From drills to skills? Cultivating thinking skills and soft skills in Malaysian schools

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Presentation outline

- What are the Four Cs?
- Why do we need to cultivate the Four Cs in schools?
- How do schools elsewhere cultivate the Four Cs?
- What do the Malaysian TIMSS and PISA data tell us?
- **Four Cs cultivation in Malaysian schools today**
- **Policy proposals for cultivating the Four Cs**

Research overview

What are the Four Cs?

- **Critical thinking:** using reasoning to analyse, evaluate, and synthesise diverse sources of information
- **Creativity:** the process of developing original ideas that have value
- **Communication:** expressing views clearly and persuasively, and responding constructively to others' views
- **Collaboration:** the process of engaging actively and reciprocally in a team to achieve shared goals

Observable Four Cs behaviours

Critical thinking	Creativity
• ask questions that deepen understanding of unfamiliar material, and look for answers in efficient ways • identify points of view, claims, and evidence • select the most important/relevant pieces of information, based on evidence • discuss the interaction between pieces of information • describe, reflect on, and direct one's own thinking process	• generate multiple and varied ideas to solve an unfamiliar problem • elaborate on, and revise, the ideas to suit circumstances • weigh the strengths and weaknesses of each idea • integrate different perspectives while developing and evaluating ideas • reflect on the creative process continuously, and use these insights to strengthen the selected ideas
Communication	**Collaboration**
• convey views confidently and respectfully in writing and speech, and in familiar and unfamiliar contexts • structure information systematically and effectively • acknowledge information conveyed by others using verbal and non-verbal cues • accurately summarise information conveyed by others • affirm, modify, or contradict other's views, with politeness and reasons	• build consensus and motivation through discussion • distribute tasks according to each member's strengths and weaknesses • adapt to different working styles and to changing task requirements • resolve conflicts through fair negotiations and compromises • monitor and affirm individual and group achievements

Why do we need policies to develop the Four Cs in primary and secondary schools?

- **How can cultivating the Four Cs help Malaysia?**
  - Boosting economic productivity and filling job market gaps.
  - Supporting government development plans.
  - Facilitating national unity and civic consciousness.
- **How can cultivating the Four Cs help Penang?**
  - Driving a shift to knowledge-intensive industries.
  - Enriching the legacy of excellent public schools.
- **How can cultivating the Four Cs help individual Malaysian children?**
  - Raising social mobility and employability.
  - Improving quality of life through increased capabilities.
- **Why focus on primary and secondary schools?**
  - Optimising cognitive development during formative years.
  - Ensuring efficient use of public education funds.

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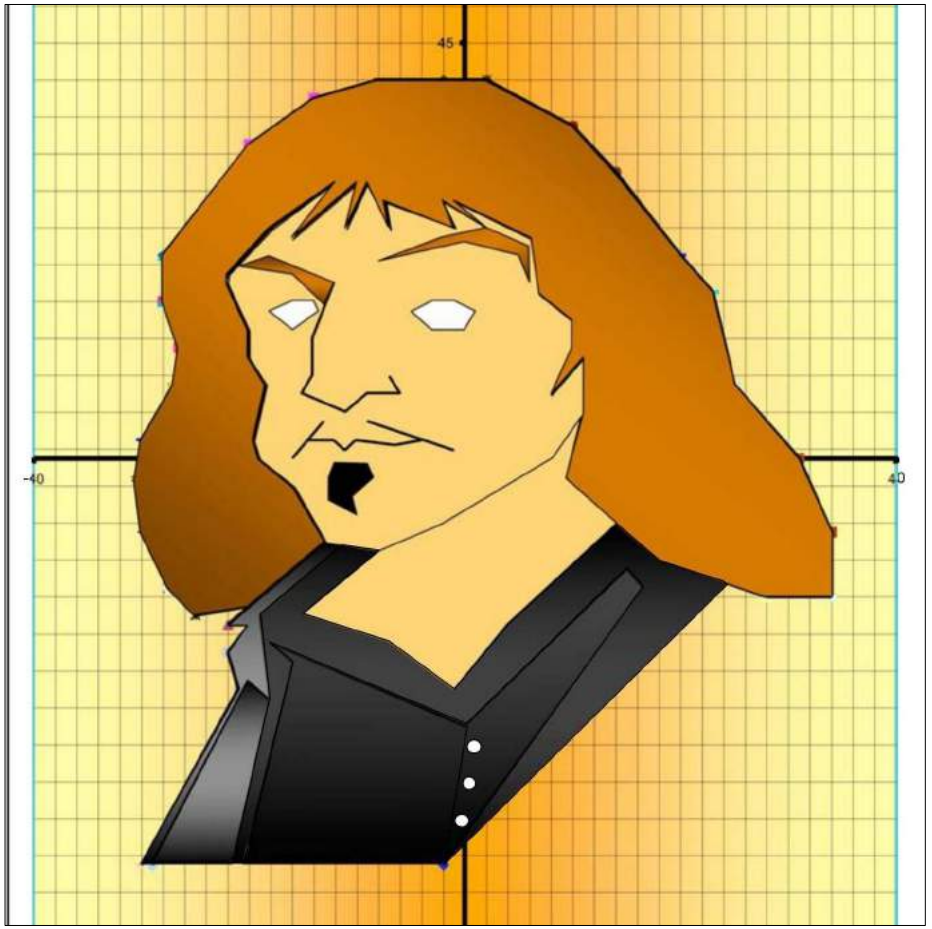
Recent calls for deeper skills training

