



SECONDARY ANALYSIS OF PISA DATA FOR GRADE LEVEL EFFECT DUE TO GRADE REPETITION ON IMPROVEMENT IN READING PERFORMANCE

Kwok-cheung Cheung •

University of Macau, China

Soi-kei Mak

University of Macau, China

Pou-seong Sit

University of Macau, China

Man-Kai Ieong

University of Macau, China

Abstract

Release of the PISA 2018 results revealed that Macao is not only a high-performing, but also fast-improving economy in three core literacies (reading, mathematics and science) in the past decade. Based on the publicly released data, this study seeks to validate that Macao's remarkable progress in one main part is due to the lowering of the prevalence of grade repetition in the past decade. Secondary analysis of the Macao-PISA data was conducted, analyzing the trend of the rates of student grade repetition against the backdrop of the percentage of Macao's 15-year-olds studying at the various grade levels. The trend over the six cycles of Macao-PISA assessment since 2003 shows that there is an increasing percentage of 15-year-olds studying at grade levels appropriate to their biological age with same-age peers. Admittedly, when more of the sampled students are studying at the modal grades, more of them possess favorable psychological dispositions and self-regulatory learning mechanisms. Consequently, they are able to reach or even excel beyond baseline performance standards. Thus, grade level of an age-based sample provides one convincing explanation on why Macao was commended for its fast improvement and high level performance in PISA 2018 in the past decade.

Keywords: grade level effect; grade repetition; Macao; PISA; self-regulatory learning

Correspondence concerning this paper should be addressed to:

• University of Macau, Faculty of Education, Taipa, Macau, China. Address: Room 2016, E33, Faculty of Education, University of Macau, Av. da Universidade, Taipa, Macau, China. E-mail: kccheung@umac.edu.mo

Introduction

On 3 December 2019, Organization for Economic Co-operation and Development (OECD) released the Programme for International Student Assessment (PISA) 2018 evaluation results of three core literacies, *i.e.* reading, mathematics and science. There are three notable findings indicating the emerging high quality of Macao's basic education system (Cheung, Sit, Mak, & Jeong, 2020; OECD, 2019). The first is that Macao ranked third in the league table of the three core literacies amongst the 79 participating economies. The second is that Macao ranked second in the league table of students who passed the baseline level (*i.e.*, level 2 of the proficiency scale) of the three core literacies. The third is a commendation from OECD that Macao is the only economy which in the past two decades was continuously fast-improving since its first participation in PISA in 2003.

Objective of the study

For any country or economy seeks to raise the quality of its educational system, it is of paramount importance to policy makers and stakeholders to understand why Macao is commended for its fast improvement and high level performance in PISA 2018 in the past decade. It is noteworthy that in PISA 2015, Macao had already been commended by OECD for being one of the five basic education systems which was simultaneously high in educational quality and educational equity (OECD, 2016). Not long ago, as evidenced in PISA 2009, Macao's literacy performance was only mediocre (OECD, 2010). The authors of this research paper, who are the same crew of researchers undertaking the series of Macao-PISA study, would like to provide an insider's viewpoint to validate that this remarkable progress in literacy performance in one main part is because of the grade level, due to the lowering of the prevalence of grade repetition at primary and secondary education level in recent years.

To achieve the objective of this study and to guide conduct of enquiry, we would like to delineate a conceptual model of increased student performance. The model is about an explanation on the genesis of grade level effect in age-based sample surveys of student achievement, as well as the underlying mechanisms of grade level effect in age-based sample of student achievement. Based on this conceptual model, we will proceed to spell out the research question of the present study, with an aim to examine grade level effect due to grade repetition on improvement in Macao's student reading performance in PISA.

Conceptual model guiding conduct of enquiry

Genesis of grade level effect in age-based sample of student achievement

In large-scale sampled survey of educational achievement, when the researchers adopted grade-based sampling, one often obtained results indicating that students studying at higher grade levels outperform those at the lower grade levels (*see* Mullis, Martin, Foy, & Arora, 2012 for an example of such grade level effect). For sampled survey in which age-based sampling is adopted, such as the series of Macao-PISA studies examined in the present study, it is also possible to observe grade level effects because students of the same-age may be studying at different grade levels. Of note is that, because of grade repetition, the percentage of the same-age students vary across different grade levels. Hence, the modal grades of a sampled survey of students should refer to those one or two grade levels with the most students (*i.e.*, >50% of the assessment sample). For instance, in a PISA study which assessed 15-year-olds at the time of testing, the students were actually aged between “15-years-3-months” and “16-years-2-months”. The modal grades for most participating countries would be Grade 9, Grade 10, or both of these two grades taken together.

