

Policy Making with IEA Report

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Plenary Keynote Speech at The 3rd IEA IRC, 16-20, Sep., 2008, Taipei, Taiwan

Content

I . A Policy Making with IEA Report in Taiwan

II . Action Plans w.r.t. the Policy

Formal Action

MOE: Collaboration Plan - After Class Support (2006)

NSC: Call for proposals in year 2004/2005

Informal Action

III .Making A Policy Efficient:

The Five Necessary Elements

IV .Discussion

“Find a right person to do the right thing”

I . A Policy Making with IEA Report in Taiwan

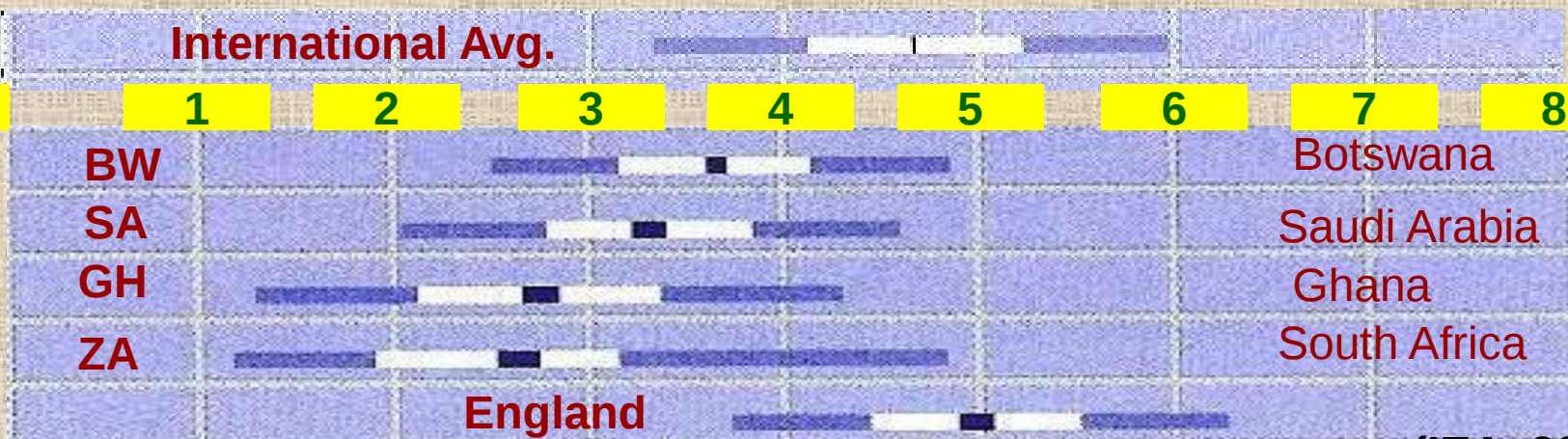
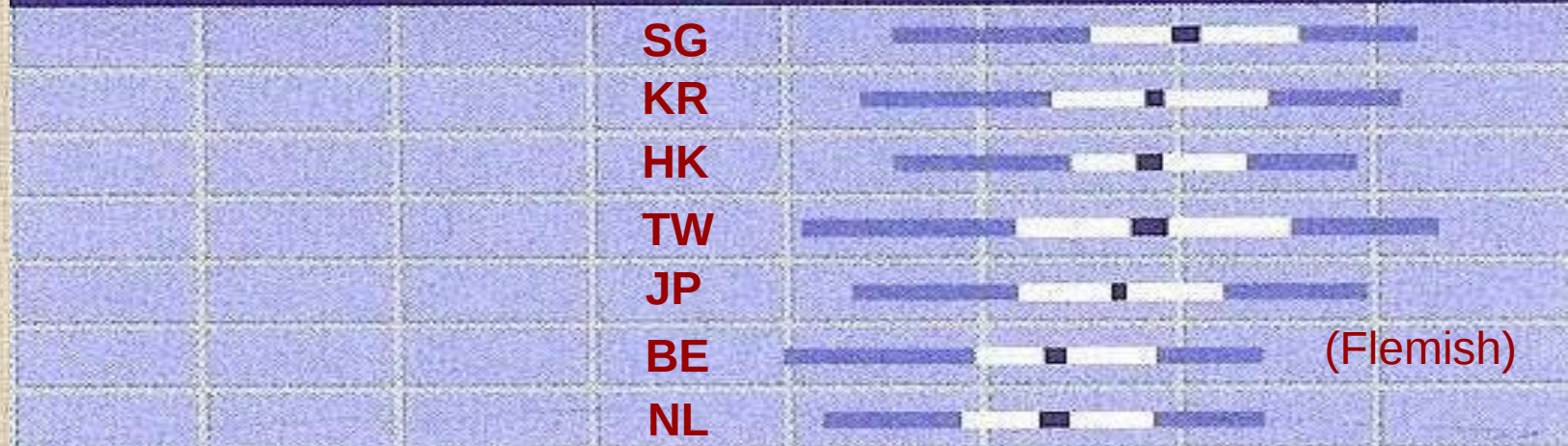
About

