

# 澳門非高等教育制度與規劃前瞻研討會

## 促進自主學習的評估 – PISA 的啟示與課堂評估的重構

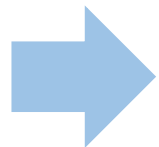
樂善堂王仲銘中學校長

何世敏博士

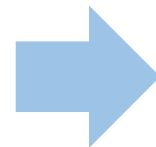
30-10-2016

# 問題的提出

課堂實踐？



自主學習？



學生成績？

**#1** 自主學習、課堂實踐、學生成績三者究竟有何關係？

**#2** 近十年國際上有沒有大型研究數據証實自主學習與學生成績的關係？

**#3** 我們可以怎樣優化課堂實踐進一步提升自主學習以至學生成績？

# PISA的啟示 (1) – 自主學習的重要性

## 自主學習四個主要向度 (PISA 2000)

- selecting appropriate *learning goals* which guide the learning process;
- using appropriate *knowledge and skills* to direct learning;
- consciously selecting appropriate *learning strategies* appropriate to the task at hand; and
- being *motivated* to learn.

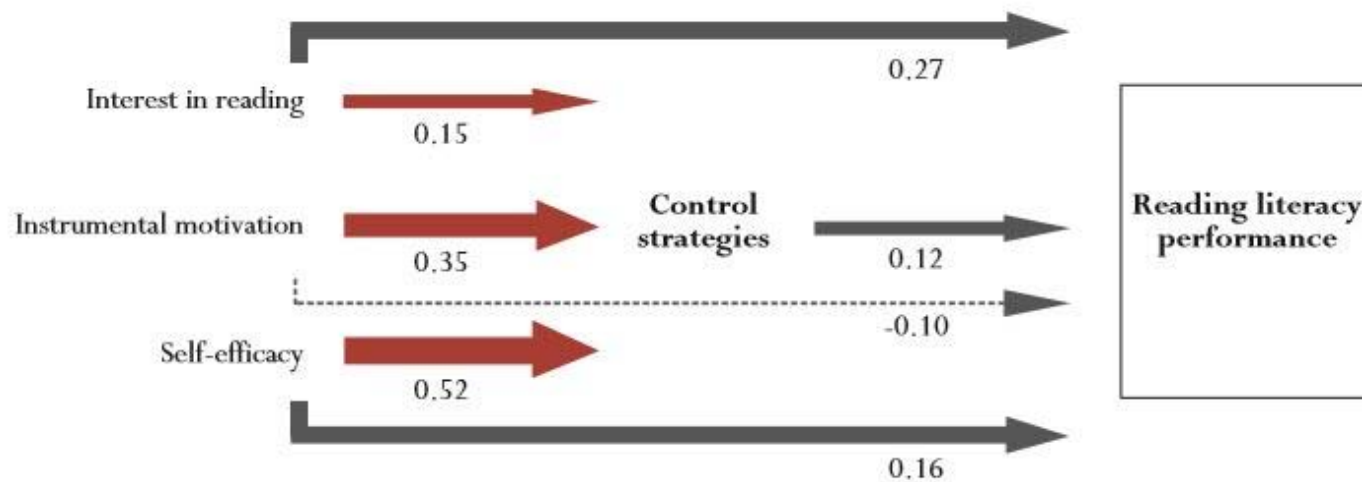
### **Implications for educational policy and practice**

One of the main implications of the results presented in this report is that it is worthwhile for educational systems to promote students' ability to be effective and thus self-regulated learners. Students' approaches to learning, namely their use of learning strategies, their confidence and their motivation, are central aspects of schooling. They are not only associated with success in school but can also be viewed as an educational outcome as such. Students' motivation as well as their repertoire of strategies may change over life, but the prerequisites acquired in school function as a solid base for further development. Although there are no longitudinal studies that link students' capacity to regulate their own learning as measured in PISA with success in future life, evidence from the literature suggests that it indeed makes a difference.

# PISA的啟示 (2) – 自主學習與成績的關係

## 國際閱讀成績 (PISA 2001) (Artelt et al, 2003)

Individual factors associated with control strategies and performance, when controlling for other factors



The width of each arrow is proportional to the *regression coefficient*, shown in each box, a measure of the association between the factors comparable in meaning to that shown in Figure 2.4 above (however, the proportion of explained variance cannot in this case be calculated from the coefficient for a single variable, since several variables are looked at simultaneously). The *direction of the arrows in this diagram indicate a suggested effect rather than a demonstrated causal link*.