Table 1 presents the mean reading literacy performance of the 30+ OECD countries at each grade level (*i.e.*, Grade 7-11) of the 15-year-olds in PISA 2009 and PISA 2018. In these two cycles of the PISA assessment, it can be seen that students studying at higher grade levels performed better than their 15-year-old counterparts studying at the lower grade levels. This performance difference with the earlier grade level is especially pronounced for the two modal grades of Grade 9 and 10 found in most participating countries/economies. Of note in the interpretation of grade level effect is that, within a decade from 2009 to 2018, there is a small decline in student reading performance of the two modal grades between the two cycles of PISA assessment, and this decline is especially pronounced at Grade 9 (~10 score points) and less so in Grade 10 (~2 score points). However, the distribution of 15-year-olds in the OECD countries across the various grade levels from Grade 7 to Grade 11 remained very much the same between PISA 2009 and PISA 2018.

Table 1. Mean reading literacy performance of the OECD countries at each grade level of sampled students in PISA 2009 and 2018

Grade	PISA 2009			PISA 2018		
	Mean	% of students	Performance difference with earlier grade	Mean	% of students	Performance difference with earlier grade
7	349	0.6	-	348	0.5	-
8	379	5.0	30	385	4.5	37
9	458	34.8	79	448	35.4	63
10	515	51.4	57	513	51.4	65
11	565	8.1	50	550	7.4	37
Average (Total Sample)	493			487		

Note: % of students do not add up to 100% since the very small percentage of Grade 12 students (i.e. <1%) has not been included.

Underlying mechanisms of grade level effect in age-based sample of student achievement

The conceptual model of the variables involved in the mechanisms underpinning grade level effects is concerned with notions of this effect, which is often mediated in nature on student achievement in the educational context of grade repetition. For instance, in the research of Rosário, Núñez, Valle, González-Pienda, and Lourenço (2013), grade level effects on school achievement are found mediated by student motivational dispositions and self-regulatory learning mechanisms, and grade level is hypothesized to be correlated with study time and whether the student has the repeated grade or not.

Since 2003 until 2018, Macao has participated in six cycles of Programme of International Student Assessment (*i.e.*, PISA, 2003, PISA, 2006, PISA, 2009, PISA, 2012, PISA, 2015, and PISA, 2018). The assessment results, particularly the earlier cycles conducted before 2015, reveal that Macao is one of the few participating economies or countries with the highest rates of grade repetition at the primary and secondary levels for its 15-year-old students (Cheung, 2010; OECD, 2011 & 2014). Based on the PISA 2012 data, local researchers have analyzed the underlying mechanisms of grade repetition, and the variables involved in the mediation mechanisms furnished the theoretical underpinnings of the grade level effects applicable to Macao schooling context (Sit, Cheung, Cheong, Mak, Soh, & Jeong, 2015). Specifically, it was revealed that in Macao, there are altogether three mechanisms found that can explain the unsatisfactory performance of the adolescent grade repeaters: (1) insufficient opportunity to learn, (2) inadequate self-regulation of students, and (3) inappropriate teacher guidance

and management. The variables entailed in the mediation mechanisms concur with those examined by Rosário et al. (2013).

Because of the disadvantages associated with the grade level effects, Sit et al. (2015) proposed to Macao Government to urge schools to abolish the grade repetition policy, so as to alleviate the harm done on the grade repeaters (*see* Bocks, 1977; Brophy, 2006; Jackson, 1975, for a critique and/or review of the negative effects of grade repetition). In Macao, grade repetition is widely regarded as a school-based accountability system seeking to guarantee minimum academic standards, accompanied with the purposive aim at the fostering of the three core literacies in school children (Lei, 2014; Sit et al., 2015). In 2015, many schools began to note the high PISA literacy performance results, and believed that minimum academic standards should have been achieved for the majority of the total population of 15-year-old students. They would like to take the local Government's advice to lower the prevalence of grade repetition in the basic education system. Naturally, this move will cast the effect of grade level on student performance.

