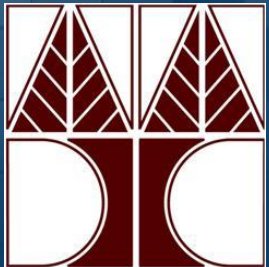


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Investigating the impact of national/state policy on student achievement: An international perspective



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INTRODUCTION

International comparative studies

- Large number of comparative studies focusing on educational achievement in different outcomes of schooling
- Ultimate goal: Isolation of factors related to student learning which could be manipulated through policy changes.
- Cross-sectional studies focused on measuring final student achievement (e.g., PISA, TIMSS)
- Emphasis on measuring teacher and school factors (e.g., quality of teaching, school climate, parental involvement) rather than system level factors (e.g., national policy for teaching)

EER studies

- **Educational Effectiveness Research (EER) aims to identify factors associated with student achievement gains:** Great improvement in the last three decades.
- But:
 - Most studies collected data from a single country



Extensive discussion about the need for international studies to identify the impact of system level factors on student achievement gains

The European project “Establishing a knowledge base for quality in education: Testing a dynamic theory of educational effectiveness”

■ ***Aims:***


- Development of the international dimension of EER
- Provision of a response to the knowledge gaps in the field

■ **Specific study: Part of the project**

Aims:

- Development of a **theoretical framework** that may provide insight into improving student learning outcomes and on broader issues concerned with educational policies.
- Investigation of the extent to which the ***Dynamic model of Educational Effectiveness*** (Creemers & Kyriakides, 2008) can be used as a starting point for establishing such a framework.

The Dynamic model of educational effectiveness: An overview

The model  multilevel in nature (see Figure 1)
factors operating at four levels.

- ***Teaching and learning situation***
- ***School-level factors***
- ***The wider educational environment***
- ***The system level***

The five dimensions of the Dynamic model

- Definition of measurement of each factor by using five dimensions: *frequency*, *focus*, *stage*, *quality*, and *differentiation*.
 - **Frequency:**
 - A quantitative mean of measuring the functioning of each effectiveness factor
 - **The other four dimensions:**
 - Examination of the **qualitative characteristics** of the factors' functioning

The system level factors of the Dynamic model

- The model refers to the most important factors operating at the system level that may affect achievement. Emphasis is given to the:
 - A. National policy and the actions taken to improve the quality of teaching and the School Learning Environment (SLE)**
 - B. Evaluation of the national educational policy
 - C. Wider educational environment of a country and especially its ability to increase opportunities for learning and develop positive values for learning.

Investigating the impact of national policy on student achievement

A) National-state policy on teaching

- **Quantity of teaching:** timetable of the school, long-term and short-term planning, policy on absenteeism and drop out. Provision of support to the schools to keep the quantity of teaching to a maximum level.
- **Quality of teaching:** Standards for teaching
- **Provision of learning opportunities:** Policy-makers' attempt to support schools to undertake extracurricular activities contributing to the achievement of the aims of the curriculum

B) National-state policy on improving SLE

- Teacher collaboration, supporting the school partnership policy, use of resources

Investigating the impact of national policy on student achievement

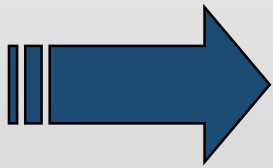
- Policy may have an impact on changing stakeholder actions when
 - the abilities of stakeholders to implement the policy guidelines are taken into account
 - policy expectations are clear and justified to all stakeholders.
- Support to stakeholders to implement the policy is provided
- National policy can be examined measured through:
 - A) Content analysis of policy documents
 - B) Perceptions of stakeholders responsible for promoting the policy at national level
 - C) Perceptions of head teachers who are responsible for supporting the implementation of the policy at school level

Empirical data supporting the validity of the Dynamic model

- National studies and meta-analyses provided empirical support to the importance of the classroom and the school factors (Creemers, Kyriakides and Sammons, 2010)
- Studies revealed that classroom (Kyriakides & Creemers, 2008, 2009; Antoniou, 2009) and school level factors (Creemers & Kyriakides, 2010; Demetriou, 2009) are associated with student achievement gains.
- The use of the five dimensions has an additive value in explaining the variance in student achievement gains.
 - Factors which were not statistically significant when were measured using frequency dimension, had a significant effect when the other four dimensions were taken into account.