Summary of differences in learner characteristics between strong and weak readers

Characteristics	In how many of 21 OECD countries <sup>1</sup> is there a significant difference in learning approaches between strong and weak readers?	OECD average effect size
Interest in reading	Strong readers more in all except Mexico	0.80
Academic self-concept	Strong readers more in all 21 countries	0.74
Self-concept in reading	Strong readers more in all 21 countries	0.69
Self-efficacy	Strong readers more in all 21 countries	0.61
Control strategies	Strong readers more in all 21 countries	0.52
Effort and persistence	Strong readers more in 19 countries	0.37
Mathematical self-concept	Strong readers more in 17 countries	0.37
Elaboration strategies	Strong readers more in 18 countries	0.33
Preference for competitive learning	Strong readers more in 16 countries; Weak readers more in Portugal	0.23
Instrumental motivation	Strong readers more in 10 countries; Weak readers more in Italy	0.19
Interest in mathematics	Strong readers more in 6 countries; Weak readers more in 2 countries	0.10
Memorisation strategies	Strong readers more in 6 countries; Weak readers more in 4 countries	0.02
Preference for co-operative learning	Weak readers more in 5 countries	-0.09

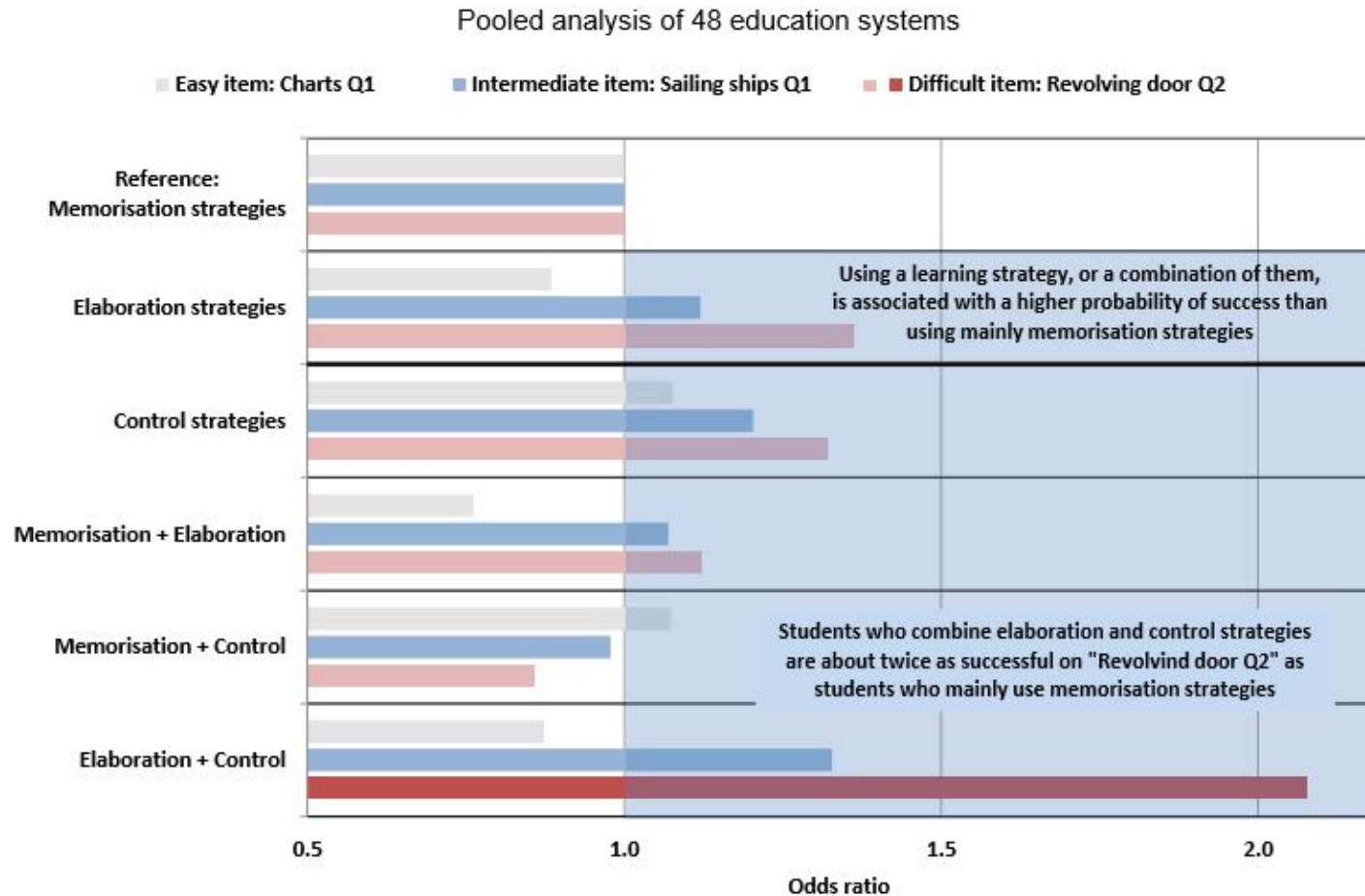
1. Excludes the Netherlands, for which the response rate is too low to ensure comparability.

