. With respect to students at Level 4, students can create original visual outputs that combine elements in an unusual or unexpected way for open visual design tasks. Students at this level can also generate unconventional solution ideas that integrate innovative approaches in familiar social, and sometimes scientific, problem contexts. This includes when tasked to iterate on and improve an existing solution idea in more open, familiar problem contexts.
	<b>41 score points</b>	
	4	At Level 4, students can productively engage in idea generation across a range of expressive and problem-solving tasks. Students at Level 4 can also generate original and diverse ideas for simple tasks in more familiar domain contexts. With respect to students at Level 3, students at this level can generate an appropriate idea for most types of idea generation task, including more complex or unfamiliar problem-solving tasks and tasks in a scientific context. They can also build on others' ideas for solutions in social and scientific contexts, although they tend to provide an obvious or common iteration with respect to their peers. Students at Level 4 can generate their own original ideas in written expression tasks and sometimes when iterating on others' ideas. They can express their imagination in unexpected ways, making unconventional idea associations between elements of the stimulus and their written output, or they can add atypical details to elaborate creatively on more common ideas. Students at this level can often suggest 2 or 3 qualitatively different ideas in open written expression and social problem contexts, but are less successful in more complex or constrained social and scientific problem contexts.
	<b>32 score points</b>	
Low performers	3	At Level 3, students can generate one or several appropriate ideas for simple to moderately complex expressive and problem-solving tasks, including extended written ideas that require them to engage and express their imagination and coherently build upon others' ideas. Students at this level thus show a greater level of engagement with creative tasks than students at Level 1 or Level 2. Students at Level 3 still typically suggest ideas that rely on obvious idea associations or common themes with respect to their peers, but they begin to demonstrate the ability to generate original solutions for familiar, everyday problems with a social focus. They may suggest solution ideas that not many other students think of or add an innovative or different twist to more conventional solution ideas.
	<b>23 score points</b>	
	2	At Level 2, students can generate appropriate ideas for simple visual and written expression tasks as well as those that focus on solving familiar, everyday social problems. With respect to students at Level 1, students in Level 2 can develop simple written ideas in the form of longer captions or short dialogues. Students at Level 2 typically suggest ideas that rely on obvious idea associations for expressive tasks or that refer to existing solutions for problems in social problem-solving tasks. Students can generate more than one appropriate idea for some written expression and social problem-solving tasks, but these ideas are not qualitatively different to one another.
	<b>15 score points</b>	
	1	At Level 1, students can generate very simple visual designs using isolated shapes or existing visual elements, and in some cases very short written outputs (e.g. a few words), that require them to engage their imagination. In general, students at this level rely on obvious themes or idea associations as the basis for their response and struggle to generate more than one appropriate idea even for very open and simple imagination tasks. These students typically generate simple visual or written outputs with few details that reflect only a minimal level of engagement with the task.
	<b>6 score points</b>	

FIGURE 2.2 Summaries of the 6 proficiency levels and cut-off points on the creative thinking scale

## 2.5 Construct coverage in the creative thinking assessment

There were 32 items in the creative thinking assessment. These were organised into test units that varied in terms of the ideation process, the domain context and the duration of the unit (guidelines of between 5 and 15 minutes). Some units included a single item and some units included multiple items, although dependencies between items within units was minimised.

The creative thinking units were organised into five mutually exclusive 30-minute blocks or clusters. The clusters were rotated according to an integrated design. About 28% of the sample of PISA students were administered the creative thinking assessment – these students who took the creative thinking assessment spent one hour on creative thinking test items with the remaining hour of testing time assigned to one of the other core domains (mathematics, reading or scientific literacy).

All items were open-ended and relied on human judgement guided by detailed scoring rubrics and well-defined coding procedures.

Table 2.1 shows the distribution of the items in the creative thinking assessment.

**TABLE 2.1** Distribution of items by ideation process and domain context

Ideation process	Domain context				Total
	Written expression	Visual expression	Social problem-solving	Scientific problem-solving	
Generate diverse ideas	4	1	4	3	12
Generate creative ideas	6	1	3	1	11
Evaluate and improve ideas	2	2	3	2	9
<b>Total</b>	12	4	10	6	32

## 2.6 Sample items

Several creative thinking units and items were released from the PISA 2022 assessment to illustrate how students interacted with the items. In this section, images of the item are provided, along with the item information, including the items classification by ideation process and domain context, the item-specific coding criteria and the assigned proficiency level. Interactive versions of these items are available through the OECD PISA website.

## Illustration titles

PISA 2022
?


**Illustration Titles**

Question 1 / 2

Refer to the illustration on the right. Type your answer to the question in the text box below.

Write an **original** title for the illustration on the right. An original title is a title that not many people would think of.

**Title**



<b>Item ID</b>	DT300Q02
<b>Domain context</b>	Written expression
<b>Ideation process</b>	Generate diverse ideas
<b>Coding criteria</b>	<p>In written expression tasks, differences in ideas are based on elements of the form requested, rather than on pre-defined categories. In this case, students are asked to provide their responses in the form of a title for a given illustration, and elements of this form are described in the coding guide.</p> <p>Appropriate titles (ideas that are on task and on topic) can be different in <b>2</b> ways:</p> <ul style="list-style-type: none"> <li>• based on <b>underlying focus</b> – each title makes clearly different associations to the stimulus, so the subjects of each are clearly different OR</li> <li>• based on <b>method of implementation</b> – the titles have a similar underlying focus but implement linguistic or literary devices to change the representation of ideas. Linguistic or literary devices may include (but are not limited to):             <ul style="list-style-type: none"> <li>◦ some titles consist of a literal description of the image or its components, and other titles consist of abstract associations or figurative expressions</li> <li>◦ each title reflects a different perspective or interpretation of the illustration as a whole, or of a component in the illustration</li> <li>◦ the titles use punctuation, capitalisation, spelling or other grammatical elements to create distinct meanings.</li> </ul> </li> </ul>
<b>Proficiency levels</b>	4 (full credit) 1 (partial credit)

## Robot story

PISA 2022

**Robot Story**  
 Question 1 / 3

*Type your answers to the question in the boxes below.*

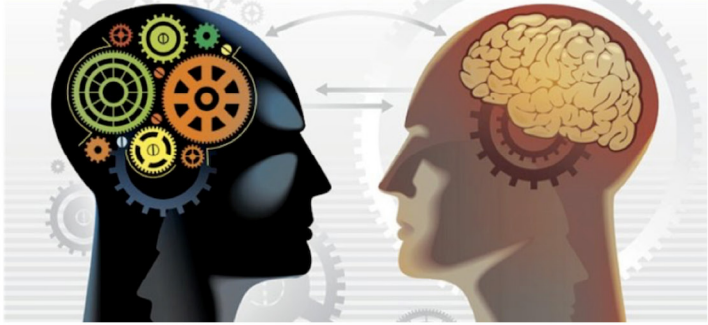
Write **2 different film story ideas** for a film about a human named Leo who is interacting with an intelligent robot named Rob. You do not need to write the full film story, but only explain what the film will be about. The two stories should be as different from each other as possible.

We recommend that you spend no longer than **7 minutes** on this question, and use no more than **8 sentences** for each story idea.

**Film story idea 1**

**Film story idea 2**

### ROBOT STORY



**Rob**
**Leo**

<b>Item ID</b>	DT570Q01
<b>Domain context</b>	Written expression
<b>Ideation process</b>	Generate diverse ideas
<b>Coding criteria</b>	<p>In written expression tasks, differences in ideas are based on elements of the form requested, rather than on pre-defined categories. In this case, students are asked to provide their responses in the form of a story idea for a film, and elements of this form are described in the coding guide.</p> <p>Appropriate titles (ideas that are on task and on topic) can be different in <b>2</b> ways:</p> <ul style="list-style-type: none"> <li>• based on <b>underlying focus</b> – each story idea makes clearly different associations to the stimulus, so the subject of each plot is clearly different OR</li> <li>• based on <b>method of implementation</b> – the story ideas convey similar plots but implement story elements to change the representation of ideas. Story elements may include (but are not limited to):             <ul style="list-style-type: none"> <li>◦ each story is conveyed from a different perspective, affecting how the plot is represented</li> <li>◦ each story has a different setting that changes how the characters interact or the significance of objects or events</li> <li>◦ each story conveys different relationships between characters, affecting how they interact or changing the significance of events</li> <li>◦ the actions and/or choices of the characters in each story are different, causing the plots to unfold differently</li> <li>◦ the attributes of the characters in each story are different, changing their motivations or the role they play in the story (e.g. background, abilities, personality).</li> </ul> </li> </ul>
<b>Proficiency levels</b>	4 (full credit)

# Space comic

PISA 2022

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**Space Comic**  
Question 1 / 2

Refer to the comic strip on the right. Use the text boxes to answer the question.

The text in a comic strip is intended to convey the dialogue between characters. Write a comic strip using the illustrations and text boxes on the right. Your comic strip should be **original** in the sense that not many people would think of it.

Use as many of the available text boxes on the right as needed.

We recommend that you spend no longer than **5 minutes** on this question.

**Text 1**

**Text 3**

**Text 2**

**Text 4**

**Text 5**

**Text 6**

<b>Item ID</b>	DT240Q01
<b>Domain context</b>	Written expression
<b>Ideation process</b>	Generate creative ideas
<b>Coding criteria</b>	<p>The coding guide defines conventional themes for all items corresponding to the 'generate creative ideas' ideation process.</p> <p>There are 2 conventional themes for this item:</p> <ul style="list-style-type: none"> <li><b>Conventional Theme 1:</b> Dialogue focusing on heat/temperature, weather, or seasons, but excluding discussions about environmental degradation or global warming</li> <li><b>Conventional Theme 2:</b> Dialogue focusing on environmental degradation or global warming.</li> </ul> <p>Appropriate responses (on task and on topic) corresponding to a conventional theme were awarded partial credit unless combined with an innovative approach or implementation. Appropriate responses corresponding to an original theme (i.e. not one of the conventional themes) were awarded full credit.</p>
<b>Proficiency levels</b>	<p>5 (full credit)</p> <p>2 (partial credit)</p>



PISA 2022

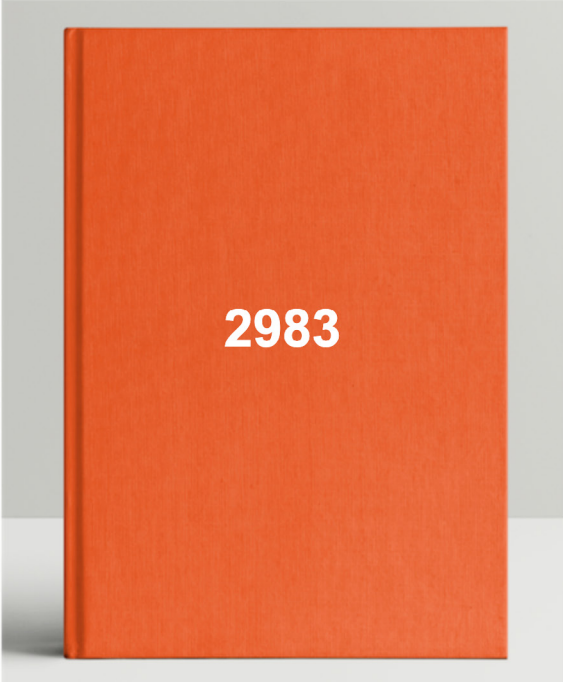
2983  
Question 1 / 1

Refer to the book cover on the right. Type your answer to the question in the text box below.

Write an **original** story idea for the book with the cover on the right. An original story idea is a story idea that not many people would think of. You do not need to write the full story, but only describe what the book could be about.

We recommend that you spend no longer than **5 minutes** on this question, and use no more than **8 sentences**.

**Story idea**



<b>Item ID</b>	DT370Q01
<b>Domain context</b>	Written expression
<b>Ideation process</b>	Generate creative ideas
<b>Coding criteria</b>	<p>The coding guide defines conventional themes for all items corresponding to the 'generate creative ideas' ideation process.</p> <p>There are 2 conventional themes for this item:</p> <ul style="list-style-type: none"> <li>• <b>Conventional Theme 1:</b> A positive or neutral account of what life is like for humans in the future (i.e. the year 2983)</li> <li>• <b>Conventional Theme 2:</b> The number as a designation or identification for a person, a place, or an object (such as an address, a serial number, model number, or other identification number).</li> </ul> <p>Appropriate responses (on task and on topic) corresponding to a conventional theme were awarded partial credit unless combined with an innovative approach or implementation. Appropriate responses corresponding to an original theme (i.e. not one of the conventional themes) were awarded full credit.</p>
<b>Proficiency levels</b>	4 (full credit) 3 (partial credit)

# Science fair poster 1

PISA 2022

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**Science Fair Poster**  
 Question 1 / 2

Use the drawing tools on the right and the text box below to answer the question.

Create an **original** poster for the Science Fair that represents the theme: **Life in Deep Space**.

Your poster should be **original** in the sense that not many people would think to represent the theme in this way.


Describe your design in one sentence in the box below.

We recommend that you spend no longer than **7 minutes** on this question.

**Description**

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Available Stamps:



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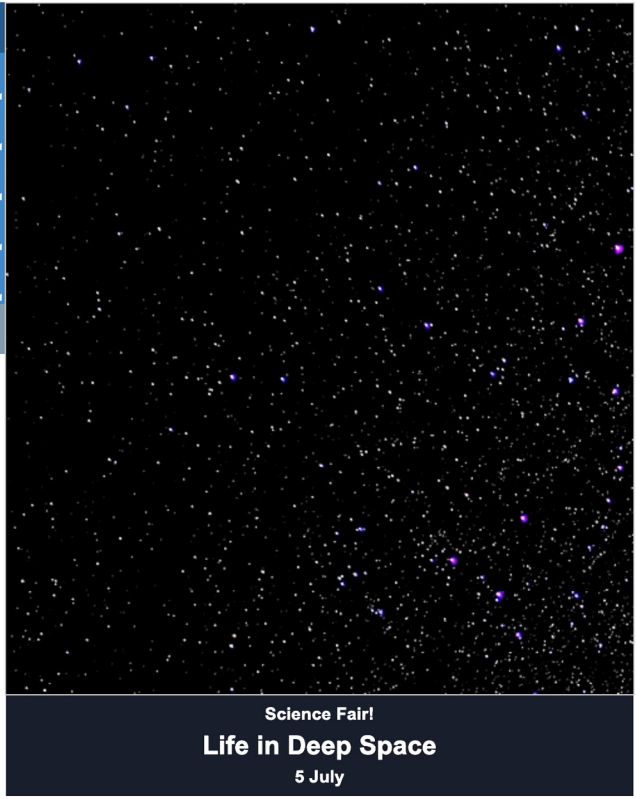
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<b>Item ID</b>	DT200Q01
<b>Domain context</b>	Visual expression
<b>Ideation process</b>	Generate creative ideas
<b>Coding criteria</b>	<p>The coding guide defines conventional themes for all items corresponding to the 'generate creative ideas' ideation process.</p> <p>There are 2 conventional themes for this item:</p> <ul style="list-style-type: none"> <li>• <b>Conventional Theme 1:</b> The Earth is the most dominant component used to represent life in space</li> <li>• <b>Conventional Theme 2:</b> Components that convey exploration of space (such as astronaut(s), spacecraft, vehicles, or constructed satellites) are the most dominant representation of life in space.</li> </ul> <p>Appropriate responses (on task and on topic) corresponding to a conventional theme were awarded partial credit unless combined with an innovative approach or implementation. Appropriate responses corresponding to an original theme (i.e. not one of the conventional themes) were awarded full credit.</p>
<b>Proficiency levels</b>	6 (full credit) 1 (partial credit)

## Science fair poster 2

PISA 2022

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**Science Fair Poster**  
 Question 2 / 2

Use the drawing tools on the right and the text box below to answer the question.

**Improve** the poster on the right to make it relevant to the theme of 'Life in Deep Space.' Your improvements should be **original** in the sense that not many people would think of changing the poster in this way. Make sure that the existing poster design is still visible in the final design.

Describe your design in one sentence in the box below.

We recommend that you spend no longer than **5 minutes** on this question.

**Description**

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 Available Stamps:

Science Fair!  
**Life in Deep Space**  
 5 July

<b>Item ID</b>	DT200Q02
<b>Domain context</b>	Visual expression
<b>Ideation process</b>	Evaluate and improve ideas
<b>Coding criteria</b>	<p>The coding guide defines conventional themes for all items corresponding to the 'evaluate and improve ideas' ideation process.</p> <p>There are 3 conventional themes for this item:</p> <ul style="list-style-type: none"> <li><b>Conventional Theme 1:</b> The Earth is added to the poster to represent life in deep space</li> <li><b>Conventional Theme 2:</b> Plants or flora are added to the poster to represent life in deep space</li> <li><b>Conventional Theme 3:</b> Components that convey exploration of space (such as astronaut(s), spacecraft, vehicles, or constructed satellites) are added to the poster to represent life in space.</li> </ul> <p>Appropriate responses (on task and on topic) corresponding to a conventional theme were awarded partial credit unless combined with an innovative approach or implementation. Appropriate responses corresponding to an original theme (i.e. not one of the conventional themes) were awarded full credit.</p>
<b>Proficiency levels</b>	6 (full credit) 1 (partial credit)

18

PISA 2022: Assessing creative thinking for a better future

# Library accessibility 1

PISA 2022


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**Library Accessibility**  
 Question 1 / 2

*Type your answers to the question in the boxes below.*

Describe **3 different ideas** for how to improve the wheelchair accessibility of the library. The ideas should be as different from each other as possible. Be specific in your descriptions.

We recommend that you spend no longer than **5 minutes** on this question.



**Idea 1**

**Idea 2**

**Idea 3**

<b>Item ID</b>	<b>DT500Q01</b>
<b>Domain context</b>	Social problem-solving
<b>Ideation process</b>	Generate diverse ideas
<b>Coding criteria</b>	<p>In social problem-solving tasks, ideas can be different in <b>2</b> ways:</p> <ul style="list-style-type: none"> <li>based on <b>underlying focus</b> – solutions in a response belong to different categories or to different sub-categories (such as, but not limited to, the list below) OR</li> <li>based on <b>method of implementation</b> – the response introduces specifically different modes of implementing the same or similar solutions (such as by including distinct tools, strategies, people involved, etc.).</li> </ul> <p>Example categories and sub-categories for this item include the following:</p> <ul style="list-style-type: none"> <li><b>Category 1</b> – Physical modifications to the library                             <ul style="list-style-type: none"> <li>Sub-category 1-1: Adding ramps</li> <li>Sub-category 1-2: Modifying the staircase</li> <li>Sub-category 1-3: Adding an elevator</li> <li>Sub-category 1-4: Having only one floor</li> <li>Sub-category 1-5: Having lower shelves</li> <li>Sub-category 1-6: Having a special section for wheelchair users.</li> </ul> </li> <li><b>Category 2</b> – Providing human assistance to wheelchair users (e.g. staff or volunteers deliver library materials or bring customers to the materials)                             <ul style="list-style-type: none"> <li>Sub-category 2-1: Hiring staff or adding volunteers to retrieve library materials for customers, and/or to deliver materials to customers (this excludes solutions unrelated to increasing access to the building, such as buying books online from retailers)</li> <li>Sub-category 2-2: Hiring staff or adding volunteers to aid with taking customers to the materials.</li> </ul> </li> <li><b>Category 3</b> – Providing technological assistance mechanisms (e.g. to aid with retrieving materials, guiding customers, or requesting deliveries)                             <ul style="list-style-type: none"> <li>Sub-category 3-1: To aid with retrieving out-of-reach materials for customers</li> <li>Sub-category 3-2: To aid with taking customers to the materials</li> <li>Sub-category 3-3: To request delivery of or access to library materials (this excludes solutions unrelated to increasing access to the library's building or the use of general solutions, such as 'use e-readers').</li> </ul> </li> </ul>
<b>Proficiency levels</b>	4 (full credit) 2 (partial credit)

## Library accessibility 2

PISA 2022

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**Library Accessibility**  
Question 2 / 2

*Type your answer to the question in the text box below.*

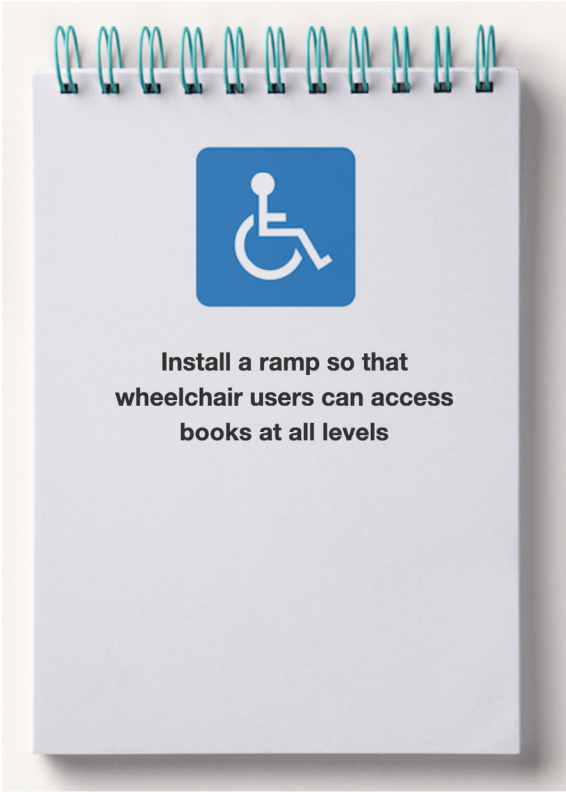
The local committee has decided to pursue the idea of installing a ramp so that wheelchair users can access books at all levels. However, they think that the idea can be improved.

Describe an **original** idea for a modification or feature that could be added to the ramp that will improve the ability of wheelchair users to access books in the library. The idea should be original in the sense that not many people would think of it.

Describe the improved idea in the box below.

**Improved Idea**

**LIBRARY ACCESSIBILITY**



**Install a ramp so that  
wheelchair users can access  
books at all levels**

<b>Item ID</b>	DT500Q02
<b>Domain context</b>	Social problem-solving
<b>Ideation process</b>	Evaluate and improve ideas
<b>Coding criteria</b>	<p>The coding guide defines conventional themes for all items corresponding to the 'evaluate and improve ideas' ideation process.</p> <p>There are 2 conventional themes for this item:</p> <ul style="list-style-type: none"> <li>• <b>Conventional Theme 1:</b> Automate the floor of the ramp to move customers in wheelchairs using a conveyor belt</li> <li>• <b>Conventional Theme 2:</b> Automate the ramp in ways to move customers in wheelchairs (push and/or pull devices, ramps that move to different locations, etc.).</li> </ul> <p>Appropriate responses (on task and on topic) corresponding to a conventional theme were awarded partial credit unless combined with an innovative approach or implementation. Appropriate responses corresponding to an original theme (i.e. not one of the conventional themes) were awarded full credit.</p>
<b>Proficiency levels</b>	6 (full credit) 5 (partial credit)

## Save the bees

PISA 2022

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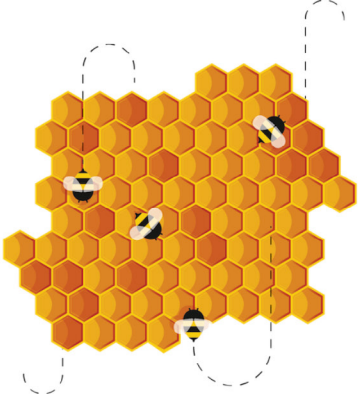
**Save the Bees**  
Question 2 / 3

Type your answer to the question in the first box or select an answer from the available options on the right.

You are now asked to suggest an **original** idea that could be used to increase awareness about the importance of bees.

The idea should be original in the sense that not many people would think of it.

**Either** write a new idea **OR** select one of your ideas from Question 1.



**Select this box to write a new idea**

**OR select one of your ideas from Question 1**

<b>Item ID</b>	DT400Q02
<b>Domain context</b>	Social problem-solving
<b>Ideation process</b>	Generate creative ideas
<b>Coding criteria</b>	<p>The coding guide defines conventional themes for all items corresponding to the 'generate creative ideas' ideation process.</p> <p>There are 3 conventional themes for this item:</p> <ul style="list-style-type: none"> <li><b>Conventional Theme 1:</b> Methods or content that club members may use to verbally communicate the importance of bees (this theme applies to solutions in which someone explains, tells, shares, etc.)</li> <li><b>Conventional Theme 2:</b> Create and/or present informative visuals (e.g. videos, posters or flyers)</li> <li><b>Conventional Theme 3:</b> Enable interaction with or the observation of live bees.</li> </ul> <p>Appropriate responses (on task and on topic) corresponding to a conventional theme were awarded partial credit unless combined with an innovative approach or implementation. Appropriate responses corresponding to an original theme (i.e. not one of the conventional themes) were awarded full credit.</p>
<b>Proficiency levels</b>	5 (full credit) 4 (partial credit)

# Carpooling

PISA 2022

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**Carpooling**  
Question 1 / 1

*Type your answer to the question in the box below.*


You are part of a team identifying creative solutions for issues faced by communities around the world.

To encourage carpooling (travel in the same vehicle together) and thus reduce air pollution and the number of vehicles on the road, some countries provide discounts on fuel and tolls to people who carpool. Think of an **original** way that the initiative to promote carpooling can be expanded and improved upon.

Describe the improved idea in the box below.

**Improved Idea**

**CARPOOLING**



<b>Item ID</b>	<b>DT630Q01</b>
<b>Domain context</b>	Social problem-solving
<b>Ideation process</b>	Evaluate and improve ideas
<b>Coding criteria</b>	<p>The coding guide defines conventional themes for all items corresponding to the 'Evaluate and Improve Ideas' ideation process.</p> <p>There is only one conventional theme for this item:</p> <ul style="list-style-type: none"> <li>• <b>Conventional Theme 1:</b> Establish additional financial incentives (e.g. rewards in the form of currency, OR discounts for services or items other than discounts on fuel and tolls).</li> </ul> <p>Appropriate responses (on task and on topic) corresponding to a conventional theme were awarded partial credit unless combined with an innovative approach or implementation. Appropriate responses corresponding to an original theme (i.e. not one of the conventional themes) were awarded full credit.</p>
<b>Proficiency levels</b>	5 (full credit) 4 (partial credit)

Save the river 1

PISA 2022

**Save the River**  
Question 1 / 2


Refer to the information below. Type your answers to the question in the boxes on the right.

A lab team investigating the problem has collected frogs in two places along the river. Where the river flows out of the city, there are fewer frogs than usual.

Their main hypothesis so far is that pollution from the factories and farms in the surrounding area is causing the problem with the frogs. However, the lead scientist thinks there may be other reasons for the problem that are unrelated to pollution.

Describe **2 different ideas** that might explain why there are fewer frogs where the river flows out of the city. Your ideas should be scientifically valid (can be tested using scientific methods) and as different from each other as possible.

We recommend that you spend no longer than **5 minutes** on this question.



**Idea 1**

**Idea 2**

<b>Item ID</b>	DT690Q01
<b>Domain context</b>	Scientific problem-solving
<b>Ideation process</b>	Generate diverse ideas
<b>Coding criteria</b>	<p>In scientific problem-solving, appropriate hypotheses can be different in <b>2</b> ways:</p> <ul style="list-style-type: none"> <li>based on <b>underlying focus</b> – hypotheses in a response belong to different categories (or sub-categories) of reasons why the frog population has decreased (such as, but not limited to, the list in the table below) OR</li> <li>based on <b>method of implementation</b> – hypotheses suggest specifically different effects to explain how the frog population has decreased due to the same underlying cause (for instance, the reason why there are fewer frogs could be the same, but the decrease may have happened because of either increased mortality or increased migration).</li> </ul> <p>Example categories and sub-categories for this item include the following:</p> <ul style="list-style-type: none"> <li><b>Category 1</b> – Changes to the water habitat <ul style="list-style-type: none"> <li>Sub-category 1-1: Changes in water level</li> <li>Sub-category 1-2: Changes in water temperature.</li> </ul> </li> <li><b>Category 2</b> – Changes in surrounding fauna (non-human) <ul style="list-style-type: none"> <li>Sub-category 2-1: New/additional predators</li> <li>Sub-category 2-2: New/additional competitors for food.</li> </ul> </li> <li><b>Category 3</b> – Changes to the local flora (e.g. a new invasive plant species, or absence of important flora) <ul style="list-style-type: none"> <li>Sub-category 3-1: Changes to food availability</li> <li>Sub-category 3-2: Changes in climate affecting local flora</li> <li>Sub-category 3-3: Human interventions affecting local flora.</li> </ul> </li> <li><b>Category 4</b> – Changes to the frogs themselves (e.g. infection, disease or mutation) <ul style="list-style-type: none"> <li>Sub-category 4-1: Infection or disease</li> <li>Sub-category 4-2: Mutation.</li> </ul> </li> <li><b>Category 5</b> – Changes to the behaviour or activities of humans in the area (e.g. noise, ground vibrations, or humans capturing frogs) <ul style="list-style-type: none"> <li>Sub-category 5-1: Change in noise</li> <li>Sub-category 5-2: Excess ground vibrations</li> <li>Sub-category 5-3: Capturing or removing frogs from the river.</li> </ul> </li> </ul>
<b>Proficiency levels</b>	5 (full credit)



## Save the river 2

PISA 2022

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**Save the River**  
Question 2 / 2

Refer to the information on the right. Type your answer to the question in the box below.

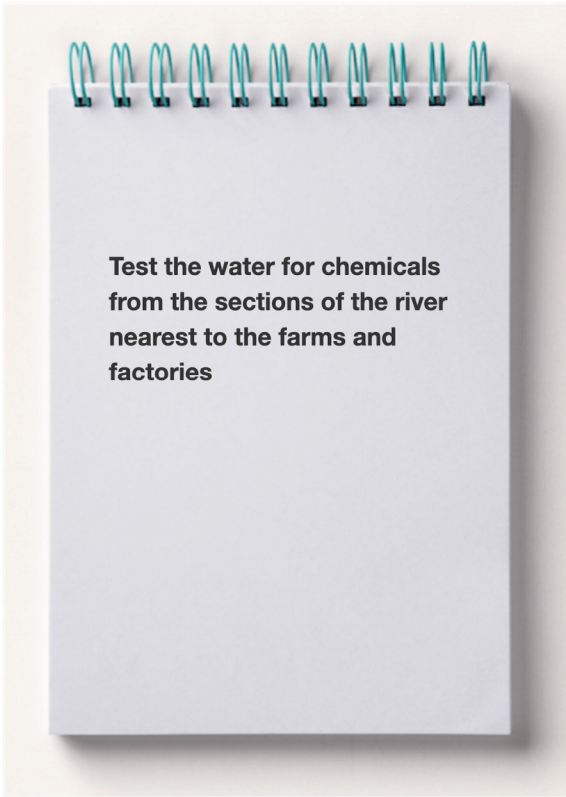
The lab team has decided to conduct an experiment to test whether pollution from the factories is the cause of the problem with the frogs. Their proposed experiment is shown on the right.

Think of a way to improve the experiment that is **original** in the sense that not many people would think of it. Your idea should help the team to gain more conclusive evidence in order to know if chemical pollution is the cause of the problem with the frogs.

Describe your improved experiment idea in the box below.

**Improved Experiment Idea**

**SAVE THE RIVER**



<b>Item ID</b>	<b>DT690Q02</b>
<b>Domain context</b>	Scientific problem-solving
<b>Ideation process</b>	Evaluate and improve ideas
<b>Coding criteria</b>	<p>The coding guide defines conventional themes for all items corresponding to the 'evaluate and improve ideas' ideation process.</p> <p>There are 3 conventional themes for this item:</p> <ul style="list-style-type: none"> <li>• <b>Conventional Theme 1:</b> Test the water using a specific method to determine the presence of chemicals or pollution</li> <li>• <b>Conventional Theme 2:</b> Test the frogs for the presence of chemicals in or on their bodies</li> <li>• <b>Conventional Theme 3:</b> Introduce a control to the experiment so that results from affected samples can be compared to results where the pollution from factories and farms are not a variable (e.g. a control group of frogs unaffected by pollution from the farms and factories, or a control sample of unpolluted water unaffected by the farms and factories).</li> </ul>
<b>Proficiency levels</b>	6 (full credit) 4 (partial credit)

# 3

## Student performance in creative thinking

Students from 64 countries and economies participated in the PISA 2022 creative thinking assessment. This chapter reports and compares the results of Australian students with the 39 countries that performed higher than the lowest performing OECD country (Colombia). It also focuses on performance across states and territories and for different demographic groups of interest. The relationship between student performance in creative thinking and in the PISA core mathematics is also examined.

The discussion focuses on differences that are statistically significant (are unlikely to have occurred by chance). Where the commentary states that there was a difference between sets of numbers, (whether these were scores, percentages or percentage point differences), it means that the difference satisfied this condition. Where it states that there was no difference, or where no comment is made regarding a possible comparison, it indicates that the difference was not statistically significant. For more information about statistical significance, please refer to the Reader's guide.

Because of rounding, the totals in the text may not add up exactly to the corresponding individual country numbers or percentages as reported in the related figure or table. For more information about rounding of figures, please refer to the Reader's guide.

## Interpreting differences in PISA creative thinking performance

How do we go about understanding the difference in mean creative thinking scores between 2 groups of students? The following comparisons can help in judging the magnitude of score differences.

Students' performance in creative thinking is summarised on a single creative thinking scale.<sup>1</sup> The creative thinking scale ranges from 0 to 60 points, with 60 points representing the maximum score across all 32 items in the creative thinking test-item pool. Thus, scores on this scale reflect students' estimated performance (that is, the sum of partial and full credit responses) as if they had taken a hypothetical test comprising all 32 items from the pool.

### Interpreting differences in scores on the creative thinking scale

- ▶ a 1-score-point difference is equivalent to approximately 0.10 of the OECD standard deviation in creative thinking performance. This is considered a *small* difference.
- ▶ a 3-score-point difference is equivalent to approximately 0.25 of the OECD standard deviation in creative thinking performance. This is considered a *large* difference.
- ▶ a 1- to 3-score-point difference is considered a *moderate* difference in creative thinking performance.

### Interpreting differences in proficiency on the creative thinking scale

The PISA creative thinking scale is divided into 6 proficiency levels (Level 1 to Level 6); each proficiency level spans a range of 7 to 9 score points.

- ▶ Students who achieved a proficiency of Level 5 or 6 (41 score points or higher) are considered high performers.
- ▶ Level 3 is considered the baseline level of proficiency in creative thinking that students need to acquire to successfully participate in society. Consequently, the group of students who scored below Level 3 (less than 23 score points) are considered low performers in this report.
- ▶ Students who attained a proficiency of Level 3 or above (23 score points or higher) are considered to have attained the National Proficient Standard.

<sup>1</sup> The PISA creative thinking scale is a different scale from the PISA core (reading, mathematics and science) assessment domain scale.

## 3.1 Australia's creative thinking results in an international context

### Performance

Singapore was the highest scoring country (or economy) in creative thinking, with a mean score of 41 points.<sup>2</sup> Korea, Canada and Australia performed at similar levels, lower than Singapore but higher than all other countries. Australia performed higher than 60 other countries, which included New Zealand, Estonia, Finland, Denmark, Chinese Taipei, Hong Kong (China) and Macao (China). Australian students achieved a mean score of 37 points in creative thinking.

Twelve countries (Singapore, Korea, Canada, Australia, New Zealand, Estonia, Finland, Denmark, Latvia, Belgium, Poland and Portugal) performed higher than the OECD average of 33 points. Singapore was the only non-OECD country to perform higher than the OECD average.

Figure 3.1 lists the mean creative thinking scores, along with the standard errors, confidence intervals around the mean, and the difference between the 10th and 90th percentiles. It also shows the distribution of creating thinking scores within a country. Countries are shown in order from the highest to the lowest mean creative thinking score and the 3 colour bands indicate whether a particular country performed at a significantly higher or lower level or at a level not significantly different to Australia.

This chapter only provides a commentary on those countries who performed higher than the lowest performing OECD country (Colombia). The countries omitted from this chapter are:

Albania	Dominican Republic*	Moldova	Philippines
Baku (Azerbaijan)	El Salvador	Mongolia	Saudi Arabia
Brazil	Indonesia	Morocco	Thailand
Brunei Darussalam	Jamaica*	North Macedonia	Kazakhstan
Bulgaria	Jordan	Panama	Palestinian Authority
Cyprus	Malaysia	Peru	Uzbekistan

The measure of the range of creative thinking performance (between the 10th and 90th percentiles) within each country varied considerably and was not strongly related to the mean score for that country.

Latvia (22 score points), Denmark (24 score points) and Singapore (25 score points) had the smallest ranges between the lowest and highest performing students, indicating greater similarity in performance. However the United Arab Emirates (40 score points), Qatar (36 score points) and Israel (35 score points) had the largest range between the lowest and highest performing students, indicating there was greater diversity in performance.

In Australia, the difference between the lowest and highest performing students was 29 score points, a range similar to Canada, Hong Kong (China), Macao (China) and New Zealand, as well as the OECD average.

<sup>2</sup> For ease of reading, economies are referred to as countries.

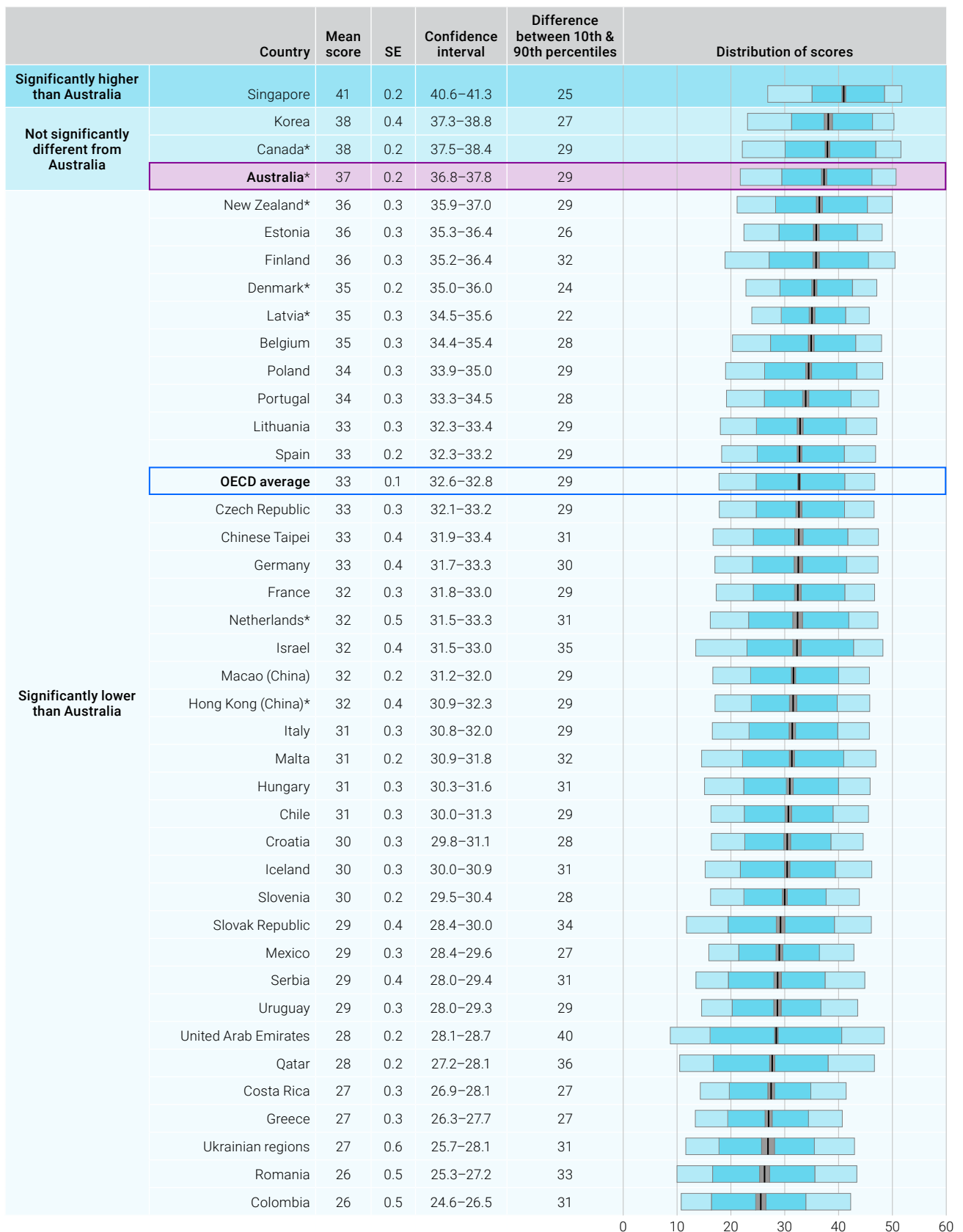


FIGURE 3.1 Mean scores and distribution of student performance on the creative thinking scale, by country

## Proficiency

Proficiency levels provide further meaning about students' ability in creative thinking. There are 7 described levels of proficiency in the 2022 creative thinking assessment, which range from Level 6 (highest proficiency) to below Level 1 (lowest proficiency).

Figure 3.2 shows the percentages of students at each proficiency level on the creative thinking scale. Countries are ordered by the percentages of students who performed below Level 3, which is the internationally assigned baseline proficiency level. Countries with the lowest percentage of students below Level 3 are placed at the top of the figure and those with the highest proportion are placed at the bottom.

### High performers

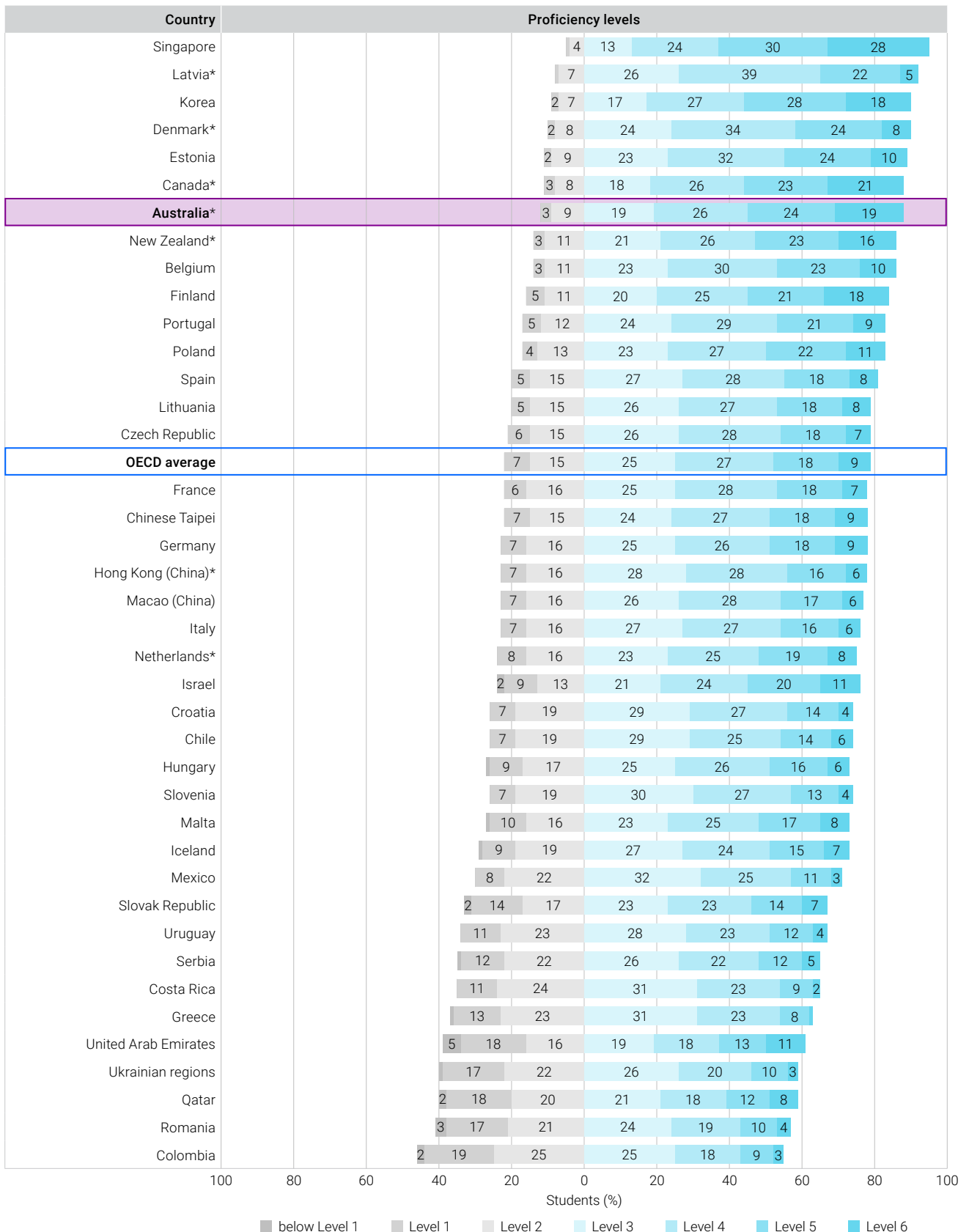
Students who scored at Level 5 or Level 6 (that is, 41 score points or above) are considered high performers in creative thinking. High performers can productively engage in original and diverse creative idea generation across a wide range of tasks, identify weaknesses in existing solutions, and suggest innovative improvements, even in complex, abstract, and unfamiliar contexts.