Conceptual model of grade level effect due to grade repetition on improvement in student reading performance

Analysis of the PISA 2009 and PISA 2018 data, of which reading was the major domain of assessment, demonstrates clearly the grade level effect of PISA assessment for 15-year-olds studying at the various grade levels from Grade 7 to Grade 11 (*see* Table 1). For both PISA 2009 and PISA 2018, as the grade level becomes higher, the mean of students' performance also increases. It is noteworthy that the size of this grade level effect is affected immensely by the percentage of students studying at the various grade levels, particularly the two main modal grades (*i.e.*, Grade 9 and 10) of students assessed in PISA. Mediated by facilitative psychological dispositions and self-regulatory learning (SRL) mechanisms of grade repeaters the conceptual model shown in Figure 1 below provides an explanation on how grade level has an effect on reading performance between the two cycles of PISA assessment (*i.e.*, PISA 2009 and PISA 2018). Interested readers can consult Boekaerts and Corno (2005) who have written a paper on how self-regulation in classroom is treated as a fruitful perspective on assessment and intervention, and Schunk and Ertmer (2000), who delineated the relationships between self-regulation and academic learning as well as self-efficacy enhancing interventions.

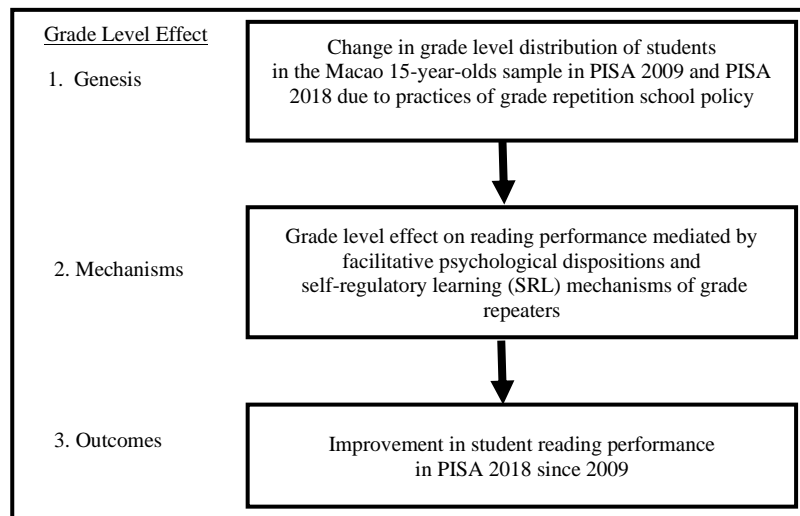


Figure 1. Conceptual model of grade level effect due to grade repetition on improvement in student reading performance

Research question

The main advantage of the policy of abolition of the grade repetition is that students can study together with their same-age peers, and that opportunities to learn curricular contents at higher grade levels are not hampered (Sit et al., 2015). It is the view of the researchers of this study that, when the prevalence of grade repetition was successfully lowered in the years between 2009 and 2018, more of the 15-year-old students assessed in PISA would be studying in the two modal grades (*i.e.*, Grade 9 and 10) and less in the earlier grades (*i.e.*, Grade 7 and 8). Because of the grade level effects on literacy performance, in accordance with the conceptual model shown in Figure 1 and the grade level effect mechanisms validated by Sit et al. (2015) using the Macao-PISA 2012 data, the hypothesis tested in this study is that when a higher percentage of students are studying in the modal grade(s), the Macao student PISA assessment performance will be increased accordingly. This increase can be attested to the test results of Macao-PISA 2018 in comparison with that of the Macao-PISA 2009 (OECD, 2010, 2019).

The research question is thus expressed as follows:

Compared with the performance results of PISA 2009, what percentage of the growth in Macao student reading performance assessed in PISA 2018 can be attributed to grade level effect, should the policy of grade repetition have already

been implemented in 2009, i.e. grade distribution of the Macao student sample for PISA 2009 is the same as that of PISA 2018?

Method

Participants

The participants are the 15-year-old students tested in the PISA 2009 and PISA 2018 reading literacy study. There were altogether 65 and 78 countries/economies participating in PISA 2009 and PISA 2008 respectively (*see* OECD, 2010 & 2019 for the sampling statistics).

Instruments

In PISA 2009 and PISA 2018, reading is the major domain of literacy assessment. After scaling of the test responses, a student reading performance score which comprises a set of plausible values will be calculated for secondary data analysis (*see* OECD, 2010 & 2019 for the reading performance results).