Source: OECD PISA Database, 2001. Table C4.4.



# 國際數學成績 (PISA 2012) (Alfonso et al, 2016)

Figure 4.14. Pure and mixed learning strategies



Notes: Odds ratios for the easy and intermediate items are not statistically significant. Statistically significant odds ratios for difficult items are marked in a darker tone.

Source: OECD, PISA 2012 Database.



# 香港閱讀、數學及科學成績 (PISA 2000) (Ho, 2004)

**Table 5. Multi-level Analyses of the Relationship Between SRL Indices and Reading, Mathematical, and Scientific Literacy Scales After controlling for Student and School Background Factors**

	Reading		Mathematics		Science	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Control strategies	5.1***	0.79	5.2***	0.78	5.3***	1.03
Effort and persistence	2.6***	0.58	2.1	1.91	4.2***	1.10
Self-efficacy	3.9***	0.50	4.3**	1.63	3.3*	1.51
Control expectation	0.8***	0.15	1.2	0.89	0.9	0.90
Instrumental motivation	-0.5	0.54	-2.7**	0.85	-1.3	0.82
Elaboration strategies	-1.4*	0.67	1.9**	0.70	-0.16	1.14
Memorization	-1.7	0.90	-5.3***	1.54	-4.3**	1.35
Competitive learning	3.5***	0.47	4.3***	0.57	2.7*	1.22
Cooperative learning	1.3***	0.34	0.9	1.00	3.3***	0.33
Between-school variance	590***		666***		431***	
Within-school variance	3091***		3889***		3394***	
Between-school variance explained	0.77		0.83		0.83	
Within-school variance explained	0.15		0.18		0.15	
Total variance explained	0.47		0.48		0.47	

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

# 三種主要學習策略 (PISA 2000)

## Learning strategies

### Elaboration strategies

- When I study, I try to relate new material to things I have learned in other subjects.....
- When I study, I figure out how the information might be useful in the real world.....
- When I study, I try to understand the material better by relating it to things I already know.....
- When I study, I figure out how the material fits in with what I have learned.....

### Memorisation strategies

- When I study, I try to memorise everything that might be covered.....
- When I study, I memorise as much as possible.....
- When I study, I memorise all new material so that I can recite it.....
- When I study, I practice by saying the material to myself over and over.....

### Control strategies

- When I study, I start by figuring out what exactly I need to learn.....
- When I study, I force myself to check to see if I remember what I have learned.....
- When I study, I try to figure out, as I read, which concepts I still haven't really understood.....
- When I study, I make sure that I remember the most important things.....
- When I study, and I don't understand something, I look for additional information to clarify the point.....

# PISA的啟示 (3) – 知識與能力的多元化

(PISA, 2009; 2012; 2015)

學科知識 (語文、數學、科學)



跨學科知識 (資訊科技、財務、全球)



認知能力 (解難、創新)



社交能力 (協作、溝通)