Generally, the countries with the highest mean scores were also the countries with the highest percentage of high performers. Fifty-eight per cent of Singaporean students were high performers in creative thinking, while 46% of Korean students, 45% of Canadian students and 43% of Australian students were high performers. Macao (China) and Hong Kong (China) had 22% of high performers and Colombia, Costa Rica and Greece had 12% or fewer high performers. On average, 27% of students across the OECD countries were high performers.

### Low performers

In this report, students who scored below Level 3 (less than 23 score points) are considered low performers.

The high-performing countries were also among the countries with the smallest proportion of low performers, ranging from 6% in Singapore, 10% in Korea, 11% in Canada and 12% in Australia. Latvia, Denmark and Estonia also had small proportions of low performers (8%, 10% and 11% respectively). Over 40% of students in Qatar, Romania and Colombia were low performers. On average, 22% of students across OECD countries were low performers in creative thinking.



Note: if the proportion of students in a proficiency level is 1% or lower, the level is shown but without the numeric label '1'. This convention has been used for all figures about proficiency levels in this chapter.

**FIGURE 3.2** Students' proficiency levels in creative thinking, by country

## The relationship between creative thinking performance and the PISA core assessments

On average across the OECD countries, the correlation between creative thinking and mathematics was 0.67 and the correlation between creative thinking and the other 2 core domains was similar: 0.66 for both science and reading.<sup>3</sup> For Australia, the correlation between creative thinking and mathematics was 0.65 and the correlation between creative thinking and reading was 0.63, which were lower than the OECD average, while the correlation between creative thinking and science was 0.64, which was similar to the OECD average. Despite the similarities in these findings, the creative thinking assessment evaluates a distinct set of skills compared to those assessed in maths, reading and science.

Another approach to determining whether the skills assessed in the PISA 2022 creative thinking assessment are unique is to analyse the extent to which variations in student performance in creative thinking can be explained by mathematics performance.<sup>4</sup>

Figure 3.3 shows the variation in creative thinking performance that is associated with mathematics performance (OECD, 2024). Countries are shown in descending order of the percentage of variation uniquely associated with mathematics performance.

On average, across the OECD countries, 28% of the variation in creative thinking performance can be uniquely associated with student performance in mathematics and 20% can be explained by student background and factors that are common to both student background and mathematics performance. The remaining 52% of the variation in creative thinking performance is uniquely captured by the creative thinking assessment, that is the assessment measures a different subset of skills that are assessed in the mathematics assessment.

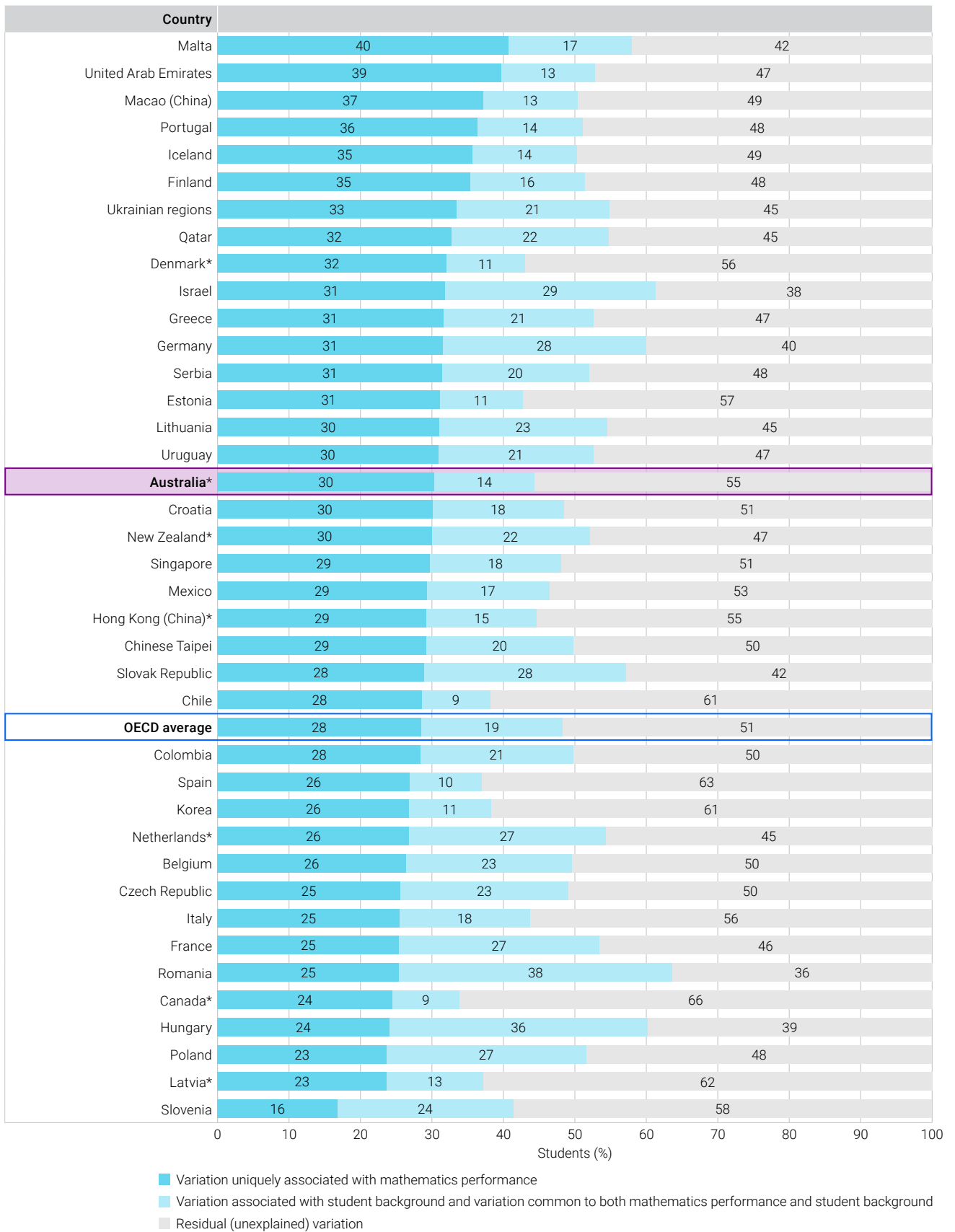
In Australia, 30% of the variation in creative thinking performance reflected skills that were uniquely associated with student performance in mathematics, 19% reflected skills that were associated with student background and factors that are common to both student background and mathematics performance, and 51% reflected skills that were uniquely associated the creative thinking skills.

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<sup>3</sup> The correlation between the PISA core assessment domains is more strongly associated than the correlation between creative thinking and each of the core domains. The correlations between the 2 core domains are: mathematics and science is 0.87, mathematics and reading is 0.80, and reading and science is 0.80.

<sup>4</sup> Mathematics performance has been selected as mathematics was the major focus for PISA 2022.





**FIGURE 3.3** Variation in creative thinking performance associated with mathematics performance

## 3.2 Australia's creative thinking results in a national context

### States and territories

#### Performance

Figure 3.4 presents the creative thinking performance for students in each of the Australian states and territories. The mean scores for creative thinking ranged from 39 points in the Australian Capital Territory to 36 points in the Northern Territory.

All jurisdictions performed higher than the OECD average and all jurisdictions performed lower than Singapore. On average, the Australian Capital Territory performed 2 points lower than Singapore, and Tasmania and the Northern Territory performed 5 points lower than Singapore.

The largest range of student performance in creative thinking was seen in New South Wales, with 30 points between the 10th and 90th percentiles, while the Australian Capital Territory had the narrowest range at 27 points.

Table 3.1 presents the pairwise comparisons of mean creative thinking performance between any 2 states and territories.

- ▶ Students in the Australian Capital Territory performed at a similar level to students in Western Australia and at a higher level than students in all other jurisdictions.
- ▶ Students in Western Australia performed higher than students in South Australia and Tasmania.
- ▶ Students in Victoria and New South Wales performed higher than students in Tasmania.

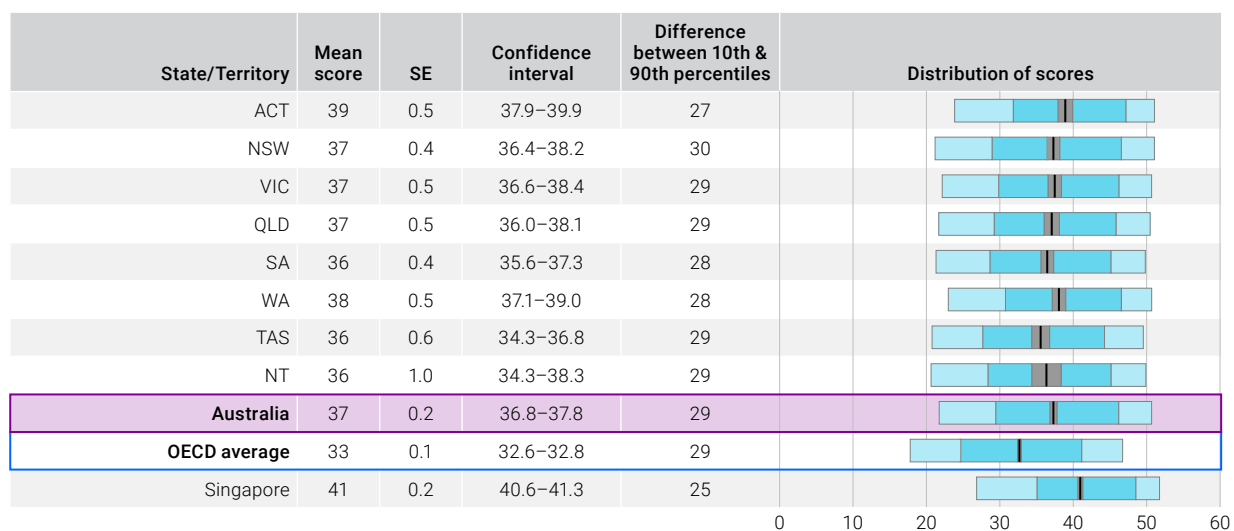


FIGURE 3.4 Mean scores and distribution of student performance on the creative thinking scale, by state and territory

**TABLE 3.1** Multiple comparisons of mean creative thinking performance, by state and territory

State/Territory	Mean score	SE	ACT	WA	VIC	NSW	QLD	SA	NT	TAS	OECD average
ACT	39	0.5		●	▲	▲	▲	▲	▲	▲	▲
WA	38	0.5	●		●	●	●	▲	●	▲	▲
VIC	37	0.5	▼	●		●	●	●	●	▲	▲
NSW	37	0.4	▼	●	●		●	●	●	▲	▲
QLD	37	0.5	▼	●	●	●		●	●	●	▲
SA	36	0.4	▼	▼	●	●	●		●	●	▲
NT	36	1.0	▼	●	●	●	●	●		●	▲
TAS	36	0.6	▼	▼	▼	▼	●	●	●		▲
<b>OECD average</b>	<b>33</b>	<b>0.1</b>	▼	▼	▼	▼	▼	▼	▼	▼	

Note: read across the row to compare a state's/territory's performance with the performance of each state or territory listed in the column heading.

▲ Mean performance statistically significantly higher than in comparison state/territory

● No statistically significant difference from comparison state/territory

▼ Mean performance statistically significantly lower than in comparison state/territory

## Proficiency

Figure 3.5 shows the percentages of students at each creative thinking proficiency level for each jurisdiction, together with the percentages for Australia, Singapore and the OECD average.

### National Proficient Standard

88% of Australian students attained the National Proficient Standard (Level 3 or above), compared to 78% across the OECD countries. The proportion of students who achieved the National Proficient Standard ranged from 85% in the Northern Territory to 91% in the Australian Capital Territory.

### High performers

43% of Australian students were high performers. This was higher than the OECD average of 27% but not near the 58% of students in Singapore who achieved Level 5 or 6. Students in the states and territories had the following percentages of high performers:

- ▶ 49% in the Australian Capital Territory
- ▶ 45% in Western Australia
- ▶ 43% in New South Wales and Victoria
- ▶ 41% in Queensland
- ▶ 39% in South Australia and the Northern Territory
- ▶ 34% in Tasmania.

### Low performers

12% of Australian students were low performers. This proportion was double Singapore's (6%) but lower than the average across the OECD countries (22%). Students in the states and territories had the following proportions of low performers:

- ▶ 15% in the Northern Territory
- ▶ 14% in Tasmania
- ▶ 13% in both New South Wales and South Australia
- ▶ 12% in Queensland
- ▶ 11% in Victoria
- ▶ 10% in Western Australia
- ▶ 9% in the Australian Capital Territory.

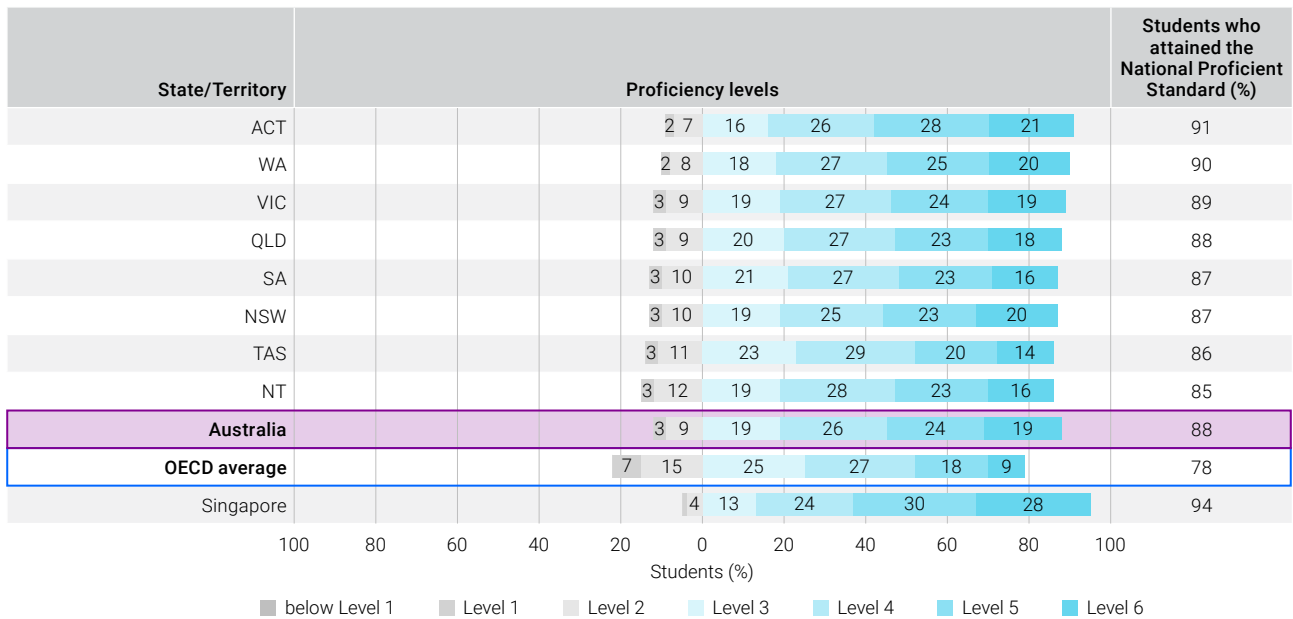


FIGURE 3.5 Students' proficiency levels in creative thinking, by state and territory

## School sector

### Performance

The mean scores for creative thinking by school sector are shown in Figure 3.6. Students in independent schools achieved a mean score of 40 points, which was significantly higher than students in Catholic schools (38 points) and government schools (36 points).

Students in government schools had the largest range of scores with 30 points between students in the 10th and 90th percentiles, whereas the differences in the spread of scores for Catholic schools and independent schools were smaller, at between 26 and 27 points, respectively.

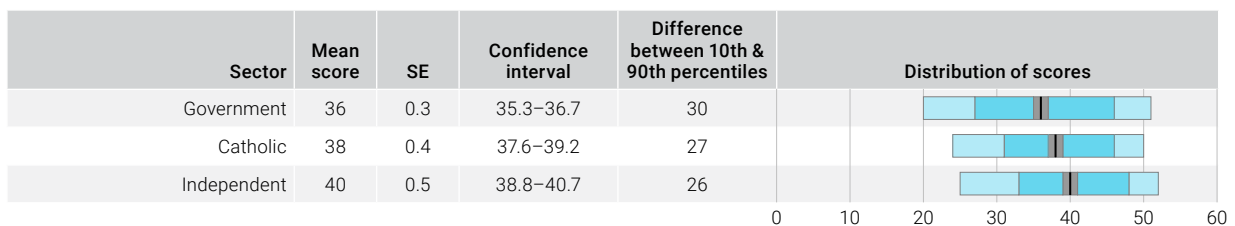


FIGURE 3.6 Mean scores and distribution of student performance on the creative thinking scale, by school sector

### Proficiency

Figure 3.7 shows the percentages of students at each proficiency level on the creative thinking scale by school sector.

### National Proficient Standard

Eighty-five per cent of students in government schools attained the National Proficient Standard in creative thinking, compared to 92% of students in Catholic schools and 93% of students in independent schools.

## High and low performers

There was a higher proportion of high performers in independent schools (52%) than in Catholic schools (46%) and government schools (38%).

There were almost twice as many low performers in government schools (15%) than in independent schools (7%) and Catholic schools (8%).

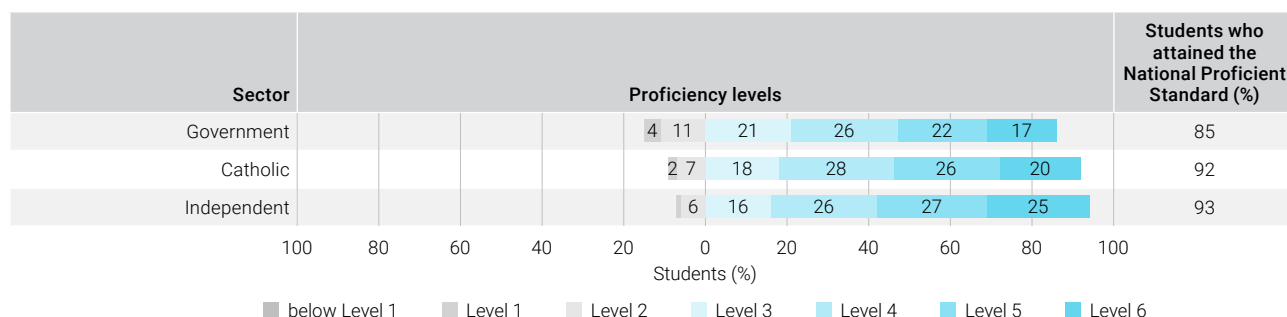


FIGURE 3.7 Students' proficiency levels in creative thinking, by school sector

## 3.3 Australia's creative thinking results for different demographic groups in a national context

### Gender: National

#### Performance

Figure 3.8 shows the creative thinking performance for Australian female and male students and the OECD average. Australian female students achieved a mean score of 39 points, which was 3 points higher than Australian male students (36 points). Australian female and male students performed higher than their peers across the OECD average. This pattern was also seen across all countries, where female students performed at a higher level than male students.

There was 28 points between the highest performing (students at the 10th percentile) and lowest performing (students at the 90th percentile) Australian female students, which was the same as for females across the OECD countries. There was 30 points between the highest and lowest performing Australian male students, which was larger than for males across the OECD countries.

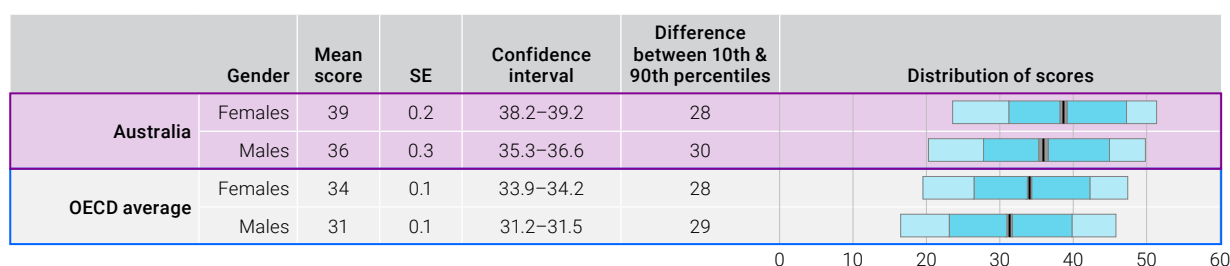


FIGURE 3.8 Mean scores and distribution of student performance on the creative thinking scale, for Australia by gender

## Proficiency

Figure 3.9 shows the percentages of female and male Australian students and the OECD average at each level of the creative thinking scale, and the proportion of students who attained the National Proficient Standard.

### National Proficient Standard

- ▶ Almost all Australian female students (91%) attained the National Proficient Standard, compared to 85% of Australian male students.

### High performers

- ▶ The percentage of high-performing Australian female students (47%) was higher than the percentage across OECD countries (31%).
- ▶ The percentage of high-performing Australian male students (38%) was higher than the percentage across OECD countries (23%).
- ▶ There was a 9 percentage point difference between female and male high-performing students, in favour of females.

### Low performers

- ▶ The percentage of low-performing Australian female students (9%) was lower by almost half of the percentage across OECD countries (18%).
- ▶ The percentage of low-performing Australian male students (15%) was lower than the percentage across OECD countries (25%).
- ▶ There was a 6 percentage point difference between Australian female and male low-performing students, in favour of females.

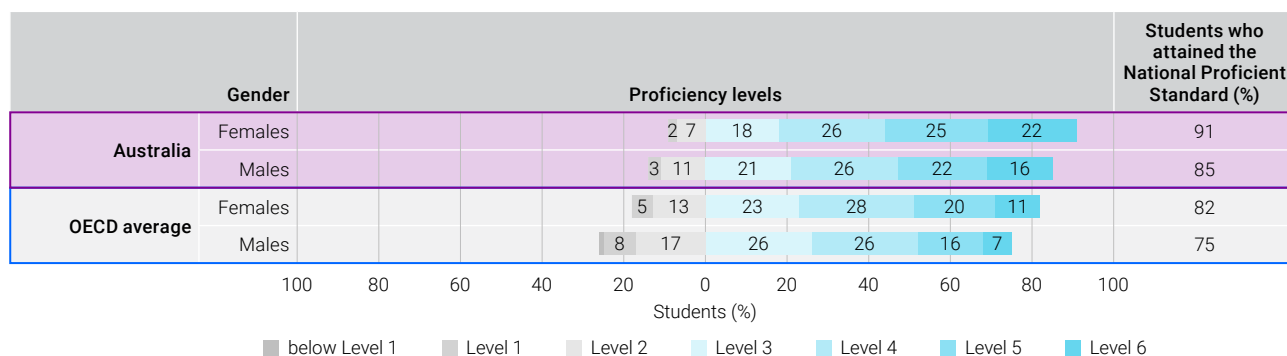


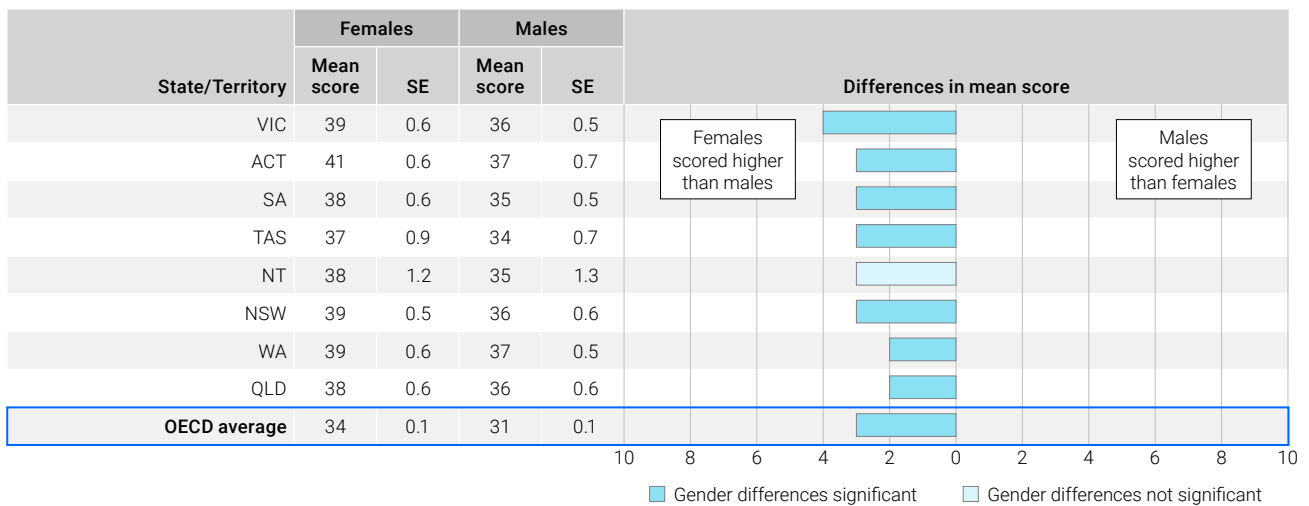
FIGURE 3.9 Students' proficiency levels in creative thinking by gender, for Australia and the OECD average

## Gender: States and territories

### Performance

Figure 3.10 shows female students performed at a higher level than male students in all jurisdictions except the Northern Territory, where there were no significant gender differences. The largest gender differences were found in Victoria, where females scored 4 points higher than males. The smallest gender differences were found in Queensland and Western Australia, with a 2 score point difference, in favour of females.

Female students across all jurisdictions performed higher than female students across OECD countries. Male students across all jurisdictions also performed higher than their OECD counterparts.



**FIGURE 3.10** Mean scores and differences in student performance on the creative thinking scale, by state, and territory and gender

## Proficiency

Figure 3.11 shows the proportions of students in each proficiency level on the creative thinking scale for the states and territories and the OECD average by gender.

### National Proficient Standard

The proportion of female students who attained the National Proficient Standard in creative thinking in the Australian Capital Territory was higher than South Australia, New South Wales and Queensland and similar to the other jurisdictions. The proportions ranged from 90% in Tasmania and the Northern Territory to 95% in the Australian Capital Territory.

The proportion of male students who attained the National Proficient Standard in the Australian Capital Territory was higher than in New South Wales and Tasmania, and similar to the other jurisdictions. The proportions ranged from 81% in the Northern Territory to 89% in Western Australia.

### Female high performers

The proportion of high-performing female students in the Australian Capital Territory was higher than in New South Wales, South Australia, Queensland and Tasmania, and similar to the proportions of high-performing females in the other jurisdictions.

The proportions of high-performing female students across all jurisdictions were higher than the OECD average (31%) and ranged from 56% in the Australian Capital Territory to 39% in Tasmania.

### Male high performers

The proportion of high-performing male students in the Australian Capital Territory was higher than in South Australia and Tasmania, and similar to the proportions of high-performing males in the other jurisdictions.

The proportions of high-performing male students across all jurisdictions were higher than the OECD average (23%) and ranged from 43% in the Australian Capital Territory to 30% in Tasmania.

### Female low performers

The proportion of low-performing female students in the Australian Capital Territory was lower than in South Australia and New South Wales, and similar to the proportions in the other jurisdictions.

The proportions of low-performing female students across all jurisdictions were lower than the OECD average (18%) and ranged from 5% in the Australian Capital Territory to 10% in Queensland, the Northern Territory and Tasmania.

### Low-performing male students

The proportion of low-performing male students in Western Australia was lower than in New South Wales and Tasmania, but similar to the proportions in the other jurisdictions.

The proportion of low-performing male students across all jurisdictions were lower than the OECD average (25%) and ranged from 11% in Western Australia to 19% in the Northern Territory.

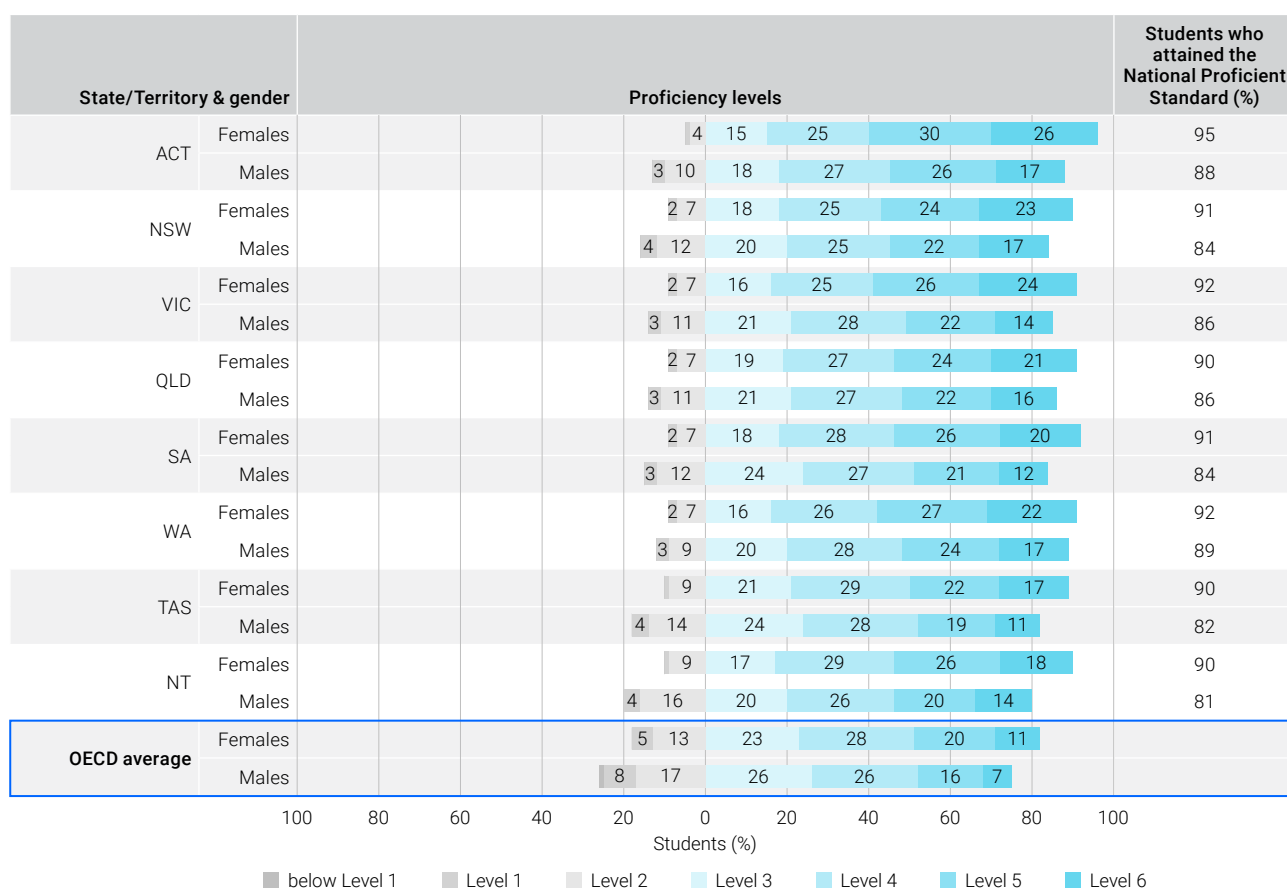


FIGURE 3.11 Students' proficiency levels in creative thinking, by state and territory and gender

## Geographic location

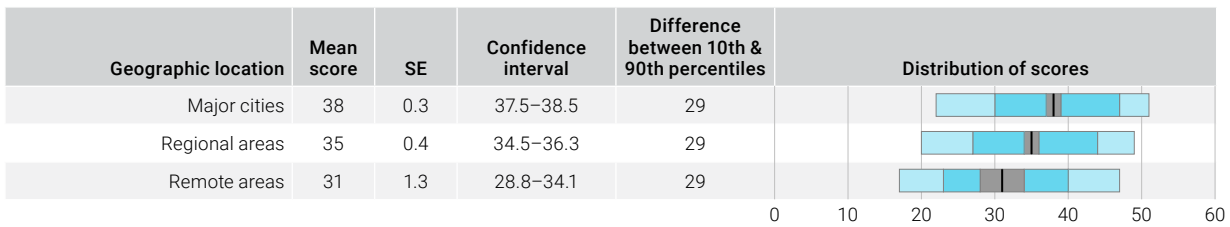
### Performance

Figure 3.12 shows the creative thinking performance of students from schools classified using the Australian Statistical Geography Standard (ASGS).

Students in major city schools achieved a mean score of 38 points, which was 3 points higher than in regional schools (35 score points) and 7 points higher than in remote schools (31 score points). Students in regional schools performed higher than students in remote schools.

The range of scores between the 10th and 90th percentiles for schools across the different geographic locations was 29 score points each.





**FIGURE 3.12** Mean scores and distribution of student performance on the creative thinking scale, by geographic location

Figure 3.14 shows the percentages of students on the creative thinking scale for schools classified by the ASGS.

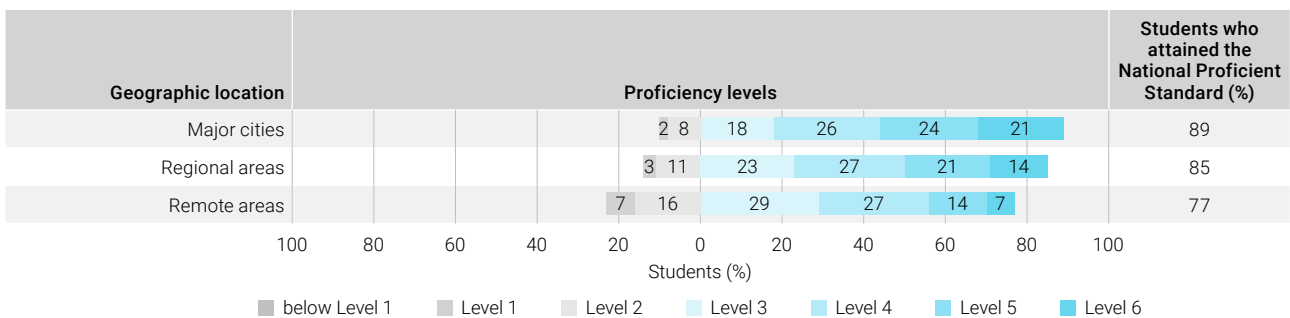
### National Proficient Standard

Eighty-nine per cent of students in major city schools attained the National Proficient Standard in creative thinking, which was higher than in regional schools (85%) and in remote schools (77%). The proportion of students who attained the National Proficient Standard in regional schools was not different to remote schools.

### High and low performers

The proportion of high performers in major city schools (45%) was higher than in regional schools (35%) and in remote schools (21%), and the proportion of high performers in regional schools was higher than in remote schools.

The proportion of low performers in major city schools (11%) was lower than in regional schools (15%) and remote schools (23%), but the proportions of low performers in regional schools and in remote schools were similar.



**FIGURE 3.13** Students' proficiency levels in creative thinking, by geographic location

## Socioeconomic background

### Performance

Figure 3.14 shows the performance of students in creative thinking at each socioeconomic background (ESCS) quarter and illustrates that, on average, students from higher socioeconomic backgrounds performed at a higher level than students from lower socioeconomic backgrounds.

On average, students from the highest socioeconomic quarter scored 9 points higher in creative thinking than students in the lowest quarter. The score difference between one-quarter and the next was between 3 points on average.

The ranges of scores from the 10th and 90th percentiles were largest for students in the lowest quarter (30 points), with smaller spreads of performance for students in the highest quarter (25 points).

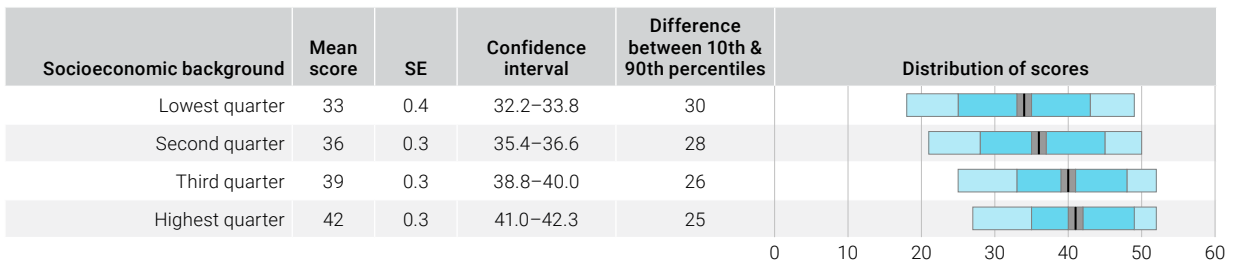


FIGURE 3.14 Mean scores and distribution of student performance on the creative thinking scale, by socioeconomic background

## Proficiency

Figure 3.15 shows the proficiency of students on the creative thinking scale and the proportions of students who attained the National Proficient Standard across the socioeconomic quarters. Students in the lowest socioeconomic quarters were under-represented at the higher end of the scale and over-represented at the lower end of the scale.

### National Proficient Standard

The percentage of students who attained the National Proficient Standard increased with each increase in socioeconomic quarter: 79% of students in the lowest, 87% in the second, 93% in the third, and 95% in the highest quarter. There was a 16-percentage point difference between students who attained the National Proficient Standard in the highest and lowest quarters.

### High performers

The proportion of high performers increased with each increase in socioeconomic quarter: 28% of students in the lowest, 37% in the second, 50% in the third, and 60% in the highest quarter. There was a 32-percentage point difference between the high performers in the highest and lowest quarters.

### Low performers

The proportion of low performers decreased with each increase in socioeconomic quarter: 21% of students in the lowest, 13% in the second, 7% in the third, and 5% in the highest quarter. There was a 16-percentage point difference between the low performers in the highest and lowest quarters.

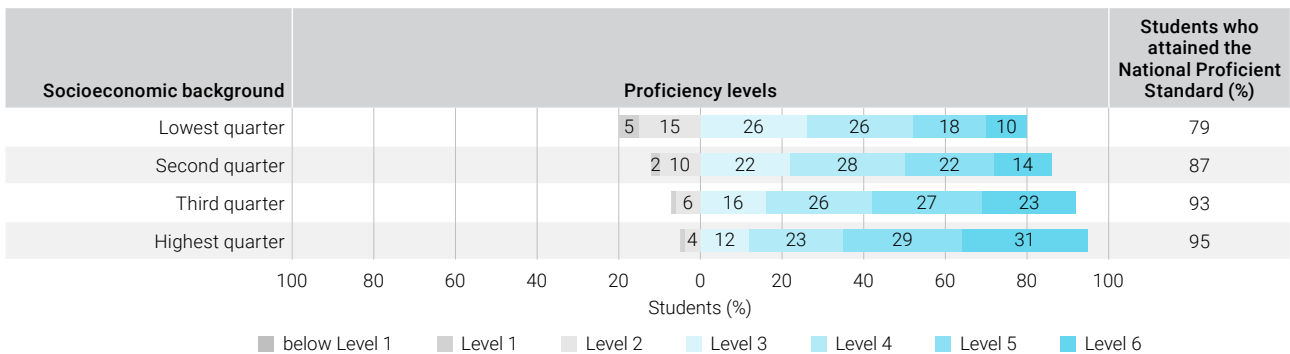


FIGURE 3.15 Students' proficiency levels in creative thinking, by socioeconomic background

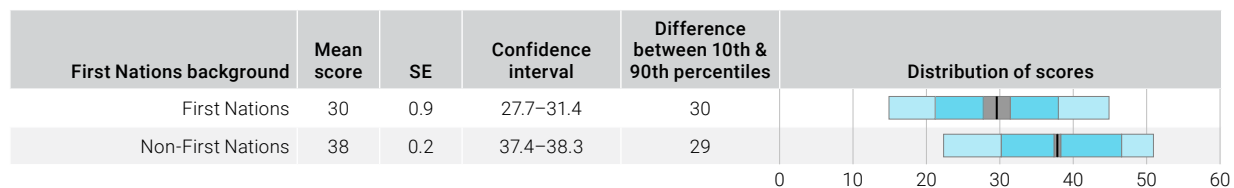
## First Nations background

### Performance

Figure 3.16 shows First Nations and non-First Nations student performance on the creative thinking scale. First Nations students achieved a mean score of 30 points, which was 8 points lower than the mean score of 38 points for non-First Nations students.

First Nations students performed higher than students in Qatar, Costa Rica, Greece, the Ukrainian regions, Romania and Colombia. Their performance was similar to students in Italy, Malta, Hungary, Chile, Croatia, Iceland, Slovenia, Slovak Republic, Mexico, Serbia, Uruguay and the United Arab Emirates.

The spread of scores between the 10th and 90th percentiles for First Nations and non-First Nations students were similar.



**FIGURE 3.16** Mean scores and distribution of student performance on the creative thinking scale, by First Nations background

Figure 3.17 shows the large under-representation of First Nations students at the higher end of the creative thinking scale and similarly, the large over-representation of First Nations students at the lower end of the proficiency scale.

### National Proficient Standard

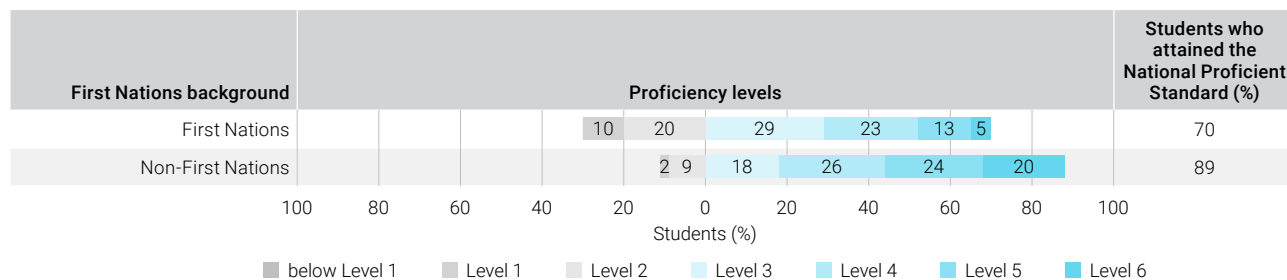
Almost 70% of First Nations students attained the National Proficient Standard in creative thinking compared to 89% of the non-First Nations students.

### High performers

Eighteen per cent of First Nations students were high performers, which was less than twice the proportion of high-performing non-First Nations students (45%).

### Low performers

The proportion of low-performing First Nations students (30%) was higher, and more than double the proportion of low-performing non-First Nations students (11%).



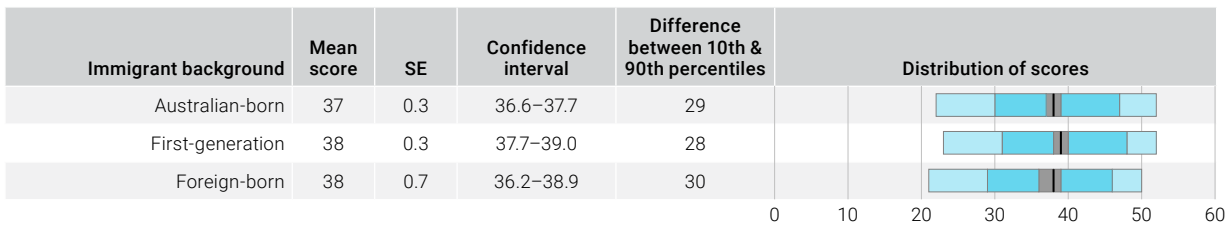
**FIGURE 3.17** Students' proficiency levels in creative thinking, by First Nations background

## Immigrant background

### Performance

Figure 3.18 shows that first-generation students performed higher by 1 score point than Australian-born students (38 compared to 37 score points), while the performances of first-generation and foreign-born students and Australian-born and foreign students were similar.

The spread of scores for students of different immigrant backgrounds ranged from 28 points for first-generation students to 30 points for foreign-born students.



**FIGURE 3.18** Mean scores and distribution of student performance on the creative thinking scale, by immigrant background

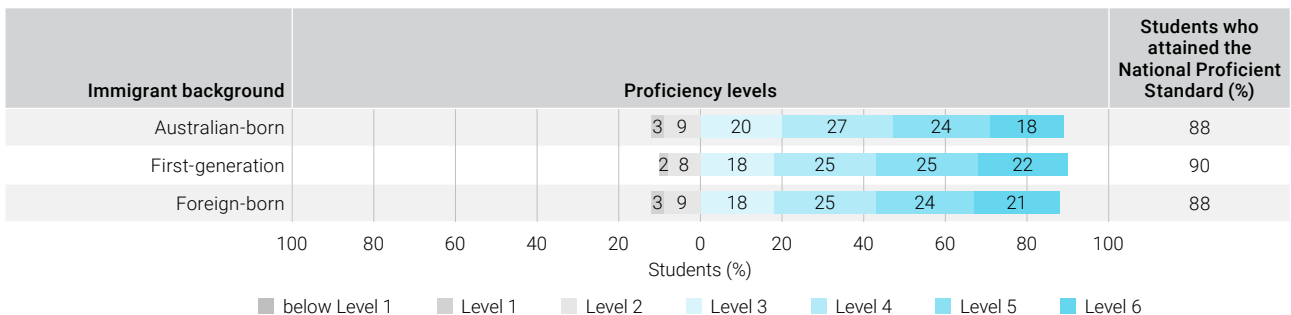
## Proficiency

Figure 3.19 shows the percentage of students by immigrant background on the creative thinking scale.