For the purposes of the present study, two variables are used to gauge the grade level effect due to grade repetition. The first is the grade level studied by the sampled 15-year-old students, typically ranging from Grade 7 to Grade 12. The second is to ask whether student has grade-repeated in the primary and junior secondary levels or not (*see* OECD, 2010 & 2019 for the assessment results and statistics).

Secondary data analysis procedures

There are altogether four steps involved in the process of testing the hypothesis, with the rationale delineated as follows:

1. An analysis of the trend of a decade of the rates of grade repetition of students studying at the basic education levels (*i.e.*, preprimary, primary and secondary) in Macao schools prior to the conduct of PISA 2018.
2. An analysis of the percentage of Macao's 15-year-old students studying at the various grade levels (*i.e.*, Grade 7-12) in secondary schools so as to find out the modal grade of Macao's students participated in PISA 2018.
3. An analysis of the modal grade of the sampled 15-year-old students of the 65 and 78 countries/economies participating in PISA 2009 and PISA 2018 respectively, of which reading literacy was the major domain of PISA assessment.
4. An analysis of change of distribution of grade level studied by Macao's 15-year-old students, compared with that of the OECD countries in a decade of PISA

assessment from 2009 to 2018. The intention is to calculate what the percentage of the growth in reading performance assessed in PISA 2018 is, should the policy of slowing down the rates of grade repetition have been implemented in 2009.

Step 1 investigates whether rates of grade repetition of students studying at basic education level have declined or not in the decade after the conduct of the PISA 2009 study. This helps to see whether Macao's practices of grade repetition have slowed down in scale or not. Step 2 seeks to find out the grade level distribution of students in the Macao sample of the various cycles of PISA assessment, and from the analysis, to be able to know the modal grade(s), which helps to judge what percentage of students are studying at grade level with their same-age peers. Step 3 shows whether Macao's modal grades, compared with other participating countries/economies, are either of higher level or larger in size than the previous cycle of PISA assessment. As a result of this change, student performance will be increased because of the grade level effect on educational achievement. Step 4 attempts to calculate the improvement in reading performance in PISA 2018 if the policy of the reduction of the rates of grade repetition had already been implemented in Macao schools in 2009, *i.e.* grade composition of the age-based sample in 2018 is the same as that of 2009.

Data for use in the secondary data analyses

Data was drawn from OECD's PISA website (<https://www.oecd.org/pisa/data/>). Secondary data analysis was conducted using the IEA's IDB Analyzer (<https://www.iea.nl/data-tools/tools>), which may be accessed in the same website where the PISA data were downloaded. Of note is that the Macao-PISA assessment, because of the small size of the student body, is not a sample, but a census of performance of all the 15-year-old population in the three core literacies fostered at the basic education stage of schooling. The data are thus of paramount importance to gauge the quality of Macao basic education from an international comparative education perspective.

Results

Figure 2 presents a summary of a decade of the rates of grade repetition of students studying in preprimary, primary, lower secondary and higher secondary grade levels in Macao's basic education. The four line curves shown reveal a clear declining pattern and this trend is especially noticeable at the lower secondary and primary grade levels, from 11.8% to 6.7% and 4.2% to 1.6% respectively.

Naturally this decline has an effect on sampling statistics of the 15-year-old students in PISA 2018, which is age- rather than grade-based in the assessment of literacy performance.



Data Source: https://portal.dsedj.gov.mo/webdsejspace/internet/Inter_main_page.jsp?id=8514
 Figure 2. Trend of a decade of the rates of grade repetition of students studying at the preprimary, primary, and secondary levels in Macao schools

Figure 3 shows the percentage of Macao’s 15-year-old students studying at the various grade levels (*i.e.*, Grade 7-12) in Macao’s secondary schools in the six cycles of PISA assessment from PISA 2003 to PISA 2018 (*see also* Cheung et al., 2020). Students studying in Grade 10 or above rose from 22.2% to 58.9%. In 2018, only 11.3% of the Grade 7 and 8 students were studying below the two modal grades, *i.e.* Grade 9 and 10, whereas in 2003 the corresponding figure is only 43.7%.