- International Labor Organization, *The changing nature of jobs (World Employment and Social Outlook 2015)*, May 2015.
- World Economic Forum, *The future of jobs: Employment, skills and workforce strategy for the Fourth Industrial Revolution (Global Challenge Insight Report)*, January 2016.
- World Bank, *Digital dividends (World Development Report 2016)*, 2016.
- OECD, *Employment outlook 2016*, July 2016.

How do schools elsewhere cultivate the Four Cs?

- Examples: Skills modules; personalised learning; blended learning; project-based learning; competency-based assessments; extracurricular programmes; internships
- Insights from cognitive science
- Case studies:
  - Project-based learning at High Tech High, the U.S.A.
  - Blended learning at the Innova Schools, Peru
  - Work-based learning at the Studio Schools, England

Case study example: Project-based learning at High Tech High, California, the U.S.A.



Sources: Graph-It Design—Alfred Solis, Math/Physics, High Tech High, http://www.hightechhigh.org/unboxed/issue3/cards/pdfs/graph_it_design.pdf; screen capture of *Most Likely to Succeed* Trailer, https://vimeo.com/122502930.

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What do the TIMSS and PISA data tell us?

- Classroom activities that engage students in the Four Cs cultivate corresponding skills.
- We need classroom approaches that cultivate skills and content mastery concurrently.
- We must pay attention to school culture and setting.
- We need better ways of measuring skills development.

OUTCOME VARIABLES	EXPLANATORY VARIABLES	CONTROLS
TIMSS 2007 maths reasoning score TIMSS 2007 science reasoning score	Classroom activities / teacher actions that engage students in the Four Cs	Parental education, number of books at home, interest in the subject
PISA 2012 maths score PISA 2012 student habits (from survey)		

Four Cs cultivation in Malaysian schools: Current policies

Pop quiz: How long has it been like this?

"It was a content-loaded curriculum … Teachers burdened with large classes and heavy workloads hurried through content ... Scant attention was paid to those who fell by the wayside and never acquired the basic skills of reading, writing and numeracy. … Those who had gained the basic skills had to rely heavily on texts and rote learning. … Public opinion at this time began to be heard in terms of letters to the press …. Parents, aware of the importance of good grades in a heavily examination-oriented school system, were investing to a considerable extent in private tuition, a 'remedy' beyond the reach of the socially disadvantaged."

Pop quiz: How long has it been like this?

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Source: Mukherjee, H., & Singh, J. S. (1983). The new primary school curriculum project: Malaysia, 1982. *International Review of Education*, 29(2), 247-257.