Empirical data supporting the validity of the Dynamic model

- **There is no study investigating the impact of system level factors and their dimensions on student achievement gains.**



Necessity of the study

METHODS

- Six countries (Belgium/Flanders, Cyprus, Germany, Greece, Ireland, and Slovenia)
- Stratified sampling procedure (Cohen, Manion, & Morrison, 2000) to **select at least 50 primary schools in each country** (n=334).
- Written tests in **mathematics and science** to all grade 4 students (n= 10742) of these schools
 - beginning and at end of school year 2010-2011
- Permission from IEA to use the released items of **TIMSS 2007**
- The properties of each item and their relation with the curricula of grades 3 and 4 in each country were taken into account for developing the two types of test.

Content analysis of the official policy documents

- Collection of all the official educational documents that included regulations and guidelines (national and state policy) by the research team of each country
- Selection of educational regulations and guidelines on aspects related to
 - a) the policy on teaching,
 - b) the policy on school learning environment
 - c) evaluation of educational policy/schools/teachers
- A “profile” for each country: A number of tables – One table for each system level factor
- Coding of each suggestion on the relevant table

Content analysis of the official policy documents

- Details related to the five dimensions next to each suggestion (e.g., differentiation aspects)
- Coordination by the Cypriot research team
 - Skype meetings for clarifications
 - On site visits to other countries when it was necessary
- Coding by two different research teams for reliability reasons
- Skype meetings and agreement for each country
- Transformation of the qualitative data into numerical data
 - ➔ Comparison of the countries

Interviews with the stakeholders who promote the policy

- Semi -structured interviews with individuals occupying key positions in the different educational systems
- Different persons responsible for different aspects of the policy in each country
 - Each research team completed a table to state the position of the stakeholder that is responsible for each aspect of the policy
 - Each stakeholder was asked about the aspects that is responsible for

Interviews with the stakeholders who promote the policy

- Questions on aspects related to
 - the policy on teaching
 - the policy on school learning environment
 - evaluation of educational policy/schools/teachers
- Cooperation of all the participant countries in the development of the instrument
- Use of the instrument in a pilot study
 - ➔ corrections and improvement of the general questionnaire

Coding of the interviews

- Transformation of the qualitative data into numerical data
 - Comparison of the countries
- Coding by two different research teams for reliability reasons
- Coordination by the Cypriot research team
- Skype meetings for clarification and agreement for each country

ANALYSIS OF THE DATA

- **Separate multilevel analyses** to identify the impact (on student achievement) of the data emerged from the
 - content analyses of the policy documents
 - analyses of the interviews
- **Two multilevel analyses for each way of measuring the system level factors**, to identify the impact of the system factors on student achievement in each subject (mathematics and science)



Total: Four multilevel analyses

ANALYSIS OF THE DATA

- Two-level model (students within schools) without any explanatory variables (empty model) to determine the variance at each level.
- **Model 1:** the context variables were added to the empty model.
- For each student outcome, different versions of **model 2** were established.
- In each version of model 2, the system level factors of the dynamic model (accompanied by their dimensions) were added one by one to model 1.

RESULTS FROM THE ANALYSIS OF THE POLICY DOCUMENTS

Parameter Estimates and (Standard Errors) for the analysis of student achievement in mathematics			
System Factors	Model 0	Model 1	Model 2a
Fixed part (intercept)	330.5.(2.0)	33.7(10.0)	31.9(9.3)
Student Level			
Context			
Prior achievement		0.68(0.01)	0.68(0.01)
School Level			
Context			
Prior achievement		0.32(0.04)	0.29(0.04)
System Level			
Partnership – Active participation of parents (frequency)			3.0(0.5)
Variance components			
School	23.7%	4.9%	4.0%
Student	78.4%	47.5%	47.5%
Explained		47.6%	48.5%
Significance test			
Loglikelihood	103307	98607	98.604
Reduction		4700	3
Degrees of freedom		2	1
<i>p</i> value		0.001	0.001