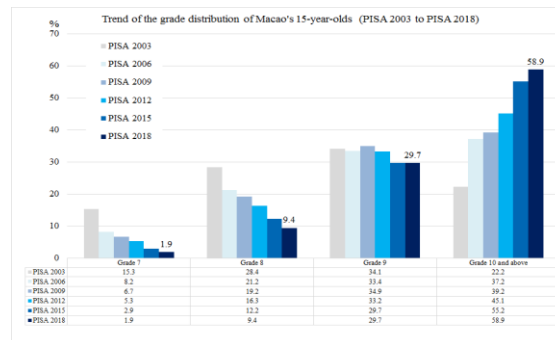
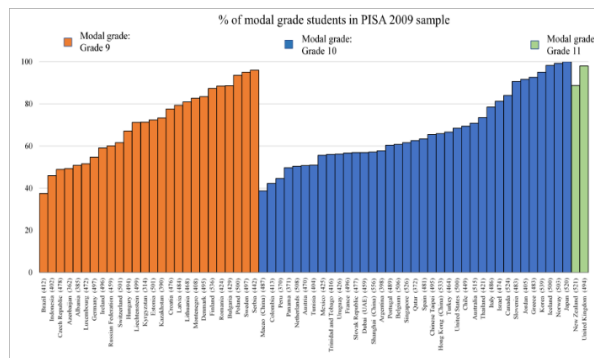


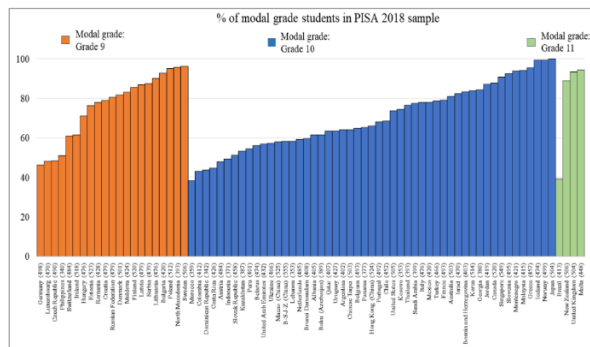
Figure 3. Percentage of Macao’s 15-year-old students studying at the various grade levels (*i.e.*, Grade 7-12) in secondary schools (PISA 2003- PISA 2018)

In both 2009 and 2018, reading literacy was the major domain of assessment. Starting from 2009, Grade 10 became the modal grade of the Macao-PISA assessment, though there was only 39% of 15-year-olds belonged to it. Macao's reading literacy performance was only mediocre (score = 487) as its performance was significantly below the OECD average (score = 493). In 2018, Grade 10 remained the modal grade of the Macao-PISA assessment. Due to more and more students not repeating grades, nearly 60% of all 15-year-olds were studying at Grade 10. Comparing 2009 and 2018, student performance rose quickly from a level below OECD's average and in a decade's time emerged to rank third (score = 525) in the league table of reading literacy.



Note: Enclosed in parentheses is the reading performance score of the participating countries/economies

Figure 4. Modal grade of sampled 15-year-old students of the 65 countries/economies participating in PISA 2009



Note: Enclosed in parentheses is the reading performance of the participating countries/economies

Figure 5. Modal grade of sampled 15-year-old students of the 78 countries/economies participating in PISA 2018

As seen in Figure 2-5, the trend across the six cycles of Macao-PISA assessment in recent years shows that there is a greater percentage of 15-year-old students studying at grade levels appropriate to their biological age (*i.e.*, Grade 9 and 10). There was a big increase from 56% in 2003 to 88% in 2018. It can be seen that more students studying at the modal grades, as well as Macao students' improvement in reading literacy, have resulted in an appreciable increase of Macao's reading literacy performance in PISA 2018 (from 487 in PISA 2009 to 525 in PISA 2018). Based on some simple calculation of figures shown in Table 2, if Macao's 15-year-olds in PISA 2009 had the same grade level distribution as that of PISA 2018, Macao's mean reading performance would have been 12 score points higher than what it was (*i.e.*, equals to $487 + 12 = 499$), a magnitude of 6 score points higher than the average of the OECD countries (= 493). In a nutshell, the policy of grade repetition, if it was implemented in 2009, would account for 31.6% of the growth in reading performance assessed in PISA 2018 (*i.e.*, 12 out of the 38 score points increase in a decade of time from 2009 to 2018).