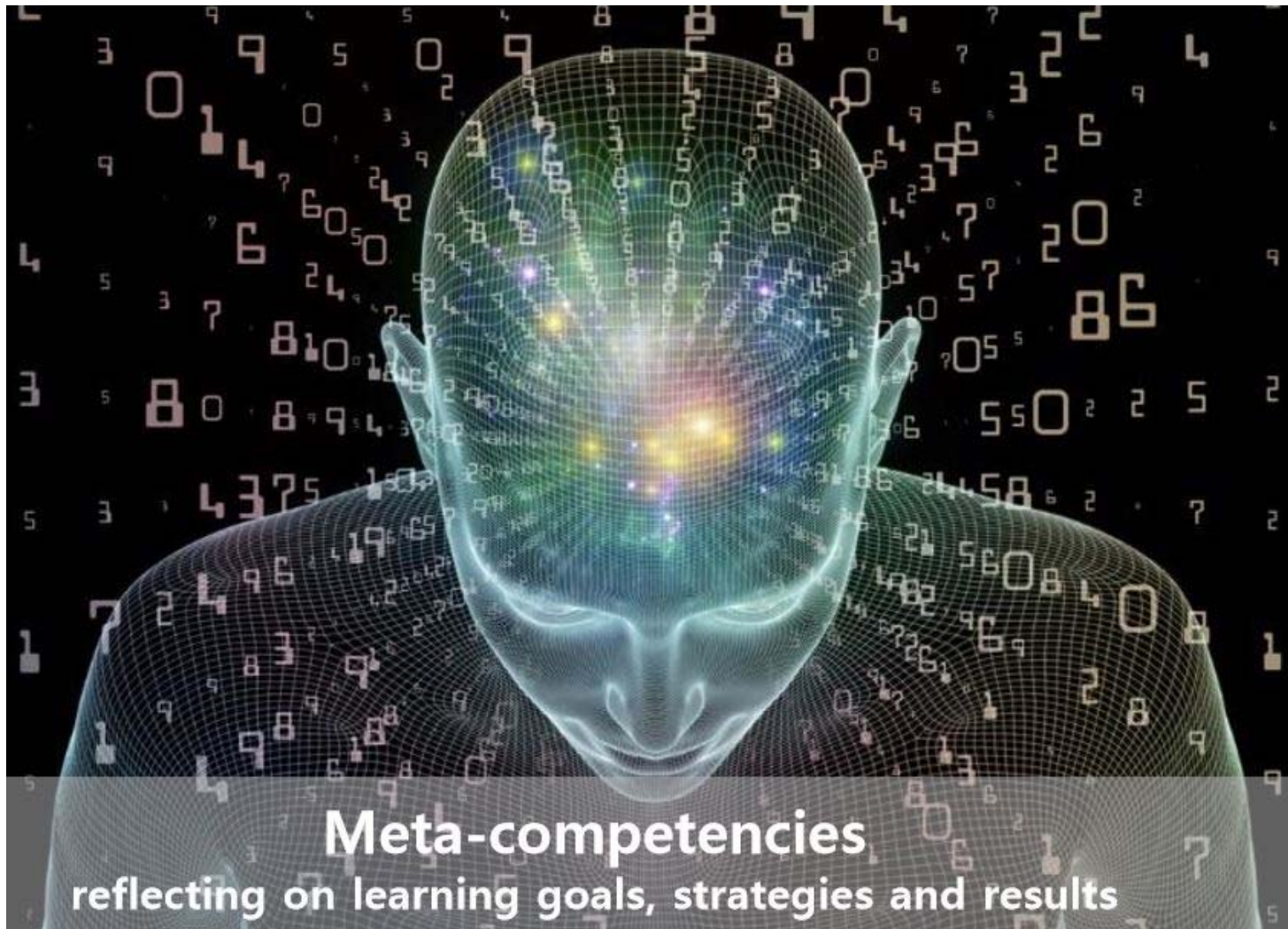


元認知能力 (計劃、監察、評估)