- **Low Achiever**
- **Learning Interest**
- **Self-efficacy**

Distribution of Mathematics Achievement

TIMSS-2003 **Grade 8**

Mathematics Achievement Distribution



Distribution of Mathematics Achievement

TIMSS-2003 **Grade 4**

Mathematics Achievement Distribution

SG

HK

JP

TW

BE

NL

(Flemish)

International Avg.

×100

1

2

3

4

5

6

7

8

PH

MA

TN

Morocco

Tunisia

% of students reaching TIMSS 2003 International Benchmark

Grade 8

Countries	International Benchmark			
	(Advanced) 625	(High) 550	(Intermediate) 475	(Low) 400
Singapore	44	77	93	99
Taiwan	38	66	85	96
Korea	35	70	90	98
Hong Kong	31	73	93	98
Japan	24	62	88	98

(IEA, 2004)

% of students reaching TIMSS 2003 International Benchmark

Grade 4

Countries	International Benchmark			
	(Advanced) 625	(High) 550	(Intermediate) 475	(Low) 400
Singapore	38	73	91	97
Hong Kong	22	67	94	99
Japan	21	60	89	98
Taiwan	16	61	92	99

(IEA, 2004)

A local definition of Low Achievers

Students who are not reaching TIMSS intermediate benchmark, e.g., 8% of grade 4; 15% of grade 8, in Taiwan.

Low Achievers



Why the % of low achievers showed a “quantum jump” from grade 4 to 8 in Taiwan?



Proposal for Ministry of Education and National Science Council Business Coordination Meeting (First Meeting, 2006)

Item

Background

Proposer

案由	如何制定教育政策以落實『帶好每位學生』的教育理念，並提昇我國中小學學生數理科的學習興趣及信心，提請討論。
說明	一、由部會共同參與由 IEA 主辦的「國際數學與科學教育成就趨勢調查(TIMSS 2003)」，經初步分析來看，有三個值得注意的現象： 1. 在四十九個參與調查的國家中，我國國二和小四學生的科學總平均成績排名都是第二，國二和小四學生的數學總平均成績排名都是第四，表現極為優異。 2. 以領先群的五個國家來看，我國國中二年級數學的低成就群〈475 分以下〉人數佔 15%，高於各領先群國家甚多。〈詳表一〉 3. 對於數理的學習興趣及自信心指標，領先群的五個國家普遍低於國際平均，與第一名的新加坡相較，我國學生數理的學習興趣及自信心又更低〈詳表二〉 二、為提昇我國中小學學生數理素質及學習興趣，建議將下列兩點列為施政目標，並以下一次的 TIMSS(2011 年)施測成績為績效查核指標： 1. 在『帶好每位學生』的教育理念下，於六年內將低成就群的孩子由 15%減少至 10%以內。 2. 提昇學生對數理學習興趣，將『非常同意』及『有點同意』喜歡數學的百分率提高在國際平均(60%)以上。
擬辦	
提案單位	教育部國教司、國科會科教處

- Department of Elementary Education, MOE
- Department of Science Education, NSC

提案人：陳司長明印、林處長福來

聯絡電話：27377971

How to formulate education policies to put the education vision, “take care of every student so that each child gets progress”, into practice and to enhance elementary and secondary school students’ interests and confidences toward mathematics and science? Please discuss on this issue.

Background 1 - phenomena

1. Reports of TIMSS-2003 (conducted by IEA) reveal three phenomena that need to be noticed:

- a) Our students performed well among the 49 participated nations. The average science scores of our eighth-grade and fourth-grade students rank number two; the average mathematics scores of our eighth-grade and fourth-grade students rank number four.