Table 2. Macao 15-year-olds' reading literacy performance and percentage of students at each grade level in PISA 2009 and PISA 2018

Grade level	PISA 2009		PISA 2018	
	Mean	% of student	Mean	% of student
7	390	6.7	415	1.9
8	441	19.2	457	9.4
9	488	34.9	507	29.7
10	524	38.7	549	57.9
11	557	0.5	572	1.0
Average (Total sample)	487		525	

Note: Mean reading performance of the OECD countries in PISA 2009 and PISA 2018 is 493 and 487 respectively

Discussion of findings

In the decade before 2018 the majority of schools in Macao were private and there was a variety of grade repetition policies practiced, which were translated into multifarious school-based accountability of minimum competency standards (Lei, 2014). The finding of PISA 2009 that Macao adolescents' reading literacy did not perform up to standard has been of great concern to both educational practitioners and researchers, who would like to know what studying problems are faced by the grade repeaters. One influential secondary data analysis was done by Sit et al. (2015) who made use of the Macao-PISA 2012 data to uncover the

mediation mechanisms accounting for the influences of grade repetition on student performance. It was revealed that there are altogether three mechanisms able to explain the performance of the adolescent grade repeaters: (1) insufficient opportunity to learn, (2) inadequate self-regulation of students, and (3) inappropriate teacher guidance and management. The three mechanisms (involving eight mediation variables) identified, added together, are able to explain 0.7 grade level of schooling. The researchers further maintained that unless remedial programs and courses of action for the grade repeaters can be shown empirically to be effective, it is not a good idea for Macao schools to maintain their grade repetition policies without teachers' proper guidance and instruction. Macao Government considered this advice seriously, and urged the schools to lower the rates of grade repetition as far as practicable. Since then, in the ensuing PISA 2015 and PISA 2018 cycles of assessment, more and more 15-year-olds studied in the two modal grades (*i.e.*, Grade 9 and 10) of the PISA assessment.

Because sampling of students in PISA is age-based and not grade-based, when more of the sampled students were studying at the modal grades, the chances are that more of the sampled students are able to reach baseline standards or even excel in the three core literacies. Naturally, the average performance assessed of an educational system (such as the case of Macao in PISA 2018) will be elevated due to more opportunities for students to learn at higher grade levels, as well as the more adequate regulation of student learning with same-age peers under the more appropriate teacher guidance and management.

In a nutshell, as portrayed in Figure 2, Macao's improvement of PISA 2018 reading performance since 2009 can be interpreted using the conceptual model of grade level effect due to grade repetition on improvement in student reading performance, and the mechanisms underpinning grade level effect on reading performance can be empirically shown to be mediated by facilitative psychological dispositions and self-regulatory learning (SRL) mechanisms of grade repeaters in the PISA 2012 study, a study conducted 3 years after PISA 2009 and 6 years before PISA 2018.

Limitations and caveats of the study

The research design and findings of the triennial PISA studies are intended to assist policy makers and educational practitioners around the world, to improve quality of provision to students studying at the basic education level. Admittedly, the age-based and cross-sectional research design of the PISA studies prove difficult for the researchers to conduct secondary data analysis, to assess grade level effects and causal relationships of variables. Fortunately, this study

capitalizes on the special characteristics of the Macao-PISA sampled students and finds a way to assess grade level effect, due to the slowing down of the prevalence of grade repetition in a decade of time from 2009 to 2018. With hindsight, the special characteristics are: (1) Macao's student data was not a sample but a census; (2) Macao's grade repetition was indeed very serious and there was a high percentage of students studying at the Grade 7 and 8 levels, whereas in other countries/economies there was not; (3) Grade repeaters possessed self-regulatory learning characteristics, as shown in the analysis of Macao-PISA 2012 data reported in Sit et al. (2015).

In a nutshell, grade level effect is not only an educational effect but also a psychological effect of the grade repeaters with mechanisms related to opportunity to learn at higher grade levels, as well as the process of self-regulatory learning witnessed in the Macao-PISA 2012 sample. Other studies are needed clever research design to conduct this kind of secondary data analysis to find out what other educational and psychological effects are in operation for the students (grade-repeated or not) to result in Macao students' improvement in reading literacy in a decade of PISA assessment during 2009 to 2018.

Conclusion

Macao's remarkable progress in academic achievement in the past decade can be explained appreciably due to the policy and practice of the lowering of the prevalence of grade repetition at primary and secondary education level in Macao schools. Macao was successfully based on PISA findings of earlier cycles, made an informed policy in order to raise education quality of its basic education system with excellence and effectiveness. In the forthcoming decade, there is a continuing need to improve the quality of the teaching profession further, so that teachers can grow and improve in the education of the overage grade repeaters (and those under the new grade repetition policy granted promotion to study at the next grade level), particularly in areas of opportunity to learn with same-age peers, practices of self-regulatory learning in core literacy areas, and classroom management of non-attentive and disruptive behaviors (Cheung, 1990; Nota, Soresi, & Zimmerman, 2004; Pajares, 2008; Välijärvi & Sahlberg, 2008).