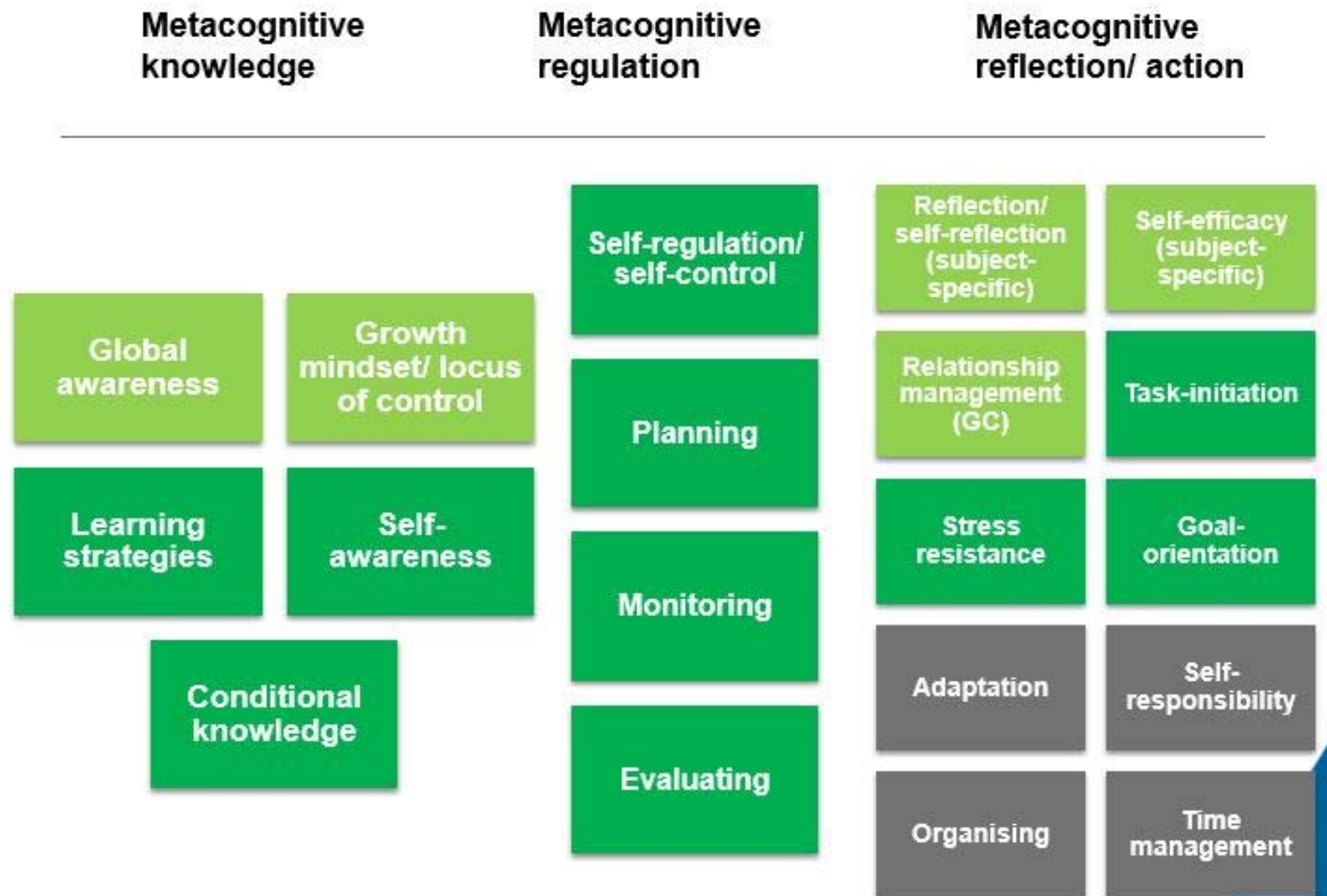


# 18<sup>th</sup> OECD/Japan Seminar – Education 2030

(Andreas Schleicher, 2016)



**Meta-competencies**  
reflecting on learning goals, strategies and results



Source: Green - Emily R. Lai (2011); Simone R. D, & L. Salganik (2015)

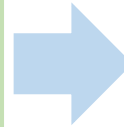
# PISA的啟示 (4) – 課堂的關鍵影響

(Alfonso et al, 2016; OECD, 2013; PISA, 2012)

課堂輸入：學生社經背景、教師能力

課堂過程：課堂氣氛、教學策略、

回饋及評估



學習成果

**Two-dimensional taxonomy of educational outcomes and predictive factors**

	<b>Input</b>	<b>Processes</b>	<b>Outcomes</b>
<b>Students</b>	Gender, grade level, socio-economic status Educational career, grades Immigration background, family environment and support ICT experience, attitudes, skills Openness, problem-solving styles	Attendance/truancy Outside-class activities - e.g. participation in after-school programmes Motivation, engagement Learning and thinking strategies, test taking strategies Learning time (including homework and private tuition)	Mathematical performance Mathematics-related attitudes, beliefs and motivation General school-related attitudes and behaviour, e.g. commitment, truancy Learning motivation, educational expectations
<b>Classrooms</b>	Class size, socio-economic background and ethnic composition Teacher education/training, expertise	Quality of instruction: structure, support, challenge Opportunity to learn: implemented curriculum, assigned tasks, mathematics-related activities Instructional time, grouping, assessment and feedback	Aggregated student variables
<b>Schools</b>	Socio-economic background and ethnic composition Affluence of the community School funding, public vs. private School size Parental involvement	Achievement orientation, shared norms, leadership, teacher morale and co-operation, professional development Admission and recruitment policies, tracking, course offerings/school curriculum, evaluation Teacher-student relations, supportive environment	Aggregated student variables Promotion/retention and graduation rates Attendance
<b>Countries (Systems)</b>	Economic wealth, social (in)equality Diversity policies	School funding, tracking and allocation, policies for professional teacher development, support for special needs and language minority students, hiring and certification policies Accountability and evaluation policies, locus of decision making	Aggregated student variables Average graduation level