Current policies targeting the Four Cs

- Pentaksiran Berasaskan Sekolah (PBS)
- Pentaksiran Tingkatan 3 (PT3)
- Higher-order thinking skills (HOTS) questions in exams
- i-THINK thinking maps

Source: http://ithink.org.my/Content/SupportKit/Posters/

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Four Cs cultivation in Malaysian schools: Why don't these policies work?

Overarching motivation: Success in exams

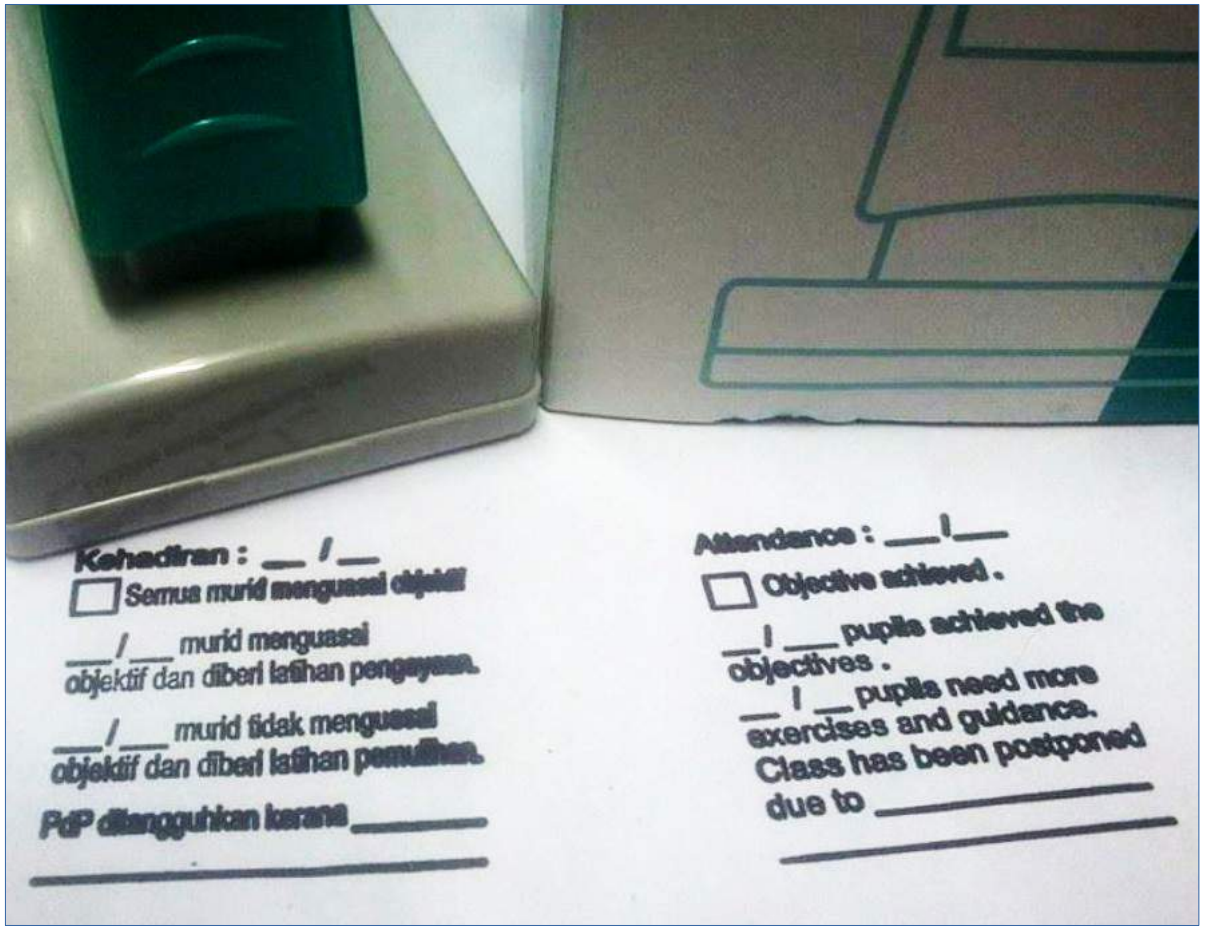
"All of the tactics, tips and tricks we were taught for answering PMR years ago must be scrapped to pave the way for PT3. ... We were the unfortunate lab rats in a failed experiment, and our effort and time put into studying were all in vain. There is nothing that the Education Ministry can do to compensate for our losses."