There were 47% of high-performing first-generation students, 44% of high-performing foreign-born students and 42% of high-performing Australian-born students. There were more high-performing first-generation students (47%) than Australian-born students (42%); however, there were no differences between the proportions of high-performing first-generation students and foreign-born students and between the proportions of high-performing Australian-born students and foreign-born students.

Ninety per cent of first-generation students achieved the National Proficient Standard and 88% each of Australian-born students and foreign-born students attained this level. There was no difference in the proportion of students who attained the National Proficient Standard across the immigrant background groups.

There was 12% each of low-performing Australian-born students and foreign-born students, and 10% of low-performing first-generation students. There were no differences between the proportions of low-performing students across the immigrant backgrounds.



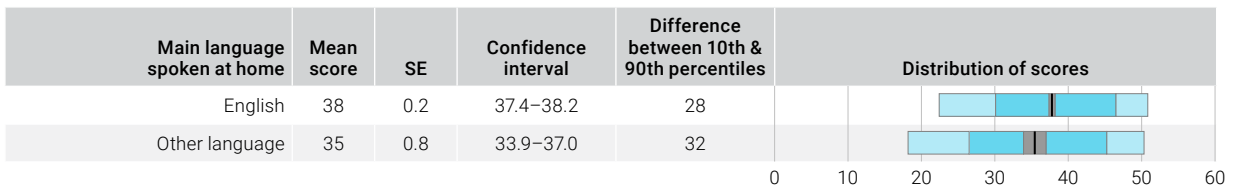
**FIGURE 3.19** Students' proficiency level in creative thinking, by immigrant background

## Language background

### Performance

Figure 3.20 shows the creative thinking performance of students by language background. There was no difference in performance between students whose main language spoken at home was English and students who spoke a language at home other than English.

The spread of scores between the 10th and 90th percentiles was larger for students who spoke a language other than English at home (32 points) compared to the spread of scores for students who spoke English at home (28 points).



**FIGURE 3.20** Mean scores and distribution of student performance on the creative thinking scale, by language background

### Proficiency

Figure 3.21 shows the percentages of students on the creative thinking scale for the 2 language background groups.

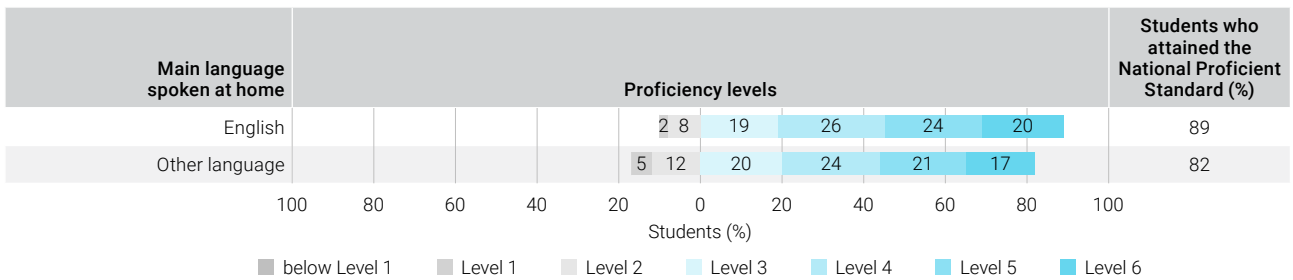
### National Proficient Standard

Eighty-nine per cent of students who spoke English at home attained the National Proficient Standard, which was higher than the 82% of students who spoke a language other than English at home.

### High and low performers

There was no difference between the proportions of high performers who spoke English at home and those who spoke a language other than English at home (13%).

There were fewer low performers who spoke English at home (11%) than low performers who spoke a language other than English at home (18%).



**FIGURE 3.21** Students' proficiency level in creative thinking, by language background

# 4

## Creative thinking from the student perspective

According to the OECD, creative thinking can be applied not only to contexts related to the expression of imagination, such as creative writing or the arts, but also to other areas where the generation of ideas is functional to the investigation of issues, problems or society-wide concerns (OECD, 2024, p. 218).

This chapter focuses on student responses to questionnaire items that measured different aspects of creative thinking. The constructs explored included:

- ▶ creative self-efficacy
- ▶ creativity and openness to intellect
- ▶ creative school and class environment
- ▶ participation in creative activities at school
- ▶ student imagination and adventurousness.

Results are provided for constructed indices designed to standardise responses onto one scale.<sup>1</sup>

Each construct examines the similarities and differences in students' creative thinking between countries, the Australian jurisdictions and different demographic groups. Each section also explores the relationship between each creative thinking construct and creative thinking performance.

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<sup>1</sup> The Reader's guide provides more information about the PISA indices.

## 4.1 Creative self-efficacy

Creative self-efficacy describes an individual's beliefs about their capacity to successfully produce creative work, especially when facing challenging circumstances (Beghetto & Karwowski, 2017). Influenced by other factors such as prior experience, emotional affect and the surrounding environment, creative self-efficacy is fundamental in motivating individuals to overcome obstacles and engage in creative tasks (Beghetto, 2006).

This section focuses on students' creativity and their beliefs about using their creativity to complete creative thinking tasks.

### Measuring creative self-efficacy

Students were asked to rate their level of confidence in their own creative abilities to complete a range of creative thinking tasks on a 4-point scale (not at all confident; not very confident; confident; very confident).

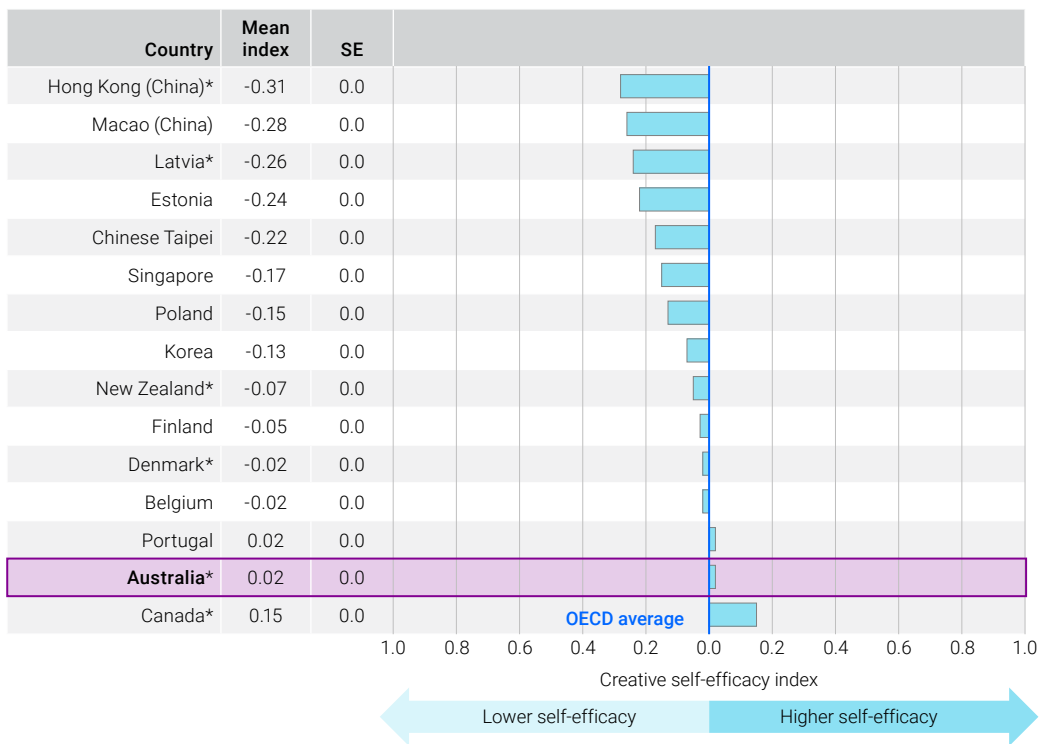
1. *Coming up with creative ideas for school projects.*
2. *Being creative.*
3. *Telling creative stories.*
4. *Expressing your ideas creatively.*
5. *Making creative drawings.*
6. *Thinking of many good ideas for science experiments.*
7. *Inventing new things.*
8. *Thinking of many ideas for solving disagreements with people.*
9. *Addressing social problems like pollution.*
10. *Coming up with many good ideas for helping people in need.*

A Creative self-efficacy index was constructed using the responses to these statements. It was standardised to have a mean of 0 and a standard deviation of 1 across OECD countries. Positive values on the index indicate that the students reported higher creative self-efficacy; lower values indicate that the students had lower creative self-efficacy than on average across the OECD countries.

### Creative self-efficacy in an international context

Figure 4.1 shows the mean index scores for Australia, selected comparison countries, and the OECD average on the Creative self-efficacy index. Countries are presented in order from the lowest to highest mean index score.

- ▶ Of the comparison countries, students from Hong Kong (China), Macao (China), Latvia, Estonia, Chinese Taipei, Singapore, Poland, Korea, New Zealand, Finland, Denmark and Belgium reported lower creative self-efficacy than Australian students.
- ▶ The OECD average on the Creative self-efficacy index (0.00) was also lower than Australia's mean index score (0.02).
- ▶ Students from Canada reported the highest creative self-efficacy (0.15), while students in Hong Kong (China) reported the lowest creative self-efficacy (-0.31).
- ▶ Australia's mean index score of 0.02 was similar to Portugal's.



Note: Countries are ordered from lowest to highest mean index score.

**FIGURE 4.1** Mean scores for the Creative self-efficacy index, for Australia and comparison countries

Figure 4.2 presents the percentages of students who reported they felt confident or very confident about having to do a range of tasks reflective of creative self-efficacy, for Australia, the comparison countries and the OECD average.

- ▶ A higher proportion of students in Australia reported they felt confident or very confident *coming up with creative ideas for school projects, being creative, thinking of many new ideas for solving disagreements with people and coming up with good ideas for helping people in need* than students across the OECD countries.
- ▶ A similar proportion of students in Australia and students across the OECD countries reported they felt confident or very confident *telling creative stories, expressing your ideas creatively, making creative drawings, thinking of many good ideas for science experiments, and addressing social problems like pollution*.
- ▶ A similar proportion of students in Australia and Denmark reported they felt confident *coming up with creative ideas for school projects*.
- ▶ Similar proportions of students in Australia, Latvia, New Zealand, and across the OECD countries reported that they felt confident or very confident *making creative drawings*.
- ▶ Similar proportions of students in Australia, Denmark, Belgium, Korea, New Zealand and across the OECD countries reported that they felt confident or very confident *telling creative stories*.
- ▶ Similar proportions of students in Australia, Canada and Portugal reported that they felt confident or very confident *thinking of many ideas for solving disagreements with people*.
- ▶ Students in Hong Kong (China), Macao (China), Estonia, Chinese Taipei, and Singapore reported that they felt less confident than Australian students on all statements about creative self-efficacy.



Country	Students who reported they feel confident or very confident (%)				
	Coming up with creative ideas for school projects	Being creative	Telling creative stories	Expressing your ideas creatively	Making creative drawings
Hong Kong (China)*	51	57	48	54	48
Macao (China)	43	60	52	56	47
Latvia*	40	65	49	60	56
Estonia	49	67	52	59	53
Chinese Taipei	44	65	51	61	47
Singapore	57	64	47	57	42
Poland	46	66	49	63	51
Korea	55	61	61	57	48
New Zealand*	63	72	61	65	55
Finland	63	69	66	59	53
Denmark*	70	70	63	66	53
Belgium	64	71	62	64	53
Portugal	62	75	58	67	50
<b>Australia*</b>	<b>69</b>	<b>75</b>	<b>62</b>	<b>67</b>	<b>56</b>
Canada*	73	78	68	72	59
<b>OECD average</b>	<b>62</b>	<b>72</b>	<b>61</b>	<b>66</b>	<b>55</b>

Country	Students who reported they feel confident or very confident (%)				
	Thinking of many good ideas for science experiments	Inventing new things	Thinking of many ideas for solving disagreements with people	Addressing social problems like pollution	Coming up with many good ideas for helping people in need
Hong Kong (China)*	43	41	60	43	59
Macao (China)	40	37	61	46	63
Latvia*	39	41	62	49	60
Estonia	42	42	57	53	61
Chinese Taipei	36	38	66	46	70
Singapore	45	43	68	57	66
Poland	43	65	65	58	67
Korea	45	45	62	52	64
New Zealand*	44	48	70	59	67
Finland	45	59	67	61	68
Denmark*	48	51	64	65	71
Belgium	48	56	69	56	71
Portugal	53	64	74	74	75
<b>Australia*</b>	<b>50</b>	<b>49</b>	<b>74</b>	<b>62</b>	<b>72</b>
Canada*	57	56	74	64	74
<b>OECD average</b>	<b>50</b>	<b>58</b>	<b>70</b>	<b>62</b>	<b>70</b>

■ Significantly lower than Australia   
■ Not significantly different from Australia   
■ Significantly higher than Australia

Note: Countries are ordered from lowest to highest mean score on the Creative self-efficacy index.

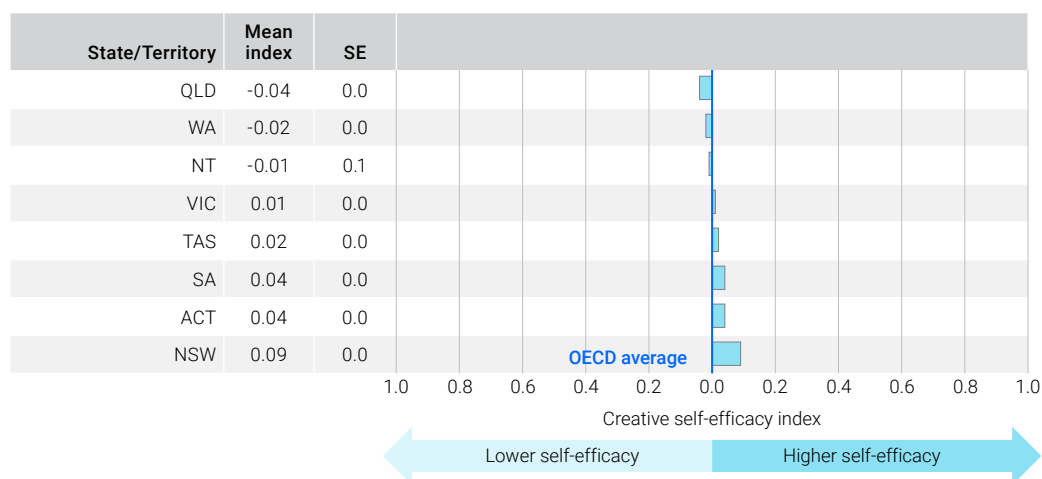
**FIGURE 4.2** Percentages of students who felt confident about statements related to creative self-efficacy, for Australia and comparison countries

## Creative self-efficacy in a national context

Figure 4.3 shows the mean index scores for the Australian states and territories and the OECD average on the Creative self-efficacy index. Jurisdictions are presented in order from the lowest to highest mean index score.

Nationally, the mean index scores for creative self-efficacy ranged from -0.04 in Queensland to 0.09 in New South Wales.

Students in New South Wales reported higher creative self-efficacy than students across the OECD countries, while students in the other jurisdictions reported similar creative self-efficacy to the OECD average.



Note: Jurisdictions are ordered from lowest to highest mean index score.

**FIGURE 4.3** Mean scores for the Creative self-efficacy index, by state and territory

Figure 4.4 presents the percentages of students in the states and territories who reported they felt confident or very confident about having to do a range of tasks reflective of creative self-efficacy.

- ▶ Higher proportions of students in Western Australia, the Northern Territory, Victoria, South Australia, the Australian Capital Territory and New South Wales reported that they were confident *coming up with creative ideas for school projects* than students across the OECD countries. Apart from students in the Australian Capital Territory, a higher proportion of students in those same jurisdictions reported they were more confident in their beliefs about *being creative*.
- ▶ A higher proportion of students in Tasmania and New South Wales reported they were confident in *expressing your ideas creatively* than students across the OECD countries.
- ▶ A higher proportion of students in the Australian Capital Territory than in Victoria reported feeling confident in *thinking of many good ideas for science experiments* than students across the OECD countries.
- ▶ Higher proportions of students in Queensland, Victoria and New South Wales reported feeling confident in *thinking of many ideas for solving disagreements with people* than students across the OECD countries.
- ▶ A higher proportion of students in New South Wales reported feeling confident in *addressing social problems like pollution* than students across the OECD countries. However, a lower proportion of students in Victoria than students across the OECD countries felt confident about this statement.
- ▶ Higher proportions of students in Western Australia and New South Wales reported feeling confident in *coming up with many good ideas for helping people in need* than students across the OECD countries.
- ▶ A lower proportion of students in all jurisdictions except in the Australian Capital Territory than across the OECD countries reported feeling less confident *inventing new things*.

State/Territory	Students who reported they feel <i>confident</i> or <i>very confident</i> (%)				
	Coming up with creative ideas for school projects	Being creative	Telling creative stories	Expressing your ideas creatively	Making creative drawings
QLD	65	73	59	64	53
WA	66	75	60	66	54
NT	71	77	58	64	53
VIC	69	78	63	64	56
TAS	67	74	63	70	54
SA	71	76	62	69	58
ACT	72	74	66	68	53
NSW	71	74	62	70	58
<b>OECD average</b>	62	72	61	66	55

State/Territory	Students who reported they feel <i>confident</i> or <i>very confident</i> (%)				
	Thinking of many good ideas for science experiments	Inventing new things	Thinking of many ideas for solving disagreements with people	Addressing social problems like pollution	Coming up with many good ideas for helping people in need
QLD	51	47	75	57	69
WA	49	49	73	60	73
NT	51	46	66	56	66
VIC	47	48	76	61	72
TAS	49	49	72	61	70
SA	51	51	71	65	73
ACT	55	54	73	62	70
NSW	52	52	75	65	75
<b>OECD average</b>	50	58	70	62	70

■ Significantly lower than the OECD average    
■ Not significantly different from the OECD average    
■ Significantly higher than the OECD average

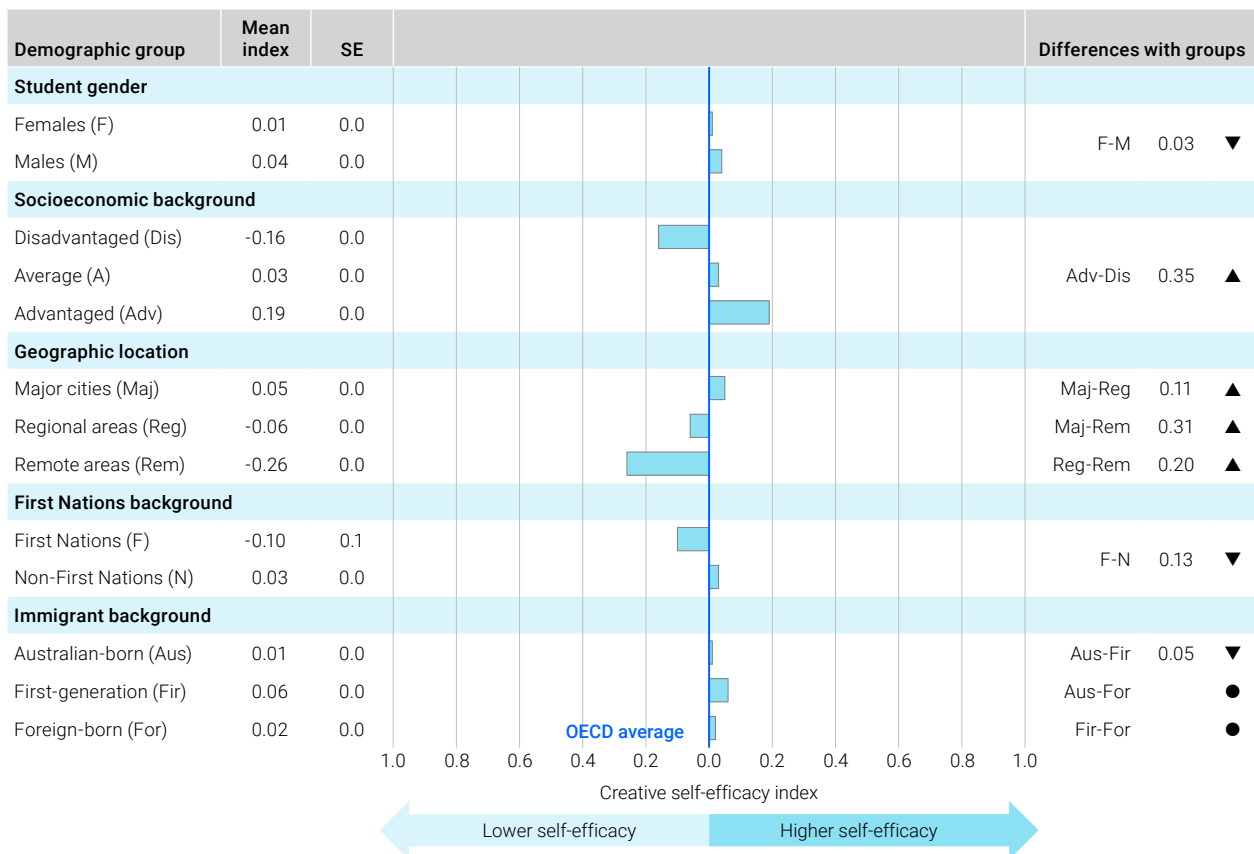
Note: Jurisdictions are ordered from lowest to highest mean score on the Creative self-efficacy index.

**FIGURE 4.4** Percentages of students who felt confident about statements related to creative self-efficacy, by state and territory

## Creative self-efficacy for different demographic groups

Figure 4.5 shows the mean index scores on the Creative self-efficacy index for students for different demographic groups.

- ▶ Female students reported lower creative self-efficacy than male students.
- ▶ Students from advantaged socioeconomic backgrounds reported higher creative self-efficacy than students from disadvantaged socioeconomic backgrounds.
- ▶ Students who attended schools in major cities reported higher creative self-efficacy than students at schools in regional and remote areas.
- ▶ Students from non-First Nations backgrounds reported higher creative self-efficacy than First Nations students.
- ▶ Foreign-born students reported higher creative self-efficacy than Australian-born students. There were no differences between Australian-born and first-generation students or between first-generation students and foreign-born students.



▲ Mean of first group significantly higher than second group  
● No statistically significant difference  
▼ Mean of first group significantly lower than second group

**FIGURE 4.5** Mean scores for the Creative self-efficacy index, for different demographic groups

Table 4.1 presents the percentages of students who reported they felt confident or very confident about having to do a range of tasks reflective of creative self-efficacy, for the different demographic groups.

- ▶ A greater proportion of female than male students reported they felt more confident about *making creative drawings* (58% compared to 52%) and *coming up with good ideas for helping people in need* (75% compared to 69%).
- ▶ A greater proportion of students from advantaged than disadvantaged socioeconomic backgrounds reported that they felt more confident about *addressing social problems like pollution* (72% compared to 50%), *coming up with creative ideas for school projects* (76% compared to 60%), *thinking of many ideas for solving disagreements with people* (81% compared to 67%), *thinking of many good ideas for science experiments* (57% compared to 43%).
- ▶ While the percentage point differences were small (less than 5 percentage points), a greater proportion of students in major city schools than in regional schools reported that they felt confident about having to do a range of tasks creatively. The largest difference was observed for *thinking of many ideas for solving disagreements with people* (76% compared to 68%).
- ▶ A greater proportion of students in major city schools than in remote schools reported that they felt confident about *expressing your ideas creatively* (67% compared to 49%) and *coming up with creative ideas for school projects* (70% compared to 55%).
- ▶ A greater proportion of students in regional schools than in remote schools reported that they felt confident about *expressing your ideas creatively* (64% compared to 49%) and *coming up with creative ideas for school projects* (66% compared to 55%).

- ▶ A lower proportion of First Nations students than non-First Nations students reported that they felt confident *thinking of many ideas for solving disagreements with people* (62% compared to 75%), *addressing social problems like pollution* (51% compared to 62%), and felt more confident in *coming up with creative ideas for school projects* (59% compared to 69%).
- ▶ Small percentage point differences were observed between first-generation students and Australian-born students who reported confidence in *making creative drawings* (58% compared to 54%) and *coming up with many good ideas for helping people in need* (74% compared to 72%).

**TABLE 4.1** Percentages of students who felt confident about statements related to creative self-efficacy, by demographic groups

Demographic group	Students who reported they feel <i>confident</i> or <i>very confident</i> (%)									
	Coming up with creative ideas for school projects		Being creative		Telling creative stories		Expressing your ideas creatively		Making creative drawings	
	%	SE	%	SE	%	SE	%	SE	%	SE
<b>Student gender</b>										
Females	71	0.9	77	0.9	62	1.0	67	1.1	58	0.9
Males	66	1.0	74	0.9	61	1.1	66	0.9	52	0.9
Difference (F-M)	5 pp ▲		3 pp ▲		●		●		6 pp ▲	
<b>Socioeconomic background</b>										
Disadvantaged	60	1.5	72	1.1	55	1.6	59	1.8	54	1.6
Average	69	0.9	76	0.9	63	1.2	67	0.9	56	1.0
Advantaged	76	1.1	77	1.2	66	1.5	71	1.2	56	1.2
Difference (Adv-Dis)	16 pp ▲		5 pp ▲		11 pp ▲		12 pp ▲		●	
<b>Geographic location</b>										
Major cities	70	0.8	76	0.7	63	0.9	67	0.8	56	0.7
Regional areas	66	1.3	74	1.4	59	1.6	64	1.2	54	1.5
Remote areas	55	5.6	72	6.8	52	5.2	49	4.8	54	6.4
Difference (Maj-Reg)	4 pp ▲		●		●		3 pp ▲		●	
Difference (Maj-Rem)	15 pp ▲		●		●		18 pp ▲		●	
Difference (Reg-Rem)	11 pp ▲		●		●		15 pp ▲		●	
<b>First Nations background</b>										
First Nations	59	3.2	76	2.8	58	3.2	62	3.2	56	2.9
Non-First Nations	69	0.7	75	0.7	62	0.8	67	0.7	55	0.6
Difference (F-N)	10 pp ▼		●		●		●		●	
<b>Immigrant background</b>										
Australian-born	69	1.0	75	1.0	62	1.1	67	0.9	54	1.0
First-generation	70	1.2	76	1.2	62	1.5	66	1.3	58	1.1
Foreign-born	66	2.2	75	1.6	59	1.8	67	1.6	56	1.8
Difference (Aus-Fir)	●		●		●		●		4 pp ▼	
Difference (Aus-For)	●		●		●		●		●	
Difference (Fir-For)	●		●		●		●		●	

pp percentage points

▲ Mean of first group significantly higher than second group

● No statistically significant difference

▼ Mean of first group significantly lower than second group

**TABLE 4.1 (continued)** Percentages of students who felt confident about statements related to creative self-efficacy, by demographic groups

Demographic group	Students who reported they feel <i>confident</i> or <i>very confident</i> (%)									
	Thinking of many good ideas for science experiments		Inventing new things		Thinking of many ideas for solving disagreements with people		Addressing social problems like pollution		Coming up with many good ideas for helping people in need	
	%	SE	%	SE	%	SE	%	SE	%	SE
<b>Student gender</b>										
Females	43	0.9	44	1.0	75	0.8	64	1.0	75	0.8
Males	57	0.9	55	0.9	74	0.9	59	1.1	69	0.8
Difference (F-M)	14 pp ▼		11 pp ▼		●		5 pp ▲		6 pp ▲	
<b>Socioeconomic background</b>										
Disadvantaged	43	1.5	46	1.3	67	1.3	50	1.8	67	1.6
Average	50	0.9	49	1.0	75	0.9	61	1.0	72	0.8
Advantaged	57	1.5	55	1.4	81	1.1	72	1.2	78	1.2
Difference (Adv-Dis)	14 pp ▲		9 pp ▲		14 pp ▲		22 pp ▲		12 pp ▲	
<b>Geographic location</b>										
Major cities	50	0.8	50	0.7	76	0.7	63	0.9	73	0.6
Regional areas	49	1.5	48	1.5	68	1.2	58	1.6	69	1.3
Remote areas	45	7.5	39	7.9	68	6.5	59	5.3	67	4.6
Difference (Maj-Reg)	●		●		8 pp ▲		5 pp ▲		4 pp ▲	
Difference (Maj-Rem)	●		●		●		●		●	
Difference (Reg-Rem)	●		●		●		●		●	
<b>First Nations background</b>										
First Nations	48	3.7	50	3.3	62	3.3	51	3.2	70	2.7
Non-First Nations	50	0.6	49	0.7	75	0.6	62	0.8	72	0.6
Difference (F-N)	●		●		13 pp ▼		11 pp ▼		●	
<b>Immigrant background</b>										
Australian-born	49	0.9	50	1.0	74	0.8	61	1.1	72	0.8
First-generation	52	1.1	50	1.3	74	1.1	64	1.3	74	1.0
Foreign-born	49	2.2	48	2.1	77	1.9	61	1.9	71	1.7
Difference (Aus-Fir)	●		●		●		●		2 pp ▼	
Difference (Aus-For)	●		●		●		●		●	
Difference (Fir-For)	●		●		●		●		●	

pp percentage points

▲ Mean of first group significantly higher than second group

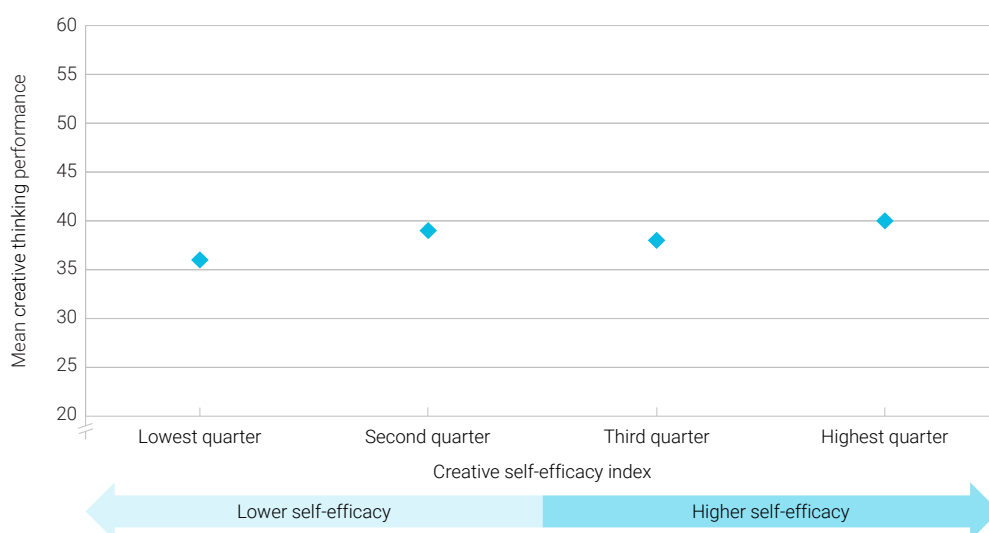
● No statistically significant difference

▼ Mean of first group significantly lower than second group

## The relationship between creative self-efficacy and creative thinking performance

Figure 4.6 shows the relationship between creative self-efficacy (by quarters) and creative thinking performance.

On the Creative self-efficacy index, students in the highest quarter scored 3 points on average higher than students in the lowest quarter in creative thinking performance.



**FIGURE 4.6** Creative thinking self-efficacy and creative thinking performance, for Australia

## 4.2 Creativity and openness to intellect

Openness to intellect describes an individual’s receptivity to appreciate and engage with abstract and complex information, primarily through reasoning (DeYoung et al. 2014). Openness to intellect is an empirically derived dimension of personality that reflects individual differences in the ability and tendency to seek, detect, comprehend, utilize, and appreciate complex patterns of information, both sensory and abstract. These processes can be described as cognitive exploration, where cognition is taken broadly to include both reasoning and perception (DeYoung et al. 2014).

Students who are high in openness to intellect have a broad range of interests. They are curious about the world and other people and are eager to learn new things and enjoy new experiences.

This section focuses on student’s creativity and openness to intellect.

### Measuring openness to intellect

Students were asked to rate their agreement to statements about their views on their openness to intellect on a 4-point scale (strongly disagree, disagree, agree, strongly agree).

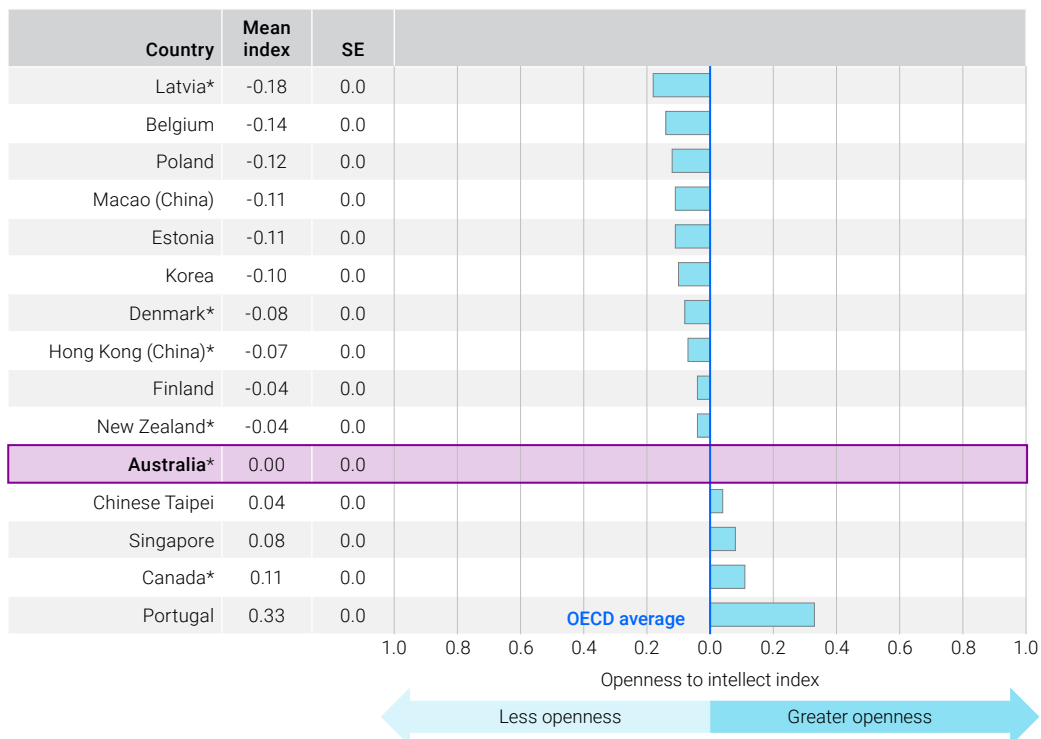
1. *Doing something creative satisfies me.*
2. *I am very creative.*
3. *I like creating stories.*
4. *I like games that require creative solutions.*
5. *I enjoy thinking about new ways to solve problems.*
6. *I enjoy solving complex problems.*
7. *I like school work that is challenging.*
8. *I can suggest several solutions to problems.*
9. *I enjoy learning new things.*

An Openness to intellect index was constructed using the responses to these statements. The index was standardised to have mean of 0 and a standard deviation of 1 across OECD countries. Positive values on the index indicate that the students reported greater openness to intellect; lower values indicate that the student had less openness to intellect than on average across the OECD countries.

## Openness to intellect in an international context

Figure 4.7 shows the mean index scores for Australia, selected comparison countries, and the OECD average on the Openness to intellect index. Countries are presented in order from the lowest to highest mean index score.

- ▶ Of the comparison countries, students in New Zealand, Finland, Hong Kong (China), Denmark, Korea, Estonia, Macao (China), Poland, Belgium, and Latvia reported less openness to intellect than Australian students.
- ▶ Students in Portugal reported the highest openness to intellect (0.33), while students in Latvia reported the least openness to intellect (-0.18).
- ▶ The mean index score of 0.00 for Australia was similar to that of students in Chinese Taipei, and students on average across the OECD (0.00).



Note: Countries are ordered from lowest to highest mean index score.

**FIGURE 4.7** Mean scores for the Openness to intellect index, for Australia and comparison countries

Figure 4.8 presents the percentages of students who agreed or strongly agreed with statements about their own views on their openness to intellect, for Australia, the comparison countries and across the OECD countries.

- ▶ A higher proportion of Australian students agreed or strongly agreed *I am very creative, and I enjoy projects that require creative solutions* than students on average across the OECD countries.
- ▶ A similar proportion of Australian students and students on average across the OECD countries agreed or strongly agreed *doing something creative satisfies me, I like creating stories, I like games that challenge my creativity, I enjoy thinking about new ways to solve problems, I enjoy solving complex problems, I like school work that is challenging, and I enjoy learning new things*.
- ▶ A similar proportion of students in Australia, New Zealand and Hong Kong (China) agreed or strongly agreed *doing something creative satisfies me, I like creating stories, I enjoy solving complex problems, I like school work that is challenging, and I enjoy learning new things*.
- ▶ A lower proportion of students in Macao (China), Latvia, Estonia, Poland, Korea, and Belgium reported agreement with statements regarding their own views on their openness to intellect than Australian students.



Country	Students who reported they agree or strongly agree (%)				
	Doing something creative satisfies me	I am very creative	I like creating stories	I like games that challenge my creativity	I enjoy projects that require creative solutions
Hong Kong (China)*	80	56	58	67	62
Macao (China)	81	53	53	71	60
Latvia*	72	61	51	73	65
Estonia	76	60	51	70	65
Chinese Taipei	85	59	54	72	69
Singapore	81	55	57	75	69
Poland	80	68	70	71	64
Korea	71	54	62	63	53
New Zealand*	79	65	55	73	67
Finland	79	64	55	70	63
Denmark*	70	53	55	69	61
Belgium	69	61	52	63	64
Portugal	94	70	81	84	79
<b>Australia*</b>	79	66	57	73	69
Canada*	83	70	60	76	70
<b>OECD average</b>	78	64	57	72	66

Country	Students who reported they agree or strongly agree (%)				
	I enjoy thinking about new ways to solve problems	I enjoy solving complex problems	I like school work that is challenging	I can suggest several solutions to problems	I enjoy learning new things
Hong Kong (China)*	69	56	51	63	82
Macao (China)	67	47	41	57	79
Latvia*	64	43	28	59	74
Estonia	65	49	40	69	80
Chinese Taipei	76	50	47	62	84
Singapore	73	62	49	68	88
Poland	58	40	39	57	75
Korea	61	45	48	63	77
New Zealand*	65	52	49	59	84
Finland	65	57	37	66	75
Denmark*	64	57	51	70	87
Belgium	66	48	45	65	84
Portugal	83	61	64	72	94
<b>Australia*</b>	68	54	49	64	83
Canada*	69	57	51	68	86
<b>OECD average</b>	68	53	48	67	83

■ Significantly lower than Australia    
■ Not significantly different from Australia    
■ Significantly higher than Australia

Note: Countries are ordered from lowest to highest mean score on the Openness to intellect index.

**FIGURE 4.8** Percentages of students who reported they agreed or strongly agreed with statements about their openness to intellect, for Australia and comparison countries

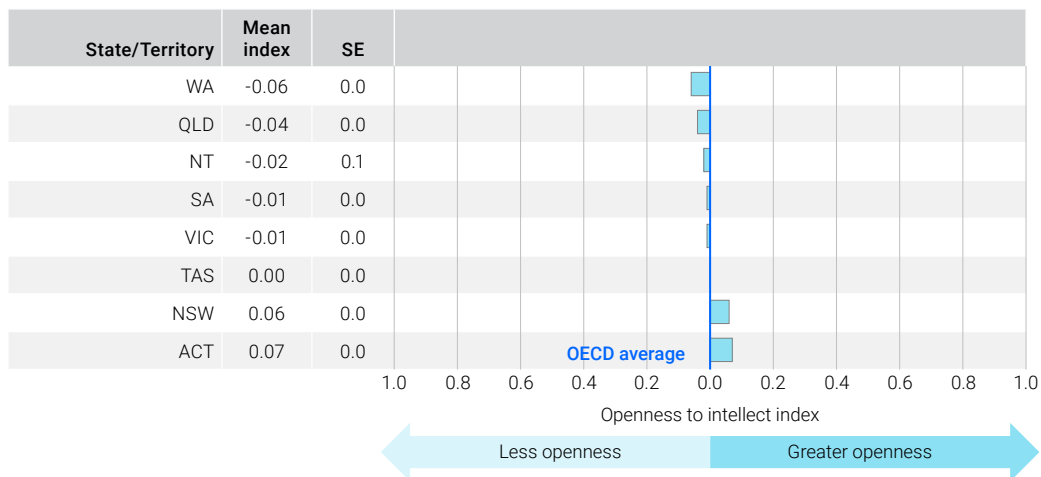
## Openness to intellect in a national context

Figure 4.9 shows the mean index scores for the Australian states and territories and the OECD average on the Openness to intellect index. Jurisdictions are presented in order from the lowest to highest mean index score.

Nationally, the mean index scores for openness to intellect ranged from -0.06 in Western Australia to 0.07 in the Australian Capital Territory.

Students in New South Wales reported greater openness to intellect than students on average across the OECD countries. And students in the other jurisdictions reported similar openness to intellect as students across the OECD countries, except for students in Western Australia who reported less openness to intellect.

Students in the Australian Capital Territory reported higher openness to intellect than students in Queensland and Western Australia.



Note: Jurisdictions are ordered from lowest to highest mean index score.

**FIGURE 4.9** Mean scores for the Openness to intellect index, by state and territory

Figure 4.10 presents the percentages of students in the states and territories who agreed or strongly agreed with statements about their own views on their openness to intellect.

- ▶ A higher proportion of students in Queensland, South Australia, Victoria, New South Wales and the Australian Capital Territory reported *I enjoy projects that require creative solutions* than students on average across the OECD countries.
- ▶ A higher proportion of students in South Australia and New South Wales agreed or strongly agreed *I am very creative* than students on average across the OECD countries.
- ▶ A higher proportion of students in the Australian Capital Territory reported they agreed or strongly agreed *doing something creative satisfies me* and *I like school work that is challenging* than students on average across the OECD countries. A higher proportion of students in Victoria reported that they agreed or strongly agreed *I can suggest several solutions to problems* than students on average across the OECD countries.
- ▶ A lower proportion of students in Western Australia reported they agreed *I like creating stories*, and less students in Queensland and Tasmania agreed *I can suggest several solutions to problems* than students on average across the OECD countries.

State/Territory	Students who reported they agree or strongly agree (%)				
	Doing something creative satisfies me	I am very creative	I like creating stories	I like games that challenge my creativity	I enjoy projects that require creative solutions
WA	79	64	53	72	64
QLD	77	65	55	72	70
NT	78	72	55	71	65
SA	80	69	59	71	72
VIC	80	65	57	72	70
TAS	79	64	59	73	67
NSW	79	69	58	74	70
ACT	83	67	56	74	74
<b>OECD average</b>	78	64	57	72	66

State/Territory	Students who reported they agree or strongly agree (%)				
	I enjoy thinking about new ways to solve problems	I enjoy solving complex problems	I like school work that is challenging	I can suggest several solutions to problems	I enjoy learning new things
WA	67	53	45	63	81
QLD	66	53	47	63	83
NT	69	52	40	61	85
SA	66	50	51	63	83
VIC	69	53	50	64	84
TAS	63	57	52	60	84
NSW	69	55	51	65	83
ACT	70	54	54	72	84
<b>OECD average</b>	68	53	48	67	83

■ Significantly lower than the OECD average    
■ Not significantly different from the OECD average    
■ Significantly higher than the OECD average

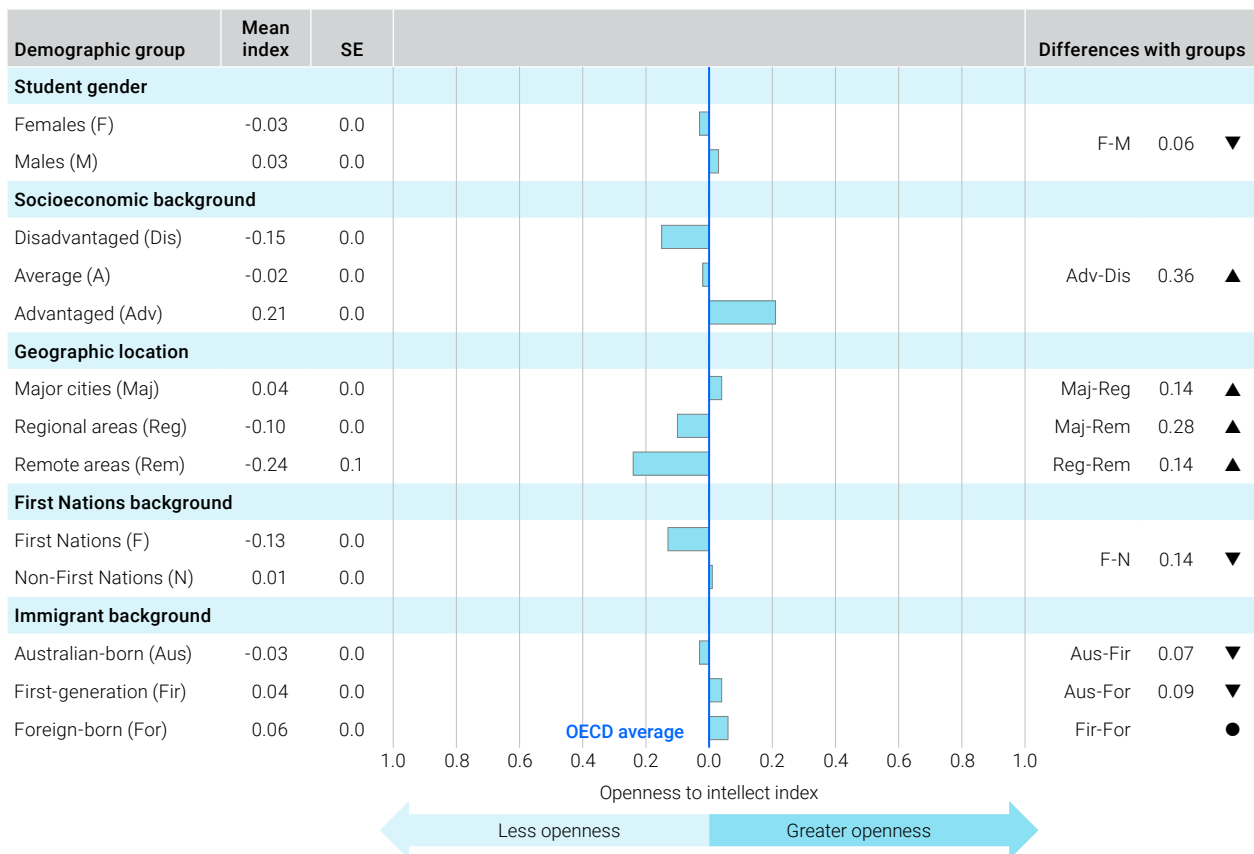
Note: Jurisdictions are ordered from lowest to highest mean score on the Openness to intellect index.