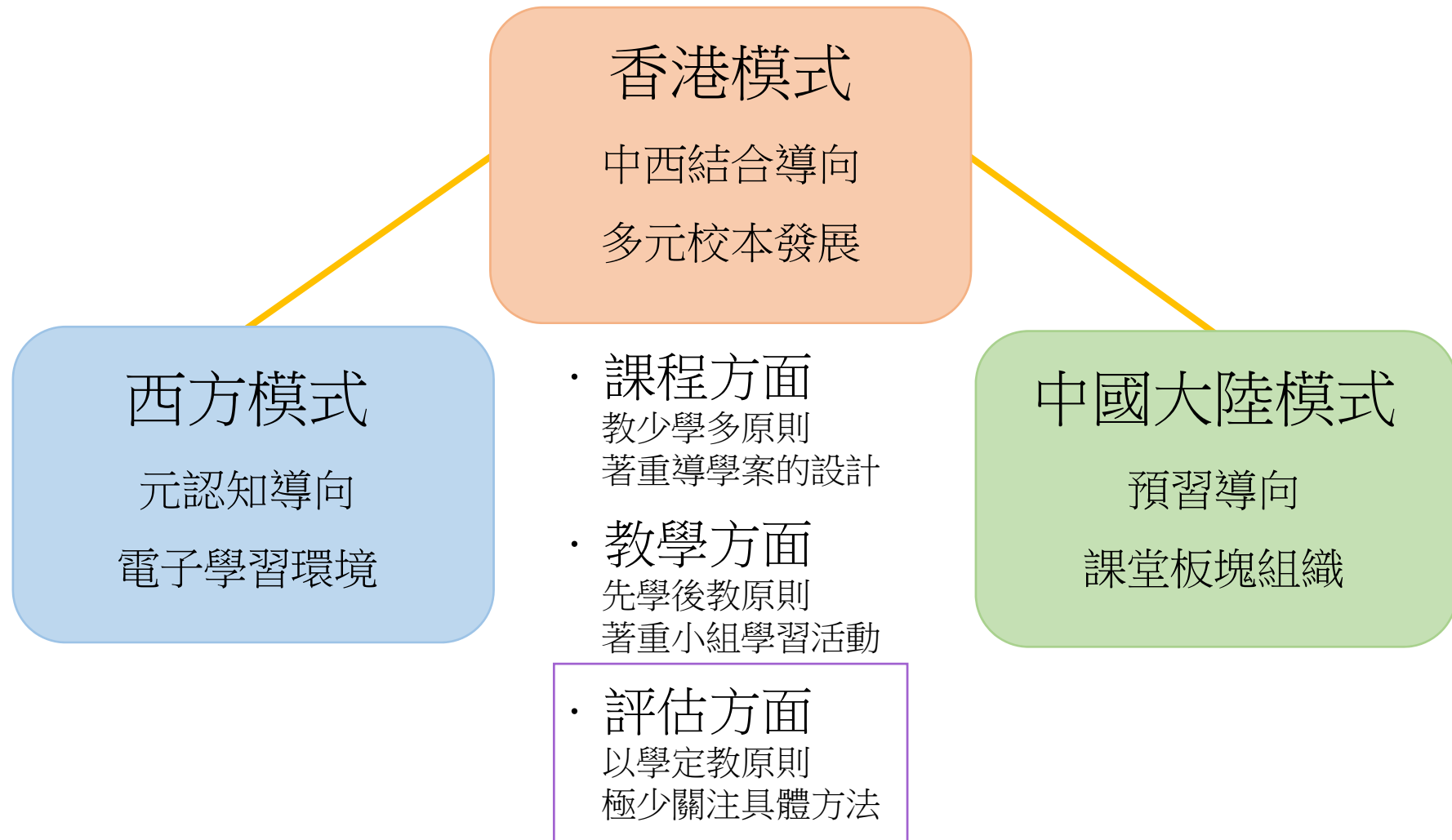
(OECD, 2013)