Source: Gan, J. S. (2014). PT3 a big step backwards in education. *Malaysiakini*, 24 December 2014.

Effects of the exam-orientation on Four Cs cultivation

- Focus on memorising content over practising skills
  - lecture-style teaching
  - exam-based drills
- Mistrust of alternative assessments
  - widespread doubt about the reliability of PBS
  - despite the opacity of centralised exam grading

Numerous directives, endless paperwork



"sebab pe saya hasil cop refleksi ni?
-sebab saya pun guru
-sebab saya nak mudahkan kerja2 guru yg semakin hari bertambah...."

Source: COP rubber stamp BBM untuk cikgu, *Facebook* posts, 29 December 2014 & 28 December 2015

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Effects of the paperwork burden on Four Cs cultivation

- Focus on procedural compliance over student outcomes
  - e.g. i-THINK online course and posters
- Less time invested in teaching and learning
  - less room for innovation and collaboration in school leadership and teaching
- New policy = new “wayang”
  - inflation of school self-evaluations
  - copied project work and fabricated results

Cynicism and blame, partly due to flip-flops

Year	Four Cs policies that have been reversed or indefinitely postponed
2011	From 2016, UPSR grades to comprise 60% centralised tests (Year 6) and 40% school-based assessment (Years 1 to 6).
2011	Teachers must compile students' PBS evidence in Fail Perkembangan Murid and Fail Showcase; and record PBS achievement online in SPPBS.
2011	The PMR will be completely replaced by PBS in 2014, with both teacher-designed and Ministry- designed assessment tasks.
2013	English to be a compulsory pass subject beginning with SPM 2016.
2013	Practical testing to be introduced for science subjects beginning in 2015.
2014	Teachers must complete the Kursus i-THINK Dalam Talian by end of 2014.

Sources: various circulars and other official government documents

The blame game in Malaysian education

"Dalam masa kami menatarkan pelaksanaan PBS itu, kita tidak pernah pun mengatakan bahawa anak-anak itu perlu dikumpul evidens-evidens itu dan difailkan. Tapi sebenarnya saya rasa cara mereka menginterpretasi, kefahaman itu, yang lari daripada landasan sebenar."

Nawal Salleh,
Examinations Syndicate director

However, the *Panduan Pengurusan PBS* belies her statement:

Penyimpanan

Evidens murid disimpan dalam **dua jenis fail** seperti berikut:

. Fail Perkembangan Murid

- Fail Perkembangan Murid (FPM) ialah fail yang menyimpan evidens perkembangan pembelajaran murid.
- Seorang murid mempunyai satu FPM yang mengandungi evidens semua mata pelajaran.
- Setiap evidens hendaklah direkodkan dalam Rekod Perkembangan Murid (RPM). RPM diletakkan dihadapan evidens setiap mata pelajaran.
- Fail ini menyimpan evidens terkini bagi setiap deskriptor dan evidens terdahulu dikembalikan kepada murid.

. Fail *Showcase*

- Fail *Showcase* (FS) ialah fail yang menyimpan setiap evidens terbaik bagi semua deskriptor untuk semua mata pelajaran.
- FS hendaklah dijadikan rujukan piawaian evidens.
- FS hendaklah disediakan mengikut tahun/tingkatan atau kelas.

Sources: *Landskap: Dasar Peperiksaan Baru*, televised on TV1 on 16 October 2015; *Panduan Pengurusan PBS,* Putrajaya: Lembaga Peperiksaan, 2012

Effects of flip-flops and the blame game on Four Cs cultivation

- Little motivation to invest in new policies
  - no healthy critique from the front line
  - no grassroots support → no staying power
- Poor relationships between students and teachers
  - TIMSS 2011 student questionnaire:

"Your teacher thinks you can do well in _____ with difficult materials."					
Subject	**% "disagree a little" or "disagree a lot"**				
	Malaysia	**Int'l average**	**Singapore**	**Thailand**	**Indonesia**
Mathematics	62.1	35.5*	33.9	33.7	45.1
Science	65.5	34.3⁺	41.7	27.5	—^

*Average of the 41 participating countries, excluding Malaysia; with each country weighted equally.
⁺Average of the 26 participating countries that answered the Integrated Science survey, excluding Malaysia; with each country weighted equally
^Indonesian students answered this question separately for biology, chemistry, and physics.