**FIGURE 4.10** Percentages of students who agreed or strongly agreed with statements about their openness to intellect, by state and territory

## Openness to intellect for different demographic groups

Figure 4.11 shows the mean index scores on the Openness to intellect index for students for different demographic groups.

- ▶ Male students reported higher openness to intellect than female students.
- ▶ Students from advantaged socioeconomic backgrounds reported higher openness to intellect than students from disadvantaged socioeconomic backgrounds.
- ▶ Students who attended schools in major cities reported higher openness to intellect than students at schools in regional and remote areas.
- ▶ Students from First Nations backgrounds reported lower openness to intellect than non-First Nations students.
- ▶ Australian-born students reported less openness to intellect than first-generation born students and foreign-born students. There were no differences between first generation born students and foreign-born students.



▲ Mean of first group significantly higher than second group  
● No statistically significant difference  
▼ Mean of first group significantly lower than second group

**FIGURE 4.11** Mean scores for the Openness to intellect index, for different demographic groups

Table 4.2 presents the percentages of students who reported they agreed or strongly agreed with statements about their openness to intellect, for the different demographic groups.

- ▶ A greater proportion of male than female students reported *I like games that challenge my creativity* (78% compared to 67%), *I enjoy thinking about new ways to solve problems* (72% compared to 63%), *I enjoy solving complex problems* (62% compared to 46%), *I like school work that is challenging* (53% compared to 46%), and *I can suggest several solutions to problems* (66% compared to 61%).
- ▶ A greater proportion of female than male students reported *doing something creative satisfies me* (81% compared to 77%), *I am very creative* (69% compared to 63%), and *I like creating stories* (60% compared to 53%).
- ▶ A greater proportion of students from advantaged than disadvantaged socioeconomic backgrounds agreed with the statements about their own views on their openness to intellect. The largest differences were observed for the statements *I enjoy projects that require creative solutions* (76% compared to 64%), *I enjoy thinking about new ways to solve problems* (79% compared to 60%), *I enjoy solving complex problems* (65% compared to 46%), *I like school work that is challenging* (59% compared to 41%), *I can suggest several solutions to problems* (74% compared to 55%), and *I enjoy learning new things* (89% compared to 76%).
- ▶ A greater proportion of students in major city schools reported *I enjoy thinking about new ways to solve problems* (69% compared to 63%), *I enjoy solving complex problems* (55% compared to 50%), *I can suggest several solutions to problems* (65% compared to 60%). All other significant differences between students in major city schools and regional schools ranged between 3% and 4% in favour of students in major city schools.
- ▶ The largest differences in the proportion of students in major city schools compared to students in remote schools were observed for the statements *doing something creative satisfies me* (80% compared to 86%), *I like games that challenge my creativity* (74% compared to 63%), *I enjoy projects that require creative solutions* (70% compared to 53%), and *I like school work that is challenging* (50% compared to 38%).

- ▶ A lower proportion of First Nations students than non-First Nations students reported *I enjoy projects that require creative solutions* (61% compared to 70%), *I like school work that is challenging* (41% compared to 49%), *I enjoy learning new things* (75% compared to 83%), *I enjoy solving complex problems* (48% compared to 54%), and *I enjoy thinking about new ways to solve problems* (65% compared to 68%).
- ▶ A smaller proportion of Australian-born students than first-generation born students reported *I like games that challenge my creativity* (70% compared to 75%), *I like creating stories* (55% compared to 59%) and *I enjoy thinking about new ways to solve problems* (66% compared to 69%).
- ▶ A smaller proportion of Australian-born students than foreign-born students reported *I enjoy thinking about new ways to solve problems* (66% compared to 73%), *I like games that challenge my creativity* (70% compared to 75%), *I enjoy learning new things* (82% compared to 87%) and *I can suggest several solutions to problems* (63% compared to 67%).
- ▶ A smaller proportion of first-generation born than foreign-born students reported *I enjoy thinking about new ways to solve problems* (69% compared to 73%) and *I can suggest several solutions to problems* (64% compared to 67%).

**TABLE 4.2** Percentages of students who agreed or strongly agreed with statements about their openness to intellect, by demographic groups

Demographic group	Students who reported they agree or strongly agree (%)									
	Doing something creative satisfies me		I am very creative		I like creating stories		I like games that challenge my creativity		I enjoy projects that require creative solutions	
	%	SE	%	SE	%	SE	%	SE	%	SE
<b>Student gender</b>										
Females	81	0.9	69	0.9	60	0.9	67	1.0	69	0.9
Males	77	0.8	63	1.0	53	1.2	78	0.9	70	1.0
Difference (F-M)	4 pp ▲		6 pp ▲		7 pp ▲		11 pp ▼		●	
<b>Socioeconomic background</b>										
Disadvantaged	77	1.3	65	1.7	55	1.6	70	1.5	64	1.6
Average	80	0.8	66	1.0	55	1.0	72	0.9	69	0.9
Advantaged	80	1.1	68	1.3	62	1.2	76	1.2	76	1.1
Difference (Adv-Dis)	●		●		7 pp ▲		6 pp ▲		12 pp ▲	
<b>Geographic location</b>										
Major cities	80	0.6	67	0.7	58	0.9	74	0.8	70	0.9
Regional areas	77	1.5	65	1.5	53	1.7	70	1.4	67	1.6
Remote areas	86	5.0	59	6.6	46	4.3	63	5.2	53	7.7
Difference (Maj-Reg)	4 pp ▲		●		●		3 pp ▲		3 pp ▲	
Difference (Maj-Rem)	15 pp ▲		●		●		18 pp ▲		17 pp ▲	
Difference (Reg-Rem)	11 pp ▲		●		●		15 pp ▲			
<b>First Nations background</b>										
First Nations	77	2.9	70	3.2	54	3.6	73	3.3	61	3.3
Non-First Nations	79	0.6	66	0.7	57	0.8	73	0.7	70	0.7
Difference (F-N)	●		●		●		●		9 pp ▼	
<b>Immigrant background</b>										
Australian-born	78	0.8	67	1.0	55	0.9	70	1.0	70	0.9
First-generation	81	1.1	67	1.3	59	1.5	75	1.1	69	1.4
Foreign-born	80	1.7	63	1.8	57	2.0	75	1.7	69	1.7
Difference (Aus-Fir)	3 pp ▼		●		4 pp ▼		5 pp ▼		●	
Difference (Aus-For)	●		●		●		5 pp ▼		●	
Difference (Fir-For)	●		●		●		●		●	

pp percentage points

▲ Mean of first group significantly higher than second group

● No statistically significant difference

▼ Mean of first group significantly lower than second group

**TABLE 4.2 (continued)** Percentages of students who agreed or strongly agreed with statements about their openness to intellect, by demographic groups

Demographic group	Students who reported they agree or strongly agree (%)									
	I enjoy thinking about new ways to solve problems		I enjoy solving complex problems		I like school work that is challenging		I can suggest several solutions to problems		I enjoy learning new things	
	%	SE	%	SE	%	SE	%	SE	%	SE
<b>Student gender</b>										
Females	63	1.1	46	1.1	46	1.0	61	1.0	83	0.9
Males	72	1.1	62	0.9	53	1.1	66	1.0	83	0.9
Difference (F-M)	9 pp ▼		16 pp ▼		7 pp ▼		5 pp ▼		●	
<b>Socioeconomic background</b>										
Disadvantaged	60	1.7	46	1.4	41	1.8	55	1.6	76	1.4
Average	66	1.0	51	1.0	48	0.9	63	1.0	83	0.9
Advantaged	79	1.2	65	1.5	59	1.3	74	1.2	89	0.9
Difference (Adv-Dis)	19 pp ▲		19 pp ▲		18 pp ▲		19 pp ▲		13 pp ▲	
<b>Geographic location</b>										
Major cities	69	0.9	55	0.8	50	0.8	65	0.8	84	0.8
Regional areas	63	1.8	50	1.4	47	1.6	60	1.9	80	1.3
Remote areas	62	5.8	40	8.4	38	6.0	51	2.9	76	6.3
Difference (Maj-Reg)	6 pp ▲		5 pp ▲		3 pp ▲		5 pp ▲		4 pp ▲	
Difference (Maj-Rem)	7 pp ▲		●		12 pp ▲		14 pp ▲		8 pp ▲	
Difference (Reg-Rem)										
<b>First Nations background</b>										
First Nations	65	3.0	48	3.3	41	3.1	61	3.1	75	2.8
Non-First Nations	68	0.9	54	0.8	49	0.8	64	0.8	83	0.7
Difference (F-N)	3 pp ▼		6 pp ▼		8 pp ▼		●		8 pp ▼	
<b>Immigrant background</b>										
Australian-born	66	1.1	52	1.0	48	1.0	63	1.1	82	0.8
First-generation	69	1.2	55	1.3	50	1.4	64	1.3	84	1.1
Foreign-born	73	1.7	56	1.7	52	2.2	67	1.6	87	1.4
Difference (Aus-Fir)	3 pp ▼		●		●		●		●	
Difference (Aus-For)	7 pp ▼		●		●		4 pp ▼		5 pp ▼	
Difference (Fir-For)	4 pp ▼		●		●		3 pp ▼		●	

pp percentage points

▲ Mean of first group significantly higher than second group

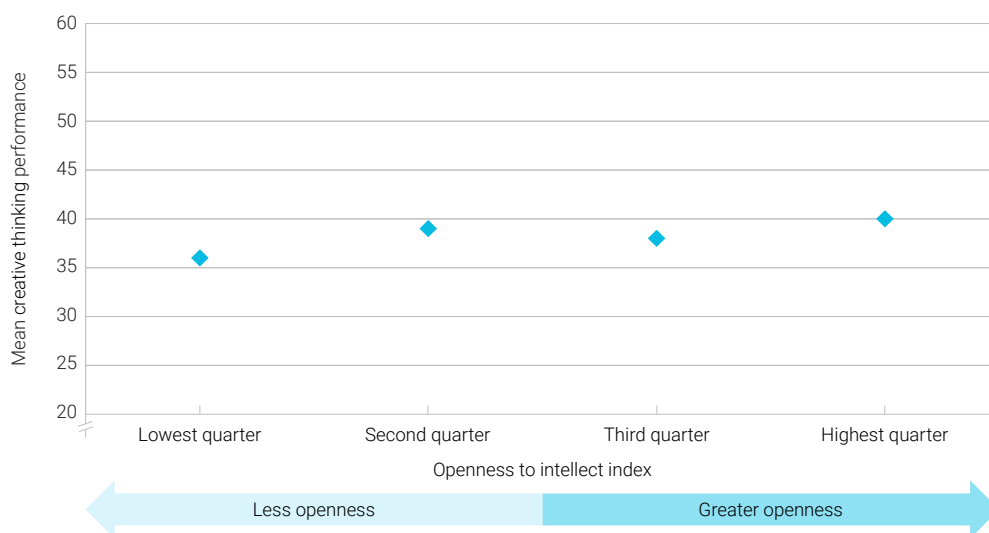
● No statistically significant difference

▼ Mean of first group significantly lower than second group

## The relationship between openness to intellect and creative thinking performance

Figure 4.12 shows the relationship between openness to intellect (by quarters) and creative thinking performance.

On the Openness to intellect index, students in the highest quarter scored 4 points on average higher than students in the lowest quarter in creative thinking performance.



**FIGURE 4.12** Openness to intellect and creative thinking performance, for Australia

### 4.3 Creative school and class environment

The classroom environment where students spend hours each day provides teachers with the opportunity to nurture and cultivate creativity.

The teacher and the ways they organise learning and teaching is a main component of the pedagogic environment. Davies et al. (2014) suggest that teacher skills and attitudes, a willingness to act as a role model, awareness of learners’ needs, flexible approaches to curriculum and lesson structure, particular types of classroom interaction with pupils, together with the use of ICT and assessment, are also important components of teaching for creativity.

This section focuses on students’ creativity and their beliefs about using their creativity to complete creative thinking tasks.

#### Measuring creative school and class environment

Students were asked to rate their agreement to statements about the degree to which creative thinking is fostered and supported in their school and class environment on a 4-point scale (strongly disagree, disagree, agree, strongly agree).

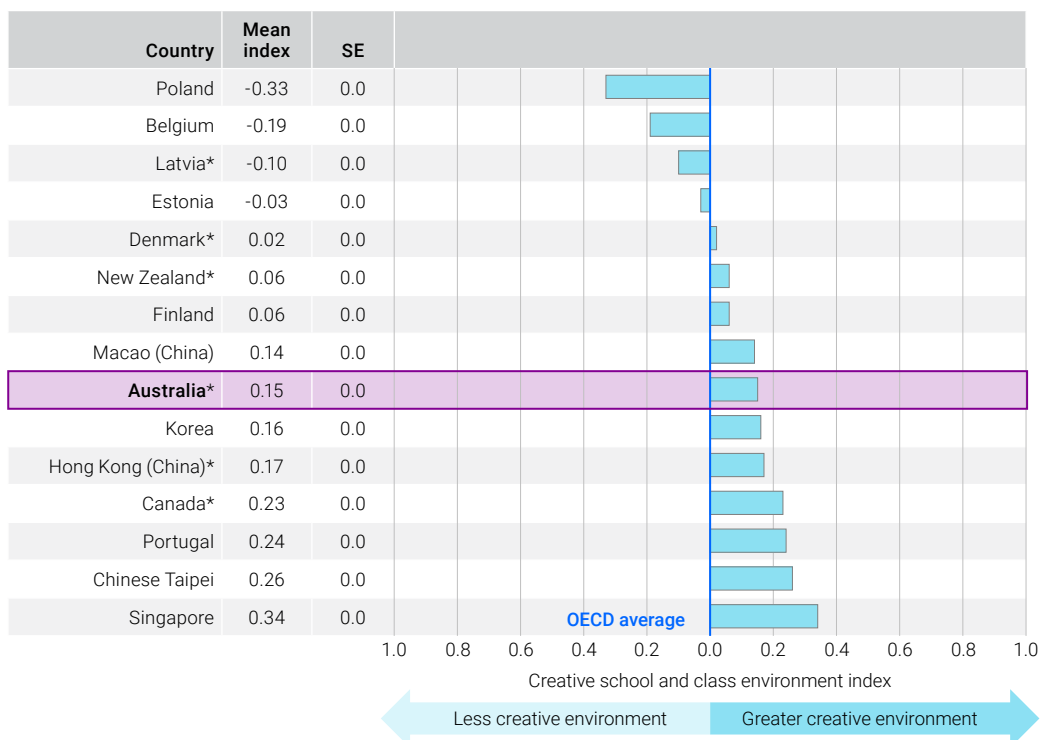
1. *My teachers give me enough time to come up with creative solutions on assignments.*
2. *My teachers value students’ creativity.*
3. *The activities we do in my classes help me think about new ways to solve problems.*
4. *My mathematics assignments require me to come up with different solutions for a problem.*
5. *My teachers encourage me to come up with original answers.*
6. *At school, I am given a chance to express my ideas.*

A Creative school and class environment index was constructed using the responses to these statements. It was standardised to have mean of 0 and a standard deviation of 1 across the OECD countries. Positive values on the index indicate that the students reported creative thinking is fostered and supported in their school and class environment to a greater extent; lower values indicate that the student reported this environment was supported to a lesser extent than on average across the OECD countries.

## Creative school and class environment in an international context

Figure 4.13 shows the mean index scores for Australia, selected comparison countries, and the OECD average on the Creative school and class environment index. Countries are presented in order from the lowest to highest mean index score.

- ▶ Of the comparison countries, students in Finland, New Zealand, Denmark, Estonia, Latvia, Belgium, Poland and students on average across the OECD countries reported a less creative school and class environment than Australian students.
- ▶ Students in Singapore reported the highest creative school and class environment (0.33), while students in Poland reported the least pedagogies encouraging creative thinking (-0.33).
- ▶ Australia's mean index score of 0.15 was similar to that of students in Hong Kong (China), Korea, and Macao (China). It was also higher than students on average across the OECD countries (0.00).



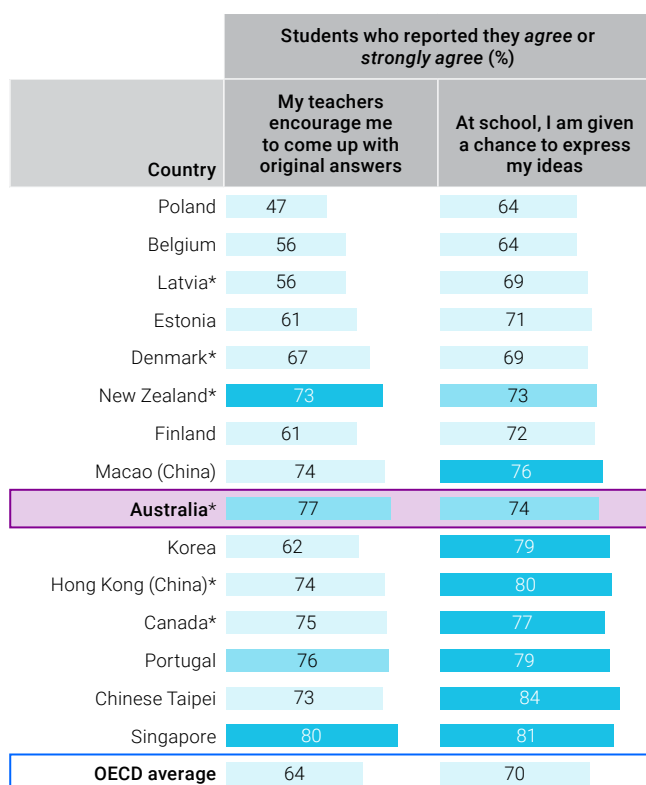
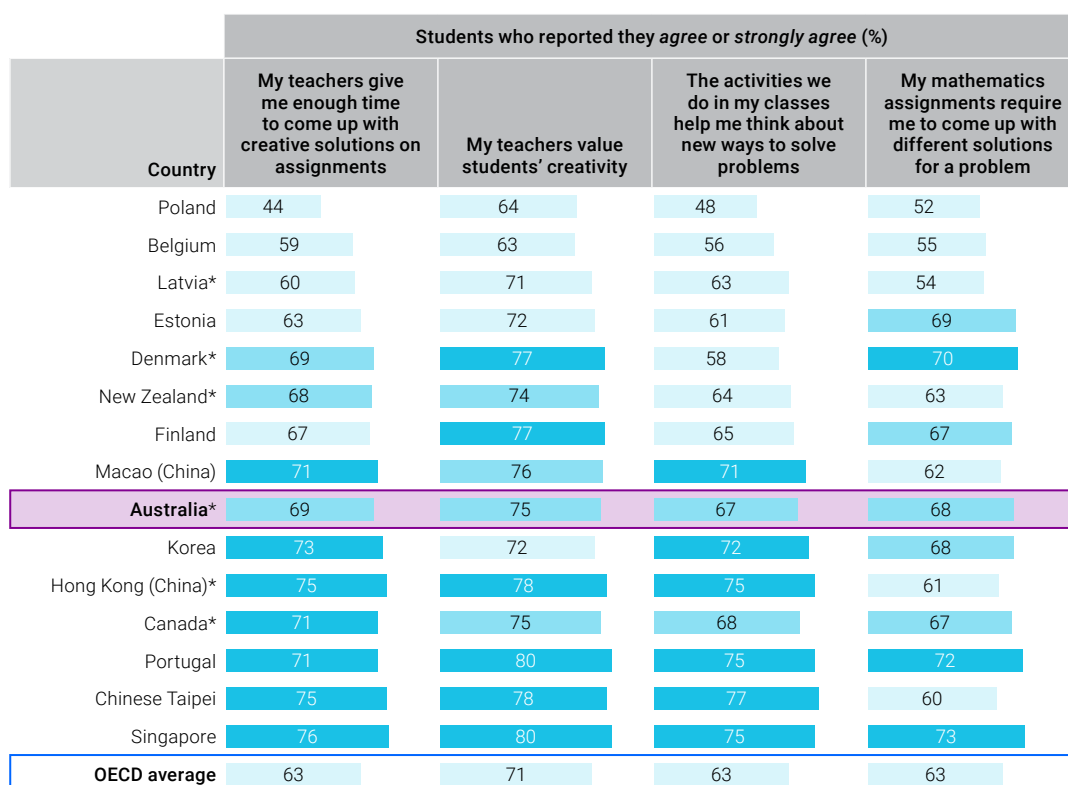
Note: Countries are ordered from lowest to highest mean index score.

**FIGURE 4.13** Mean scores for the Creative school and class environment index, for Australia and comparison countries

Figure 4.14 presents the percentages of students agreed or strongly agreed with statements about the degree to which creative thinking is fostered and supported in their school and class environment, for Australia, the comparison countries and the OECD average.

- ▶ A higher proportion of Australian students than students on average across the OECD countries reported that they agreed or strongly agreed with all 6 statements. The largest difference was for the statement *my teachers encourage me to come up with original answers*.
- ▶ A similar proportion of students in Australia and New Zealand agreed or strongly agreed *my teachers give me enough time to come up with creative solutions on assignments, my teachers value students' creativity, and at school, I am given a chance to express my ideas*.
- ▶ Higher proportions of students in Macao (China), Korea, Hong Kong (China), Canada, Portugal, Chinese Taipei and Singapore than students in Australia agreed *my teachers give me enough time to come up with creative solutions on assignments and at school I am given a chance to express my ideas*.
- ▶ A lower proportion of students in Poland, Belgium, Latvia, and students on average across the OECD countries agreed with all 6 statements regarding pedagogies encouraging creative thinking than Australian students.





■ Significantly lower than Australia    
■ Not significantly different from Australia    
■ Significantly higher than Australia

Note: Countries are ordered from lowest to highest mean score on the Creative school and class environment index.

**FIGURE 4.14** Percentage of students who reported agreement with statements about a creative school and class environment, for Australia and comparison countries

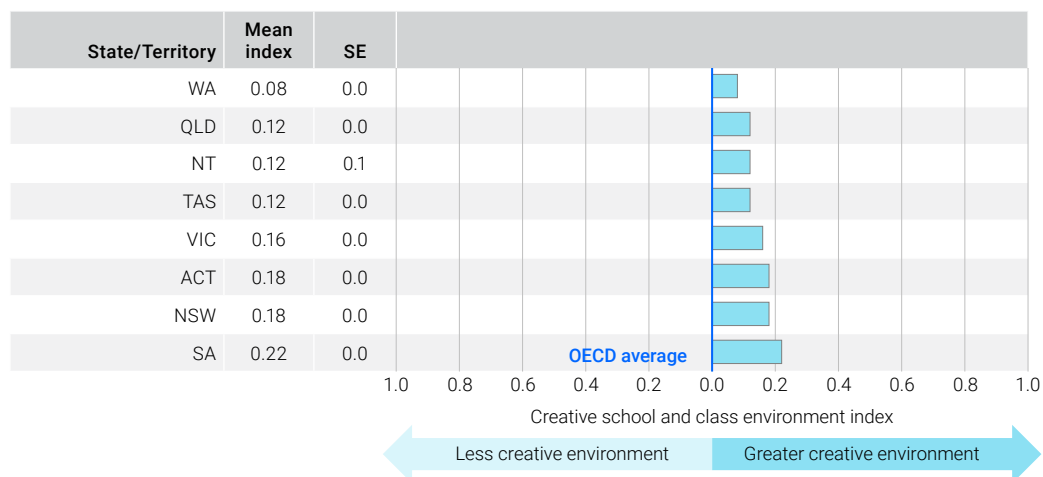
## Creative school and class environment in a national context

Figure 4.15 shows the mean index scores for the Australian states and territories and the OECD average on the Creative school and class environment index. Jurisdictions are presented in order from the lowest to highest mean index score.

Nationally, the mean index scores for creative school and class environment ranged from 0.08 in Western Australia to 0.22 in South Australia.

Students in South Australia reported a greater creative school and class environment than students in Tasmania, Queensland and Western Australia, and students on average across the OECD countries.

Students in all jurisdictions reported a greater creative school and class environment than students across the OECD countries.

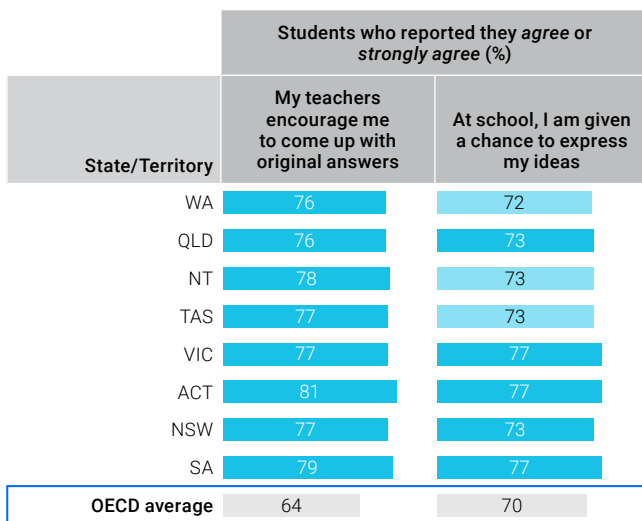
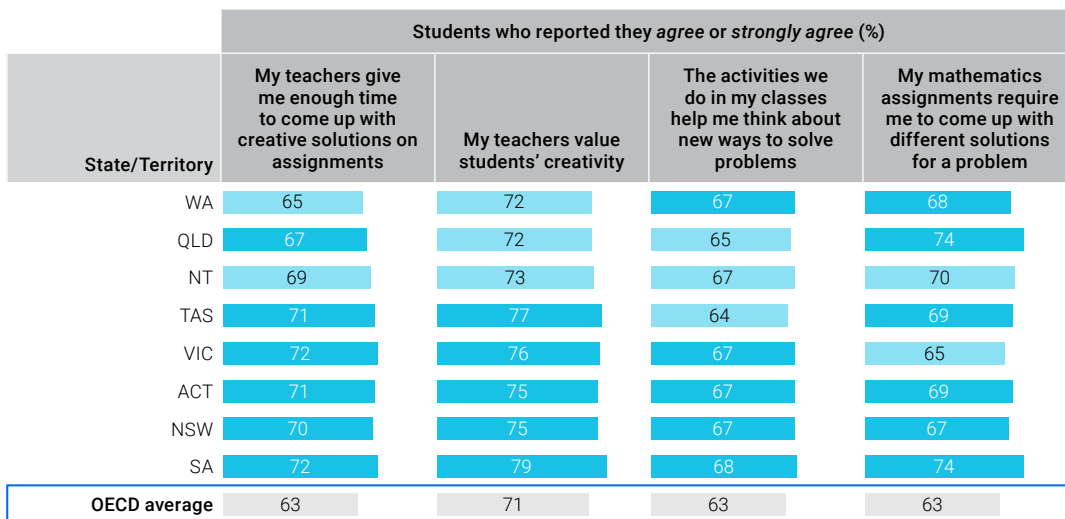


Note: Jurisdictions are ordered from lowest to highest mean index score.

**FIGURE 4.15** Mean scores for the Creative school and class environment index, by state and territory

Figure 4.16 presents the percentages of students in the states and territories who agreed or strongly agreed with statements about the degree to which creative thinking is fostered and supported in their school and class environment.

- ▶ A higher proportion of students in all jurisdictions except Western Australia and the Northern Territory reported *my teachers give me enough time to come up with creative solutions on assignments* than students across the OECD countries.
- ▶ A higher proportion of students in all jurisdictions except Western Australia, Queensland and the Northern Territory reported *my teachers value students' creativity* than students across the OECD countries.
- ▶ A higher proportion of students in all jurisdictions except Queensland, the Northern Territory and Tasmania reported *the activities we do in my class help me think about new ways to solve problems* than students across the OECD countries.
- ▶ A higher proportion of students in all jurisdictions except Western Australia, the Northern Territory and Tasmania reported *at school, I am given a chance to express my ideas* than students across the OECD countries.



■ Significantly lower than the OECD average    
■ Not significantly different from the OECD average    
■ Significantly higher than the OECD average

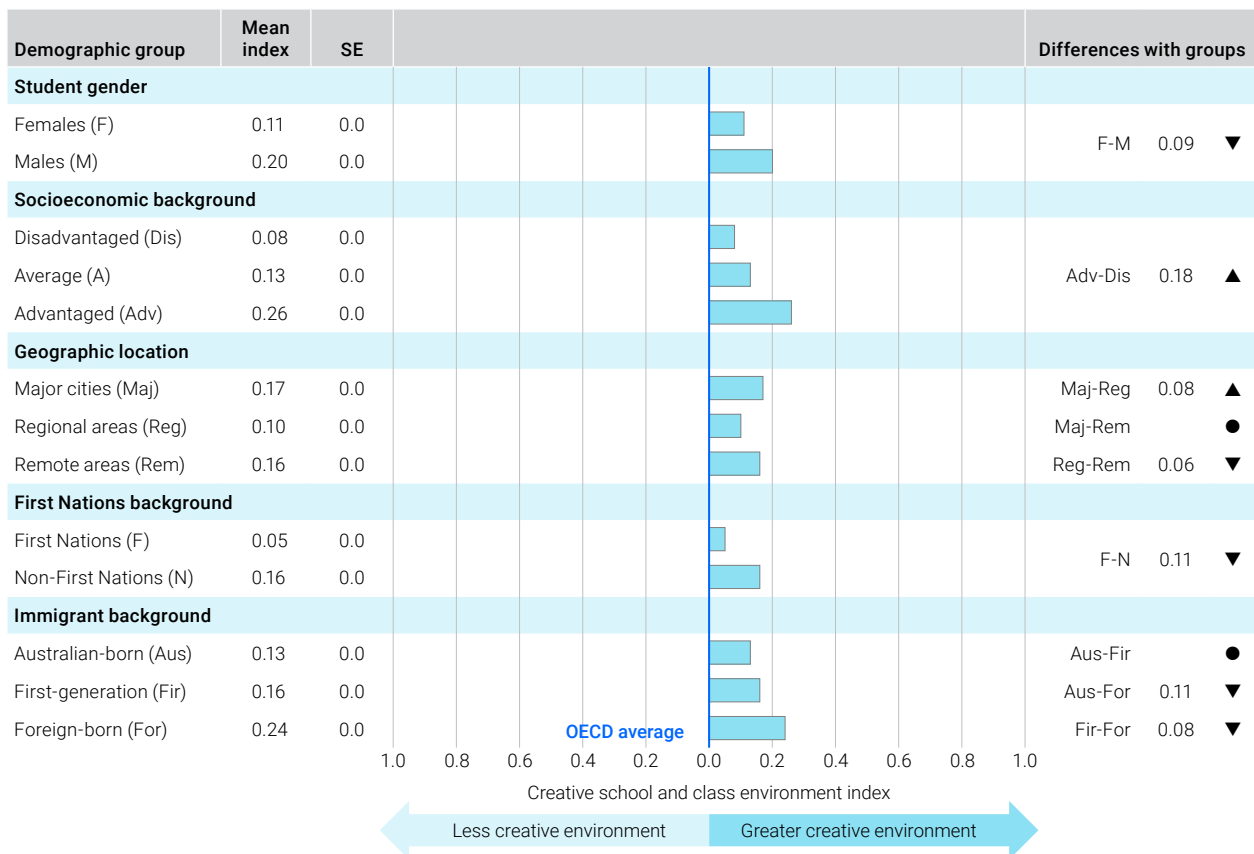
Note: Jurisdictions are ordered from lowest to highest mean score on the Creative school and class environment index.

**FIGURE 4.16** Percentages of students who agreed with statements about a creative school and class environment, by state and territory

## Creative school and class environment for different demographic groups

Figure 4.17 shows the mean index scores on the Creative school and class environment index for students for different demographic groups.

- ▶ Male students reported a greater creative school and class environment than female students.
- ▶ Students from advantaged socioeconomic backgrounds reported a greater creative school and class environment than students from disadvantaged socioeconomic backgrounds.
- ▶ Students who attended schools in major cities reported a greater creative school and class environment than students at schools in regional schools, while students who attended schools in regional areas reported a lower creative school and class environment than students at schools in remote areas.
- ▶ Students from First Nations backgrounds reported a less creative school and class environment than non-First Nations students.
- ▶ Australian-born students reported a less creative school and class environment than foreign-born students. There were no differences between Australian-born students and first-generation students.



▲ Mean of first group significantly higher than second group  
● No statistically significant difference  
▼ Mean of first group significantly lower than second group

**FIGURE 4.17** Mean scores for the Creative school and class environment index, for different demographic groups

Table 4.3 presents the percentages of students who agreed or strongly agreed with statements about the degree to which creative thinking is fostered and supported in their school and class environment, for the different demographic groups.

- ▶ A higher proportion of male than female students agreed *my teachers give me enough time to come up with creative solutions on assignments* (72% compared to 67%), *the activities we do in my classes help me think about new ways to solve problems* (69% compared to 65%), and *my mathematics assignments require me to come up with different solutions for a problem* (70% compared to 67%).
- ▶ A higher proportion of students from advantaged than disadvantaged socioeconomic backgrounds agreed *my teachers encourage me to come up with original answers* (81% compared to 74%), *my teachers value students' creativity* (77% compared to 72%), *the activities we do in my classes help me think about new ways to solve problems* (71% compared to 66%), and *at school, I am given a chance to express my ideas* (78% compared to 70%). To a lesser extent more students from advantaged than disadvantaged socioeconomic backgrounds agreed *my teachers give me enough time to come up with creative solutions on assignments* (89% compared to 76%).
- ▶ While students in major city schools reported a greater creative school and class environment than students in regional schools, the differences were small. More students in major city schools than in regional schools agreed *the activities we do in my classes help me think about new ways to solve problems* (68% compared to 64%), *my teachers encourage me to come up with original ideas* (78% compared to 75%) and *at school, I am given a chance to explain my ideas* (75% compared to 61%).
- ▶ A higher proportion of students in major city schools than in remote schools agreed *at school, I am given a chance to explain my ideas* (75% compared to 61%), while a higher proportion of students in regional schools than remote schools agreed with this statement (71% compared to 61%).
- ▶ A lower proportion of First Nations students than non-First Nations students agreed *my teachers encourage me to come up with original answers* (71% compared to 77%), and *at school, I am given a chance to express my ideas*. (69% compared to 74%).

- ▶ A smaller proportion of Australian-born students than first-generation students agreed *I like games that challenge my creativity* (70% compared to 75%), *I like creating stories* (55% compared to 59%) and *I enjoy thinking about new ways to solve problems* (66% compared to 69%).
- ▶ A smaller proportion of Australian-born students than first-generation students agreed *the activities we do in my classes help me think about new ways to solve problems* (65% compared to 68%), and *at school, I am given a chance to express my idea* (72% compared to 76%).
- ▶ A smaller proportion of Australian-born students than foreign-born students agreed *my teachers give me enough time to come up with creative solutions on assignments* (68% compared to 73%), *my teachers value students' creativity* (74% compared to 77%), *the activities we do in my classes help me think about new ways to solve problems* (65% compared to 70%), and *at school I am given a chance to express my ideas* (72% compared to 77%).

**TABLE 4.3** Percentages of students who reported they agreed with statements about a creative school and class environment, by demographic groups

Demographic group	Students who reported they agree or strongly agree (%)							
	My teachers give me enough time to come up with creative solutions on assignments		My teachers value students' creativity		The activities we do in my classes help me think about new ways to solve problems		My mathematics assignments require me to come up with different solutions for a problem	
	%	SE	%	SE	%	SE	%	SE
<b>Student gender</b>								
Females	67	0.8	75	0.7	65	0.8	67	0.7
Males	72	0.8	74	0.7	69	0.7	70	0.8
Difference (F-M)	5 pp ▼		●		4 pp ▼		3 pp ▼	
<b>Socioeconomic background</b>								
Disadvantaged	69	1.0	72	1.2	66	1.0	67	1.0
Average	69	0.9	75	0.7	65	0.9	68	0.8
Advantaged	72	0.8	77	0.8	71	1.1	70	1.1
Difference (Adv-Dis)	3 pp ▲		5 pp ▲		5 pp ▲		●	
<b>Geographic location</b>								
Major cities	70	0.7	75	0.6	68	0.6	69	0.7
Regional areas	68	1.2	73	1.1	64	1.1	68	1.0
Remote areas	66	4.4	70	4.4	54	3.7	67	4.7
Difference (Maj-Reg)	●		●		4 pp ▲		●	
Difference (Maj-Rem)	●		●		14 pp ▲		●	
Difference (Reg-Rem)	●		●		10 pp ▲		●	
<b>First Nations background</b>								
First Nations	65	2.5	70	2.3	64	2.2	68	2.0
Non-First Nations	70	0.6	75	0.5	67	0.6	68	0.6
Difference (F-N)	●		●		●		●	
<b>Immigrant background</b>								
Australian-born	68	0.8	74	0.6	65	0.7	68	0.9
First-generation	70	0.8	75	0.8	68	0.9	68	1.1
Foreign-born	73	1.6	77	1.5	70	1.3	71	1.3
Difference (Aus-Fir)	●		●		3 pp ▼		●	
Difference (Aus-For)	5 pp ▼		3 pp ▼		5 pp ▼		●	
Difference (Fir-For)	●		●		●		●	

pp percentage points

▲ Mean of first group significantly higher than second group

● No statistically significant difference

▼ Mean of first group significantly lower than second group

**TABLE 4.3 (continued)** Percentages of students who reported they agreed with statements about a creative school and class environment, by demographic groups

Demographic group	Students who reported they agree or strongly agree (%)			
	My teachers encourage me to come up with original answers		At school, I am given a chance to express my ideas	
	%	SE	%	SE
<b>Student gender</b>				
Females	77	0.7	73	0.7
Males	77	0.7	75	0.7
Difference (F-M)	●		●	
<b>Socioeconomic background</b>				
Disadvantaged	74	1.1	70	1.1
Average	76	0.6	74	0.7
Advantaged	81	0.9	78	0.7
Difference (Adv-Dis)	7 pp ▲		8 pp ▲	
<b>Geographic location</b>				
Major cities	78	0.6	75	0.6
Regional areas	75	0.8	71	1.1
Remote areas	75	3.6	61	4.1
Difference (Maj-Reg)	3 pp ▲		4 pp ▲	
Difference (Maj-Rem)	●		14 pp ▲	
Difference (Reg-Rem)	●		10 pp ▲	
<b>First Nations background</b>				
First Nations	71	1.9	69	2.3
Non-First Nations	77	0.5	74	0.5
Difference (F-N)	6 pp ▼		5 pp ▼	
<b>Immigrant background</b>				
Australian-born	77	0.6	72	0.7
First-generation	77	0.8	76	0.8
Foreign-born	79	1.3	77	1.2
Difference (Aus-Fir)	●		4 pp ▼	
Difference (Aus-For)	●		5 pp ▼	
Difference (Fir-For)	●		●	

pp percentage points

▲ Mean of first group significantly higher than second group

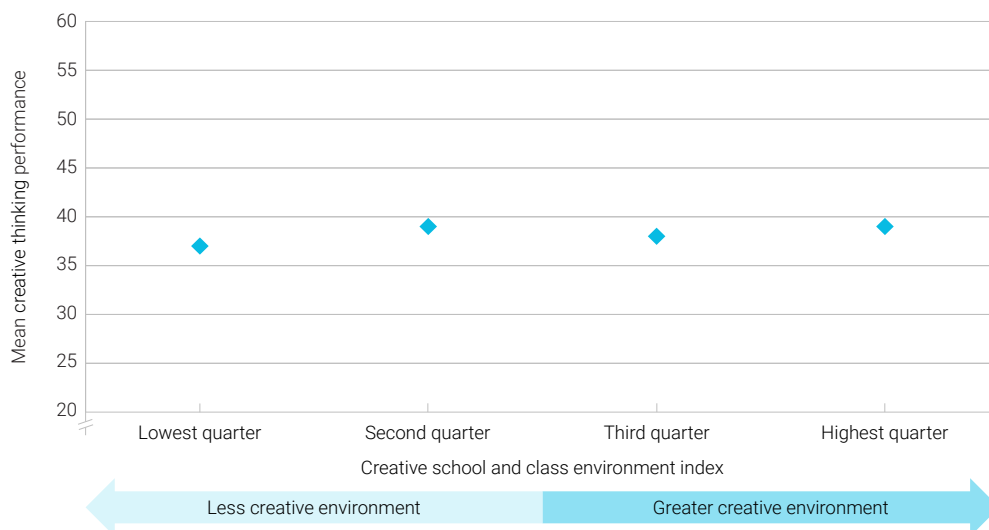
● No statistically significant difference

▼ Mean of first group significantly lower than second group

## The relationship between creative school and class environment and creative thinking performance

Figure 4.18 shows the relationship between openness to intellect (by quarters) and creative thinking performance.

On the Creative school and class environment index, students in the highest quarter scored 2 points on average higher than students in the lowest quarter on creative thinking performance.



**FIGURE 4.18** Mean scores for the creative school and class environment and creative thinking performance, for Australia

## 4.4 Participation in creative activities at school

Creative activities can improve learning and memory consolidation. When students actively engage in creative tasks related to the topic, they may better comprehend and retain the information. When the instructional process incorporates creative elements, student motivation and engagement can be increased. Students become more invested in their studies when they are encouraged to explore and express their ideas creatively. Engaging in creative activities can aid in reducing stress and anxiety, which can positively affect academic performance (Tzachrista et al.2023).

This section focuses on students' frequency and participation in creative activities in school.

### Measuring participation in creative activities at school

Students were asked to rate how often they participated in creative activities at their school on a 5-point scale (never or almost never, about once or twice a year, about once or twice a month, about once or twice a week, every day or almost every day) and an additional response option (not available at school).