# PISA 遺漏的環節

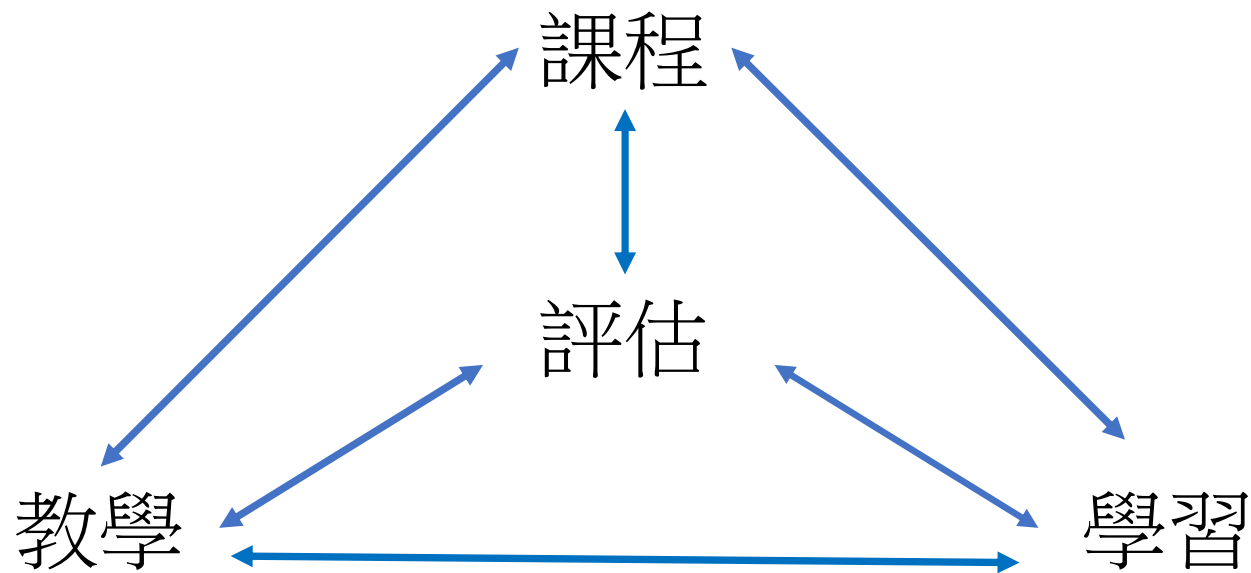
課堂實踐 – *the missing link* – 自主學習

# 自主學習課堂實踐主要模式



# 打開自主學習課堂實踐的黑盒

## 課堂實踐



# 課堂評估的重構 (1) – 靈活化運用

- ◇ 日常性
- ◇ 現場性
- ◇ 即時性
- ◇ 持續性
- ◇ 互動性
- ◇ 參與性

(Beaumont et al, 2011; Boud, 1995, Boud & Falchikov, 2007; Chappuis & Stiggins, 2002; Leehy et al, 2005; Millar, 2006; Nicol & Macfarland-Dick, 2006; Spiller, 2012; Stiggins et al, 2007)

## 課堂評估的重構 (2) – 無縫課堂

- ✧ 教學及學習與評估不是割裂分隔
- ✧ 教學及學習不是為了評估
- ✧ 評估不是主導教學及學習
- ✧ 評估是為了促進教學及學習
- ✧ 評估甚至可作為教學及學習
- ✧ 評估應可融入於教學和學習
- ✧ 三者都在課堂環境影響下不斷互動串流

(Black & Wiliam, 2009; Brookhart, 2003; Earl, 2003; Shute et al, 2009; Tomlinson, 2015; Wiliam, 2011; Volkman & Abell, 2003)

## 課堂評估的重構 (3) – 多元向度

- 課堂環境 (組織秩序/教師支持/學生投入/課堂氣氛)
- 課堂目標 (知識/能力/態度)
- 學習活動 (自學/共學/互學/導學)
- 學習任務 (課前/課始/課間/課末)
- 評估執行 (教師評估/同儕評估/自我評估)

- 評估準則 (常模參照/水平參照/個人參照)
- 評估焦點 (行為/答案/方法/元認知)
- 回饋形式 (評論/鷹架/積分/獎勵)
- 回饋方向 (向上/向後/向前)
- 跟進行動 (目標/認知策略/元認知策略/情緒)

(Brookhart, 1997; Clarke, 2012; Davis & Neitzel, 2011; Rea-Dickins, 2001; Hattie & Timperly, 2007; Hughes, 2011; Natriello, 1987)



## 課堂評估的重構 (4) – 形成性評估

- 在課堂教學與學習當下不斷持續進行
- 與課前診斷性評估及課後總結性評估互相緊扣
- 辨識及監察學習進度與課堂變化發展
- 提供學習生個人、小組及全班回饋
- 教師及同儕外在回饋與學生內在回饋互為影響
- 教師及學生從而調整教學及學習