Parameter Estimates and (Standard Errors) for the analysis of student achievement in science			
System Factors	Model 0	Model 1	Model 2a
Fixed part (intercept)	318.0(2.0)	40.4(10.2)	51.2(9.6)
Student Level			
Context			
Prior achievement		0.54(0.01)	0.54(0.01)
School Level			
Context			
Prior achievement		0.39(0.04)	0.34(0.04)
System Level			
Partnership – team teaching (Quality)			9.3(9.6)
Variance components			
School	30.9%	7.8%	6.4%
Student	69.1%	49.0%	49.0%
Explained		43.2%	46%
Significance test			
Loglikelihood	99395	95962	95862
Reduction		3433	100
Degrees of freedom		2	1
<i>p</i> value		0.001	0.001

RESULTS FROM THE ANALYSIS OF THE INTERVIEWS

Parameter Estimates and (Standard Errors) for the analysis of student achievement in mathematics			
System Factors	Model 0	Model 1	Model 2a
Fixed part (intercept)	32.6(2.1)	37.5(10.9)	65.8(10.9)
Student Level			
Context			
Prior achievement		0.67(0.01)	0.67(0.01)
School Level			
Context			
Prior achievement		0.31(0.04)	0.28(0.04)
System Level			
Opportunity to learn- Long and short term planning (quality)			21.2(3.1)
Variance components			
School	23.5%	5.1%	3.9%
Student	76.5%	47.7%	47.7%
Explained		47.2%	48.4%
Significance test			
Loglikelihood	83864	80068	80025
Reduction		3796	3
Degrees of freedom		2	1
<i>p</i> value		0.001	0.001

Parameter Estimates and (Standard Errors) for the analysis of student achievement in science			
System Factors	Model 0	Model 1	Model 2a
Fixed part (intercept)	31.6(2.4)	38.53(11.0)	45.4(3.3)
Student Level			
Context			
Prior achievement		0.67(0.01)	0.53(0.01)
School Level			
Context			
Prior achievement		0.41(0.04)	0.80(0.04)
System Level			
Opportunity to learn- Long and short term planning (quality)			45.4(3.3)
Variance components			
School	33.5%	8.1%	6.3.7
Student	67.4%	48.2%	48.2%
Explained		43.7%	48.1%
Significance test			
Loglikelihood	80538	77810	77666
Reduction		2718	144
Degrees of freedom		2	1
<i>p</i> value		0.001	0.001

RESULTS

- Almost all system factors: significant effects on student achievement both in mathematics and science
- Factors which were not statistically significant when they were measured using frequency dimension - significant effect when other dimensions were taken into account



The use of the five dimensions:
Important in the measurement of the
factors' impact on student achievement

DISCUSSION

- Both the official policy and the perceptions of the policy makers were found to explain variation on student achievement gains
- Policy documents (official policy) were expected to have smaller effects than the perceptions of those who are expected to promote the policy.
 - ➔ The policy documents affect the promotion of the policy by the stakeholders and therefore student achievement gains.
 - ➔ Clear policy documents can help
- Small effect was found
 - It was expected to be small
 - The class and the school level are more important than the system level

The next steps of the study

- This study: In a position to identify system level factors that seem to have an effect on student achievement

However: Need to test the generalizability of the findings of this study

- collection of data from more countries
 - data from countries outside Europe
- Comparison of the results from the analysis of the policy documents and the interviews with the results of the analyses of the data collected through head teacher questionnaire data



The next steps of the study

- Investigation of the impact that other system level factors have on student achievement
- Factors suggested by PISA (e.g., school autonomy, centralised or decentralised system)
- Use of PISA 2012 databases
- The findings of this secondary analysis may help us to enrich the Dynamic model



Thank you for your attention!

Instrument suggested for the investigation of system level factors

Structure of the interview