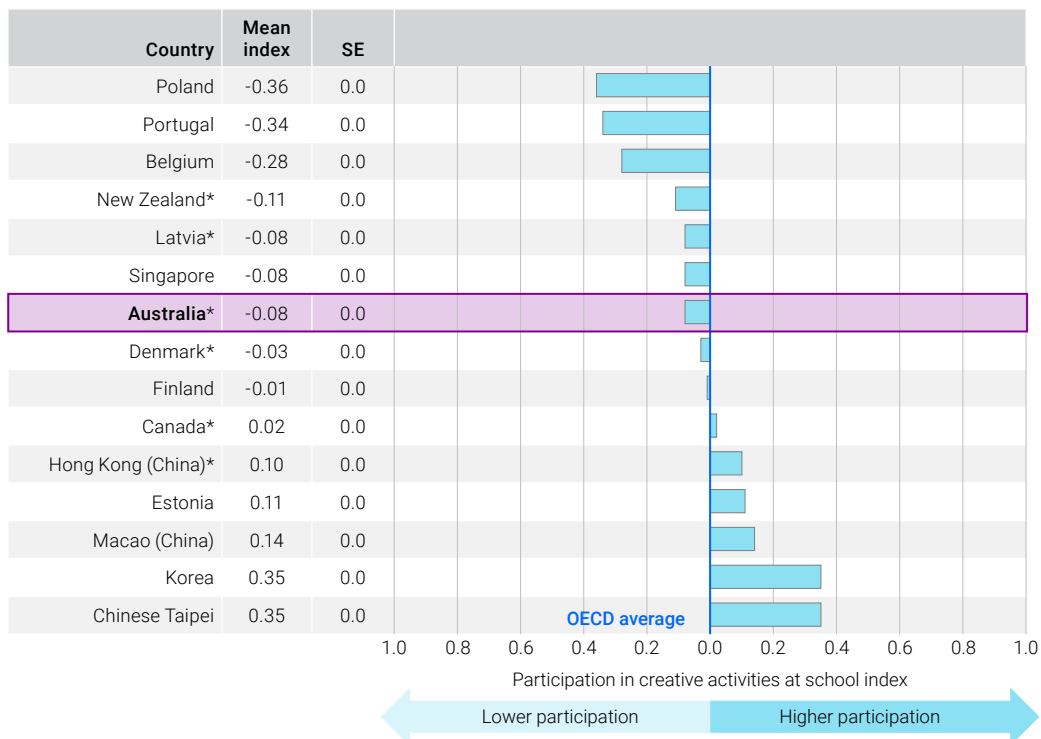
1. *Art classes/activities (e.g. painting, drawing).*
2. *Creative writing classes/activities.*
3. *Debate club.*
4. *Dramatics, theatre class/activities.*
5. *Publications (e.g. newspaper, yearbook, literary magazine).*
6. *Science club.*
7. *Computer programming classes/activities.*

A Participation in creative activities at school index was constructed using the responses to these activities. It was standardised to have mean of 0 and a standard deviation of 1 across OECD countries. Positive values on the index indicate that the students reported greater participation in creative activities at school; lower values indicate less student participation than on average across OECD countries.

## Participation in creative activities at school in an international context

Figure 4.19 shows the mean index scores for Australia, selected comparison countries, and the OECD average on the Participation in creative activities at school index. Countries are presented in order from the lowest to highest mean index score.

- ▶ Of the comparison countries, students in Poland, Portugal, Belgium, New Zealand, Latvia, Singapore, Australia, and Denmark reported the least participation in creative activities at school.
- ▶ Students in Chinese Taipei and Korea reported the highest participation in creative activities at school (0.35), while students in Poland reported the least participation in creative activities at school (-0.36).
- ▶ Australia's mean index score of -0.08 was similar to students in New Zealand, Latvia and Singapore, but lower than that of students on average across OECD countries (0.00).



Note: Countries are ordered from lowest to highest mean index score.

**FIGURE 4.19** Mean scores for the Participation in creative activities at school index, for Australia and comparison countries

Figure 4.20 presents the percentages of students who reported they participated in creative activities at school about once or twice a week or every day or almost every day, for Australia, the comparison countries and the OECD average.

- ▶ A higher proportion of Australian students than students on average across OECD countries participated in *creative writing classes/activities*, and *dramatics, theatre class/activities*, about once or twice a week or every day or almost every day.
- ▶ Similar proportions of students in Australia and New Zealand participated in *art classes/activities, music classes/activities, dramatics, theatre class/activities* and *computer programming classes/activities*.
- ▶ Higher proportions of students in Chinese Taipei, Korea, Macao (China), Estonia and Hong Kong (China) than in Australia participated in *art classes/activities, music classes/activities, debate club, publications, and science club*. Higher proportions of students in Chinese Taipei, Korea, Macao (China) also participated in computer programming classes/activities.
- ▶ Similar proportions of students in Australia and New Zealand participated in *art classes/activities, music classes/activities, dramatics, theatre class/activities* and *computer programming classes/activities*.
- ▶ Lower proportions of students in Portugal, Belgium and Singapore than in Australia participated in *art classes/activities, creative writing classes/activities, dramatics, theatre class/activities, and science club*.



Students who reported they participated <i>about once or twice a week or every day or almost every day</i> (%)					
Country	Art classes/ activities (e.g. painting, drawing)	Creative writing classes/activities	Music classes/ activities (e.g. chorus, band)	Debate club	Dramatics, theatre class/activities
Poland	13	6	9	7	8
Portugal	10	7	7	7	6
Belgium	16	9	14	5	7
New Zealand*	25	21	18	6	12
Latvia*	30	17	25	8	10
Singapore	15	15	18	4	8
<b>Australia*</b>	25	23	19	7	13
Denmark*	9	10	9	9	6
Finland	32	19	22	7	9
Canada*	28	23	19	8	16
Hong Kong (China)*	29	16	33	8	12
Estonia	53	21	53	9	10
Macao (China)	55	25	58	8	12
Korea	60	27	55	12	8
Chinese Taipei	44	22	53	10	29
<b>OECD average</b>	26	16	21	10	11

Students who reported they participated <i>about once or twice a week or every day or almost every day</i> (%)			
Country	Publications (e.g. newspaper, yearbooks, literary magazine)	Science club	Computer programming classes/activities
Poland	7	8	13
Portugal	5	6	7
Belgium	5	6	12
New Zealand*	5	6	14
Latvia*	9	9	12
Singapore	6	6	12
<b>Australia*</b>	6	7	13
Denmark*	5	15	9
Finland	7	7	14
Canada*	8	9	15
Hong Kong (China)*	9	9	16
Estonia	9	10	14
Macao (China)	7	14	38
Korea	8	16	29
Chinese Taipei	12	13	37
<b>OECD average</b>	9	11	17

■ Significantly lower than Australia    
■ Not significantly different from Australia    
■ Significantly higher than Australia

Note: Countries are ordered from lowest to highest mean score on the Participation in creative activities at school index.

**FIGURE 4.20** Percentages of students who reported participating in creative activities at school, for Australia and comparison countries

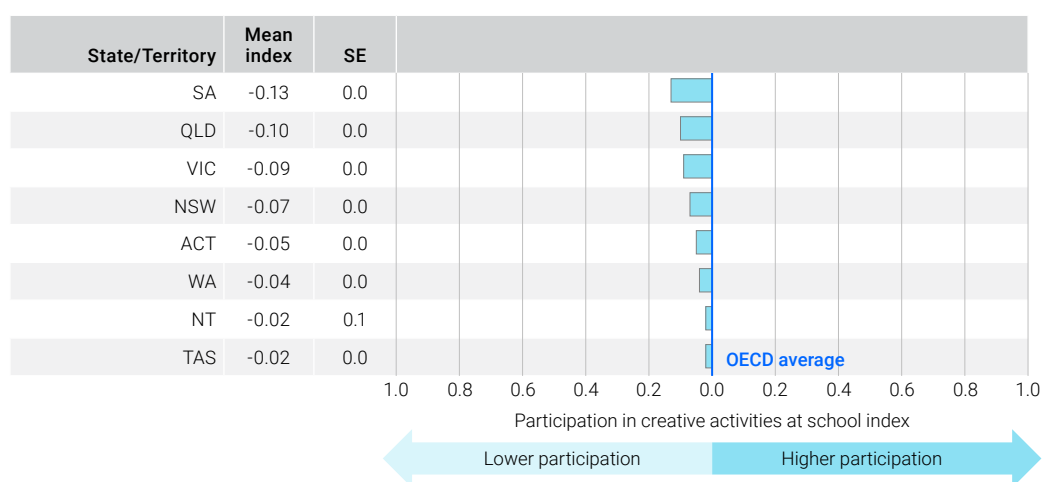
## Participation in creative activities at school in a national context

Figure 4.21 shows the mean index scores for the Australian states and territories and the OECD average on the Participation in creative activities index. Jurisdictions are presented in order from the lowest to highest mean index score.

Nationally, the mean index scores for participation in creative activities ranged from -0.13 in South Australia to -0.02 in Tasmania.

Students in South Australia reported lower participation in creative activities at school than students in the Australian Capital Territory, Western Australia and Tasmania, and students on average across the OECD countries.

Students in Western Australia, the Northern Territory and Tasmania reported similar participation in creative activities at school than students across the OECD, while students in the remaining jurisdictions reported lower participation in creative activities than students across the OECD countries.



Note: Jurisdictions are ordered from lowest to highest mean index score.

**FIGURE 4.21** Mean scores for the Participation in creative activities at school index, by state and territory

Figure 4.22 presents the percentages of students in the states and territories who reported they participated in creative activities at school about once or twice a week or every day or almost every day.

- ▶ A higher proportion of students in Tasmania reported that they participated in *art classes/activities* and *music classes/activities* than students on average across the OECD countries.
- ▶ Higher proportions of students in all jurisdictions reported that they participated in *creative writing class/activities* than students on average across the OECD countries. Students in all jurisdictions except Victoria participated in *dramatics, theatre class/activities* than students across the OECD countries.
- ▶ Similar proportions of students in all jurisdictions reported they participated in *debate club* to students on average across the OECD countries.
- ▶ Lower proportions of students in all jurisdictions except the Northern Territory participated in *science club*. Less students in all jurisdictions except in Western Australia and Tasmania participated in *computer programming classes/activities* than students on average across the OECD countries.

State/Territory	Students who reported they participated <i>about once or twice a week or every day or almost every day</i> (%)				
	Art classes/ activities (e.g. painting, drawing)	Creative writing classes/activities	Music classes/ activities (e.g. chorus, band)	Debate club	Dramatics, theatre class/activities
SA	28	21	20	6	15
QLD	26	23	17	8	15
VIC	27	24	21	6	11
NSW	23	24	19	8	14
ACT	24	24	20	6	15
WA	26	20	20	6	15
NT	28	27	18	5	17
TAS	32	25	26	6	17
<b>OECD average</b>	26	16	21	10	11

State/Territory	Students who reported they participated <i>about once or twice a week or every day or almost every day</i> (%)		
	Publications (e.g. newspaper, yearbooks, literary magazine)	Science club	Computer programming classes/activities
SA	5	6	12
QLD	6	8	13
VIC	5	6	11
NSW	6	7	13
ACT	5	6	12
WA	5	7	15
NT	7	9	14
TAS	7	6	11
<b>OECD average</b>	9	11	17

■ Significantly lower than the OECD average    
■ Not significantly different from the OECD average    
■ Significantly higher than the OECD average

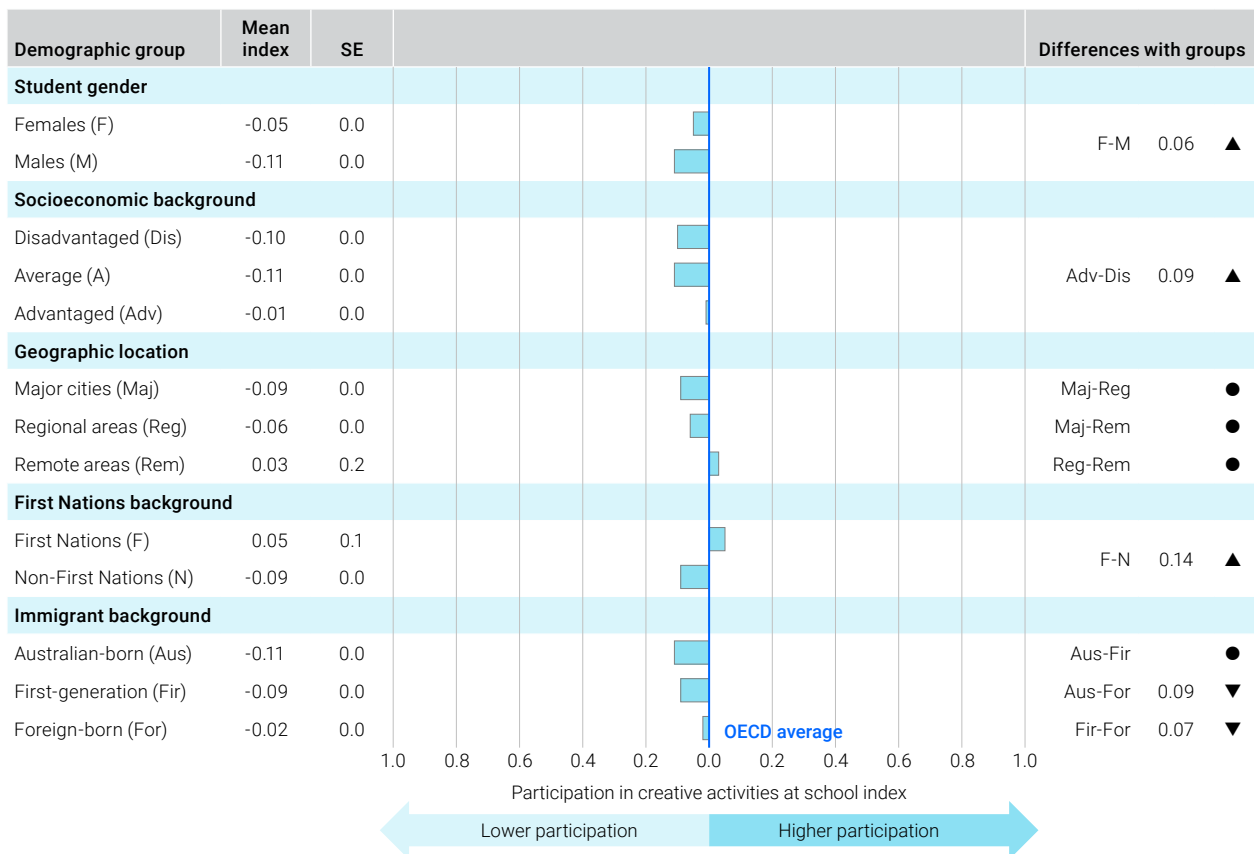
Note: Jurisdictions are ordered from lowest to highest mean score on the Participation in creative activities at school index.

**FIGURE 4.22** Percentages of students who reported participating in creative activities at school, by state and territory

## Participation in creative activities at school for different demographic groups

Figure 4.23 shows the mean index scores on the Participation in creative activities at school index for students for different demographic groups.

- ▶ Male students reported less participation in creative activities at school than female students.
- ▶ Students from advantaged socioeconomic backgrounds reported higher participation in creative activities at school than students from disadvantaged socioeconomic backgrounds.
- ▶ Students who attended schools in all geographic locations reported similar levels of participation in creative activities at school.
- ▶ Students from First Nations backgrounds reported greater participation in creative activities at school than non-First Nations students.
- ▶ Australian-born students reported lower participation in creative activities at school than foreign-born students, while first generation students reported lower participation in creative activities at school than foreign-born students.



▲ Mean of first group significantly higher than second group  
● No statistically significant difference  
▼ Mean of first group significantly lower than second group

**FIGURE 4.23** Mean scores for the Participation in creative activities at school index, for different demographic groups

Table 4.4 presents the percentages of students who participated in creative activities at school about once or twice a week or every day or almost every day, for the different demographic groups.

- ▶ A greater proportion of female than male students participated in *art classes/activities* (32% compared to 18%), while a greater proportion of male students than female students participated in *computer programming classes/activities* (17% compared to 8%).
- ▶ Although small differences, more female than male students participated in creative writing classes/activities (24% compared to 22%), and *dramatics, theatre class/activities* (15% compared to 12%).
- ▶ Similarly, small differences in participation, but in favour of male students were observed for participating in *debate club* (8% compared to 6%), *publications* (7% compared to 4%), and *science club* (9% compared to 5%).
- ▶ A greater proportion of students from advantaged than disadvantaged socioeconomic backgrounds reported that they participated in *music classes/activities* (25% compared to 16%).
- ▶ A lower proportion of students from advantaged socioeconomic backgrounds than disadvantaged socioeconomic backgrounds reported participating in *art classes/activities* (25% compared to 28%), *publications* (7% compared to 8%), *science club* (6% compared to 8%) and *computer programming classes/activities* (12% compared to 14%).
- ▶ Students in major city schools reported slightly lower but small differences in participation in creative activities at school than students in regional schools for participation in *publications* (5% compared to 7%), and *science club* (6% compared to 8%).
- ▶ First Nations students reported greater participation in creative activities at school than non-First Nations students in *art classes/activities* (32% compared to 25%), *dramatics, theatre class/activities* (20% compared to 13%), *publications* (12% compared to 5%), *science club* (13% compared to 6%) and *computer programming classes/activities* (17% compared to 14%).

- Small differences in participation in creative activities were observed (less than 5%) for students from different immigrant backgrounds. Irrespective of immigrant background a smaller proportion of Australian-born students than foreign-born students reported participating in *computer programming classes/activities* (11% compared to 16%).

**TABLE 4.4** Percentages of students who reported participating in creative activities at school, by demographic groups

Demographic group	Students who reported they participated <i>about once or twice a week or every day or almost every day</i> (%)									
	Art classes/ activities (e.g. painting, drawing)		Creative writing classes/activities		Music classes/ activities (e.g. chorus, band)		Debate club		Dramatics, theatre class/activities	
	%	SE	%	SE	%	SE	%	SE	%	SE
<b>Student gender</b>										
Females	32	0.8	24	0.6	19	0.7	6	0.4	15	0.6
Males	18	0.7	22	0.7	20	0.6	8	0.4	12	0.5
Difference (F-M)	14 pp ▲		2 pp ▲		●		2 pp ▼		3 pp ▲	
<b>Socioeconomic background</b>										
Disadvantaged	28	0.9	23	0.9	16	0.8	8	0.6	14	0.8
Average	25	0.7	22	0.6	18	0.6	6	0.4	13	0.6
Advantaged	25	1.0	25	0.8	25	0.9	7	0.5	13	0.7
Difference (Adv-Dis)	3 pp ▼		●		9 pp ▲		●		●	
<b>Geographic location</b>										
Major cities	25	0.6	23	0.5	19	0.6	7	0.3	13	0.5
Regional areas	27	1.0	24	1.1	20	0.9	7	0.6	15	0.9
Remote areas	28	4.9	16	5.5	18	5.4	5	1.9	14	5.5
Difference (Maj-Reg)	●		●		●		●		●	
Difference (Maj-Rem)	●		●		●		●		●	
Difference (Reg-Rem)	●		●		●		●		●	
<b>First Nations background</b>										
First Nations	32	2.5	25	2.0	23	1.6	12	1.7	20	2.0
Non-First Nations	25	0.5	23	0.5	19	0.5	7	0.3	13	0.4
Difference (F-N)	7 pp ▲		●		4 pp ▲		5 pp ▲		7 pp ▲	
<b>Immigrant background</b>										
Australian-born	26	0.6	23	0.6	18	0.5	6	0.3	14	0.5
First-generation	25	0.9	23	0.8	21	0.9	7	0.5	13	0.7
Foreign-born	24	1.0	23	1.2	21	1.1	8	0.8	12	0.9
Difference (Aus-Fir)	●		●		3 pp ▼		●		●	
Difference (Aus-For)	●		●		●		2 pp ▼		●	
Difference (Fir-For)	●		●		●		●		●	

pp percentage points

▲ Mean of first group significantly higher than second group

● No statistically significant difference

▼ Mean of first group significantly lower than second group

**TABLE 4.4 (continued)** Percentages of students who reported participating in creative activities at school, by demographic groups

Demographic group	Students who reported they participated <i>about once or twice a week or every day or almost every day</i> (%)					
	Publications (e.g. newspaper, yearbooks, literary magazine)		Science club		Computer programming classes/activities	
	%	SE	%	SE	%	SE
<b>Student gender</b>						
Females	4	0.3	5	0.3	8	0.4
Males	7	0.4	9	0.4	17	0.5
Difference (F-M)	3 pp ▼		4 pp ▼		9 pp ▼	
<b>Socioeconomic background</b>						
Disadvantaged	8	0.6	8	0.6	14	0.6
Average	5	0.3	6	0.3	12	0.5
Advantaged	5	0.4	6	0.5	12	0.7
Difference (Adv-Dis)	3 pp ▼		2 pp ▼		2 pp ▼	
<b>Geographic location</b>						
Major cities	5	0.3	6	0.4	13	0.4
Regional areas	7	0.6	8	0.5	12	0.8
Remote areas	7	2.8	12	3.9	14	2.9
Difference (Maj-Reg)	2 pp ▼		2 pp ▼		●	
Difference (Maj-Rem)	●		●		●	
Difference (Reg-Rem)	●		●		●	
<b>First Nations background</b>						
First Nations	12	1.7	13	1.9	17	1.7
Non-First Nations	5	0.3	6	0.3	12	0.3
Difference (F-N)	7 pp ▲		7 pp ▲		5 pp ▲	
<b>Immigrant background</b>						
Australian-born	5	0.3	7	0.3	11	0.4
First-generation	5	0.4	6	0.5	13	0.6
Foreign-born	7	0.8	8	0.9	16	1.0
Difference (Aus-Fir)	●		●		2 pp ▼	
Difference (Aus-For)	●		●		5 pp ▼	
Difference (Fir-For)	2 pp ▼		●		3 pp ▼	

pp percentage points

▲ Mean of first group significantly higher than second group

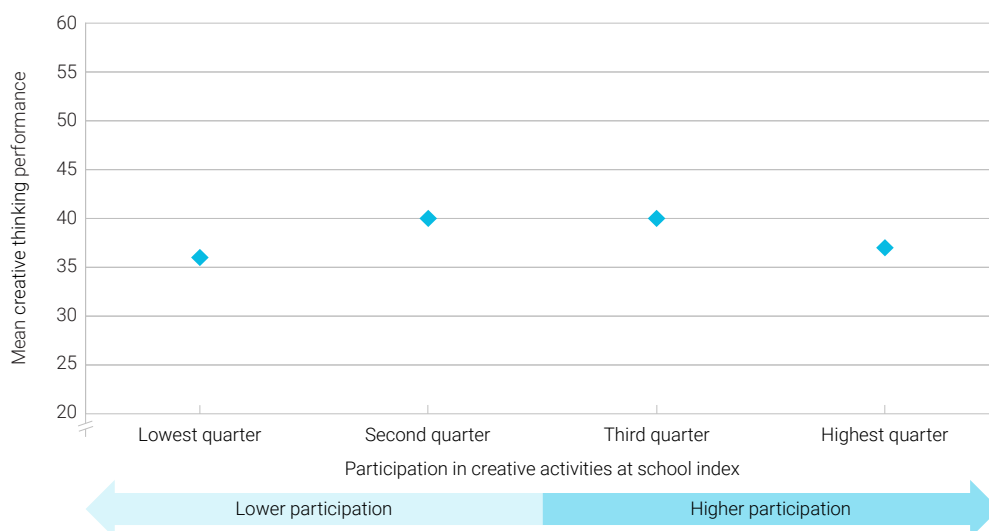
● No statistically significant difference

▼ Mean of first group significantly lower than second group

## The relationship between participation in creative activities at school and creative thinking performance

Figure 4.24 shows the relationship between participation in creative activities (by quarters) and creative thinking performance.

On the Participation in creative activities index, students in the highest quarter scored no differently to students in the lowest quarter; however, students in the middle two quarters scored 4 points on average higher than students in the lowest and highest quarters in creative thinking performance.



**FIGURE 4.24** Mean scores for the Participation in creative activities index, for Australia

## 4.5 Imagination and adventurousness

Imagination fosters creativity and supports students to develop innovative ideas. A sense of adventurousness encourages new ideas and perspectives to be explored and enhances critical thinking, decision-making skills and openness to experience. Engaging in adventurous activities help students develop resilience and adaptability, teaching them skills to navigate challenges effectively (Wu, 2024).

This section focuses on students' creativity and their beliefs in their sense of imagination and adventurousness.

### Measuring imagination and adventurousness

Students were asked to rate their agreement to statements about their views on their imagination and adventurousness on a 4-point scale (strongly disagree, disagree, agree, strongly agree).

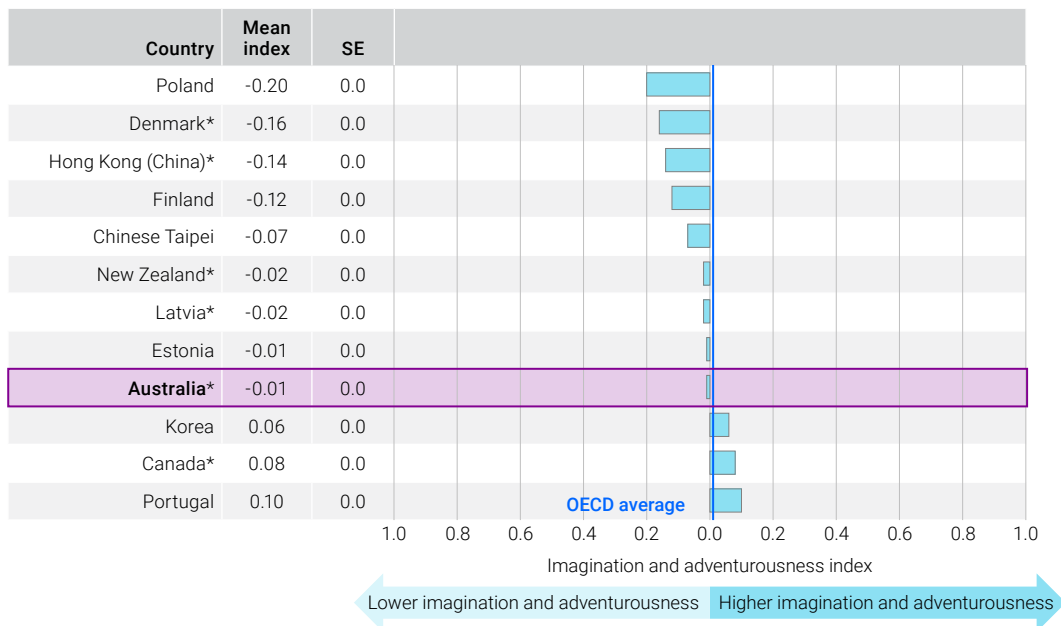
1. *I have difficulty using my imagination.*
2. *I often get lost in thought.*
3. *Coming up with new ideas is satisfying to me.*
4. *I have a good imagination.*
5. *I would get bored doing the same thing every day.*
6. *I like to be spontaneous.*
7. *I would like to travel to places I have never been.*

An Imagination and adventurousness index was constructed using the responses to these statements. The index was standardised to have mean of 0 and a standard deviation of 1 across the OECD countries. Positive values on the index indicate that the students reported greater imagination and adventurousness; lower values indicate that the student had less imagination and adventurousness than on average across the OECD countries.

## Imagination and adventurousness in an international context

Figure 4.25 shows the mean index scores for Australia, selected comparison countries, and the OECD average on the Imagination and adventurousness index. Countries are presented in order from the lowest to highest mean index score.

- ▶ Of the comparison countries, students in Korea, Canada, and Portugal reported the highest levels of imagination and adventurousness.
- ▶ Of the comparison countries, students in Poland, Denmark, Hong Kong (China), Finland, and Chinese Taipei, reported lower levels of imagination and adventurousness than students in Australia.
- ▶ Students in New Zealand, Latvia, Estonia and students on average across the OECD countries reported similar levels of imagination and adventurousness to students in Australia.



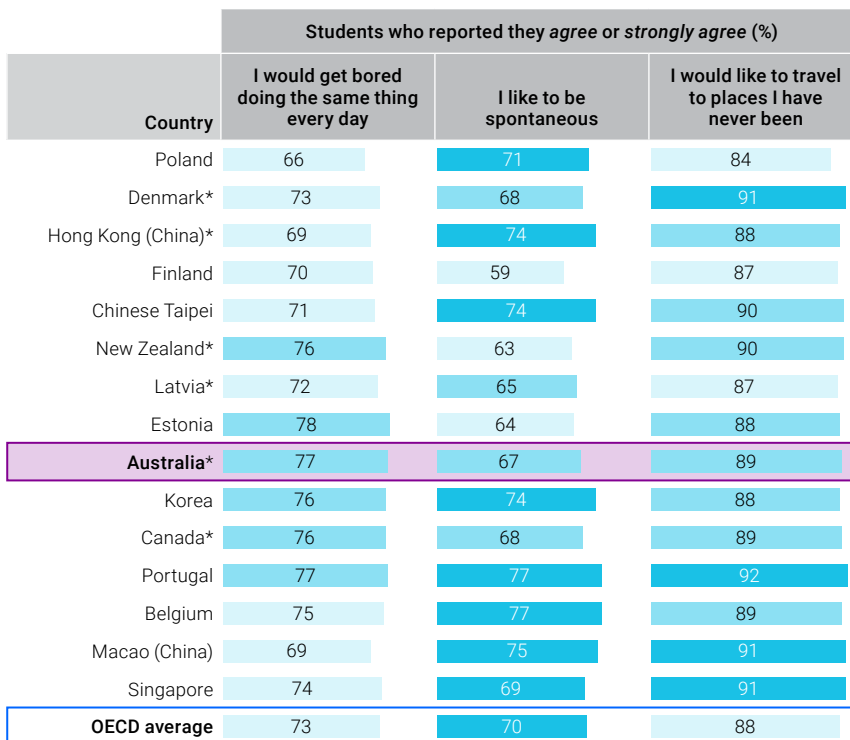
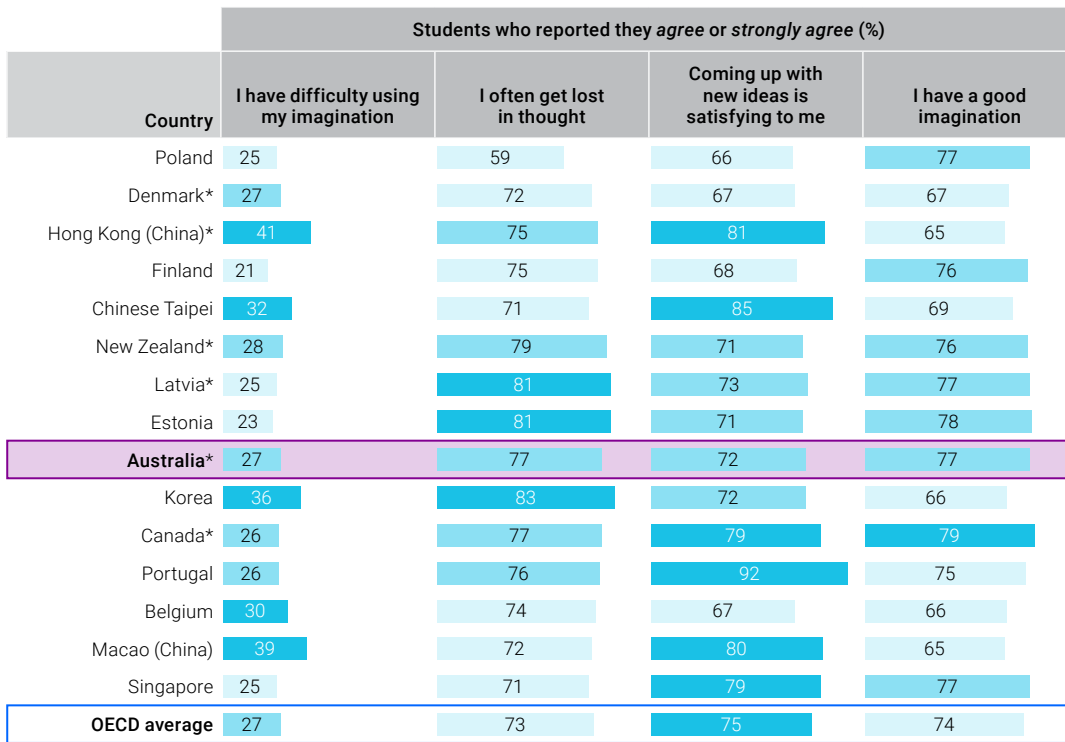
Note: Countries are ordered from lowest to highest mean index score.

**FIGURE 4.25** Mean scores for the Imagination and adventurousness index, for Australia and comparison countries

Figure 4.26 presents the percentages of students who reported they agreed or strongly agreed with statements about their own views on their imagination and adventurousness, for Australia, the comparison countries and across the OECD countries.

- ▶ Higher proportions of students in Hong Kong (China), Chinese Taipei, Korea, Belgium and Macao (China) than in Australia agreed *I have difficulty using my imagination*.
- ▶ Higher proportions of students in Hong Kong (China), Chinese Taipei, Canada, Portugal, Singapore and students on average across the OECD countries than students in Australia agreed *coming up with new ideas is satisfying to me*.
- ▶ Higher proportions of students in Poland, Hong Kong (China), Chinese Taipei, Korea, Portugal, Belgium, Macao (China), Singapore and students on average across the OECD countries than students in Australia agreed *I like to be spontaneous*.
- ▶ Higher proportions of students in Denmark, Portugal, Macao (China) and Singapore than students in Australia agreed *I would like to travel to places I have never been*.
- ▶ Similar proportions of students in Australia and in Hong Kong (China), New Zealand, Canada and Portugal agreed *I often get lost in thought*.
- ▶ Similar proportions of students in Australia and Poland, Finland, New Zealand, Latvia, Estonia and Korea agreed *I have a good imagination*.
- ▶ Lower proportions of students in Poland, Denmark, Hong Kong (China), Finland, Chinese Taipei, Latvia, Belgium, Macao (China), Singapore and students on average from across the OECD countries than in Australia agreed *I would get bored doing the same thing every day*.





■ Significantly lower than Australia    
 ■ Not significantly different from Australia    
 ■ Significantly higher than Australia

Note: Countries are ordered from lowest to highest mean score on the Imagination and adventurousness index.

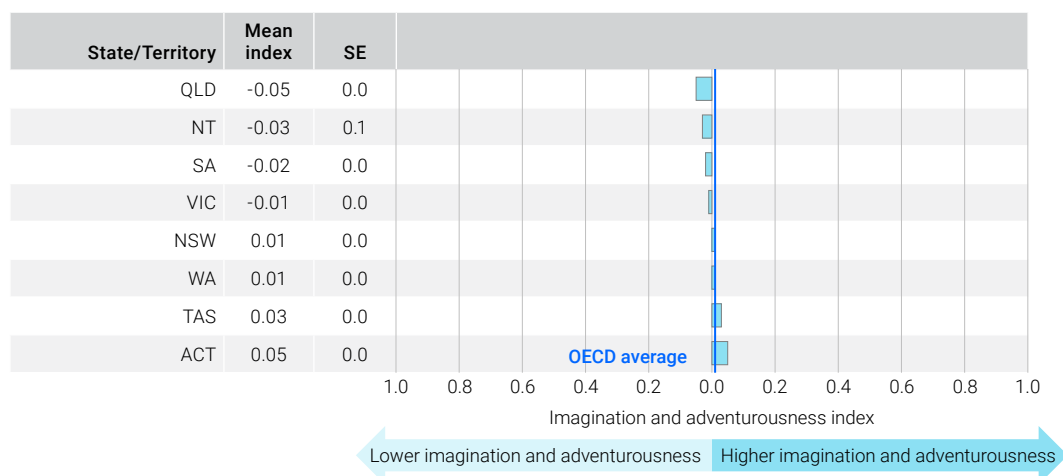
**FIGURE 4.26** Percentages of students who reported they agreed or strongly agreed with statements about their imagination and adventurousness, for Australia and comparison countries

## Imagination and adventurousness in a national context

Figure 4.27 shows the mean index scores for the Australian states and territories and the OECD average on the Imagination and adventurousness index. Jurisdictions are presented in order from the lowest to highest mean index score.

Nationally, the mean index scores for imagination and adventurousness ranged from -0.05 in Queensland to 0.05 in the Australian Capital Territory.

Students in Queensland reported lower imagination and adventurousness than students in all jurisdictions and all students on average across the OECD countries, while in all other jurisdictions students reported similar levels of imagination and adventurousness to all students on average across the OECD countries.



Note: Jurisdictions are ordered from lowest to highest mean index score.

**FIGURE 4.27** Mean scores for the Imagination and adventurousness index, by state and territory

Figure 4.28 presents the percentages of students who reported they agreed or strongly agreed with statements about their own views on their imagination and adventurousness, for the jurisdictions.

- ▶ A higher proportion of students in Queensland than students on average across the OECD countries agreed *I have difficulty using my imagination*, while a lower proportion of students in Victoria than students on average across the OECD countries agreed with this statement.
- ▶ Higher proportions of students in all jurisdictions and students on average across the OECD countries except the Northern Territory agreed *I often get lost in my thoughts* and *I would get bored doing the same thing every day*.
- ▶ A higher proportion of students in Western Australia than students in all jurisdictions and students on average across the OECD countries agreed *I would like to travel to places I have never been*.
- ▶ Similar proportions of students in all jurisdictions except the Australian Capital Territory agreed *coming up with new ideas is satisfying to me*, while a lower proportion of students in Queensland agreed with this statement than students on average across the OECD countries.
- ▶ Higher proportions of students in Queensland, Victoria, New South Wales and the Australian Capital Territory than students on average across OECD countries agreed *I have a good imagination*.
- ▶ Lower proportions of students in Queensland, South Australia, New South Wales, Western Australia and Tasmania agreed *I like to be spontaneous* than students on average across the OECD countries.

State/Territory	Students who reported they agree or strongly agree (%)			
	I have difficulty using my imagination	I often get lost in thought	Coming up with new ideas is satisfying to me	I have a good imagination
QLD	30	79	69	77
NT	26	77	74	78
SA	26	78	74	75
VIC	24	77	72	76
NSW	26	76	74	77
WA	29	81	72	75
TAS	29	78	75	78
ACT	25	80	79	80
<b>OECD average</b>	27	73	75	74

State/Territory	Students who reported they agree or strongly agree (%)		
	I would get bored doing the same thing every day	I like to be spontaneous	I would like to travel to places I have never been
QLD	77	67	89
NT	75	70	89
SA	77	66	90
VIC	77	67	90
NSW	76	68	89
WA	78	66	90
TAS	80	62	89
ACT	78	68	90
<b>OECD average</b>	73	70	88

■ Significantly lower than the OECD average    
■ Not significantly different from the OECD average    
■ Significantly higher than the OECD average

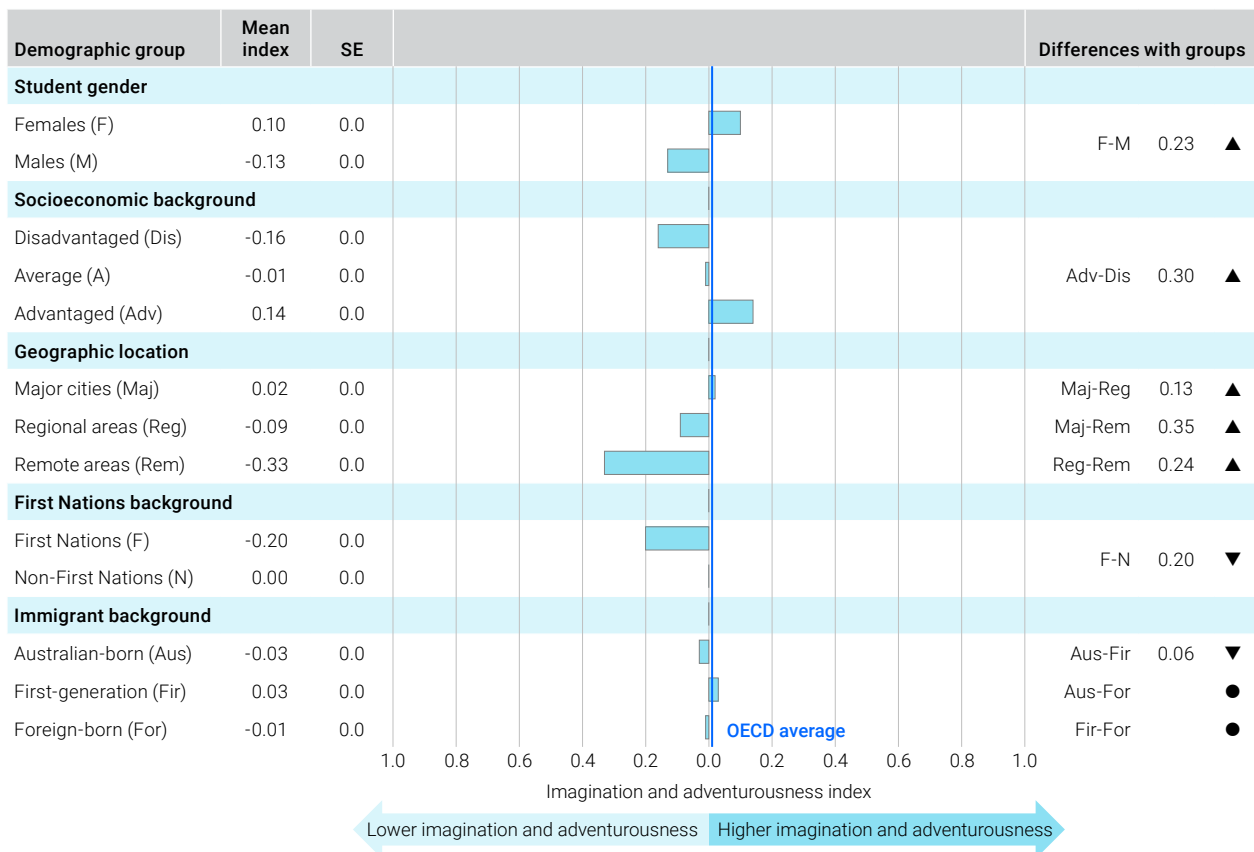
Note: Jurisdictions are ordered from lowest to highest mean score on the Imagination and adventurousness index.

**FIGURE 4.28** Percentages of students who reported they agreed or strongly agreed with statements about their imagination and adventurousness, by state and territory

## Imagination and adventurousness for different demographic groups

Figure 4.29 shows the mean index scores on the Imagination and adventurousness index for students for different demographic groups.

- ▶ Female students reported higher levels of imagination and adventurousness than male students.
- ▶ Students from advantaged socioeconomic backgrounds reported higher levels of imagination and adventurousness than students from disadvantaged socioeconomic backgrounds.
- ▶ Students who attended schools in major cities reported higher levels of imagination and adventurousness than students at schools in regional and remote areas, and similarly students who attended schools in regional areas reported higher levels of imagination and adventurousness than students at school in remote areas.
- ▶ Students from First Nations backgrounds reported lower levels of imagination and adventurousness than non-First Nations students.
- ▶ Australian-born students reported lower levels of imagination and adventurousness than first-generation students. There were no differences between first-generation students and foreign-born students.



▲ Mean of first group significantly higher than second group  
● No statistically significant difference  
▼ Mean of first group significantly lower than second group

**FIGURE 4.29** Mean scores for the Imagination and adventurousness index, for different demographic groups

Table 4.5 presents the percentages of students who reported they agreed or strongly agreed with statements about their openness to intellect, for the different demographic groups.

- ▶ A greater proportion of male than female students agreed *I have difficulty using my imagination* (28% compared to 26%), *I often get lost in thought* (84% compared to 71%), *I would get bored doing the same thing every day* (81% compared to 72%), *I like to be spontaneous* (72% compared to 62%), and *I would like to travel to places I have never been* (93% compared to 86%).
- ▶ A greater proportion of students from advantaged than disadvantaged socioeconomic backgrounds agreed *coming up with new ideas is satisfying to me* (80% compared to 66%), *I have a good imagination* (80% compared to 72%), *I would get bored doing the same thing every day* (79% compared to 73%), *I like to be spontaneous* (71% compared to 62%), and *I enjoy learning new things* (89% compared to 76%).
- ▶ A lower proportion of students from advantaged than disadvantaged socioeconomic backgrounds agreed *I have difficulty using my imagination* (23% compared to 31%).
- ▶ While students in major city schools reported higher levels of imagination and adventurousness than students in regional or remote schools, the differences were not large for some items. The largest differences were between students in major city schools and student at schools in remote areas who agreed *coming up with new ideas is satisfying to me* (74% compared to 55%), and *I have a good imagination* (77% compared to 64%), *I would get bored doing the same thing every day* (77% compared to 61%), *I like to be spontaneous* (68% compared to 59%).
- ▶ A lower proportion of students in major city schools than in remote schools agreed *I have difficulty using my imagination* (26% compared to 34%).

- ▶ A greater proportion of non-First Nations students than First Nations students agreed *I often get lost in thought* (78% compared to 72%), *coming up with new ideas is satisfying to me* (73% compared to 65%), *I would get bored doing the same thing every day* (77% compared to 71%), *I like to be spontaneous* (67% compared to 61%), *I would like to travel to places I have never been* (90% compared to 83%).
- ▶ A lower proportion of non-First Nations students than First Nations students agreed *I have difficulty using my imagination* (35% compared to 26%).
- ▶ A smaller proportion of Australian-born students than first-generation students agreed *coming up with new ideas is satisfying to me* (70% compared to 75%). Smaller levels of agreement were reported for *I like to be spontaneous* (66% compared to 69%), and *I would like to travel to places I have never been* (89% compared to 91%). A smaller proportion of Australian-born students than foreign-born students agreed *coming up with new ideas is satisfying to me* (70% compared to 76%).