Source: my calculations from IEA, *TIMSS 2011 eighth grade almanacs,* 2012, pp. 64, 90.

Implications for skills cultivation policies in primary and secondary schools

- Alternative forms of assessment must be introduced gradually, and non-traditional teaching approaches must boost exam results while cultivating the Four Cs.
- Teachers must be held accountable through mechanisms that are more flexible and more focussed on learning—and difficult to inflate.
- Policy approaches have to strengthen relationships, build shared vision, and minimise coercion.
- (Educational technology must be rolled out with great caution.)

Policy proposals
for cultivating the Four Cs

Policy proposals overview

- **Policy categories:**
  - Student assessment and instruction (3 + 3 proposals)
  - School organisation (4 proposals)
  - The teaching profession (4 proposals)
- **For each policy:**
  - aims, measures of success, Four Cs cultivation
  - systemwide/opt-in, resource demand
  - task delegation, incentives, accountability, time frame
  - empirical basis, alignment with system, potential obstacles

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Policy overviews: Student assessment

- **SPM group project component**: a compulsory SPM component requiring each Form 4 student to complete a yearlong group project addressing a problem relevant to their community
- **SPM portfolio option**: giving SPM candidates the option of being assessed not through exams, but through a portfolio of subject-specific projects
- **Public collection of HOTS test questions**: a freely accessible bank of cognitively complex test questions and answers, across all subjects and school levels

Policy overviews: Instructional tools

- **Visible Thinking routines** (primary school): a set of protocols for helping students to articulate, extend, and share their thought processes with peers and teachers
- **Peer Instruction** (secondary school science and mathematics): a protocol for deepening students' understanding through individual and paired work on puzzles testing key concepts in the syllabus
- **Argumentation frameworks** (secondary school languages and humanities): frameworks for teaching different components of effective argumentation

Policy overviews: School organisation

- **Cocurricular public projects**: requiring each student to contribute significantly to one public project (e..g. a performance, competition, school event, or community service initiative) each year
- **Self-contained classrooms in primary school**: a gradual move to self-contained classrooms, in which each class has the same teacher for most subjects, for each 3-year phase of primary school
- **Policy experiment in eliminating streaming**: an opt-in experiment to determine if eliminating streaming improves student learning and/or weakens the focus on exam results
- **Revamped school evaluations**: a phased transition to a school evaluation system incorporating data-driven improvement plans, student and teacher surveys, and town hall meetings with parents

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Policy overviews: The teaching profession

- **Revamped teacher appraisals**: a phased transition to a teacher appraisal system focussed on improving teaching and learning, using videotaped classroom observations and student feedback
- **Collaboration module**: a year-long series of structured, reflective professional learning activities for improving teaching among groups of teachers in the same subject
- **Online platform for sharing classroom stories**: a nationwide, teacher-only platform for informally sharing stories of effective lesson techniques, activities, and student interactions
- **Public discussions on questions in education**: periodic public discussions about ideas in education theory or policy, with accessible reference materials and dedicated discussion channels

Student assessment and instructional tools

Policy	Critical thinking	Creativity	Communication	Collaboration	Systemwide or opt-in? (party that chooses)
Student assessment					
SPM group project component	✓	✓	✓	✓	Systemwide
SPM portfolio option	✓	✓	✓		Opt-in (students)
Public collection of HOTS test questions	✓	✓			Systemwide
Instructional tools					
Visible Thinking routines (primary school)	✓	✓	✓	✓	Opt-in (teachers)
Peer Instruction (secondary maths, science)	✓		✓	✓	Opt-in (teachers)
Argumentation frameworks (secondary)	✓	✓	✓		Opt-in (teachers)