# 課堂評估遺漏的環節

課堂評估 → 自主學習？

# 促進自主學習的課堂評估架構

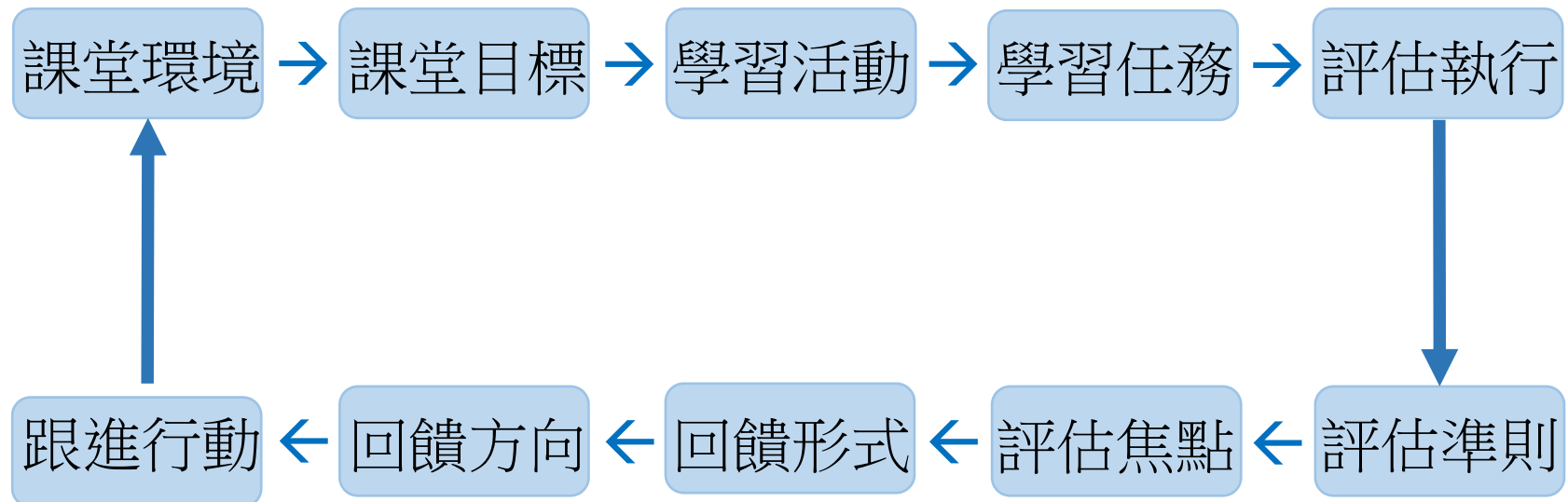
## 解構自主學習課堂 (Ho, 2014)

課堂組織 – 課程內容 – 教學策略 – 學習任務 – 自主學習策畧

與課堂評估的關聯

# 1. 評估循環

➤ 課堂評估乃一循環過程，一個向度緊接另一向度，環環相扣



## 2. 促進條件

- 要發揮促進自主學習的最佳果效，評估循環的各個向度都必須滿足一定有效促進條件

向度	有效促進自主學習的條件
課堂環境	良好的課堂氣氛及組織秩序
課堂目標	目標清晰，扣緊特定能力及知識架構
學習活動	因應課堂環境，足夠自學、共學及互學機會，配合適量比重的導學
學習任務	對應課堂目標，課前、課始、課間及課末任務互相連貫
評估執行	學生透過反思及內化教師與同儕評估，進行自我評估
評估準則	個人參照與水平參照並重
評估焦點	方法及元認知為主
回饋形式	針對方法及元認知的鷹架及評論，因應課堂環境輔以積分和獎勵
回饋方向	向上、向後及向前回饋同樣重要
跟進行動	調整目標、認知策略、元認知策略及情緒

(Andrade, 2010; Davis & Neitzel, 2011; Lysaght, 2015; Nicol, 2009; Nicol & Macfarland-Dick, 2006; OCED, 2008; William, 2014)

### 3. 關鍵環節

- 自主學習課堂是以任務為本，透過學習任務：
- 教師連繫課堂目標、課程內容及教學策畧，引導、監察及評估學生學習
- 學生同時得以自我、共同及互相發展、監察及評估 課堂自主學習的進展成效
- 學習任務是串連課堂評估、課程、教學及學習的關鍵介面和環節

# 促進自主學習的評估的關鍵 – 評估任務

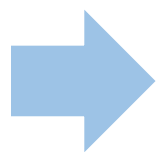
課前/課始 →	課間 →	課末 →
預習工作紙	堂上提問	重點撮要
網上視頻	黑板/平板展示	總結評論
電子習作	口頭滙報	後測
前測	角色扮演	反思報告
	模擬辯論	
	改正及互評	



# 總結：一幅較大的圖像 A Bigger Picture

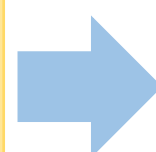
## 課堂實踐

- 課程
- 教學
- 學習
- 評估



## 自主學習

- 情意動機
- 行為管理
- 認知策略
- 元認知策略



## 學生成績

- 閱讀
- 數學
- 科學
- 其他