**TABLE 4.5** Percentages of students who reported they agreed or strongly agreed with statements about their imagination and adventurousness, by demographic groups

Demographic group	Students who reported they agree or strongly agree (%)							
	I have difficulty using my imagination		I often get lost in thought		Coming up with new ideas is satisfying to me		I have a good imagination	
	%	SE	%	SE	%	SE	%	SE
<b>Student gender</b>								
Females	28	0.8	84	0.7	72	0.8	77	0.7
Males	26	0.6	71	0.7	72	0.8	76	0.7
Difference (F-M)	2 pp ▲		13 pp ▲		●		●	
<b>Socioeconomic background</b>								
Disadvantaged	31	1.0	76	1.2	66	1.1	72	1.1
Average	27	0.7	77	0.7	72	0.8	77	0.6
Advantaged	23	1.1	79	0.9	80	1.0	80	1.0
Difference (Adv-Dis)	8 pp ▼		●		14 pp ▲		8 pp ▲	
<b>Geographic location</b>								
Major cities	26	0.7	78	0.6	74	0.7	77	0.6
Regional areas	30	0.9	77	1.0	68	1.3	75	1.0
Remote areas	34	3.1	74	6.2	55	3.6	64	6.5
Difference (Maj-Reg)	4 pp ▼		●		6 pp ▲		●	
Difference (Maj-Rem)	8 pp ▼		●		19 pp ▲		13 pp ▲	
Difference (Reg-Rem)	●		●		13 pp ▲		●	
<b>First Nations background</b>								
First Nations	35	2.5	72	2.4	65	2.5	75	2.2
Non-First Nations	26	0.6	78	0.5	73	0.6	77	0.5
Difference (F-N)	9 pp ▲		6 pp ▼		8 pp ▼		●	
<b>Immigrant background</b>								
Australian-born	27	0.7	77	0.7	70	0.8	76	0.7
First-generation	26	0.9	78	0.8	75	1.0	78	0.9
Foreign-born	27	1.7	77	1.1	76	1.5	77	1.2
Difference (Aus-Fir)	●		●		5 pp ▼		●	
Difference (Aus-For)	●		●		6 pp ▼		●	
Difference (Fir-For)	●		●		●		●	

pp percentage points

▲ Mean of first group significantly higher than second group

● No statistically significant difference

▼ Mean of first group significantly lower than second group

**TABLE 4.5 (continued)** Percentages of students who reported they agreed or strongly agreed with statements about their imagination and adventurousness, by demographic groups

Demographic group	Students who reported they agree or strongly agree (%)					
	I would get bored doing the same thing every day		I like to be spontaneous		I would like to travel to places I have never been	
	%	SE	%	SE	%	SE
<b>Student gender</b>						
Females	81	0.8	72	0.8	93	0.5
Males	72	0.8	62	0.9	86	0.6
Difference (F-M)	9 pp ▼		10 pp ▲		7 pp ▲	
<b>Socioeconomic background</b>						
Disadvantaged	73	1.1	62	1.2	86	1.0
Average	77	0.7	68	0.8	90	0.5
Advantaged	79	1.1	71	1.0	92	0.6
Difference (Adv-Dis)	6 pp ▲		9 pp ▲		6 pp ▲	
<b>Geographic location</b>						
Major cities	77	0.7	68	0.7	90	0.5
Regional areas	76	0.9	64	1.2	88	0.8
Remote areas	61	5.1	59	5.3	88	2.2
Difference (Maj-Reg)	●		4 pp ▲		●	
Difference (Maj-Rem)	16 pp ▲		9 pp ▲		●	
Difference (Reg-Rem)	15 pp ▲		5 pp ▲		●	
<b>First Nations background</b>						
First Nations	71	2.8	61	2.7	83	1.9
Non-First Nations	77	0.6	67	0.6	90	0.4
Difference (F-N)	6 pp ▼		6 pp ▼		7 pp ▼	
<b>Immigrant background</b>						
Australian-born	77	0.8	66	0.9	89	0.5
First-generation	77	0.9	69	0.9	91	0.5
Foreign-born	74	1.6	67	1.4	90	1.2
Difference (Aus-Fir)	●		3 pp ▼		2 pp ▼	
Difference (Aus-For)	●		●		●	
Difference (Fir-For)	●		●		●	

pp percentage points

▲ Mean of first group significantly higher than second group

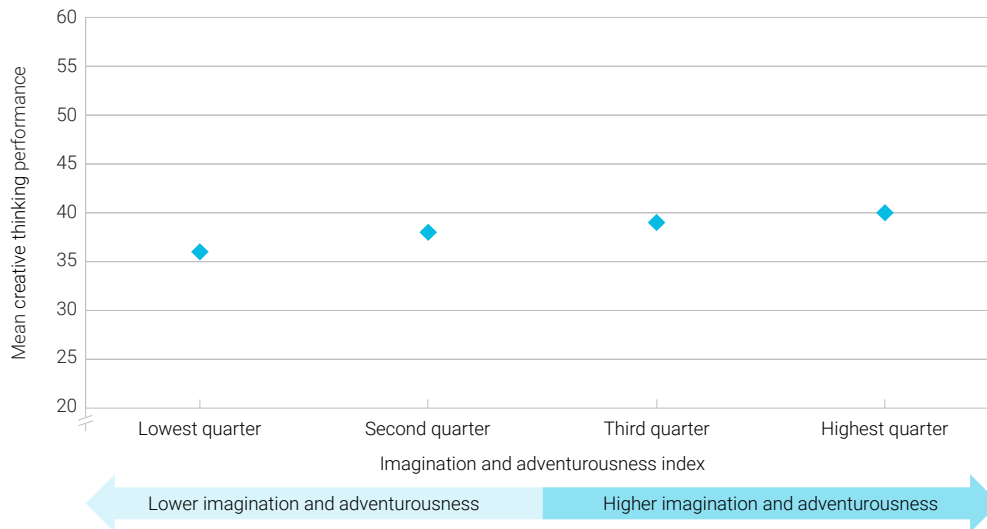
● No statistically significant difference

▼ Mean of first group significantly lower than second group

## The relationship between imagination and adventurousness and creative thinking performance

Figure 4.30 shows the relationship between imagination and adventurousness (by quarters) and creative thinking performance.

On the Imagination and adventurousness index, students in the highest quarter scored 5 points on average higher than students in the lowest quarter in creative thinking performance.



**FIGURE 4.30** Imagination and adventurousness and creative thinking performance, for Australia

# 5

## Creative thinking from the teacher's perspective

Teaching practices that perpetuate the idea that there is only one way to learn or solve problems, that cultivate attitudes of fear of authority, or that discourage students' curiosity and inquisitiveness can stifle creative thinking (OECD, 2024).

Creative teachers seek to avoid the limiting nature of subject boundaries and make frequent references to and integration with other subjects and to the world beyond the school gate (Cremin, 2015). In addition, Li et al. (2022) report that by incorporating creative teaching methods and curricula, teachers can inspire students to think critically, problem-solve, and explore new ideas. Creative teachers encourage students to express themselves freely, think differently and take risks in their learning process. They create a supportive and stimulating learning environment that nurtures imagination and originality. This atmosphere not only enhances students' creativity, but also boosts their confidence and motivation to learn.

The results in this chapter show how teachers responded to questions about creative thinking. The constructs explored included:

- ▶ creative values
- ▶ teachers' use of creative pedagogies
- ▶ teachers' openness to creativity.

Results are provided for constructed indices designed to standardise responses onto one scale.<sup>1</sup>

Each construct examines the similarities and differences in teachers' creative thinking between countries, the Australian jurisdictions and different demographic groups.

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<sup>1</sup> The Reader's guide provides more information about the PISA indices.



## 5.1 Creative values

Teachers play an important role in nurturing students' creative thinking, and their creative values are often reflected in various aspects of their teaching. The values that foster creativity in their students include encouraging creativity; promoting risk taking; fostering a growth mindset; encouraging originality providing autonomy; incorporating diverse perspectives; and supporting collaboration (Collard & Looney, 2014).

This section focuses on teachers' creative values and their beliefs about the importance of developing student creativity.

### Measuring creative values

Teachers were asked to rate their agreement with statements about their values and beliefs about the importance of developing student creativity on a 4-point scale (strongly disagree; disagree; agree; strongly agree).

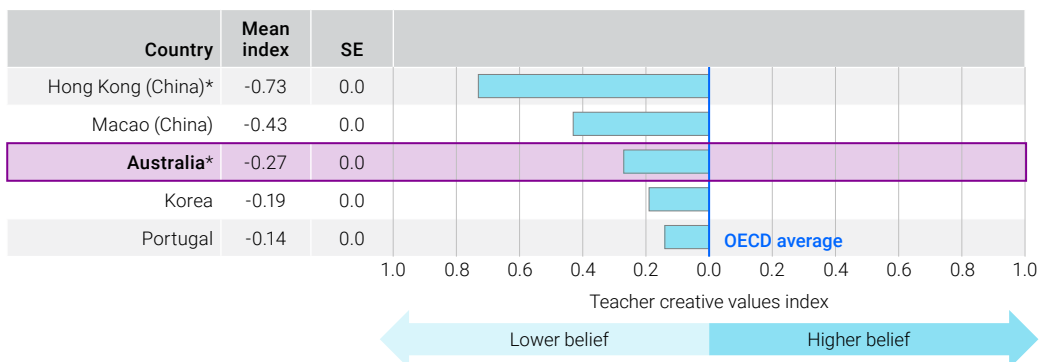
1. I value students who have many new ideas.
2. I value students who are capable of writing creative stories or poems.
3. It is important that students are able to make creative works like drawing and painting.
4. It is important for students to be able to invent new things.
5. It is important for students to solve science problems creatively.
6. It is important for students to be creative in helping others have a good relationship.

A Creative values index was constructed using the responses to these statements. It was standardised to have mean of 0 and a standard deviation of 1 across OECD countries. Positive values on the index indicate teachers reported greater creative values; lower values indicate teachers held fewer creative values than on average across OECD countries.

### Creative values in an international context

Figure 5.1 shows the mean index scores for Australia, selected comparison countries, and the OECD average on the Creative values index. Countries are presented in order from the lowest to highest mean index score.

- ▶ Of the comparison countries, teachers in Hong Kong (China) and Macao (China) reported lower creative values or belief in the importance of developing student creativity than teachers in Australia.
- ▶ Teachers in Portugal reported the highest creative values (-0.14), while teachers in Hong Kong (China) reported the lowest Creative values (-0.73).
- ▶ The mean index score of -0.27 for Australia was lower to that of teachers in Portugal and Korea and was lower than teachers on average across the OECD (0.00).



Note: Countries are ordered from lowest to highest mean index score.

**FIGURE 5.1** Mean scores for the Creative values index, for Australia and comparison countries

Figure 5.2 presents the percentages of teachers who reported they agreed or strongly agreed with statements about their creative values and beliefs about the importance of developing student creativity, for Australia, the comparison countries and the OECD average.

- ▶ A higher proportion of Australian teachers on average than across the OECD countries reported *I value students who have many new ideas*, while similar proportions of teachers in Australia and Macao (China) reported *I value students who have many new ideas*.
- ▶ Higher proportions of teachers in Hong Kong (China), Macao (China), Korea, Portugal, and on average across the OECD countries than in Australia reported *it is important that students are able to make creative works like drawing and painting*, and *it is important for students to solve science problems creatively*.
- ▶ Lower proportions of teachers in Hong Kong (China), Korea, Portugal and teachers on average across the OECD countries than teachers in Australia reported *I value students who have many new ideas*.
- ▶ Lower proportions of teachers in Hong Kong (China), Macao (China) than teachers in Australia reported *I value students who are capable of writing creative stories or poems*, and *it is important for students to be creative in helping others have a good relationship*.

Country	Teachers who reported they agree or strongly agree (%)			
	I value students who have many new ideas	I value students who are capable of writing creative stories or poems	It is important that students are able to make creative works like drawing and painting	It is important for students to be able to invent new things
Hong Kong (China)*	98	90	88	87
Macao (China)	99	94	92	92
<b>Australia*</b>	100	95	84	89
Korea	98	98	95	96
Portugal	99	91	91	98
<b>OECD average</b>	99	96	92	95

Country	Teachers who reported they agree or strongly agree (%)	
	It is important for students to solve science problems creatively	It is important for students to be creative in helping others have a good relationship
Hong Kong (China)*	94	92
Macao (China)	95	94
<b>Australia*</b>	92	95
Korea	97	98
Portugal	97	99
<b>OECD average</b>	96	97

■ Significantly lower than Australia    
 ■ Not significantly different from Australia    
 ■ Significantly higher than Australia

Note: Countries are ordered from lowest to highest mean score on the Teacher creative values index.

**FIGURE 5.2** Percentages of teachers who agreed or strongly agreed with statements about their values regarding creativity, for Australia and comparison countries

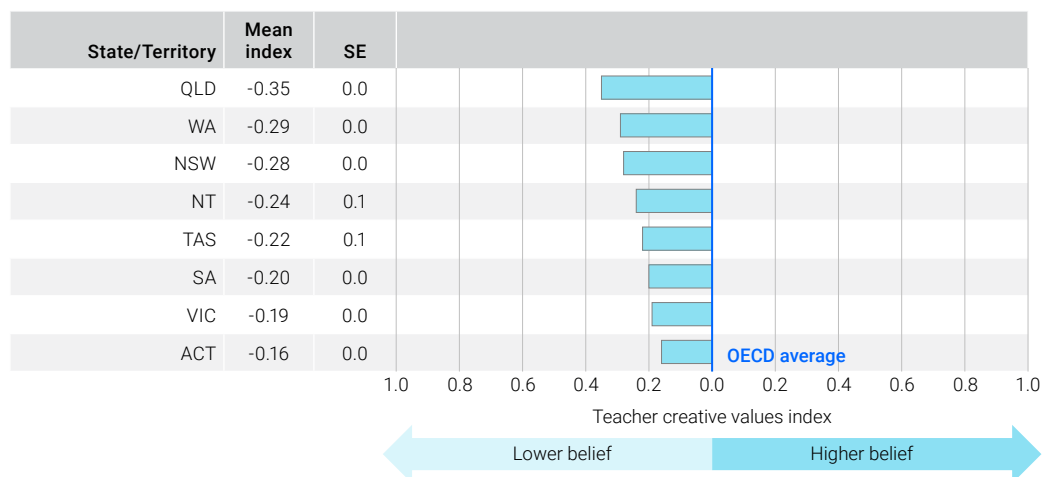
## Creative values in a national context

Figure 5.3 shows the mean index scores for the Australian states and territories and the OECD average on the Creative values index. Jurisdictions are presented in order from the lowest to highest mean index score.

Nationally, the mean index scores for teachers' creative values ranged from -0.16 in the Australian Capital Territory to -0.35 in Queensland.

Teachers in Queensland, Western Australia and New South Wales reported lower creative values than teachers in the Australian Capital Territory and teachers on average across the OECD countries.

Teachers in the Northern Territory, Tasmania, South Australia, and Victoria reported similar creative values. Teachers in all jurisdictions in Australia reported lower creative values than teachers across the OECD countries.



Note: Jurisdictions are ordered from lowest to highest mean index score.

**FIGURE 5.3** Mean scores for the Creative values index, by state and territory

Figure 5.4 presents the percentages of teachers who reported they agreed or strongly agreed with statements about their creative values and beliefs about the importance of developing student creativity, for the jurisdictions.

- ▶ Higher proportions of teachers in all jurisdictions agreed *I value students who have many new ideas* than teachers on average across the OECD countries.
- ▶ Similar proportions of teachers in New South Wales, the Northern Territory, Tasmania, South Australia, Victoria and the Australian Capital Territory agreed *I value students who are capable of writing creative stories or poems* than teachers on average across the OECD countries.
- ▶ Lower proportions of teachers in all jurisdictions agreed *it is important that students are able to make creative works like drawing and painting* and *it is important for students to be able to invent new things* than teachers on average across the OECD.
- ▶ Lower proportions of teachers in all jurisdictions except the Northern Territory and the Australian Capital Territory agreed *it is important for students to solve science problems creatively* than teachers on average across the OECD countries.

State/Territory	Teachers who reported they agree or strongly agree (%)			
	I value students who have many new ideas	I value students who are capable of writing creative stories or poems	It is important that students are able to make creative works like drawing and painting	It is important for students to be able to invent new things
QLD	100	94	83	89
WA	100	94	84	89
NSW	100	95	84	89
NT	100	98	85	86
TAS	100	95	85	86
SA	100	96	86	91
VIC	99	96	86	90
ACT	100	96	87	92
<b>OECD average</b>	99	96	92	95

State/Territory	Teachers who reported they agree or strongly agree (%)	
	It is important for students to solve science problems creatively	It is important for students to be creative in helping others have a good relationship
QLD	92	95
WA	92	94
NSW	92	95
NT	95	94
TAS	89	93
SA	93	95
VIC	93	96
ACT	94	95
<b>OECD average</b>	96	97

■ Significantly lower than the OECD average    
■ Not significantly different from the OECD average    
■ Significantly higher than the OECD average

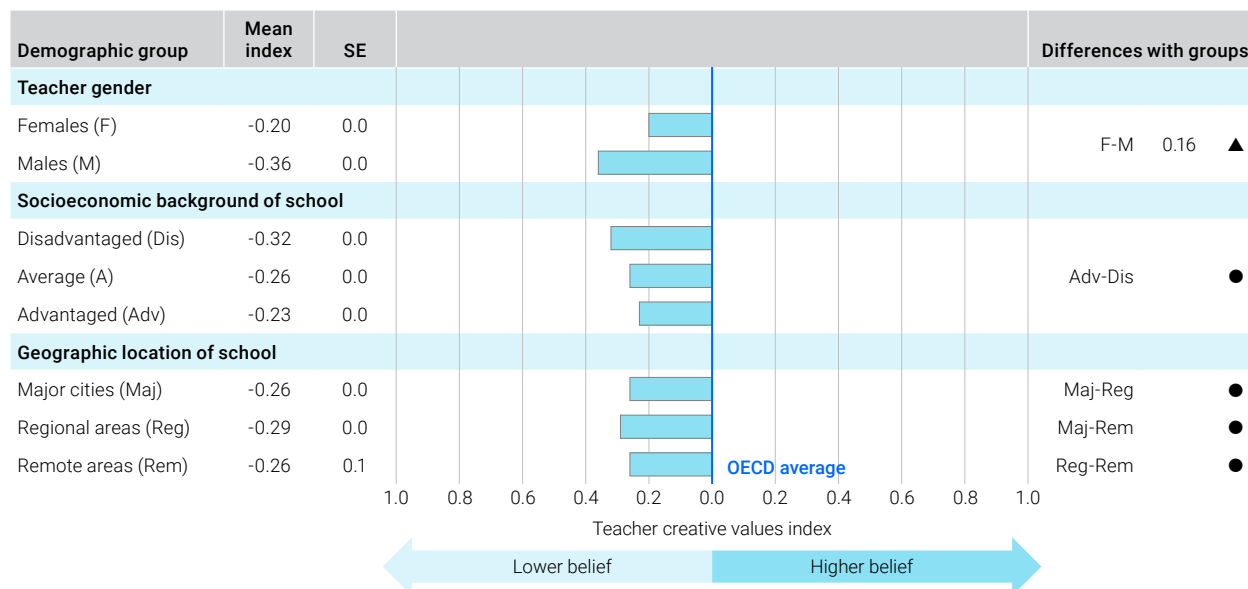
Note: Jurisdictions are ordered from lowest to highest mean score on the Teacher creative values index.

**FIGURE 5.4** Percentages of teachers who agreed or strongly agreed with statements about their values regarding creativity, by state and territory

## Creative values for different demographic groups

Figure 5.5 shows the mean index scores on the Creative values index for teachers for different demographic groups.

- ▶ Male teachers reported lower creative values than female teachers.
- ▶ Irrespective of the socioeconomic background or geographic location of schools, there was no difference in teachers' creative values.



- ▲ Mean of first group significantly higher than second group
- No statistically significant difference
- ▼ Mean of first group significantly lower than second group

**FIGURE 5.5** Mean scores for the Creative values index, for different demographic groups

Table 5.1 presents the percentages of teachers who reported they agreed or strongly agreed with statements about their creative values and beliefs about the importance of developing student creativity, for the different demographic groups.

A greater proportion of female than male teachers reported *I value students who are capable of writing creative stories or poems* (96% compared to 93%).

**TABLE 5.1** Percentages of teachers who agreed or strongly agreed with statements about their values regarding creativity, by demographic groups

Demographic group	Teachers who reported they agree or strongly agree (%)							
	I value students who have many new ideas		I value students who are capable of writing creative stories or poems		It is important that students are able to make creative works like drawing and painting		It is important for students to be able to invent new things	
	%	SE	%	SE	%	SE	%	SE
<b>Teacher gender</b>								
Females	100	0.1	96	0.3	84	0.5	90	0.5
Males	99	0.1	93	0.4	85	0.6	89	0.6
Difference (F-M)	●		3 pp ▲		●		●	
<b>Socioeconomic background of school</b>								
Disadvantaged	99	0.2	96	3.3	80	9.9	87	3.4
Average	99	0.1	95	0.6	83	1.0	88	0.8
Advantaged	100	0.1	95	0.3	85	0.6	90	0.5
Difference (Adv-Dis)	●		●		●		●	
<b>Geographic location of school</b>								
Major cities	100	0.1	95	0.3	85	0.4	89	0.4
Regional areas	99	0.2	95	0.5	83	0.9	89	0.7
Remote areas	99	1.1	95	2.0	86	2.3	89	2.0
Difference (Maj-Reg)	●		●		●		●	
Difference (Maj-Rem)	●		●		●		●	
Difference (Reg-Rem)	●		●		●		●	

Demographic group	Teachers who reported they agree or strongly agree (%)			
	It is important for students to solve science problems creatively		It is important for students to be creative in helping others have a good relationship	
	%	SE	%	SE
<b>Teacher gender</b>				
Females	93	0.4	96	0.3
Males	92	0.5	95	0.4
Difference (F-M)	●		●	
<b>Socioeconomic background of school</b>				
Disadvantaged	96	3.3	96	0.4
Average	91	0.6	95	0.4
Advantaged	92	0.5	95	0.5
Difference (Adv-Dis)	●		●	
<b>Geographic location of school</b>				
Major cities	92	0.4	95	0.3
Regional areas	92	0.6	95	0.6
Remote areas	90	2.0	93	2.7
Difference (Maj-Reg)	●		●	
Difference (Maj-Rem)	●		●	
Difference (Reg-Rem)	●		●	

pp percentage points

▲ Mean of first group significantly higher than second group

● No statistically significant difference

▼ Mean of first group significantly lower than second group

## 5.2 Teachers' use of creative pedagogies

Promoting student creativity in the classroom can be effectively achieved through teachers' use of creative pedagogies. These are teaching methods and strategies that foster students' innovative thinking, problem-solving abilities, decision-making, and original expression. According to a literature review by Graciano et al. (2024), creative pedagogies emphasise the importance of teachers creating an environment that encourages exploration, risk-taking, and the application of diverse thinking processes to enhance students' imagination and originality.

This section focuses on teachers' use of creative pedagogies and the importance teachers place on using creative approaches in their teaching.

### Measuring teachers' use of creative pedagogies

Teachers were asked to rate the importance they placed on using creative pedagogies in class on a 4-point scale (no importance, very little importance, some importance, a lot of importance).

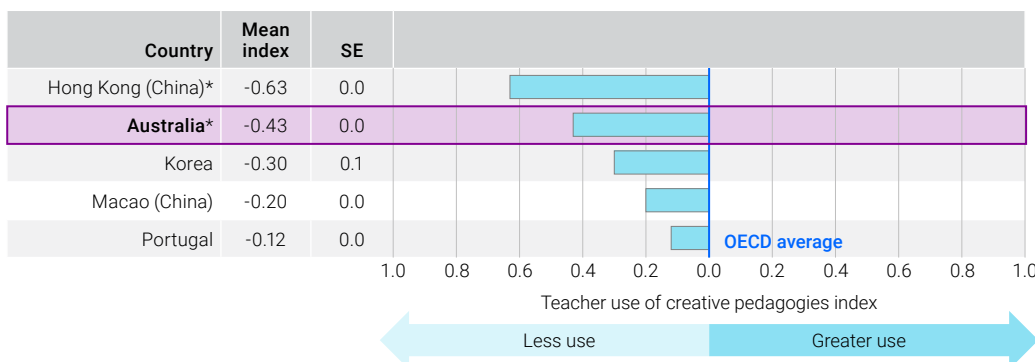
1. *Group work.*
2. *Finding ideas through brainstorming.*
3. *Playing educational games.*
4. *Debating ideas or current issues.*
5. *Giving students time to explore topics on their own.*
6. *Incorporating creative activities like drawing or poetry into projects.*

A Teacher use of creative pedagogies index was constructed using the responses to these statements. It was standardised to have mean of 0 and a standard deviation of 1 across OECD countries. Positive values on the index indicate that the teachers reported placing greater importance on the use of creative pedagogies in class; lower values indicate teachers placed less importance on them than on average across OECD countries.

### Teacher use of creative pedagogies in an international context

Figure 5.6 shows the mean scores for Australia, selected comparison countries, and the OECD average on the Teacher use of creative pedagogies index. Countries are presented in order from the lowest to highest mean index score.

- ▶ Of the comparison countries, teachers in Hong Kong (China) reported placing the least importance on using creative pedagogies in class (-0.63).
- ▶ Teachers in Portugal reported placing the greatest importance on using creative pedagogies in class (-0.12).
- ▶ Australia's mean index score of -0.43 was lower than Portugal, Macao (China) and Korea.
- ▶ The mean index score of -0.43 for Australia was lower than that of teachers on average across the OECD countries (0.00).



Note: Countries are ordered from lowest to highest mean index score.

**FIGURE 5.6** Mean scores for the Teacher use of creative pedagogies index, for Australia and comparison countries

Figure 5.7 presents the percentages of teachers who reported they placed some or a lot of importance in response to statements about using creative pedagogies in class, for Australia, the comparison countries and the OECD average.

- ▶ Similar proportions of teachers in Australia and Korea placed importance on using *group work* in class; similar proportions of teachers in Australia and Macao (China) placed importance on *debating ideas or current issues* in class.
- ▶ A higher proportion of teachers in Macao (China) than all comparison countries with the exception of Australia including teachers on average across the OECD countries placed importance on students *finding ideas through brainstorming*.
- ▶ Higher proportions of teachers in Korea, Macao (China), Portugal, and on average across the OECD countries than in Australia placed importance on *giving students time to explore topics on their own* and *incorporating creative activities like drawings or poetry into projects*. Except for Portugal, teachers in these countries also placed importance on the use of *journaling* in class, and similarly, except for Hong Kong (China), placed importance on *debating ideas or current issues* in class.
- ▶ Lower proportions of teachers in Hong Kong (China), Korea, and teachers across the OECD countries than in Australia placed importance on *playing educational games* in class.
- ▶ A lower proportion of teachers in Hong Kong (China), than in Australia placed less importance on *group work*, *finding ideas through brainstorming*, *debating ideas or current issues*, *giving students time to explore topics on their own* and *incorporating creative activities like drawing or poetry into projects*.

Country	Teachers who reported they gave some importance or a lot of importance (%)			
	Group work	Finding ideas through brainstorming	Playing educational games	Debating ideas or current issues
Hong Kong (China)*	90	92	63	78
<b>Australia*</b>	92	96	73	87
Korea	91	90	61	91
Macao (China)	97	98	79	87
Portugal	96	89	84	94
<b>OECD average</b>	93	93	77	93

Country	Teachers who reported they gave some importance or a lot of importance (%)		
	Giving students time to explore topics on their own	Journaling	Incorporating creative activities like drawing or poetry into projects
Hong Kong (China)*	91	53	55
<b>Australia*</b>	93	49	60
Korea	97	65	81
Macao (China)	96	66	71
Portugal	98	41	65
<b>OECD average</b>	96	60	74

■ Significantly lower than Australia    
 ■ Not significantly different from Australia    
 ■ Significantly higher than Australia

Note: Countries are ordered from lowest to highest mean score on the Teacher use of creative pedagogies index.

**FIGURE 5.7** Percentages of teachers who reported placing importance on the use of creative pedagogies in class, for Australia and comparison countries



## Teachers' use of creative pedagogies in a national context

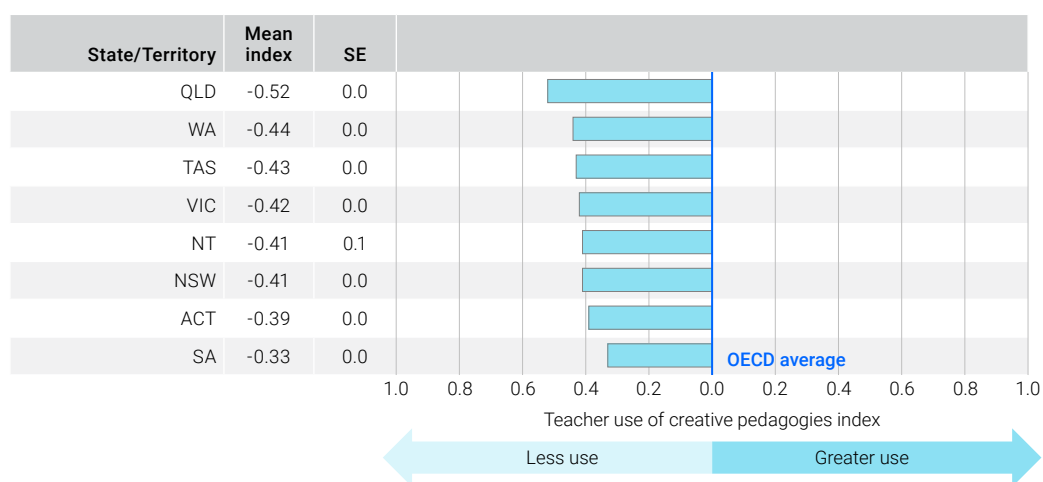
Figure 5.8 shows the mean index scores for the Australian states and territories, and the OECD average, on the Teacher use of creative pedagogies index. Jurisdictions are presented in order from the lowest to highest mean index score.

Nationally, the mean index scores for teachers' use of creative pedagogies ranged from -0.33 in South Australia to -0.52 in Queensland.

Teachers in Queensland placed the least importance on using creative pedagogies in class than teachers in all other jurisdictions and teachers on average across the OECD countries.

Teachers in all jurisdictions except South Australia and Queensland placed similar importance on using creative pedagogies in class.

Teachers in all jurisdictions placed lower importance on using creative pedagogies in class than teachers across the OECD countries.



Note: Jurisdictions are ordered from lowest to highest mean index score.

**FIGURE 5.8** Mean scores for the Teacher use of creative pedagogies index, by state and territory

Figure 5.9 presents the percentages of teachers who reported they placed some or a lot of importance in response to statements about using creative pedagogies in class, for the jurisdictions.

- ▶ A higher proportion of teachers in all jurisdictions placed importance on *finding ideas through brainstorming* than teachers on average across the OECD countries.
- ▶ Higher proportions of teachers in all jurisdictions except Tasmania and the Northern Territory placed importance on *playing educational games* than teachers on average across the OECD countries.
- ▶ Similar proportions of teachers in all jurisdictions except Queensland placed importance on *group work* than teachers on average across the OECD countries.
- ▶ Similar proportions of teachers in South Australia placed importance on *journaling* than teachers on average across the OECD countries, while in all other jurisdictions lower proportions of teachers placed importance on journaling than teachers on average across the OECD average.
- ▶ A similar proportion of teachers in the Northern Territory placed importance on *debating ideas or current issues* than teachers on average across the OECD countries.
- ▶ Lower proportions of teachers in all jurisdictions except the Northern Territory placed importance on *debating ideas or current issues* in class than teachers on average across the OECD countries.
- ▶ Lower proportions of teachers in all jurisdictions placed importance on *incorporating creative activities like drawing or poetry into projects* than teachers on average across the OECD countries, and lower proportions of teachers in all jurisdictions except South Australia placed importance on journaling and *giving students time to explore topics on their own*.

Teachers who reported they gave some importance or a lot of importance (%)				
State/Territory	Group work	Finding ideas through brainstorming	Playing educational games	Debating ideas or current issues
QLD	89	94	71	86
WA	92	95	72	84
TAS	94	96	72	82
VIC	94	96	74	86
NT	91	97	76	89
NSW	92	96	72	89
ACT	93	96	72	87
SA	94	97	74	88
<b>OECD average</b>	93	93	77	93

Teachers who reported they gave some importance or a lot of importance (%)			
State/Territory	Giving students time to explore topics on their own	Journaling	Incorporating creative activities like drawing or poetry into projects
QLD	92	46	53
WA	92	51	62
TAS	94	53	65
VIC	93	50	60
NT	90	48	65
NSW	92	49	63
ACT	92	46	63
SA	95	57	62
<b>OECD average</b>	96	60	74

■ Significantly lower than the OECD average    
■ Not significantly different from the OECD average    
■ Significantly higher than the OECD average

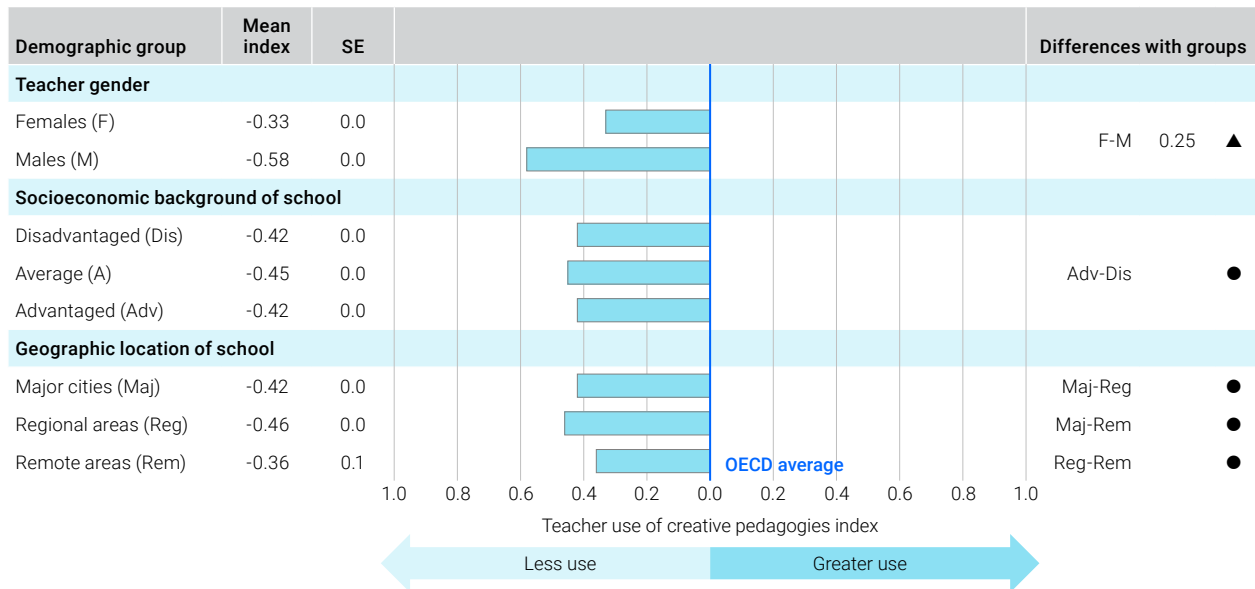
Note: Jurisdictions are ordered from lowest to highest mean score on the Teacher use of creative pedagogies index.

**FIGURE 5.9** Percentages of teachers who reported placing importance on the use of creative pedagogies in class, by state and territory

## Teacher use of creative pedagogies for different demographic groups

Figure 5.10 shows the mean index scores on the Teachers' use of creative pedagogies index for different demographic groups.

- ▶ Female teachers reported placing more importance on using creative pedagogies in class than male teachers.
- ▶ Irrespective of the socioeconomic background or geographic location of schools there was no difference in the importance teachers placed on the use of creative pedagogies.



- ▲ Mean of first group significantly higher than second group
- No statistically significant difference
- ▼ Mean of first group significantly lower than second group

**FIGURE 5.10** Mean scores for the Teacher use of creative pedagogies index, for different demographic groups

Table 5.2 presents the percentages of teachers who reported they placed some or a lot of importance in response to statements about using creative pedagogies in class, for the different demographic groups.

- ▶ A greater proportion of female than male teachers placed importance on *incorporating creative activities like drawing or poetry into projects* (65% compared to 52%), followed by *playing educational games* (76% compared to 67%), and *journaling* (52% compared to 45%).
- ▶ The remaining differences between the proportions of female and male teachers were all small; however, in general over 85% of teachers reported using the listed creative pedagogies in class.
- ▶ A greater proportion of teachers in regional schools than major city schools placed importance on *playing educational games* (75% compared to 72%).
- ▶ A lower proportion of teachers in major city schools than remote schools placed importance on *group work* (92% compared to 97%); a lower proportion of teachers in regional schools than remote schools placed importance on *group work* (91% compared to 97%).
- ▶ A lower proportion of teachers in major city and regional schools placed importance on *journaling* than teachers in remote schools (49% compared to 60%).

**TABLE 5.2** Percentages of teachers who reported placing importance on the use of creative pedagogies in class, by demographic groups

Demographic group	Teachers who reported they gave <i>some importance</i> or <i>a lot of importance</i> (%)							
	Group work		Finding ideas through brainstorming		Playing educational games		Debating ideas or current issues	
	%	SE	%	SE	%	SE	%	SE
<b>Teacher gender</b>								
Females	93	0.5	97	0.2	76	0.8	88	0.5
Males	90	0.5	93	0.4	67	0.9	85	0.6
Difference (F-M)	3 pp ▲		4 pp ▲		9 pp ▲		3 pp ▲	
<b>Socioeconomic background of school</b>								
Disadvantaged	91	0.7	96	0.4	73	1.3	87	0.6
Average	92	0.5	96	0.4	74	0.9	86	0.5
Advantaged	93	0.5	95	0.3	71	1.0	87	0.6
Difference (Adv-Dis)	●		●		●		●	
<b>Geographic location of school</b>								
Major cities	92	0.3	96	0.2	72	0.6	87	0.3
Regional areas	91	0.9	96	0.5	75	1.1	86	0.8
Remote areas	97	1.1	94	2.1	76	2.8	87	1.6
Difference (Maj-Reg)	●		●		3 pp ▼		●	
Difference (Maj-Rem)	5 pp ▼		●		●		●	
Difference (Reg-Rem)	6 pp ▼		●		●		●	

Demographic group	Teachers who reported they gave <i>some importance</i> or <i>a lot of importance</i> (%)					
	Giving students time to explore topics on their own		Journaling		Incorporating creative activities like drawing or poetry into projects	
	%	SE	%	SE	%	SE
<b>Teacher gender</b>						
Females	93	0.4	52	0.7	65	0.8
Males	91	0.5	45	1.0	52	0.8
Difference (F-M)	2 pp ▲		7 pp ▲		13 pp ▲	
<b>Socioeconomic background of school</b>						
Disadvantaged	93	0.6	51	1.2	62	1.4
Average	92	0.4	48	0.8	59	1.0
Advantaged	93	0.5	49	1.0	60	1.0
Difference (Adv-Dis)	●		●		●	
<b>Geographic location of school</b>						
Major cities	93	0.3	49	0.7	60	0.7
Regional areas	92	0.6	49	1.1	61	1.1
Remote areas	97	2.0	60	3.5	65	5.4
Difference (Maj-Reg)	●		●		●	
Difference (Maj-Rem)	4 pp ▼		11 pp ▼		●	
Difference (Reg-Rem)	5 pp ▼		11 pp ▼		●	

pp percentage points

▲ Mean of first group significantly higher than second group

● No statistically significant difference

▼ Mean of first group significantly lower than second group

## 5.3 Openness to creativity

Teachers' openness to creative activities is important in fostering an engaging and dynamic learning environment. A creative teacher is confident, enthusiastic and perceives failure as a learning opportunity. They can design engaging and interactive lessons to capture the attention and imagination of their students. Research shows teachers who embrace creative activities can boost student engagement and motivation in class, increase student enthusiasm in their lessons, and develop critical thinking and problem-solving skills (Cremin, 2015).

This section focuses on teachers' openness to participating in creative activities.

### Measuring openness to creativity

Teachers were asked to rate their agreement with statements about their openness to creative activities on a 4-point scale (strongly disagree; disagree; agree; strongly agree).

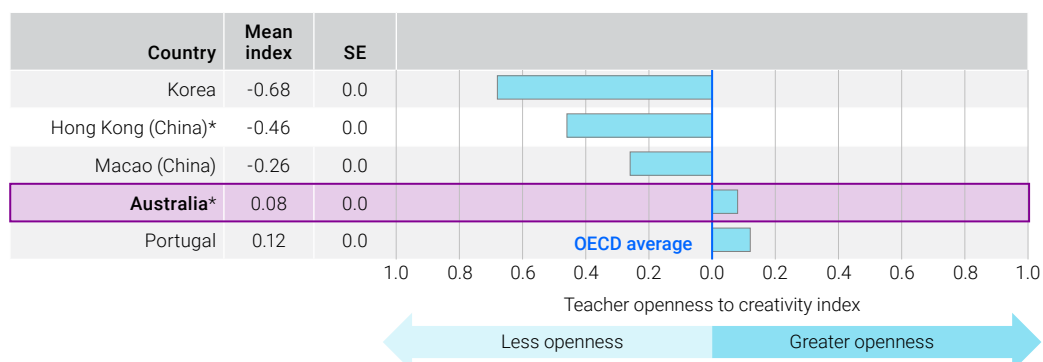
1. *I am very creative.*
2. *I enjoy projects that require creative solutions.*
3. *I enjoy solving complex problems.*
4. *I enjoy learning new things.*
5. *I enjoy artistic activities.*
6. *I express myself through art.*
7. *I have difficulty using my imagination.*
8. *I have a good imagination.*

An Openness to creativity index was constructed using the responses to these activities. It was standardised to have mean of 0 and a standard deviation of 1 across OECD countries. Positive values on the index indicate that the teachers reported greater openness to creative activities; lower values indicate teachers showed lower openness than on average across OECD countries.

### Openness to creativity in an international context

Figure 5.11 shows the mean scores for Australia, selected comparison countries, and the OECD average on the Openness to creativity index. Countries are presented in order from the lowest to highest mean index score.

- ▶ Of the comparison countries, teachers in Portugal (0.12) and Australia (0.08) reported greater openness to creativity.
- ▶ Korea's mean index score of -0.68 was lower than all the comparison countries including teachers on average across the OECD countries.
- ▶ Australia's mean index score of 0.12 was higher than teachers on average across the OECD countries (0.00).



Note: Countries are ordered from lowest to highest mean index score.

**FIGURE 5.11** Mean scores for the Openness to creativity index, for Australia and comparison countries

Figure 5.12 presents the percentages of teachers who reported they agreed or strongly agreed with statements about their openness to creative activities, for Australia, the comparison countries and the OECD average.

- ▶ A higher proportion of teachers in Portugal than in all comparison countries and across the OECD countries reported *I am very creative*; *I enjoy projects that require creative solutions* and *I enjoy learning new things*. Higher proportions of teachers in Portugal and Macao (China) reported *I enjoy artistic activities*.
- ▶ Higher proportions of teachers in all comparison countries and across the OECD countries except Australia and Portugal reported *I express myself through art*.
- ▶ Except for Australia, teachers in all comparison countries including across the OECD countries reported *I have difficulty using my imagination*; conversely, a higher proportion of teachers in Australia reported *I have a good imagination*.
- ▶ Similar proportions of teachers in Australia and Portugal reported *I enjoy solving complex problems* and *I express myself through art*.

Country	Teachers who reported they agree or strongly agree (%)			
	I am very creative	I enjoy projects that require creative solutions	I enjoy solving complex problems	I enjoy learning new things
Korea	56	54	60	82
Hong Kong (China)*	62	76	70	91
Macao (China)	69	83	72	95
<b>Australia*</b>	<b>77</b>	<b>86</b>	<b>86</b>	<b>99</b>
Portugal	80	93	87	100
<b>OECD average</b>	<b>77</b>	<b>84</b>	<b>82</b>	<b>95</b>

Country	Teachers who reported they agree or strongly agree (%)			
	I enjoy artistic activities	I express myself through art	I have difficulty using my imagination	I have a good imagination
Korea	69	49	41	62
Hong Kong (China)*	67	46	32	72
Macao (China)	76	52	29	80
<b>Australia*</b>	<b>72</b>	<b>42</b>	<b>17</b>	<b>88</b>
Portugal	93	43	20	74
<b>OECD average</b>	<b>75</b>	<b>49</b>	<b>23</b>	<b>80</b>

■ Significantly lower than Australia    
 ■ Not significantly different from Australia    
 ■ Significantly higher than Australia

Note: Countries are ordered from lowest to highest mean score on the Teacher openness to creativity index.