Background 1 - phenomena

- b) Among the five leading nations in TIMSS-2003 reports, our eighth-grade low-achievers are about 15% among all (score below 475), which exceeds the rest of leading nations. (Table 1)

Table 1. The assessment of leading groups' eighth-grade students' performance in mathematics

	Average Score	Superior% Above 625	Advanced% Above 550	Intermediate% Above 475	Elementary% Above 400	Below 400 %
Singapore	605	44	77	93	99	1
Korea	589	35	70	90	98	2
Hong Kong	586	31	73	93	98	2
Taiwan	585	38	66	85	96	4
Japan	570	24	62	88	98	2
International Average	467	7	23	49	74	26

Background 1 - phenomena

- c) For the index of interests and confidences in mathematics and science learning, the leading five nations' average is generally lower than the international average. Compare to Singapore (rank number one), our students' index of interests and confidences in mathematics and science learning is lower. (Table 2)

Table 2. Confidence of leading groups' eighth-grade students

	I like mathematics (Interest toward mathematics)			Mark for confidence of learning mathematics (My mathematics is good)		
	Totally agree	Somewhat agree	Disagree	High	middle	low
Singapore	33	42	25	39	34	27
Korea	9	34	57	30	36	34
Hong Kong	15	45	41	30	38	33
Taiwan	13	29	58	26	30	44
Japan	9	30	61	17	38	45
International Average	29	36	35	40	38	22

Background 2 - proposal

2. In order to enhance our students' mathematics and science competences and their learning interests, the following two proposals are suggested to become the goals of education policies, and the result of next TIMSS (2011) would be used as checking index:

Background 2 - proposal

- a) Under the education vision, “take care of every student so that each child gets progress”; the group of low-achievers would be reduced from 15% to 10% and below. (Base on reports of TIMSS-2011)

Decision: Agree

Background 2

- b) Enhance students' mathematics and science learning interests. Raise the percentage of mathematics liking of “totally agree” and “somewhat agree” to exceed the international average (65%).

Decision: ↓ to 60%

II. Action Plans w.r.t. the Policy

Formal Actions

MOE

NSC

II . Action Plans w.r.t. the Policy – case 1 (formal)

MOE

Collaboration Plan - After Class Support (2006)

Academic Year	Subject (Students' class achievement)	Discipline
2007	•Urban : < 5 percentile •Rural : < 25 percentile	Mandarin, English, Maths
2008	•Urban : < 15 percentile •Rural : < 25 percentile	Mandarin, English, Maths, Science, Social Studies
2009	•Urban : < 20 percentile •Rural : < 35 percentile	Mandarin, English, Maths, Science, Social Studies

擴大課輔 搶救國中小落後生

學生素質要品管！都會區全班後20% 非都會區全班後35%強制課輔

國高二將辦會考

【記者王彩鵬/台北報導】

七分可上大學，如何從國中小提升學生素質，成為全國教育局長會議首要議題，教育部提出多管齊下策略，要為國中小教育做好「品管」，將擴大課後輔導對象。另一方面，明年起，針對小四、小六、國二、高中職二年級學生，正式實施國文、英文、數學、社會、自然主要學科的學習成就評量。

為做好國中小教育「品管」，9月開學後，教育部將擴大辦理經濟弱勢且成績落後學生課後輔導計畫。都會區班級成績後20%，非都會區後35%學生需參與課輔，預計增加一萬人次學生受益。

針對國中基測成績落後學校，教育部補助從原來的一年，變成連續補助兩年，對象為國中參加基測考試學生有超過四分之一的PR值低於10。教育部表示，每年約有60至70所國中可獲補助。

國教司表示，課輔計畫實施從95年起，有九成學生從不寫作業到可完成作業，八成學生學習態度變好，六成學生成績進步。

全國教育局長會議今明兩天召開，端出第一道議題是「提升國民中小學教學品質及學生素質」。在學生能力品管方面，教育部計畫從2009年起，遇西元奇數年實施小四、小六學習成就評量，西元偶數年則是國二、高二及高職二年級的測驗。測驗都在5月中進行，今年升上小四、小六的學生，明年5月，要抽測國、英、數、社、白五學科，但小四不考社會，後年5月則進行國高中施測。

教育部表示，學生學習成就評量是以抽測方式進行，呼籲各縣市教育局施測時不得以全面普測方式辦理。能力檢測結果，也不得以學校、班級的形式公布，亦不能據此考核老師、校長的考績。至於抽測方式，每年段每科全台只抽測7000學生。教育部強調，檢測目地不是為了增加學生負擔，而是建立資料庫，跟國際學生的學習成就作比較。