Proposal: SPM project work

- A new SPM component, requiring each Form 4 student to complete a yearlong group project addressing a problem relevant to their community. All projects will be presented and defended at a public exhibition day in school.
- Aims: (i) ensure that all secondary school students work on a project with real-world links prior to graduation; (ii) build public favour towards non-traditional assessments.
- Measures of success:
  - *Direct*: quality of projects; skills demonstrated in the projects
  - *Indirect*: employment rates of recent graduates

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School organisation

Policy	Critical thinking	Creativity	Communication	Collaboration	Systemwide or opt-in? (party that chooses)
Cocurricular public projects	✓	✓	✓	✓	Systemwide
Revamped school evaluations	✓		✓	✓	Systemwide, phased
Self-contained classrooms in primary school		✓	✓	✓	Initially opt-in (schools), later systemwide
Policy experiment: eliminating streaming	✓			✓	Opt-in (schools)

Proposal: Revamped school evaluations

- A phased transition to a new school evaluation system focussed on the improvement of teaching and learning, rather than on comparisons between schools.
- New data sources: teacher observations (video-recorded), student surveys, teacher surveys
- Community accountability: an annual town hall meeting to discuss each school's improvement plan with parents
  - facilitated by a district officer or another school head
  - video-recorded for reference and accountability

Time frame for school evaluations

1st year (Ministry)	2nd year (Schools)
• Eliminate composite scores. • Revise school evaluation standards. • Train SIP+ and school heads. • Develop teacher and student surveys. • EOY: administer teacher surveys.	• Conduct classroom observations. • End of each semester: teacher surveys. • EOY: administer student surveys. • EOY: meeting with all staff to formulate the next year's improvement plan.

3rd year (Schools)	4th year onwards (Schools)
• Conduct classroom observations. • End of each semester: student and teacher surveys. • Midyear: meeting with all staff and a district officer to discuss progress. • EOY: internal meeting, in 2nd year.	• BOY: town hall meeting to discuss the improvement plan with parents. • Conduct classroom observations. • End of each semester: student and teacher surveys. • Midyear: external meeting, as in 3rd year. • EOY: internal meeting, as in 3rd year.

The teaching profession

Policy	Critical thinking	Creativity	Communication	Collaboration	Systemwide or opt-in? (party that chooses)
Revamped teacher appraisals	✓			✓	Systemwide, phased
Collaboration module	✓	✓	✓	✓	Opt-in (teachers)
Platform for sharing classroom stories	✓		✓		Opt-in (teachers)
Public discussions on questions in education	✓	✓	✓	✓	Opt-in (teachers)

Proposal: Teacher collaboration module

- A year-long series of learning activities for groups of teachers teaching the same subject. The activities aim to foster long-term collaboration routines.
- Incentives for teachers: exemption from teacher appraisal exercise; fulfil the in-service training requirement.
- Accountability:
  - BOY: each group submits a schedule to the district office.
  - After each session: teachers submit detailed, guided reflections.
  - Any two sessions: district officer observes.
  - EOY: teachers present their learning at a staff meeting.

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Concluding note

Can our education system really change?

- Crucial supporting policies:
  - Minimise teachers' administrative work.
  - Allow discussion of "sensitive topics".
- The importance of leadership and messaging.

Source: photographed at Masjid Jamek LRT station, 2 May 2016

Thank you very much

for your attention and feedback!

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Supplementary material

TIMSS 2007 regression results

TIMSS 2007 mathematics reasoning regression results

Variable	Value	Std. error
intercept	394.11**	(24.66)
Controls:		
highest parental education level (reverse coded)	-7.00**	(2.63)
number of books at home	.19**	(.03)
liking mathematics (reverse coded)	-14.06**	(2.20)
Mathematics lesson components:		
work in small groups	-.30	(.20)
explain answers	.79**	(.26)
relate learning to daily lives	.09	(.28)
review homework	.26	(.24)
write equations and functions to represent relationships	-.71*	(.28)
decide own procedures for solving complex problems	.79**	(.31)
work on problems independently	1.15**	(.33)
n	3671	
R^2	.267	