**FIGURE 5.12** Percentages of teachers who agreed or strongly agreed with statements about their openness to creativity, for Australia and comparison countries

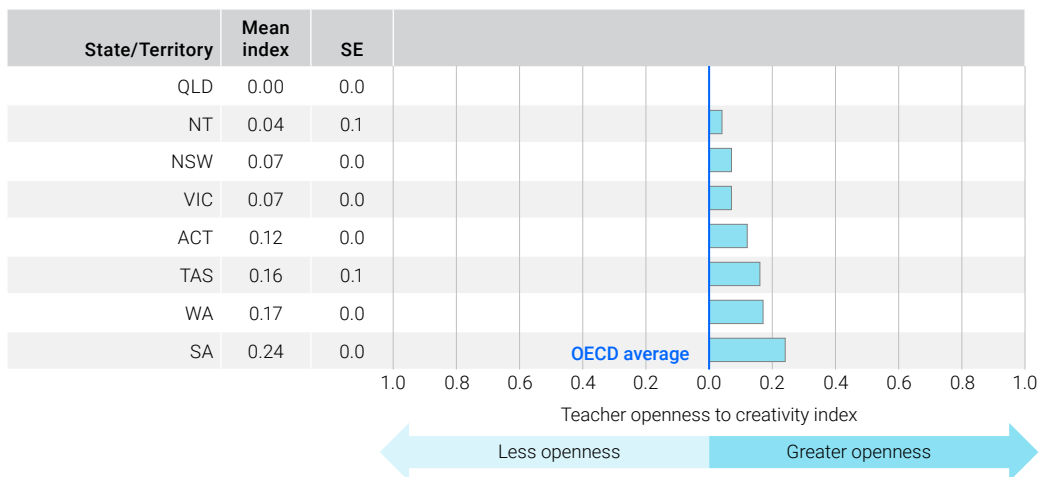
## Openness to creativity in a national context

Figure 5.13 shows the mean index scores for the Australian states and territories, and the OECD average on the Openness to creativity index. Jurisdictions are presented in order from the lowest to highest mean index score.

Nationally, the mean index scores for teachers' openness to creativity ranged from 0.00 in Queensland to 0.24 in South Australia.

Teachers in Queensland, the Northern Territory, New South Wales and Victoria reported lower openness to creative activities than teachers in the Australian Capital Territory, Tasmania, Western Australia and South Australia.

Teachers in Queensland, the Northern Territory, New South Wales, and Victoria reported similar openness to creative activities to teachers on average across the OECD countries.



Note: Jurisdictions are ordered from lowest to highest mean index score.

**FIGURE 5.13** Mean scores for the Openness to creativity index, by state and territory

Figure 5.14 presents the percentages of teachers who reported they agreed or strongly agreed with statements about their openness to creative activities, for the jurisdictions.

- ▶ Higher proportions of teachers in South Australia and Western Australia than on average across the OECD reported *I am very creative*.
- ▶ Higher proportions of teachers in the Northern Territory, New South Wales, Victoria, Western Australia and South Australia reported *I enjoy projects that require creative solutions*, while a higher proportion of teachers in all jurisdictions except Queensland reported *I enjoy solving complex problems*.
- ▶ Higher proportion of teachers in all jurisdictions except the Northern Territory reported *I enjoy learning new things* and *I have a good imagination* than on average across the OECD countries.
- ▶ Similar proportions of teachers in the Northern Territory, the Australian Capital Territory, Tasmania, Western Australia and South Australia than teachers on average across the OECD countries reported *I enjoy artistic activities*.
- ▶ A lower proportion of teachers in Queensland reported *I am very creative* than on average across the OECD countries.
- ▶ Lower proportions of teachers in all jurisdictions except Tasmania and South Australia reported *I express myself through art* than on average across the OECD countries. Teachers in the other jurisdictions were similar on average across the OECD countries.
- ▶ Lower proportions of teachers in all jurisdictions reported *I have difficulty using my imagination* than on average across the OECD countries.

State/Territory	Teachers who reported they agree or strongly agree (%)			
	I am very creative	I enjoy projects that require creative solutions	I enjoy solving complex problems	I enjoy learning new things
QLD	74	84	83	99
NT	73	89	90	99
NSW	77	87	88	99
VIC	78	86	85	99
ACT	75	86	90	99
TAS	78	87	87	99
WA	80	87	87	99
SA	82	91	90	99
<b>OECD average</b>	77	84	82	95

State/Territory	Teachers who reported they agree or strongly agree (%)			
	I enjoy artistic activities	I express myself through art	I have difficulty using my imagination	I have a good imagination
QLD	70	38	19	85
NT	70	36	16	83
NSW	71	43	18	88
VIC	70	42	17	88
ACT	75	43	16	88
TAS	73	48	14	88
WA	75	44	16	88
SA	76	46	15	90
<b>OECD average</b>	75	49	23	80

Note: Jurisdictions are ordered from lowest to highest mean score on the Teacher openness to creativity index.

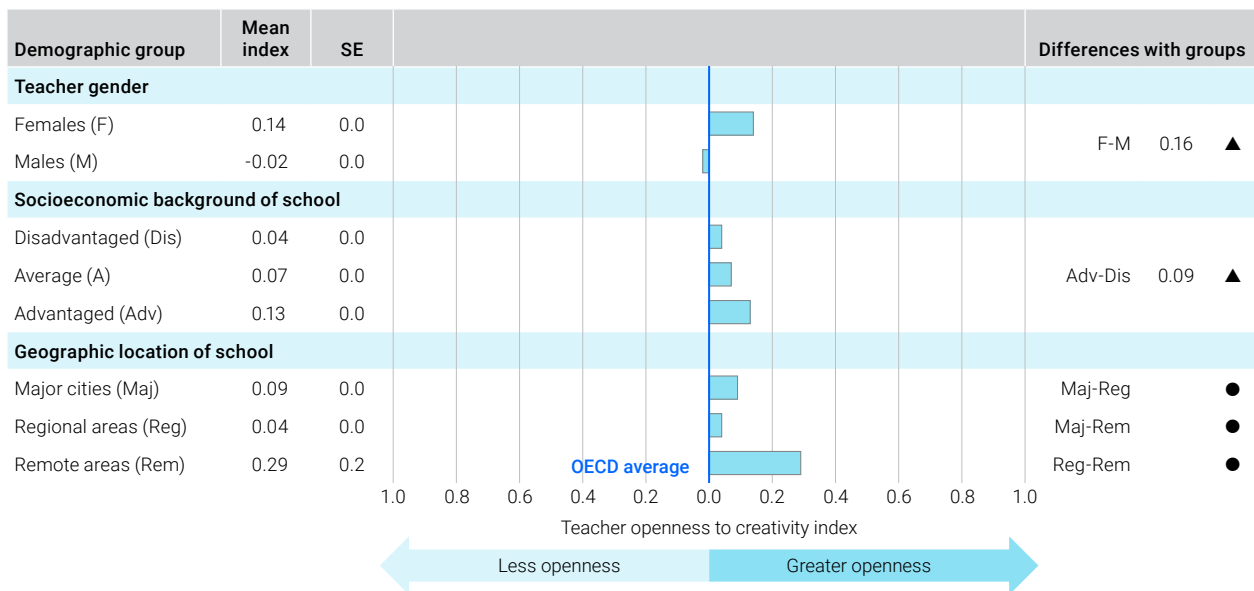
**FIGURE 5.14** Percentages of teachers who agreed or strongly agreed with statements about their openness to creativity, by state and territory

## Openness to creativity for different demographic groups

Figure 5.15 shows the mean index scores on the Openness to creativity index for teachers for different demographic groups.

- ▶ Female teachers reported greater openness to creative activities than male teachers.
- ▶ Teachers at schools in advantaged socioeconomic backgrounds reported being more open to creative activities than teachers at schools with disadvantaged socioeconomic backgrounds.
- ▶ Teachers reported similar openness to creative activities irrespective of the geographic location of their schools.





- ▲ Mean of first group significantly higher than second group
- No statistically significant difference
- ▼ Mean of first group significantly lower than second group

**FIGURE 5.15** Mean scores for the Openness to creativity index, for different demographic groups

Table 5.3 presents the percentages of teachers who reported they agreed or strongly agreed with statements about their openness to creative activities, for the different demographic groups.

- ▶ A greater proportion of female than male teachers reported *I enjoy artistic activities* (77% compared to 63%) and *I express myself through art* (47% compared to 35%). A smaller difference was observed in the proportion of female than male teachers who reported *I am very creative* (79% compared to 75%).
- ▶ A higher proportion of male than female teachers reported *I enjoy solving complex problems* (91% compared to 84%).
- ▶ While percentage differences were very small, a higher proportion of teachers in major city schools than regional schools reported *I am very creative* (78% compared to 75%) and *I enjoy solving complex problems* (87% compared to 85%).
- ▶ In contrast, a lower proportion of teachers in regional schools than remote schools reported *I am creative* (75% compared to 85%) and *I enjoy projects that require creative solutions* (85% compared to 91%), and *I enjoy artistic activities* (70% compared to 81%).

**TABLE 5.3** Percentages of teachers who agreed or strongly agreed with statements about their openness to creativity, by demographic groups

Demographic group	Teachers who reported they agree or strongly agree (%)							
	I am very creative		I enjoy projects that require creative solutions		I enjoy solving complex problems		I enjoy learning new things	
	%	SE	%	SE	%	SE	%	SE
<b>Teacher gender</b>								
Females	79	0.6	87	0.5	84	0.6	99	0.2
Males	75	0.7	86	0.7	91	0.6	99	0.2
Difference (F-M)	4 pp ▲		●		7 pp ▼		●	
<b>Socioeconomic background of school</b>								
Disadvantaged	76	1.2	86	0.9	86	0.9	99	0.3
Average	77	0.8	86	0.6	86	0.7	99	0.1
Advantaged	79	0.7	87	0.7	87	0.7	99	0.3
Difference (Adv-Dis)	●		●		●		●	
<b>Geographic location of school</b>								
Major cities	78	0.6	87	0.5	87	0.5	99	0.1
Regional areas	75	1.0	85	0.8	85	1.1	99	0.3
Remote areas	85	3.8	91	2.5	84	1.6	99	1.1
Difference (Maj-Reg)	3 pp ▼		2 pp ▲		2 pp ▼		●	
Difference (Maj-Rem)	●		●		●		●	
Difference (Reg-Rem)	10 pp ▼		6 pp ▼		●		●	

Demographic group	Teachers who reported they agree or strongly agree (%)							
	I enjoy artistic activities		I express myself through art		I have difficulty using my imagination		I have a good imagination	
	%	SE	%	SE	%	SE	%	SE
<b>Teacher gender</b>								
Females	77	0.7	47	0.7	17	0.5	87	0.5
Males	63	0.9	35	0.9	18	0.7	88	0.6
Difference (F-M)	14 pp ▲		12 pp ▲		●		●	
<b>Socioeconomic background of school</b>								
Disadvantaged	69	1.1	42	1.1	18	0.9	86	1.0
Average	71	0.8	42	0.9	18	0.8	88	0.6
Advantaged	74	0.9	43	0.9	16	0.5	89	0.5
Difference (Adv-Dis)	5 pp ▲		●		●		3 pp ▲	
<b>Geographic location of school</b>								
Major cities	72	0.6	42	0.6	17	0.5	88	0.4
Regional areas	70	1.2	41	1.2	18	1.0	86	0.9
Remote areas	81	4.8	49	4.0	12	3.2	89	2.9
Difference (Maj-Reg)	●		●		●		●	
Difference (Maj-Rem)	●		●		●		●	
Difference (Reg-Rem)	11 pp ▼		●		●		●	

pp percentage points

▲ Mean of first group significantly higher than second group

● No statistically significant difference

▼ Mean of first group significantly lower than second group

# 6

## Creative thinking from the principal's perspective

A creative school environment fosters originality and encourages students to think differently. Schools that promote creative thinking help students develop the ability to generate unique ideas and solutions. A creative environment allows students to take risks and learn from failure. They can experiment with different ideas and approaches without the fear of harsh judgment. (Richardson et al., 2018).

Students in school environments that encourage, and support creativity have been shown to have a stronger sense of personal success, stronger reasoning ability, increased confidence, increased resilience, increased motivation and engagement, and enhanced critical thinking and problem-solving skills (Jindal-Snape et al., 2013).

The results in this chapter show how principals responded to questions about creative thinking. The constructs explored included:

- ▶ creative school environment (also referred to as principals' perceptions of pedagogies encouraging creative thinking)
- ▶ creative activities offered at school
- ▶ school openness to creativity.

Results are provided for constructed indices designed to standardise responses onto one scale.<sup>1</sup>

Each construct examines the similarities and differences in principals' creative thinking between countries, the Australian jurisdictions and different demographic groups. Each section also explores the relationship between each creative thinking construct and creative thinking performance.

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<sup>1</sup> The Reader's guide provides more information about the PISA indices.

## 6.1 Creative school environment<sup>2</sup>

A school environment that supports and actively encourages students' creative expression can promote their engagement in creative activities. When students learn in a creative learning environment, they are likely to continue to develop their skills and knowledge and pursue their interests. (Jindal-Snape et al., 2013).

### Measuring creative school environment

Principals were asked to rate their agreement with statements about the encouragement of creative thinking by teachers and through activities at their school on a 4-point scale (strongly disagree, disagree, agree, strongly agree). Teachers' encouragement and school activities are referred to collectively as 'creative school environment'.

1. *Teachers in our school give students enough time to come up with creative solutions on assignments.*
2. *Teachers in our school value students' creativity.*
3. *Class activities in our school help students think about new ways to solve complex tasks.*
4. *Mathematics assignments at our school require students to come up with different solutions for a complex task.*
5. *Teachers in our school encourage students to come up with original answers.*
6. *At our school, students are given a chance to express their ideas.*

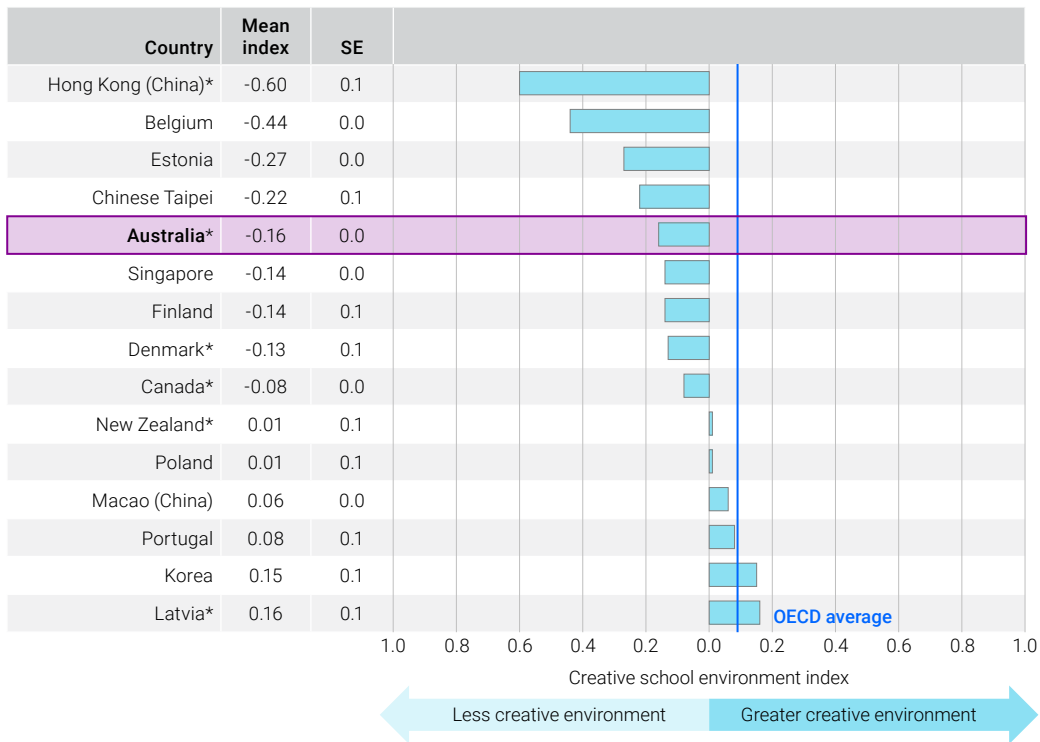
A Creative school environment index was constructed using the responses to these statements. It was standardised to have mean of 0 and a standard deviation of 1 across OECD countries. Positive values on the index indicate principals reported greater agreement that creativity was encouraged in the school; lower values indicate principals held lower agreement that creativity was encouraged in the school than on average across OECD countries.

### Creative school environment in an international context

Figure 6.1 shows the mean index scores for Australia, selected comparison countries, and the OECD average on the Creative school environment index. Countries are presented in order from the lowest to highest mean score.

- ▶ Of the comparison countries, principals in Latvia, Korea, Portugal and Macao (China) reported the most creative school environments where students' creativity is encouraged by their teachers and through school activities.
- ▶ Principals in Hong Kong reported less creative school environments (-0.60).
- ▶ More principals in Australia reported creative school environments than principals in Hong Kong (China), Belgium, Estonia and Chinese Taipei.
- ▶ Australia's mean index score of -0.16 was similar to principals on average across the OECD countries (-0.09).

<sup>2</sup> The OECD also refers to the Creative school index as the School principal's perception of pedagogies encouraging creative thinking index.

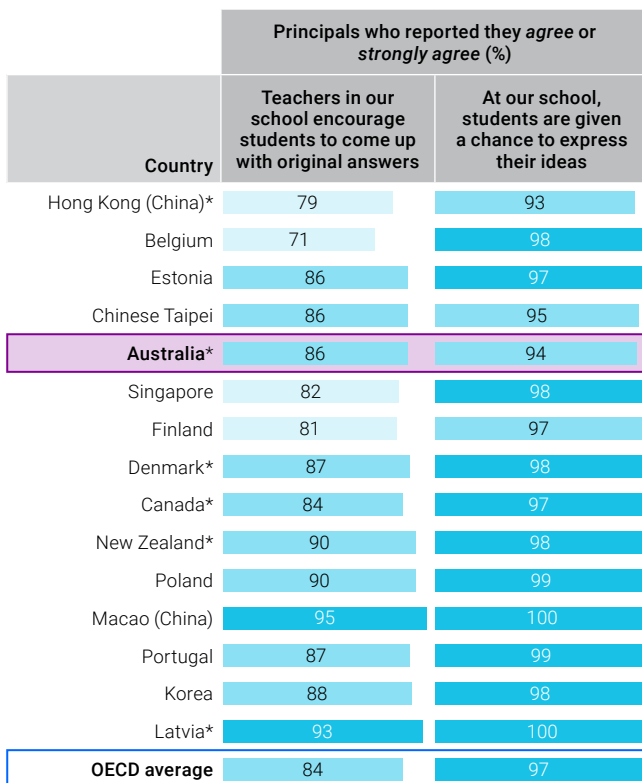
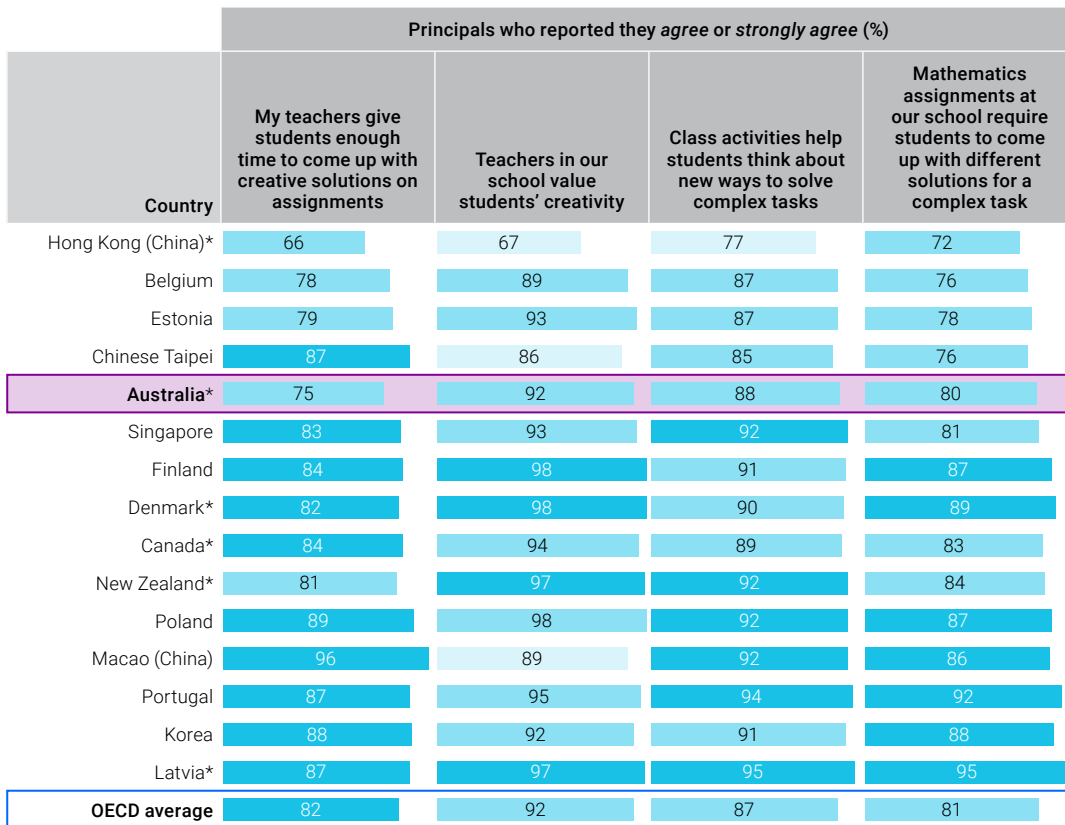


Note: Countries are ordered from lowest to highest mean index score.

**FIGURE 6.1** Mean scores for the Creative school environment index, for Australia and comparison countries

Figure 6.2 presents the percentages of principals who agreed or strongly agreed that students' creativity is encouraged by their teachers and through school activities for Australia, the comparison countries and the OECD average.

- ▶ Similar proportions of principals in Australia, Belgium and Estonia agreed *my teachers give students enough time to come up with creative solutions on assignments, teachers in our school value students' creativity, class activities help students think about new ways to solve complex tasks and mathematics assignments at our school require students to come up with different solutions for a complex task.*
- ▶ Higher proportions of teachers in all comparison countries including on average across the OECD countries except Hong Kong (China), Chinese Taipei, Australia and Finland agreed *at our school, students are given a chance to express their ideas.*
- ▶ Higher proportions of principals in all comparison countries including on average across the OECD countries than in Hong Kong (China), Belgium, Estonia, Australia and New Zealand agreed *my teachers give students enough time to come up with creative solutions on assignments.*
- ▶ Lower proportions of principals in Hong Kong (China), Chinese Taipei and Macao (China) than in Australia agreed *teachers in our school value students' creativity.*
- ▶ Lower proportions of principals in Hong Kong (China), Belgium, Singapore and Finland than in Australia agreed *teachers in our school encourage students to come up with original answers.*
- ▶ A lower proportion of principals in Hong Kong (China) than in all comparison countries including on average across the OECD countries agreed *class activities help students think about new ways to solve complex tasks.*



■ Significantly lower than Australia   
 ■ Not significantly different from Australia   
 ■ Significantly higher than Australia

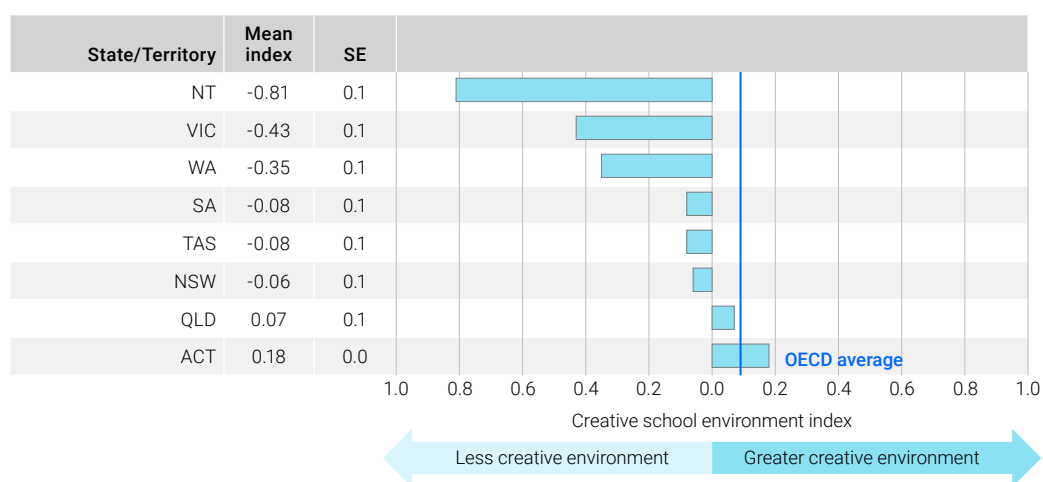
Note: Countries are ordered from lowest to highest mean score on the Creative school environment index.

**FIGURE 6.2** Percentages of principals who reported encouragement of creative thinking by teachers at their school, for Australia and comparison countries

## Creative school environment in a national context

Figure 6.3 shows the mean index scores for the Australian states and territories, and the OECD average on the Creative school environment index. Jurisdictions are presented in order from the lowest to highest mean index score.

- ▶ Nationally, the mean index scores for a creative school environment ranged from 0.18 in the Australian Capital Territory to -0.81 in the Northern Territory.
- ▶ Principals in the Australian Capital Territory reported similar creative school environments to principals in Queensland.
- ▶ Principals in the Australian Capital Territory reported more creative school environments than principals in all other jurisdictions, while principals in Queensland reported more creative school environments than principals in Western Australia, Victoria and the Northern Territory.
- ▶ Principals in New South Wales, Tasmania and South Australia reported similar school creative environments.
- ▶ Principals in the Northern Territory reported less creative school environments than principals in all other jurisdictions and on average across the OECD countries.

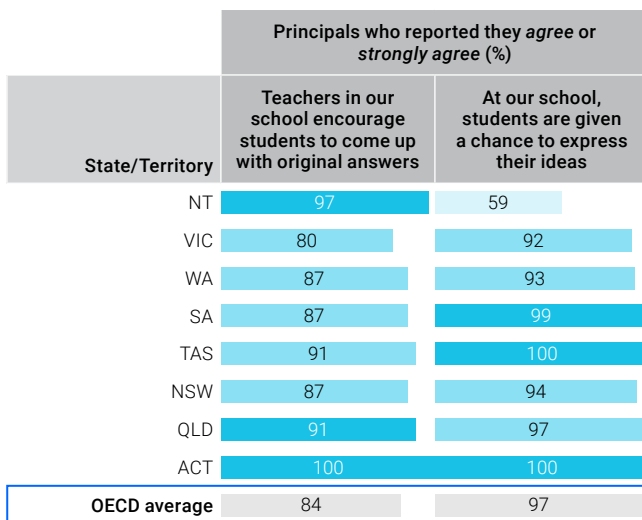
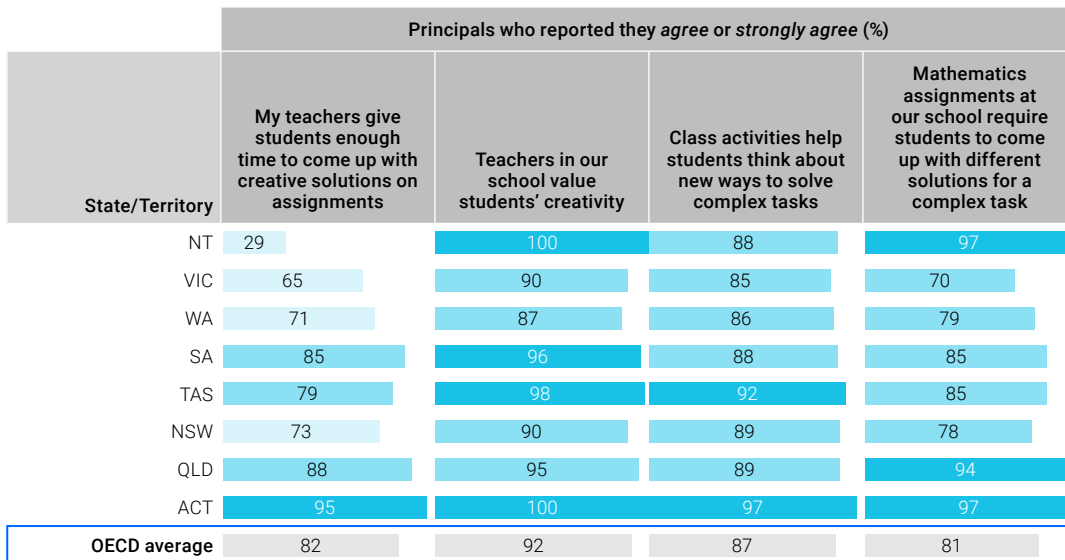


Note: Jurisdictions are ordered from lowest to highest mean index score.

**FIGURE 6.3** Mean scores for the Creative school environment index, by state and territory

Figure 6.4 presents the percentages of principals in the states and territories who reported they agreed or strongly agreed that their schools had creative school environments where students' creativity is encouraged by their teachers and through school activities.

- ▶ Higher proportions of principals of students in South Australia, Tasmania and the Australian Capital Territory than principals of students across the OECD countries reported *teachers in our school value students' creativity and students are given a chance to express their ideas*.
- ▶ Higher proportions of principals of students in the Northern Territory, Queensland and the Australian Capital Territory than principals across the OECD countries reported *mathematics assignments at our school require students to come up with different solutions for a complex task*, and reported *teachers in our school encourage students to come up with original answers*.
- ▶ Similar proportions of principals of students in all jurisdictions except Tasmania and the Australian Capital Territory than across the OECD countries reported *class activities help students think about new ways to complex tasks*.
- ▶ Lower proportions of principals of students in the Northern Territory, Victoria, Western Australia and New South Wales reported *my teachers give students enough time to come up with creative solutions on assignments* than on average across the OECD countries.
- ▶ A lower proportion of principals of students in the Northern Territory reported *at our school, students are given a chance to express their ideas* than on average across the OECD countries.



■ Significantly lower than the OECD average    
■ Not significantly different from the OECD average    
■ Significantly higher than the OECD average

Note: Jurisdictions are ordered from lowest to highest mean score on the Creative school environment index.

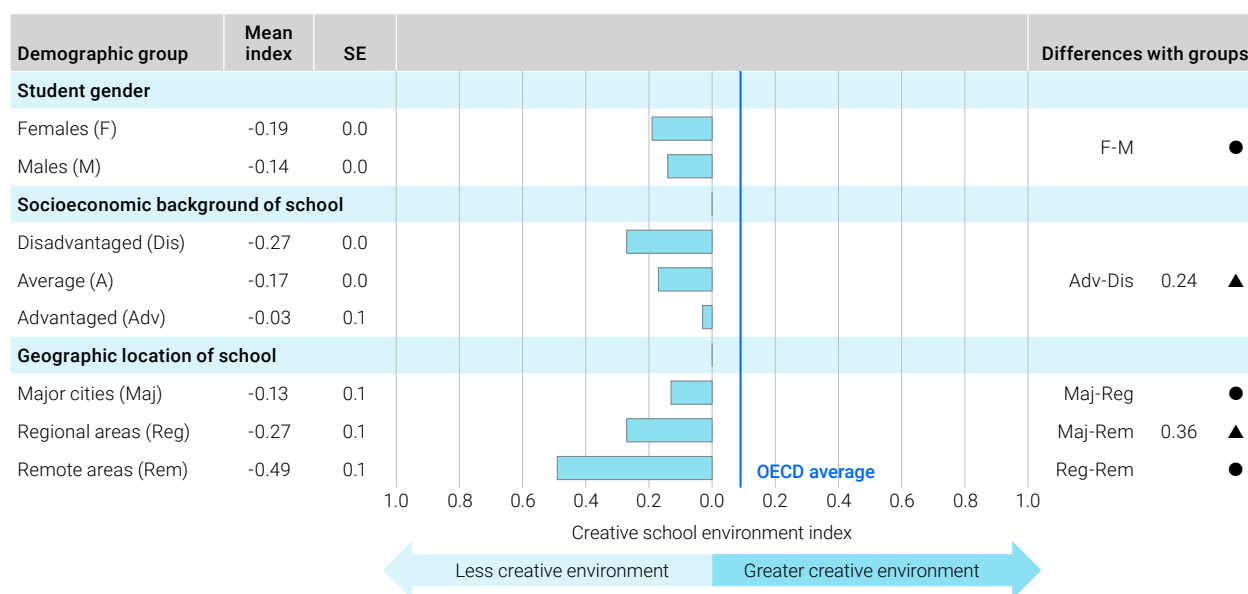
**FIGURE 6.4** Percentages of principals who reported creative school environments, by state and territory



## Creative school environment for different demographic groups

Figure 6.5 shows the mean index scores on the creative school environment index for teachers for different demographic groups.

- Principals reported their teachers gave similar encouragement to female and male students' creativity and through activities at their schools.
- Principals at schools with advantaged socioeconomic backgrounds reported more creative school environments than principals at schools with disadvantaged socioeconomic backgrounds.
- Principals at schools in major cities reported more creative school environments than principals at remote schools.



- ▲ Mean of first group significantly higher than second group
- No statistically significant difference
- ▼ Mean of first group significantly lower than second group

**FIGURE 6.5** Mean scores for the Creative school environment index, for different demographic groups

Table 6.1 presents the percentages of principals who reported they agreed or strongly agreed that their schools had creative school environments where students' creativity is encouraged by their teachers and through school activities, for the different demographic groups.

- Principals reported their teachers gave similar encouragement to female and male students' creativity and through activities at their schools. No differences were observed between principals of socioeconomically advantaged and disadvantaged students.
- A lower proportion of students who attended schools in major cities had principals who agreed *teachers in our school value students' creativity* compared to students from remote areas (91% compared to 100%). A lower proportion of students who attended schools in regional areas compared to remote areas had principals who agreed with this statement (93% compared to 100%).
- Similarly, a lower proportion of students who attended schools in major cities had principals who agreed *class activities help students think about new ways to complex tasks* compared to students from remote areas (88% compared to 97%). A lower proportion of students who attended schools in regional areas compared to remote areas had principals who agreed with this statement (86% compared to 97%).

**TABLE 6.1** Percentages of principals who reported creative school environments, by demographic groups

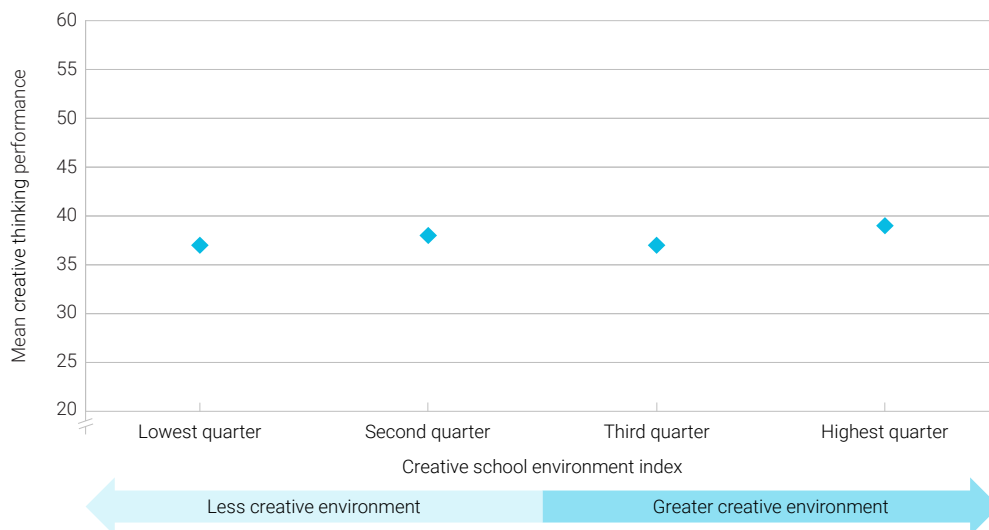
Demographic group	Principals who reported they agree or strongly agree (%)							
	My teachers give students enough time to come up with creative solutions on assignments		Teachers in our school value students' creativity		Class activities help students think about new ways to solve complex tasks		Mathematics assignments at our school require students to come up with different solutions for a complex task	
	%	SE	%	SE	%	SE	%	SE
<b>Student gender</b>								
Females	74	2.4	91	1.4	91	1.4	81	2.4
Males	76	2.0	92	1.2	92	1.2	80	2.1
Difference (F-M)	●		●		●		●	
<b>Socioeconomic background of school</b>								
Disadvantaged	74	2.4	92	1.4	88	1.9	79	2.5
Average	75	2.1	91	1.4	87	1.8	80	2.2
Advantaged	76	2.2	92	1.3	88	1.7	82	2.1
Difference (Adv-Dis)	●		●		●		●	
<b>Geographic location of school</b>								
Major cities	75	2.2	91	1.4	88	1.9	80	2.3
Regional areas	76	4.1	93	2.4	86	3.4	80	3.8
Remote areas	73	10.6	100	0.0	97	1.1	90	10.6
Difference (Maj-Reg)	●		●		●		●	
Difference (Maj-Rem)	●		9 pp ▼		9 pp ▼		●	
Difference (Reg-Rem)	●		7 pp ▼		11 pp ▼		●	

Demographic group	Principals who reported they agree or strongly agree (%)			
	Teachers in our school encourage students to come up with original answers		At our school, students are given a chance to express their ideas	
	%	SE	%	SE
<b>Student gender</b>				
Females	87	1.8	95	1.1
Males	86	1.7	94	1.4
Difference (F-M)	●		●	
<b>Socioeconomic background of school</b>				
Disadvantaged	85	2.2	94	1.4
Average	86	1.7	94	1.2
Advantaged	88	1.8	95	1.3
Difference (Adv-Dis)	●		●	
<b>Geographic location of school</b>				
Major cities	86	1.8	86	1.8
Regional areas	88	3.2	88	3.2
Remote areas	90	10.6	90	10.6
Difference (Maj-Reg)	●		●	
Difference (Maj-Rem)	●		●	
Difference (Reg-Rem)	●		●	

pp percentage points  
▲ Mean of first group significantly higher than second group  
● No statistically significant difference  
▼ Mean of first group significantly lower than second group

## The relationship between creative school and class environment and creative thinking performance

Figure 6.6 shows the relationship between a creative school and class environment (by quarters) and creative thinking performance. On the Creative school and class environment index, students in the highest quarter scored on average 2 score points higher than students in the lowest quarter in creative thinking performance.



**FIGURE 6.6** Mean scores for the creative school and class environment and creative thinking performance, for Australia

## 6.2 Creative activities offered in school

By offering creative activities, principals offer an engaging, supportive, diverse and dynamic educational environment to prepare students academically, personally and socially for the future. Clubs and creative activities allow students to develop resourcefulness, confidence, resilience, organisational skills, responsibility, cooperation, and the ability to collaborate with others. Participation also improves students' social skills, their physical and motor skills, their emotional regulation, and their self-esteem (Saifi, 2023).

This section examines the similarities and differences between countries, the Australian jurisdictions and different demographic groups for how often creative activities were offered in their school.

### Measuring creative activities offered in school<sup>3</sup>

Principals were asked to indicate how often creative activities were offered in their school on a 5-point scale (about once or twice a year, about once or twice a month, about once or twice a week, every day or almost every day, with the additional response option of 'not available at our school').

1. *art classes/activities (e.g. painting, drawing)*
2. *creative writing classes/activities*
3. *debate club*
4. *dramatics, theatre class/activities*
5. *publications (e.g. newspaper, yearbook, literary magazine)*
6. *science club*
7. *computer programming classes/activities*

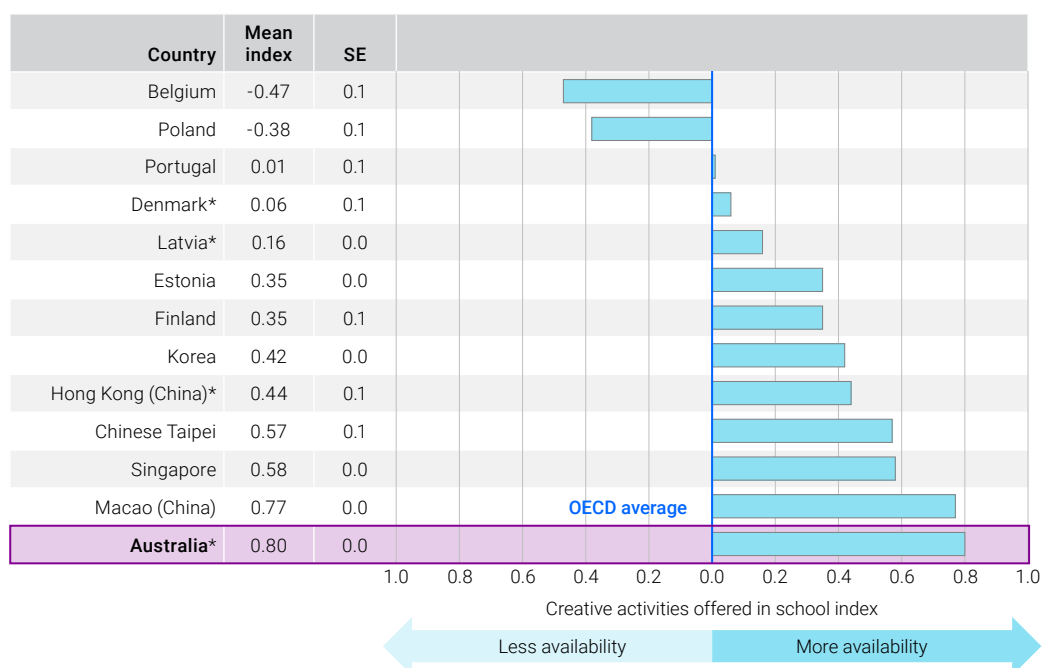
A Creative activities offered in school index was constructed using the responses to these options. It was standardised to have mean of 0 and a standard deviation of 1 across OECD countries. Positive values on the index indicate principals reported a greater frequency of creative activities offered; lower values indicate principals reported creative activities were offered less frequently than on average across OECD countries.

<sup>3</sup> The OECD also refers to the Creative activity offered in school index as the Availability of activities at school index.

## Creative activities offered in school in an international context

Figure 6.7 shows the mean index scores for Australia, selected comparison countries, and the OECD average on the Creative activities offered in school index. Countries are presented in order from the lowest to highest mean index score.

- ▶ Of the comparison countries, principals in Australia, Macao (China), Singapore, Chinese Taipei, Hong Kong (China) and Korea reported greater frequency of creative activities offered in school than principals in Belgium, Poland, Portugal, Denmark and Latvia.
- ▶ Principals in Australia reported greater frequency of creative activities offered in their schools than principals in all comparison countries except Macao (China).
- ▶ Australia's mean index score of 0.80 was greater than that of principals on average across the OECD countries (0.00).

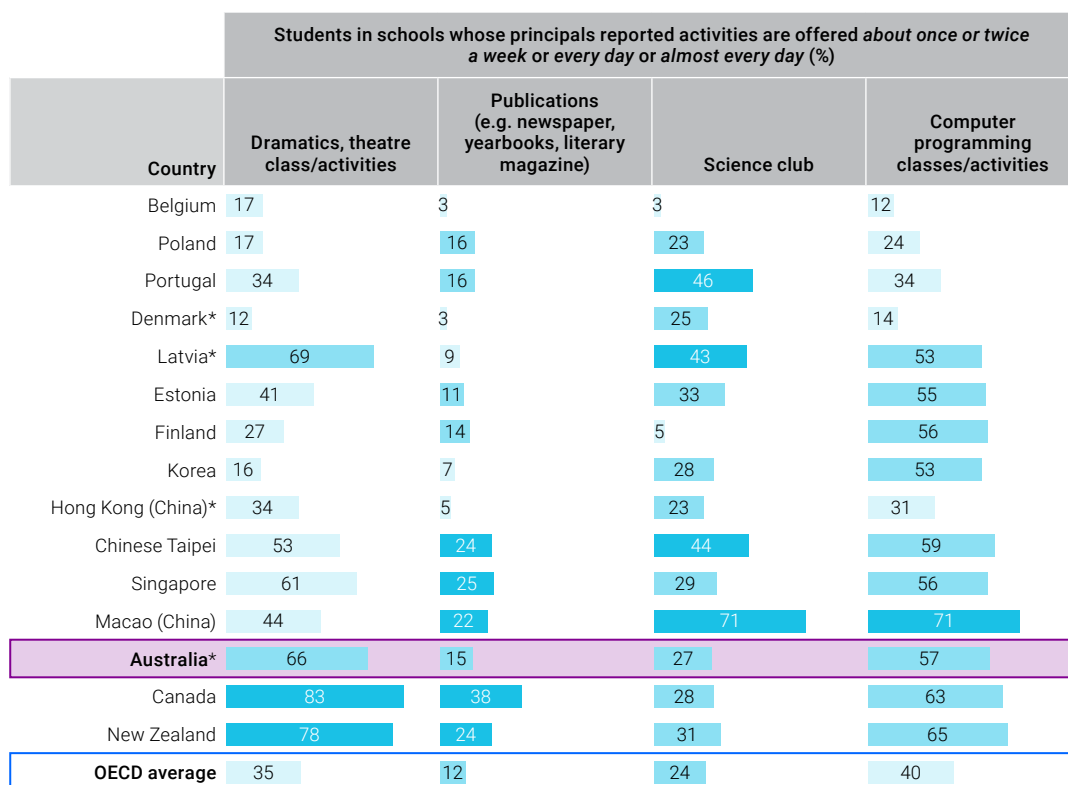
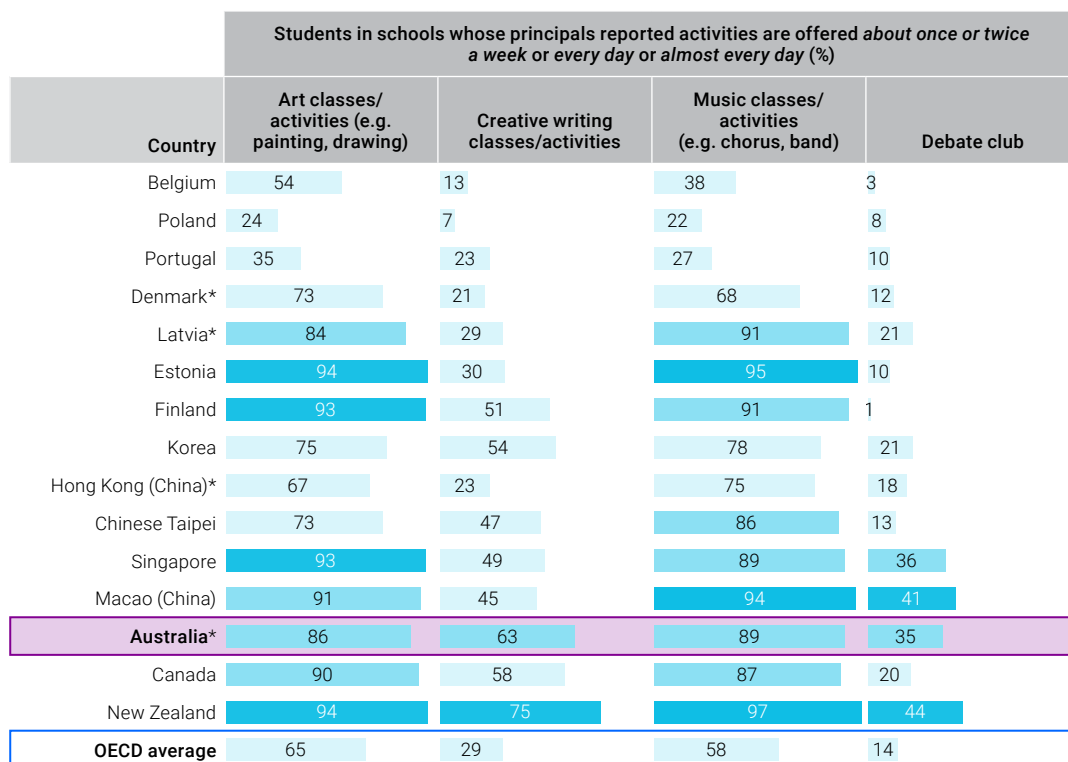


Note: Countries are ordered from lowest to highest mean index score.  
Data not available for Canada and New Zealand.