教育部為多管齊下提高學生素質，將擴大課後輔導對象，要把更多學生帶上
報系資料照

課輔師資 來自大專院校與社區

【記者姜穎/台北報導】

為提升台灣學生素質，教育部決定擴大辦理課輔，都會地區國中、小成績在班上後20%的學生，必需參與課輔。國中校長多表贊成，認為常態分班下，成績在後20%的學生，確實有必要進行課業加強。師資則可結合大專院校及社區資源，來源無虞。

教育部欲全力提升中小學生素質，提出各項

政策，決定擴大辦理課輔，都會地區國中小學習落後學生由班上後15%提高到後20%，非都會區從後25%提升到後35%，這些學生必須參與課輔，預計將增加萬人。

對此，大多數國中校長表示贊成，仁愛國中校長余國珍表示，常態分班下，都會區成績後20%的學生的學習成就確實有必要提升，課輔符合學生需求，也能提升素質。

會考測程度 校長也贊成

【本報記者王彩鵬/台北報導】

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教育部為多管齊下提高學生素質，將擴大課後輔導對象，要把更多學生帶上報系資料照

教育部欲全力提升中小學生素質，提出各項政策，決定擴大辦理課輔，都會地區國中小學習落後學生由班上後15%提高到後20%，非都會區從後25%提升到後35%，這些學生必須參與課輔，預計將增加萬人。

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II . Action Plans w.r.t. the Policy – case 1 (formal)

Results (MOE)

The linkage of the efficient cases in
After Class Support project:

<http://140.133.2.35>

II . Action Plans w.r.t. the Policy – case 1 (formal)

Results (MOE)

1. Before participating in the after-class support, 90% of participants never do their home work; after one year, all of them could finish their home work.
2. 80% of participants have developed more positive learning attitudes than before.
3. 60% of participants have progress on their school exams.

(MOE, 2008)

II . Action Plans w.r.t. the Policy – case 2 (formal)

NSC

Special call for proposals, 2004

Program Application for “Profound studies with International Students Assessment” (2004/09/08)

In order to deal with domestic education problems (such as education policies, curriculum development, teaching approaches, learning environment, belief and value about education and so on), researchers are encouraged to do profound studies based on international students assessment held by for example, IEA and OECD. Researchers who are interested in the program are welcome to bring individual or integrated projects.

II . Action Plans w.r.t. the Policy – case 2 (formal)

Results (Proposals funded by NSC in 2005)

Chih-Chien Yang	Mathematics and Reading Progress of Taiwan in TIMSS & PIRLS (1/3)
Chia-Cheng Chen	A comparative study of the factors influencing mathematics achievement: the comparison among TIMSS 1995 、 1999 、 2003
Fang-Ying Yang	Exploring the epistemic, metacognitive and the affective levels of teacher/student cognition and the styles of teaching and learning in the social and cultural context
Min-Ning Yu	Study of the international comparison of factors affecting mathematics achievement - The comparison of TIMSS 2003, PISA 2003, and TEPS databases used as an example
Mei-Shui Chiu	Students' TIMSS achievements on different problem types and their interactions with gender, affective responses and learning contexts (1/2)
Shin-Feng Chen	An International Comparative Study on the Affective Factors of Science Learning Achievement: A longitudinal Case Study on the databank of TIMSS 1995, 1999, and 2003
Hak-Ping Tam	Data analysis of the TIMSS 2003 study (1/2)
Fang-Chung Chang	Research on Academic Achievement Impacted by Economic and Educational Factors: The TIMSS Data Bank in 1995, 1999, and 2003 Years Study

II . Action Plans w.r.t. the Policy – case 2 (formal)

NSC

Regular annual call for proposals, 2005

Invitation of Science and Mathematics Education Research Projects by Department of Science Education, NSC (2005/09/20)

- Longitudinal assessment of elementary and secondary school students' science and mathematics competence and the comparison of international students assessment.
- Longitudinal assessment on elementary and secondary school students' mathematics literacy and the comparison of international students assessment.

Educators are encouraged to do regular (annually, bi-annually) or longitudinal assessment and profound analysis toward domestic elementary and secondary school students' mathematics competence and basic abilities. Educators are also encouraged to explore the related variables of enhancing mathematics competences.