*significant at the 5-percent level, **significant at the 1-percent level

TIMSS 2007 science reasoning regression results

Variable	Value	Std. error
intercept	348.49**	(21.16)
Controls:		
highest parental education level (reverse coded)	-4.38**	(1.54)
number of books at home	.15**	(.03)
liking science (reverse coded)	-7.58**	(1.71)
Science lesson components:		
work in small groups	.77**	(.27)
give explanations for what is being studied	.13	(.29)
relate learning to daily lives	.81*	(.34)
review homework	-.26	(.25)
design or plan an experiment or investigation	-1.01**	(.28)
conduct an experiment or investigation	-.03	(.25)
make observations and describe what is seen	.23	(.29)
use scientific formulas and laws to solve problems	1.63**	(.35)
n	3671	
R^2	.376	

*significant at the 5-percent level, **significant at the 1-percent level

PISA 2012 regression results

PISA 2012 mathematics regression results

Variable	Model 1 maths score, without "enjoy maths"	Model 2 maths score, with "enjoy maths"	Model 3 self-reported Four Cs behaviours score
intercept	377.08**	412.46**	4.21**
	(7.07)	(9.31)	(.25)
highest parental education level	6.99**	8.25**	.014
	(1.18)	(1.64)	(.022)
number of books at home	.087**	.059**	.00074**
	(.015)	(.017)	(.00023)
enjoying mathematics (reverse coded)	–	-17.94**	-.459**
		(2.32)	(.044)
Mathematics lesson components:			
clear goals for learning	.99	7.05	-.086
	(3.83)	(5.69)	(.072)
present thinking or reasoning at length	-4.19	-4.42	.007
	(3.07)	(3.63)	(.069)
opportunity to express opinions	-1.88	-6.91	.040
	(3.47)	(4.44)	(.063)
projects that require at least one week to complete	-25.22**	-23.08**	.138*
	(3.25)	(4.08)	(.068)
small groups to come up with joint solutions	-17.39**	-17.90**	.281**
	(3.83)	(5.01)	(.062)
students help plan activities or topics	-28.66**	-27.35**	.171*
	(3.45)	(4.31)	(.086)
questions to check understanding of what was taught	15.62**	14.42**	-.018
	(3.65)	(5.01)	(.083)
questions to reflect on the problem	6.71	11.26*	.089
	(3.76)	(4.90)	(.066)
problems requiring thinking for an extended time	7.62**	8.70*	.177**
	(2.51)	(3.53)	(.060)
decide on own procedures for solving complex problems	-.84	-1.95	.163*
	(2.81)	(4.56)	(.079)
problems with no immediately obvious method of solution	-2.63	-3.10	.072
	(3.30)	(4.50)	(.066)
problems in different contexts to ascertain understanding of concepts	17.02**	16.73**	.089
	(2.77)	(3.97)	(.068)
explain how you solved a problem	-4.76	-7.03	.199**
	(3.29)	(4.31)	(.068)
problems that apply learning to different contexts	17.00**	13.86**	.156*
	(3.17)	(3.98)	(.071)
problems that can be solved in several different ways	7.71**	1.94	.062
	(2.99)	(4.22)	(.066)
n	3278	1626	1549
R^2	.195	.223	.222

**significant at the 5-percent level, **significant at the 1-percent level*

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PISA 2012 self-reported Four Cs behaviours

- Sum of self-reported responses on 8 behaviours demonstrating the four Cs.
- Each response is scaled so that:
  - 0 = the lowest value (*never or rarely*, *not at all like me*, or *not at all confident*)
  - 1 = the highest value (*always or almost always*, *very much like me*, or *very confident*)
- Range = 0.00 to 8.00
- Mean = 4.489
- Standard deviation = 1.261

1) "I help my friends with mathematics."
2) "I talk about mathematics problems with my friends."
3) "I like to solve complex problems."
4) "I can handle a lot of information."
5) "I seek explanations for things."
6) "I can easily link facts together."
7) "How confident would you feel about understanding graphs presented in newspapers?"
8) "How confident would you feel about calculating the petrol consumption of a car?"