**FIGURE 6.7** Mean scores for the Creative activities offered in school index, for Australia and comparison countries

Figure 6.8 presents the percentages of principals who reported creative activities were offered in school about once or twice a week, or every day or almost every day, for Australia, the comparison countries and the OECD average.

- ▶ Higher proportions of principals in Estonia, Finland, Singapore and New Zealand than in Australia reported *art classes/activities* were offered in school about once or twice a week or every day or almost every day.
- ▶ A higher proportion of principals in New Zealand than in Australia reported *creative writing classes/activities* were offered in school about once or twice a week or every day or almost every day. And a higher proportion of principals in Macao (China) reported *computer programming classes/activities* were offered in school about once or twice a week or every day or almost every day than principals in Australia.
- ▶ Higher proportions of principals in Estonia, Macao (China) and New Zealand than in Australia reported *music classes/activities* were offered in school about once or twice a week or every day or almost every day.
- ▶ Lower proportions of principals in Belgium, Poland, Portugal, Denmark, Korea, Hong Kong (China), Chinese Taipei, and principals on average across the OECD countries than in Australia reported *art classes/activities*, *creative writing classes/activities*, *debate club*, *dramatics*, *theatre class/activities* were offered about once or twice a week or every day or almost every day.
- ▶ Lower proportions of principals in Belgium and Finland than in Australia reported *science club* was offered about once or twice a week or every day or almost every day.



■ Significantly lower than Australia    
■ Not significantly different from Australia    
■ Significantly higher than Australia

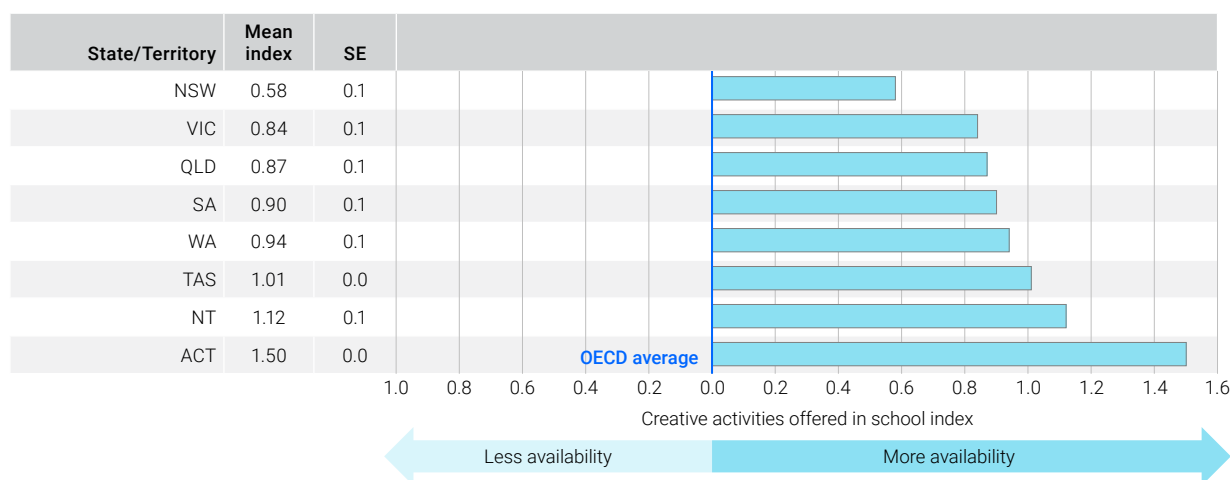
Note: Countries are ordered from lowest to highest mean score on the Creative activities offered in school index.

**FIGURE 6.8** Percentages of principals and frequency of creative activities offered in their schools, for Australia and comparison countries

## Creative activities offered in school in a national context

Figure 6.9 shows the mean index scores for the Australian states and territories and the OECD average on the Creative activities offered in school index. Jurisdictions are presented in order from the lowest to highest mean index score.

- ▶ Nationally, the mean index scores for creative activities offered in schools ranged from 1.50 in the Australian Capital Territory to 0.58 in New South Wales, all significantly higher than the OECD average.
- ▶ Principals at schools in the Australian Capital Territory reported creative activities were offered more frequently in their schools than reported by principals in all other jurisdictions.
- ▶ Principals in South Australia, Western Australia, Tasmania and the Northern Territory reported creative activities were offered to a similar extent in their schools.
- ▶ Principals in Victoria, Queensland, South Australia, and Western Australia reported creative activities were offered to the same extent in their schools.

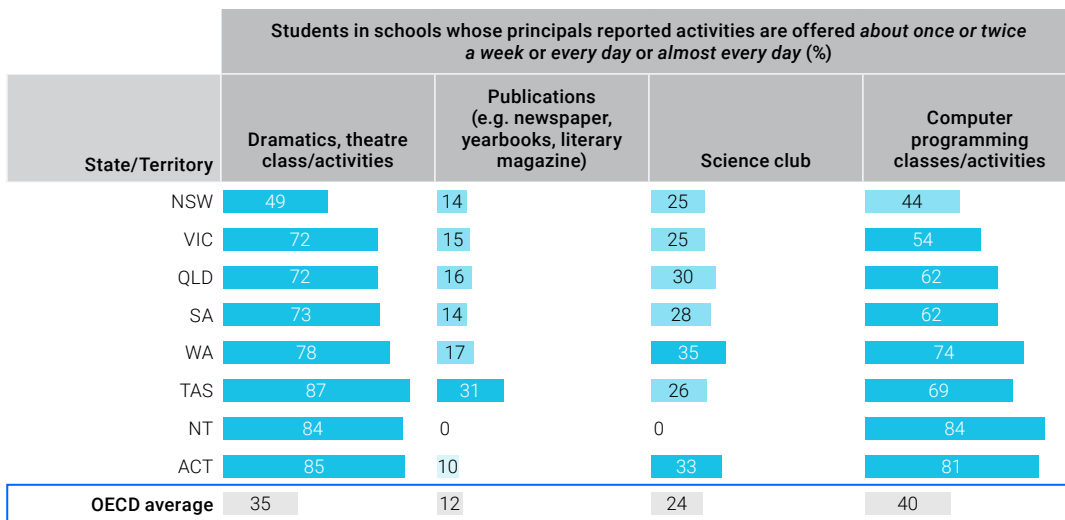
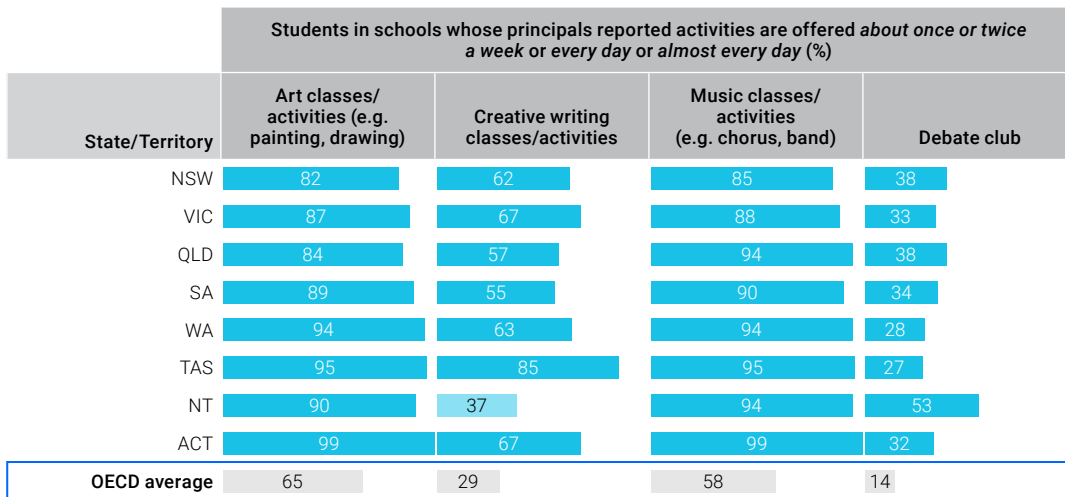


Note: Jurisdictions are ordered from lowest to highest mean index score.

**FIGURE 6.9** Mean scores for the Creative activities offered in school index, by state and territory

Figure 6.10 presents the percentages of principals who reported creative activities were offered in their school about once or twice a week or every day or almost every day, for the jurisdictions.

- ▶ Higher proportions of principals in all jurisdictions than on average across the OECD countries reported *art classes/activities*, *music classes/activities*, *debate club* and *dramatics*, *theatre class/activities* were offered about once or twice a week or every day or almost every day.
- ▶ A higher proportion of principals in Tasmania than on average across the OECD countries reported activities covering school *publications* were offered about once or twice a week or every day or almost every day, while a higher proportion of principals in Western Australia and the Australian Capital Territory reported *science club* was offered about once or twice a week or every day or almost every day.
- ▶ A similar proportion of principals in the Northern Territory than on average across the OECD countries reported *creative writing classes/activities* were offered about once or twice a week or every day or almost every day. And a similar proportion of principals in New South Wales to principals on average across the OECD countries reported *computer programming classes/activities* were offered about once or twice a week or every day or almost every day.
- ▶ A lower proportion of principals of students in the Australian Capital Territory and the Northern Territory than principals on average across the OECD countries reported activities covering school *publications* were offered about once or twice a week or every day or almost every day.



■ Significantly lower than the OECD average    
■ Not significantly different from the OECD average    
■ Significantly higher than the OECD average

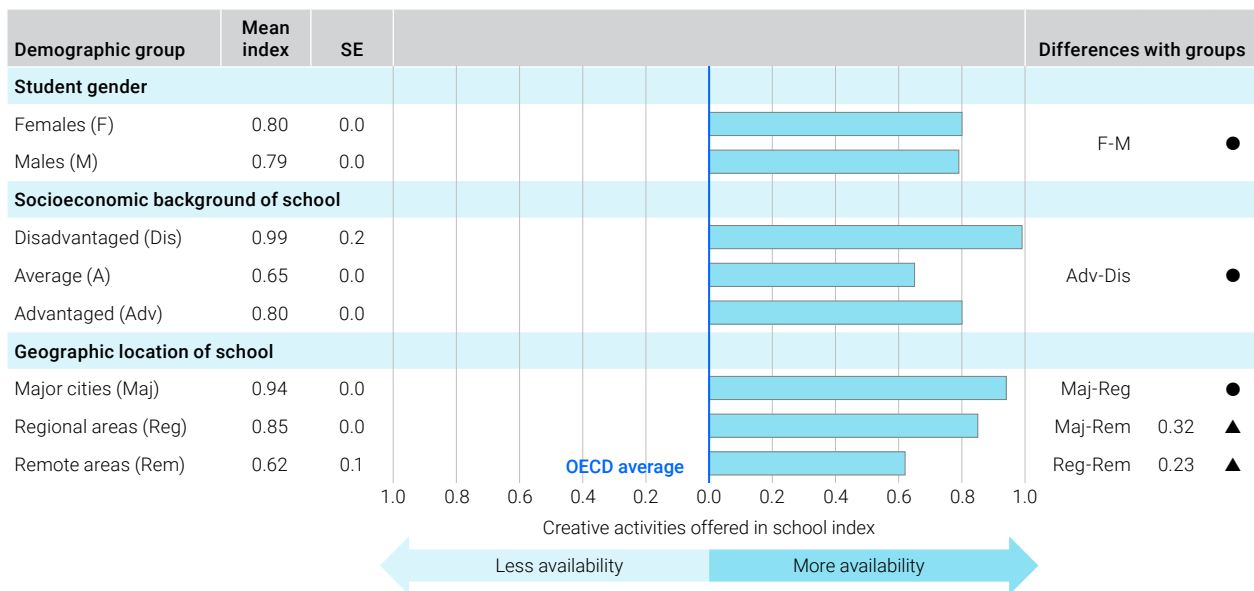
Note: Jurisdictions are ordered from lowest to highest mean score on the Creative activities offered in school index.

**FIGURE 6.10** Percentages of principals and frequency of creative activities offered at their schools, for Australia and comparison countries, by state and territory

## Creative activities offered in school for different demographic groups

Figure 6.11 shows the mean index scores on the Creative activities offered in school index for different demographic groups.

- Principals reported the frequency of creative activities offered in school to their female and male students was similar. Similarly, principals of students at schools with advantaged socioeconomic backgrounds and disadvantaged backgrounds reported no difference in the frequency of creative activities offered in their schools.
- Principals of students at schools in major cities reported a greater frequency of creative activities being offered in their schools than principals of students who attended remote schools, while principals of students who attended regional schools reported a greater frequency of creative activities being offered in their schools than principals of students who attended remote schools.



▲ Mean of first group significantly higher than second group  
 ● No statistically significant difference  
 ▼ Mean of first group significantly lower than second group

**FIGURE 6.11** Mean scores for the Creative activities offered in school index, for different demographic groups

Table 6.2 presents the percentages of principals who reported creative activities were offered in school about once or twice a week or every day or almost every day, for the different demographic groups.

- ▶ A higher proportion of students from advantaged backgrounds than students from disadvantaged backgrounds had principals who reported *debate club* (49% compared to 22%), *dramatics, theatre class/activities* (71% compared to 62%) and *science club* (36% compared to 20%) and *computer programming classes/activities* (62% compared to 53%) were offered in school about once or twice a week or every day or almost every day.
- ▶ A higher proportion of students who attended schools in major cities than in regional areas had principals who reported the following creative activities were offered in their schools about once or twice a week or every day or almost every day: *debate club* (41% compared to 18%) and *science club* (31% compared to 17%). And a lower proportion of principals of students who attended schools in major cities than in regional areas reported *dramatics, theatre class/activities* (65% compared to 72%) were offered in their school about once or twice a week or every day or almost every day.
- ▶ A lower proportion of students who attended schools in major cities than in remote areas had principals who reported *art classes/activities* (87% compared to 96%), *music classes/activities*, (90% compared to 99%), *debate club* (41% compared to 0%), *dramatics, theatre class/activities* (65% compared to 38%) and *school publications* (15% compared to 0%) were offered in their school about once or twice a week or every day or almost every day.
- ▶ A higher proportion of students who attended schools in regional areas than in remote areas had principals who reported *debate club* (18% compared to 0%), *dramatics, theatre class/activities* (72% compared to 38%) and *publications* (16% compared to 0%) were offered in their school about once or twice a week or every day or almost every day.
- ▶ While a lower proportion of students who attended schools in regional areas than in remote areas had principals who reported *art classes/activities* (83% compared to 96%), and *music classes/activities* (86% compared to 99%), were offered about once or twice a week or every day or almost every day.



**TABLE 6.2** Percentages of principals and frequency of creative activities offered at their schools, by demographic groups

Students in schools whose principals reported activities are offered <i>about once or twice a week or every day or almost every day</i> (%)								
Demographic group	Art classes/ activities (e.g. painting, drawing)		Creative writing classes/activities		Music classes/ activities (e.g. chorus, band)		Debate club	
	%	SE	%	SE	%	SE	%	SE
<b>Student gender</b>								
Females	85	1.7	62	2.2	89	1.6	37	2.1
Males	87	1.6	63	2.2	89	1.5	33	2.2
Difference (F-M)	●		●		●		●	
<b>Socioeconomic background of school</b>								
Disadvantaged	85	1.7	60	2.5	87	2.0	22	1.8
Average	85	1.6	61	2.1	89	1.6	34	2.2
Advantaged	88	2.2	66	2.7	94	1.2	49	2.9
Difference (Adv-Dis)	●		●		●		27 pp ▲	
<b>Geographic location of school</b>								
Major cities	87	1.8	64	2.3	90	1.5	41	2.4
Regional areas	83	3.3	59	4.6	86	3.3	18	3.2
Remote areas	96	2.0	54	16.9	99	1.5	0	0.0
Difference (Maj-Reg)	●		●		●		33 pp ▲	
Difference (Maj-Rem)	9 pp ▲		●		9 pp ▲		40 pp ▲	
Difference (Reg-Rem)	13 pp ▼		●		13 pp ▼		18 pp ▲	

Students in schools whose principals reported activities are offered <i>about once or twice a week or every day or almost every day</i> (%)								
Demographic group	Dramatics, theatre class/activities		Publications (e.g. newspaper, yearbooks, literary magazine)		Science club		Computer programming classes/activities	
	%	SE	%	SE	%	SE	%	SE
<b>Student gender</b>								
Females	66	2.4	15	1.8	28	2.6	56	2.8
Males	66	2.2	15	1.8	27	2.3	57	2.2
Difference (F-M)	●		●		●		●	
<b>Socioeconomic background of school</b>								
Disadvantaged	62	2.6	13	1.6	20	2.0	53	2.6
Average	66	2.3	15	1.7	27	2.3	56	2.4
Advantaged	71	2.6	18	2.3	36	3.3	62	2.9
Difference (Adv-Dis)	9 pp ▲		●		16 pp ▲		9 pp ▼	
<b>Geographic location of school</b>								
Major cities	65	2.5	15	2.0	31	2.7	58	2.6
Regional areas	72	3.8	16	3.3	17	3.3	53	4.6
Remote areas	38	16.1	0	0.0	25	14.9	74	13.5
Difference (Maj-Reg)	7 pp ▼		●		14 pp ▲		●	
Difference (Maj-Rem)	27 pp ▲		15 pp ▲		●		●	
Difference (Reg-Rem)	34 pp ▲		16 pp ▲		●		●	

pp percentage points

▲ Mean of first group significantly higher than second group

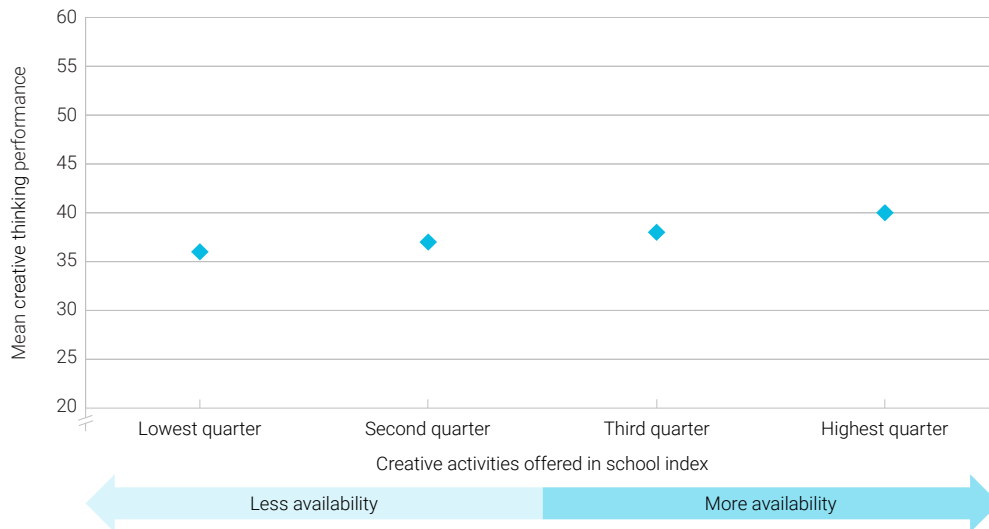
● No statistically significant difference

▼ Mean of first group significantly lower than second group

## The relationship between creative activities offered in school and creative thinking performance

Figure 9.7 shows the relationship between creative activities offered in school (by quarters) and creative thinking performance.

On the Creative activities offered in school index, students in the highest quarter scored on average 3 score points higher than students in the lowest quarter in creative thinking performance.



**FIGURE 6.12** Mean scores for the Creative activities offered in school index and creative thinking performance, for Australia

## 6.3 School openness to creativity

Recognising students' openness to creativity is essential for school principals as it directly shapes the educational environment. By understanding different levels of creative inclination, principals can guide teachers to implement tailored instructional approaches that cater to diverse student needs. This recognition fosters a positive school culture where innovation, risk-taking, and collaboration are celebrated, leading to increased student engagement and motivation. When students feel that their creative expressions are valued, they are more likely to participate actively in their learning experiences, enhancing their overall academic performance (Vuk, S. 2023).

This section examines the similarities and differences between countries, the Australian jurisdictions and different demographic groups for principals' perceptions of school openness to creativity, and specifically their students' orientation towards openness and creativity.

### Measuring school openness to creativity<sup>4</sup>

Principals were asked to indicate the extent to which they agreed with statements regarding their students' orientation towards openness and creativity on a 4-point scale (strongly disagree, disagree, agree, strongly agree).

1. *Are creative.*
2. *Enjoy doing creative projects.*
3. *Perform well when given the freedom to be creative.*
4. *Enjoy work that is challenging.*
5. *Enjoy learning new things.*
6. *Perform well when given complex problems to solve.*
7. *Are artistic.*
8. *Are imaginative.*
9. *Are able to think of many new ideas.*

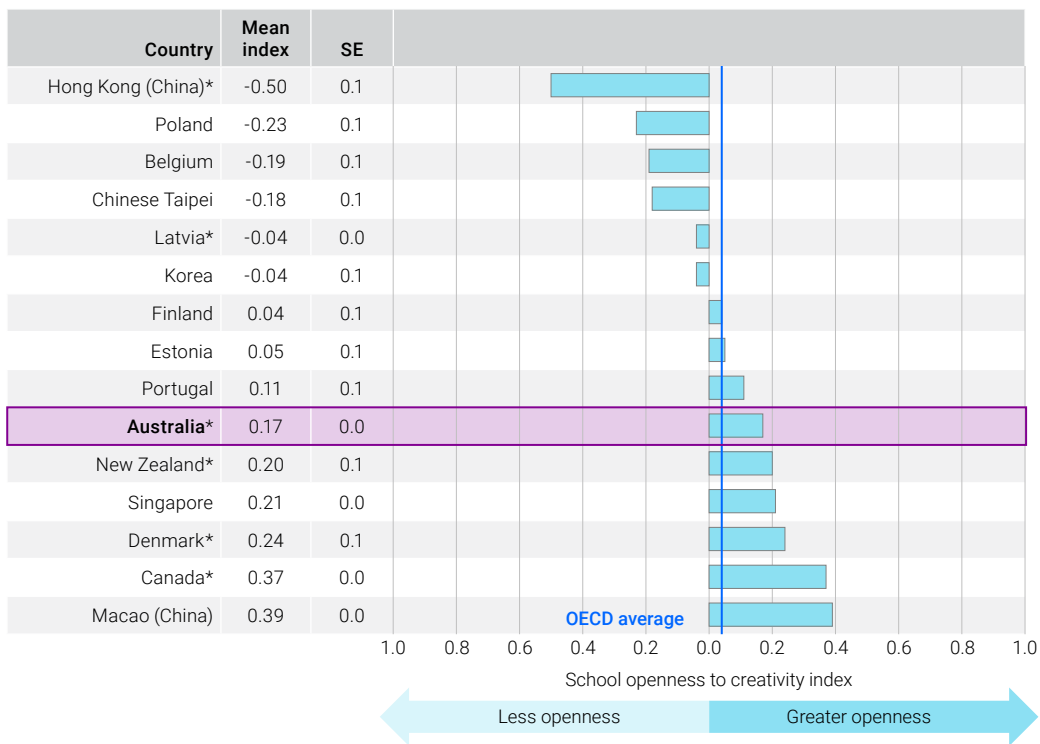
A School openness to creativity index was constructed using the responses to these statements. It was standardised to have mean of 0 and a standard deviation of 1 across OECD countries. Positive values on the index indicate principals reported students had a greater orientation towards openness and creativity; lower values indicate principals reported students had less orientation towards openness and creativity than on average across OECD countries.

### School openness to creativity in an international context

Figure 6.13 shows the mean index scores for Australia, selected comparison countries, and the OECD average on the School openness to creativity index. Countries are presented in order from the lowest to highest mean index score.

- ▶ Of the comparison countries, principals in Macao (China) and Denmark reported a greater student orientation toward openness to creativity than principals in all other comparison countries.
- ▶ Principals in Australia reported greater student orientation toward openness to creativity than principals in Hong Kong (China), Poland, Belgium, Chinese Taipei, Latvia and Korea.
- ▶ Principals in Australia reported similar student orientation toward openness to creativity as principals in Finland, Estonia, Portugal, New Zealand, Singapore and Denmark.
- ▶ Australia's mean index score of 0.17 was greater than that of principals on average across OECD countries (0.04).

<sup>4</sup> The OECD also refers to the School openness to creativity index as the School principals' perception of school openness to creativity index.



Note: Countries are ordered from lowest to highest mean index score.

**FIGURE 6.13** Mean scores for the School openness to creativity index, for Australia and comparison countries

Figure 6.14 presents the percentages of principals who reported they agreed or strongly agreed with statements about their students' orientation towards openness and creativity, for Australia, the comparison countries and the OECD average.

- ▶ Higher proportions of principals in Latvia, Finland, Estonia and Canada than in Australia agreed or strongly agreed *most students at my school are creative*. And a higher proportion of principals in Singapore and Denmark reported *most students at my school enjoy doing creative projects*.
- ▶ Higher proportions of principals in Latvia, Korea, Finland, Singapore, Canada and Macao (China) than in Australia agreed *most students at my school are artistic*. And higher proportions of principals in Denmark and Canada agreed *most students at my school are able to think of many new ideas* than principals in Australia.
- ▶ Higher proportions of principals in Finland, Denmark, Canada and Macao (China) than in Australia agreed *most students at my school are imaginative*.
- ▶ Similar proportions of principals in Australia, Latvia, Korea, Finland, Estonia, Portugal, New Zealand, Singapore and Denmark agreed *most students at my school perform well when given the freedom to be creative*.
- ▶ Lower proportions of principals in Hong Kong (China), Poland, Belgium, Chinese Taipei, Korea, Estonia and on average across the OECD countries than in Australia agreed *most students at my school enjoy learning new things*.
- ▶ Lower proportions of principals in Hong Kong (China), Poland, Chinese Taipei, Latvia, Korea, Finland, Estonia and principals on average across the OECD countries than in Australia agreed *most students at my school enjoy work that is challenging*.
- ▶ A lower proportion of principals in Hong Kong (China) than in all comparison countries, including principals on average across the OECD countries, reported *most students at my school are imaginative*.

Country	Percentage of students whose principals reported they agree or strongly agree (%)				
	Most students at my school are creative	Most students at my school enjoy doing creative projects	Most students at my school perform well when given the freedom to be creative	Most students at my school enjoy work that is challenging	Most students at my school enjoy learning new things
Hong Kong (China)*	52	57	68	54	79
Poland	74	72	79	72	80
Belgium	72	76	77	82	91
Chinese Taipei	69	65	80	59	77
Latvia*	88	82	86	29	94
Korea	67	71	80	71	77
Finland	89	74	86	62	92
Estonia	90	86	86	70	88
Portugal	77	78	87	85	94
<b>Australia*</b>	83	86	86	80	95
New Zealand*	84	82	87	84	98
Singapore	82	90	86	80	94
Denmark*	86	90	91	77	96
Canada*	90	87	93	85	97
Macao (China)	80	88	94	83	95
<b>OECD average</b>	77	78	85	72	88

Country	Percentage of students whose principals reported they agree or strongly agree (%)			
	Most students at my school perform well when given complex problems to solve	Most students at my school are artistic	Most students at my school are imaginative	Most students at my school are able to think of many new ideas
Hong Kong (China)*	49	48	60	59
Poland	44	35	80	74
Belgium	46	25	78	73
Chinese Taipei	56	61	79	77
Latvia*	46	52	82	78
Korea	69	62	80	79
Finland	65	62	89	82
Estonia	65	54	77	83
Portugal	85	40	85	84
<b>Australia*</b>	71	51	80	82
New Zealand*	74	55	82	80
Singapore	73	63	83	79
Denmark*	73	42	90	94
Canada*	78	59	88	88
Macao (China)	67	72	86	80
<b>OECD average</b>	58	45	78	77

■ Significantly lower than Australia    
■ Not significantly different from Australia    
■ Significantly higher than Australia

Note: Countries are ordered from lowest to highest mean score on the School openness to creativity index.

**FIGURE 6.14** Percentages of principals who reported they agreed or strongly agreed their students showed an orientation towards openness and creativity, for Australia and comparison countries

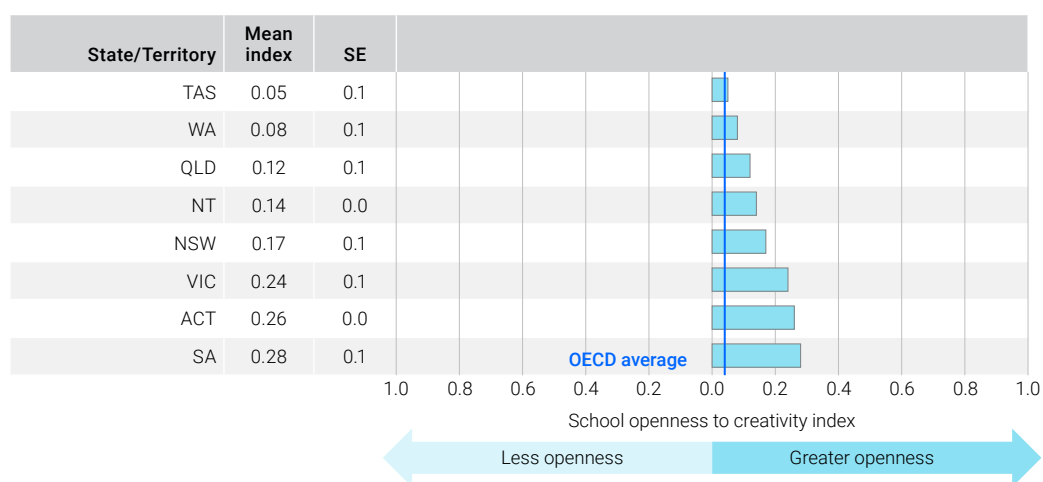
## School openness to creativity in a national context

Figure 6.15 shows the mean index scores for the Australian states and territories and the OECD average on the School openness to creativity index. Jurisdictions are presented in order from the lowest to highest mean index score.

Nationally, the mean index scores for school openness to creativity ranged from 0.05 in Tasmania to 0.28 in South Australia.

Principals in all Australian jurisdictions reported similar agreement that their students showed orientation toward openness to creativity.

Principals in South Australia, the Australian Capital Territory, Victoria, and the Northern Territory reported higher agreement that their students showed orientation toward openness to creativity than principals on average across the OECD countries.



Note: Jurisdictions are ordered from lowest to highest mean index score.

**FIGURE 6.15** Mean scores for the School openness to creativity index, by state and territory

Figure 6.16 presents the percentages of principals who reported they agreed or strongly agreed with statements about their students' orientation towards openness and creativity, for the jurisdictions.

- ▶ Higher proportions of principals in all jurisdictions than on average across the OECD countries agreed *most students at my school enjoy learning new things*.
- ▶ Higher proportions of principals in all jurisdictions except the Northern Territory than on average across the OECD countries agreed *most students at my school perform well when given complex problems to solve*.
- ▶ Higher proportions of principals in Western Australia, Queensland, Victoria and the Australian Capital Territory than on average across the OECD countries agreed *most students at my school are creative*.
- ▶ Higher proportions of principals in Western Australia, New South Wales, Victoria and the Australian Capital Territory than on average across the OECD countries agreed *most students at my school enjoy doing creative projects*.
- ▶ A higher proportion of principals in the Australian Capital Territory than in schools on average across the OECD countries agreed *most students at my school perform well when given the freedom to be creative*. In contrast, a lower proportion of principals in the Northern Territory than on average across the OECD countries agreed with this statement.
- ▶ Higher proportions of principals in the Northern Territory, Victoria, the Australian Capital Territory and South Australia than on average across the OECD countries agreed *most students at my school enjoy work that is challenging*. And higher proportions of principals in Western Australia, Queensland, the Northern Territory, Victoria and the Australian Capital Territory agreed *most students at my school are able to think of many new ideas*.
- ▶ Similar proportions of principals in all jurisdictions except the Northern Territory and Victoria than on average across the OECD countries agreed *most students at my school are imaginative*.

- ▶ A lower proportion of principals of students in the Northern Territory than on average across the OECD countries agreed *most students at my school enjoy doing creative projects*, and *most students at my school perform well when given the freedom to be creative*. And a lower proportion of principals in the Australian Capital Territory than on average across the OECD countries agreed *most students at my school are artistic*.

State/Territory	Percentage of students whose principals reported they agree or strongly agree (%)				
	Most students at my school are creative	Most students at my school enjoy doing creative projects	Most students at my school perform well when given the freedom to be creative	Most students at my school enjoy work that is challenging	Most students at my school enjoy learning new things
TAS	77	79	88	74	95
WA	90	87	88	78	93
QLD	85	83	86	79	96
NT	80	51	55	86	97
NSW	78	86	84	77	95
VIC	86	88	87	85	97
ACT	93	98	95	82	100
SA	82	84	83	81	92
<b>OECD average</b>	77	78	85	72	88

State/Territory	Percentage of students whose principals reported they agree or strongly agree (%)			
	Most students at my school perform well when given complex problems to solve	Most students at my school are artistic	Most students at my school are imaginative	Most students at my school are able to think of many new ideas
TAS	69	55	77	75
WA	70	50	83	85
QLD	68	50	79	85
NT	62	42	100	92
NSW	71	51	76	76
VIC	71	53	86	86
ACT	87	44	79	80
SA	74	55	80	80
<b>OECD average</b>	58	45	78	77

■ Significantly lower than the OECD average    
■ Not significantly different from the OECD average    
■ Significantly higher than the OECD average

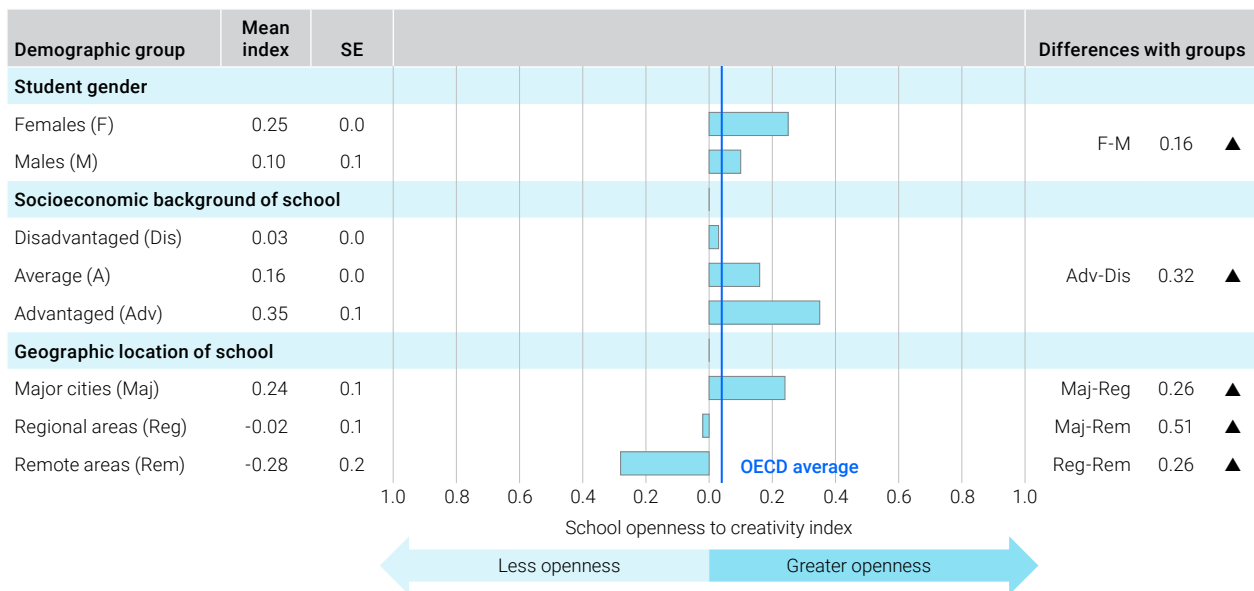
Note: Jurisdictions are ordered from lowest to highest mean score on the School openness to creativity index.

**FIGURE 6.16** Percentages of principals who reported they agreed or strongly agreed their students showed an orientation towards openness and creativity, by state and territory

## School openness to creativity for different demographic groups

Figure 6.17 shows the mean index scores on the School openness to creativity index for teachers for different demographic groups.

- ▶ Principals of female students reported greater school openness to creativity than for male students.
- ▶ Principals of students at schools with advantaged socioeconomic backgrounds reported greater school openness to creativity than principals at schools with disadvantaged socioeconomic backgrounds.
- ▶ Principals of students at schools in major cities reported greater school openness to creativity than principals from schools in regional areas and remote schools. Similarly, principals of students in regional schools reported greater school openness to creativity than principals of students in remote schools.



▲ Mean of first group significantly higher than second group  
● No statistically significant difference  
▼ Mean of first group significantly lower than second group

**FIGURE 6.17** Mean scores for the School openness to creativity index, for different demographic groups

Table 6.3 presents the percentages of principals who reported they agreed or strongly agreed with statements about their students' orientation towards openness and creativity, for the different demographic groups.

- ▶ A higher proportion of principals of female students than male students agreed *students are creative* (86% compared to 81%), *enjoy doing creative projects* (89% compared to 83%), *are artistic* (56% compared to 47%), *are imaginative* (83% compared to 78%), and *are able to think of many new ideas* (84% compared to 80%).
- ▶ A higher proportion of principals at schools with socioeconomically advantaged backgrounds agreed *most students enjoy work that is challenging* (84% compared to 76%), *enjoy learning new things* (97% compared to 93%), *perform well when given complex problems to solve* (77% compared to 63%), *are imaginative* (84% compared to 78%), and *are able to think of many new ideas* (86% compared to 80%).
- ▶ A higher proportion of students who attended schools in major cities than schools in regional areas had principals who agreed *most students perform well when given complex problems to solve* (74% compared to 60%).
- ▶ A lower proportion of students who attended schools in major cities than in remote areas had principals who agreed *most students enjoy doing creative projects* (85% compared to 93%).



**TABLE 6.3** Percentages of principals who reported they agreed or strongly agreed their students showed an orientation towards openness and creativity, by demographic groups

Demographic group	Percentage of students whose principals reported they agree or strongly agree (%)									
	Most students at my school are creative		Most students at my school enjoy doing creative projects		Most students at my school perform well when given the freedom to be creative		Most students at my school enjoy work that is challenging		Most students at my school enjoy learning new things	
	%	SE	%	SE	%	SE	%	SE	%	SE
<b>Student gender</b>										
Females	86	1.6	89	1.5	87	1.5	80	2.1	95	0.9
Males	81	1.7	83	2.0	84	1.8	80	1.9	95	0.9
Difference (F-M)	5 pp ▲		6 pp ▲		●		●		●	
<b>Socioeconomic background of school</b>										
Disadvantaged	81	2.0	88	1.7	84	2.1	76	2.3	93	1.4
Average	83	1.6	86	1.7	86	1.6	81	2.0	96	0.9
Advantaged	86	1.8	84	2.1	87	1.8	84	2.1	97	0.7
Difference (Adv-Dis)	●		●		●		8 pp ▲		4 pp ▲	
<b>Geographic location of school</b>										
Major cities	84	1.5	85	1.8	85	1.9	81	2.0	96	0.9
Regional areas	81	4.1	88	2.7	90	2.6	78	3.8	93	2.4
Remote areas	74	9.9	93	2.1	70	17.6	67	15.1	97	1.1
Difference (Maj-Reg)	●		●		●		●		●	
Difference (Maj-Rem)	●		8 pp ▼		●		●		●	
Difference (Reg-Rem)	●		●		●		●		●	

Demographic group	Percentage of students whose principals reported they agree or strongly agree (%)							
	Most students at my school perform well when given complex problems to solve		Most students at my school are artistic		Most students at my school are imaginative		Most students at my school are able to think of many new ideas	
	%	SE	%	SE	%	SE	%	SE
<b>Student gender</b>								
Females	72	2.0	56	2.5	83	1.6	84	1.9
Males	69	2.2	47	2.5	78	1.8	80	2.0
Difference (F-M)	●		9 pp ▲		5 pp ▲		● 5 pp ▲	
<b>Socioeconomic background of school</b>								
Disadvantaged	63	2.4	50	2.7	78	1.8	80	2.3
Average	72	2.0	51	2.5	80	1.7	82	1.9
Advantaged	77	2.2	54	3.0	84	1.8	86	1.9
Difference (Adv-Dis)	14 pp ▲		●		6 pp ▲		6 pp ▲	
<b>Geographic location of school</b>								
Major cities	74	2.2	52	2.7	82	1.9	84	2.1
Regional areas	60	4.1	49	5.1	75	3.5	77	3.6
Remote areas	47	16.6	50	16.4	85	12.8	78	13.0
Difference (Maj-Reg)	14 pp ▲		●		●		●	
Difference (Maj-Rem)	●		●		●		●	
Difference (Reg-Rem)	●		●		●		●	

pp percentage points

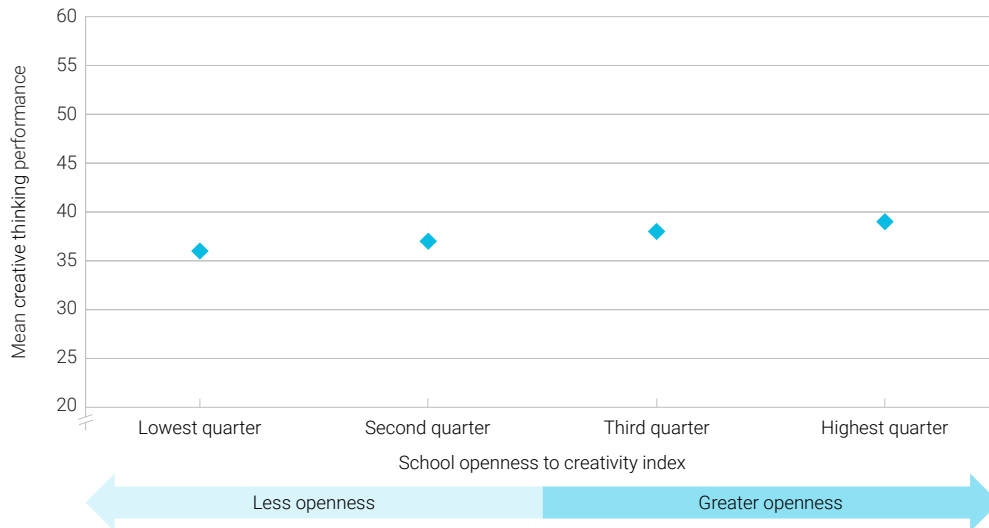
▲ Mean of first group significantly higher than second group

● No statistically significant difference

▼ Mean of first group significantly lower than second group

## The relationship between school openness to creativity and creative thinking performance

Figure 6.18 shows the relationship between school openness to creativity (by quarters) and creative thinking performance. On the School openness to creativity index, students in the highest quarter scored on average 3 score points higher than students in the lowest quarter in creative thinking performance.



**FIGURE 6.18** Mean scores for the School openness to creativity index and creative thinking performance, for Australia

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