26

II . Action Plans w.r.t. the Policy – case 2 (formal)

Results (Proposals funded by NSC after 2006)

Mei-Yu Chang	The Understanding of TIMSS Test Question, the Process of Answering the Question, and Science Achievement in Grade 4 students
Fang-Chung Chang	Testing the Correlation Between Student's Achievement and Their Mathematical Belief: Using the TIMSS2003 Data to Explore Fourth and Eight Graders
Mei-Yu Chang	The relationship between science curriculum and self-confidence, interest, achievement of students in elementary science learning
Min-Ning Yu	The way toward a female scientist---An exploratory study from the TIMSS data analysis
Hak-Ping Tam	Data analysis of the TIMSS 2003 study (2/2)
Mei-Shui Chiu	Students' TIMSS achievements on different problem types and their interactions with gender, affective responses and learning contexts (2/2)
Min-Hsiung Huang	International Comparisons of the Variability of Student Performance within and Between Classroom: fourth and Eight Grade Student in the TIMSS2003

II . Action Plans w.r.t. the Policy – case 2 (formal)

Results (Proposals funded by NSC after 2006)

Chien-Shu Chang	The Research for Mathematics and Reading Performance of Fourth Graders in TIMSS2003 and PIRLS2006 field Test
Shin-Feng Chen	An International Comparative Study on the Affective Factors of Science Learning Achievement: A longitudinal Case Study on the databank of TIMSS 1995, 1999, and 2003
Fang-Chung Chang	Research on Academic Achievement Impact by Economic Factor: The TIMSS Data Bank in 1995,1999,and 2003 Year Study
Miao-Hsiang Lin	Statistical Methods for Analyzing Contextual Perspectives for the TIMSS 2003 International Database

II. Action Plans w.r.t. the Policy

Informal Actions

Invited Speeches

on

- **Learning characteristics**
- **Comparison**
- **Practice scheme**

II . Action Plans w.r.t. the Policy – (informal)

Date	Title of Speech	Audience	Site
May 16, 2007	The world cup of education – The distances from Taiwan to the world	School principles & citizens who care about education	Tayih Landis Hotels and Resorts, Tainan (hosted by Common Wealth Magazine & Taiwan Microsoft)
May 31, 2007	The dream and practice of Taiwan high quality senior high school education	Principles of senior high schools in Southern Taiwan	National PingTung University of Education
Aug. 23, 2007	A practice scheme for Taiwan high quality education	School principles and dean of study in Hsinchu City	Hsinchu Municipal Nan-Liao Primary School
Apr. 25, 2008	A practice scheme for Taiwan high quality education	School dean of study in Kaohsiung city	Kaohsiung Municipal Fwu-Shan Junior High School

III. Making A Policy Efficient - the five necessary elements

- **Initiators of policy**
- **Goals of policy**
- **Indicators of achieving the goals**
- **Executors of action plans**
- **Annual progress assessment**

IEA are implicit initiators of policy

Different societal education phenomena can be revealed and identified with IEA reports.

The identified phenomenon then is like a starter of an engine for education reform policy.

Goals and Indicators

The Taiwanese policy for supporting lower achievers are heavily relied on TIMSS-2003 and TIMSS-2011 for its goals and indicators of achieving the goals.

Executors of Action Plans

- Researchers (NSC)
- University educators (MOE)
- **Available tutors**

Available Tutors in Taiwan -1

- Stray Teacher

The supply of prospective teachers exceeds the demand

E.g., in year 2006, there are 72 universities/colleges with teacher education program, 17,000 certified school teachers graduated. Among them, 4,000 are selected as regular teacher. More than 10,000 are “Stray Teacher”. Many of stray teachers make contribution to after-class support program.

Available Tutors in Taiwan -2

- Retired Teacher
- Qualified College Student (part-time)
- In-service Teacher

Annual Progress Assessment

How many % of program budget should be allocated for Annual Progress Assessment?

It is necessary for Taiwan to learn this issue from experienced countries.

IV. Discussion

Find a right person to do the right thing

A mechanism for generating efficient policy

- **Vision Setting**

depends on:

Motivator ?
Constructor ?
Inventor ?

Pioneer
vs.
Follower

- **Policy Makers:**

- Initiator
- Decision maker
- Promoter

- **Action Plan:**

- Designer
- Promoter
- Executor

- **Evaluation:**

- Annual Assessment Inspector
- Program Evaluator

Comments