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PBS Form 3 English Dokumen Standard Prestasi (2012–2014)

BAND	PERNYATAAN STANDARD	DESKRIPTOR	EVIDENS
3 **Tahu, Faham dan Boleh Buat**	**B3** Use knowledge acquired through listening, speaking, reading and writing.	**B3 DL1** Requesting assistance, expressing appreciation and gratitude	**B3 DL1 E1** Able to request assistance when facing a problem and to express gratitude for the assistance rendered
		B3 DL2 Listening to and understanding reports	**B3 DL2 E1** Able to show understanding of a report by sequencing main ideas and supporting details
		B3 DB1 Processing texts read by using contextual clues	**B3 DB1 E1** Able to derive the meaning of words through contextual clues
		B3 DB2 Understanding cause and effect relationships in a text	**B3 DB2 E1** Able to use logical connectors in a text to show cause and effect relationships
		B3 DT1 Writing speeches	**B3 DT1 E1** Able to write out a speech on a particular topic: • using the correct format • in paragraphs • in not less than 120 words

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PBS Form 3 English Panduan Perkembangan Pembelajaran Murid (2014–present)

KEMAHIRAN	BAND	DESKRIPTOR
Tulis	1	Write mainly simple sentences that lack accuracy and with minimal use of writing conventions.
	2	Express some ideas using mainly simple sentences on a limited range of topics with simple vocabulary and writing conventions with some textual organisation.
	3	Write a text expressing one's opinions using a range of simple sentence patterns, sufficient writing conventions and vocabulary with a little creativity.
	4	Write a text on some topics expressing one's opinions and thoughts with a fair amount of sentence patterns, writing conventions, vocabulary and creativity.
	5	Produce a good piece of writing on a variety of topics expressing one's opinions and thoughts with some creativity using a variety of sentence patterns, writing conventions and some sophisticated vocabulary and display some critical thinking skills.
	6	Produce an excellent piece of writing on a variety of topics expressing one's opinions and thoughts creatively and critically using an extensive variety of sentence patterns, writing conventions incorporating sophisticated vocabulary and displaying the ability to paraphrase using own words.

Sample Visible Thinking routine: Connect-Extend-Challenge

Consider what you have just read, seen, or heard, then ask yourself:

- How are the ideas and information presented *connected* to what you already knew?
- What new ideas did you get that *extended* or broadened your thinking in new directions?
- What *challenges* or puzzles have come up in your mind from the ideas and information presented?

Source: Ron Ritchhart, Mark Church, & Karin Morrison, *Making Thinking Visible: How to Promote Engagement, Understanding, and Independence for All Learners,* San Francisco, CA: Jossey-Bass, 2011, p. 132.

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Sample ConcepTest for Peer Instruction: Introductory physics

A person standing at the edge of a cliff throws one ball straight up and another ball straight down at the same initial speed. Neglecting air resistance, the ball to hit the ground below the cliff with the greater speed is the one initially thrown

1) upward.
2) downward.
3) neither—they both hit at the same speed.

Source: Eric Mazur, *Peer instruction: A user's manual*, New Jersey: Prentice Hall, 1997, p.107.

Sample argumentation framework

- **Generating reasons**

  Goals: Reasons underlie opinions; different reasons may underlie the same opinion.
- **Elaborating reasons**

  Goal: Good reasons support opinions.
- **Supporting reasons with evidence**

  Goal: Evidence can strengthen reasons.
- **Evaluating reasons**

  Goal: Some reasons are better than others.
- **Developing reasons into an argument**

  Goal: Reasons connect to one another and are building blocks of argument.
- **Examining and evaluating opposing side's reasons**

  Goal: Opponents have reasons too.
- **Generating counterarguments to others' reasons**

  Goal: Opposing reasons can be countered. "We can fight this."
- **Generating rebuttals to others' counterarguments**

  Goal: Counters to reasons can be rebutted. "We have a comeback."
- **Contemplating mixed evidence**

  Goal: Evidence can be used to support different claims.
- **Conducting and evaluating two-sided arguments**

  Goal: Some arguments are stronger than others.

Source: Deana Kuhn, *Education for thinking*, Massachusetts: Harvard University Press, 2005, p.153–154.

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