References

- Bocks, W. (1977). Non-promotion: A year to grow? *Educational Leadership*, 34(5), 379-382.
- Boekaerts, M., & Corno, L. (2005). Self-regulation in classroom: a perspective on assessment and intervention. *Applied Psychology: An International Review*, 54(2), 199-231.
- Brophy, J. (2006). *Education policy series 6: Grade repetition*. Paris & Brussels: IIEP & IAE.
- Cheung, K. C. (1990). To grow and glow: Towards a model of teacher education and professional development. Paper presented at the 36th World Assembly of the International Council on Education for Teaching. In W. K. Ho, & R. Y. L. Wong (Eds.), *Improving the quality of the teaching profession: An international perspective* (pp. 146-157). Singapore: Institute of Education.
- Cheung, K. C. (2010). An in-depth analysis of the issue of sense of belonging at school in the PISA 2003 mathematical literacy study. *Curriculum & Instruction Quarterly*, 13(1), 95-116.
- Cheung, K. C., Sit, P. S., Mak, S. K., & Jeong, M. K. (2020). *Macao-PISA 2018 Report: Assessment of reading, mathematical and scientific literacy performance of 15-year-old students from an international comparative perspective*. Macao: Educational Testing and Assessment Research Centre, University of Macau.
- Jackson, G. B. (1975). The research evidence on the effects of grade retention. *Review of Educational Research*, 45(4), 613-635.
- Lei, K. M. (2014, July 12). Study report: One size fits all grade repetition policy is not desirable (In Chinese). *Macao Daily News*, p. A07.
- Mullis, I. V., Martin, M. O., Foy, P., & Arora, A. (2012). *TIMSS 2011 International results in mathematics*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center Lynch School of Education, Boston College.
- Nota, L., Soresi, S., & Zimmerman, B. J. (2004). Self-regulation and academic achievement and resilience: a longitudinal study. *International Journal of Educational Research*, 41(3), 198-251.
- Organization for Economic Cooperation and Development [OECD] (2010). *PISA 2009 results: What students know and can do: Student performance in reading, mathematics and science (Volume I)*. Paris: OECD Publishing.

- Organization for Economic Cooperation and Development [OECD] (2011). When students repeat grades or are transferred out of school: What does it mean for education systems? *PISA in Focus*, 6, Paris: OECD Publishing.
- Organization for Economic Cooperation and Development [OECD] (2014). Are disadvantaged students more likely to repeat grades? *PISA in Focus*, 43, Paris: OECD Publishing.
- Organization for Economic Cooperation and Development [OECD] (2016). *PISA 2015 results: Excellence and equity in education (Volume I)*. Paris: OECD Publishing, Paris.
- Organization for Economic Cooperation and Development [OECD] (2019). *PISA 2018 results: What students know and can do (Volume I)*. Paris: OECD Publishing, Paris.
- Pajares, F. (2008). Motivational role of self-efficacy beliefs in self-regulated learning. In D. H. Schunk & B. J. Zimmerman (Eds.), *Motivation and self-regulated learning. Theory, research, and applications* (pp. 111-140). Mahwah: Erlbaum.
- Rosário, P., Núñez, J. C., Valle, A., González-Pienda, J., & Lourenço, A. (2013). Grade level, study time, and grade retention and their effects on motivation, self-regulated learning strategies, and mathematics achievement: a structural equation model. *European Journal of Psychology of Education*, 28, 1311-1331.
- Schunk, D. H., & Ertmer, P. A. (2000). Self-regulation and academic learning, self-efficacy enhancing interventions. In M. Boekaerts, P. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 631-649). San Diego: Academic.
- Sit, P. S., Cheung, K. C., Cheong, W. C., Mak, S. K., Soh, K. C., & Jeong, M. K. (2015). What studying problems are faced by the adolescent grade repeaters in Macao: Uncovering underlying mechanisms based on evidences from the PISA 2012 Study. *Asia Pacific Education Review*, 16(3), 367-377.
- Väljjarvi, J., & Sahlberg, P. (2008). Should 'failing' students repeat a grade? Retrospective response from Finland. *Journal of Educational Change*, 9, 385-389.