

# USING THE DYNAMIC MODEL TO DESIGN INTERNATIONAL STUDIES IN EDUCATIONAL EFFECTIVENESS

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# INTRODUCTION

- # This paper is an attempt to present the theoretical framework of this project and identify the importance of conducting an international study testing the validity of the dynamic model

## OUTLINE OF THE PAPER

- 1) The dynamic model of educational effectiveness: an overview
- 2) Testing the validity of the dynamic model: Findings and new research questions
- 3) Using the dynamic model to design an international study on effectiveness: the ESF project

# THE DYNAMIC MODEL OF EDUCATIONAL EFFECTIVENESS: AN OVERVIEW

## Essential characteristics of the model

- # Teaching and learning are dynamic processes that are constantly adapting to changing needs and opportunities. Effective schooling should be treated as a dynamic, ongoing process.
- # The model is multilevel in nature and refers to multiple factors of effectiveness which operate at four levels.
- # The teaching and learning situation is emphasized.



# THE DYNAMIC MODEL OF EDUCATIONAL EFFECTIVENESS: AN OVERVIEW

## Essential characteristics of the model

- # School-level factors are expected to influence the teaching-learning situation by developing and evaluating the school policy on teaching and the policy on creating a learning environment at the school.
- # The final level refers to the influence of the educational system through a more formal way, especially through developing and evaluating the educational policy at the national/regional level.

# THE DYNAMIC MODEL OF EDUCATIONAL EFFECTIVENESS: AN OVERVIEW

## Essential characteristics of the model

- # Factors at the school and context level have both direct and indirect effects on student achievement.
- # Some factors which operate at the same level are related to each other.
- # Each factor is defined and measured by taking into account five dimensions: **frequency, focus, stage, quality, and differentiation.**

# USING A MULTIDIMENSIONAL APPROACH TO MEASURE THE FUNCTIONING OF FACTORS

- # **Frequency** refers to the quantity that an activity associated with an effectiveness factor is present in a system, school or classroom. This dimension may not always be related in a linear way with student outcomes.
  - Personal monitoring at school level can be measured by taking into account how often the principles use a monitoring system to supervise their teachers.
- # The other four dimensions examine qualitative characteristics of the functioning of the factors and help us describe the complex nature of educational effectiveness.



# USING A MULTIDIMENSIONAL APPROACH TO MEASURE THE FUNCTIONING OF FACTORS

- # Two aspects of **focus** are seen as important. The first one refers to the **specificity** of the activities which can range from very specific to general.
- # The second aspect of this dimension addresses the **purpose** for which an activity takes place. An activity may be expected to achieve a **single or multiple purposes**.
- # If all the activities are expected to achieve a single purpose, then the chances to achieve this purpose are high, but the effect of the factor might be small due to the fact that other purposes are not achieved and **synergy** may not exist.
- # There should be a balance with respect to the two aspects of the focus dimension.

# USING A MULTIDIMENSIONAL APPROACH TO MEASURE THE FUNCTIONING OF FACTORS

- # The **stage** at which tasks associated with a factor take place is examined. Factors need to take place over a long period of time to ensure that they have a continuous direct or indirect effect on student learning.
- # Measuring the stage dimension gives information about the continuity of the existence of a factor but the activities associated with the factor may not be the same.
- # The **quality** refers to properties of the specific factor itself, as these are discussed in the literature.
- # **Differentiation** refers to the extent to which activities associated with a factor are implemented in the same way for all the subjects involved with it. Adaptation to specific needs of each subject or group of subjects will increase the successful implementation of a factor and maximize its effect on learning.



# TEACHER FACTORS OF THE DYNAMIC MODEL

- # Teacher factors refer to teachers' instructional role and were found to be associated with student outcomes (e.g., Brophy & Good, 1986; Muijs & Reynolds, 2001; Seidel & Shavelson, 2007).
- # The eight classroom factors are as follows: orientation, structuring, questioning, teaching-modelling, applications, management of time, teacher role in making classroom a learning environment, and classroom assessment.
- # The eight teacher factors do not refer only to one approach of teaching such as the direct and active teaching approach or the constructivist approach but cover at least partly the main approaches to learning and teaching.

# SCHOOL FACTORS OF THE DYNAMIC MODEL

- # Emphasis is given to two main aspects of the school policy which affect learning at both the level of teachers and students: a) school policy for teaching and b) school policy for creating a learning environment at school.
- # The factors concerned with the school policy mainly refer to the actions taken by the school to help teachers and other stakeholders have a clear understanding of what is expected from them to do.
- # Support offered to teachers and other stakeholders to implement the school policy is also an aspect of these two overarching factors.

# SCHOOL FACTORS OF THE DYNAMIC MODEL

- # The dynamic model refers to the following four overarching school factors:
  - School policy for teaching and actions taken for improving teaching practice,
  - Evaluation of school policy for teaching and of actions taken to improve teaching,
  - Policy for creating a school learning environment and actions taken for improving the school learning environment,
  - Evaluation of the school learning environment



# TESTING THE VALIDITY OF THE MODEL: FINDINGS AND NEW RESEARCH QUESTIONS

1. A **longitudinal study** testing the validity of the model was conducted (Kyriakides & Creemers, 2008).
  - ❖ **Participants:** All grade 5 students (n=2503) from each class (n=108) of 50 primary schools in Cyprus.
  - # Achievement in mathematics, language, and religious education were measured in September 2004, May 2005, and May 2006.
  - # It was possible to provide evidence supporting the validity of the proposed measurement framework.
  - # The importance of using **five dimensions** to measure the teacher and school factors was identified (Creemers & Kyriakides, 2010).
  - # The impact of school factors depends on the current **situation** of the school and on the problems that it is facing.
    - In schools where quality of teaching is rather low, school factors had stronger effects on student outcomes.

# TESTING THE VALIDITY OF THE MODEL: FINDINGS AND NEW RESEARCH QUESTIONS

2. A longitudinal study investigating the impact of teacher factors on achievement of students at the end of pre-primary school was conducted (Kyriakides & Creemers, 2009).
  - a. Similarities and differences in effective teaching of two different subjects (mathematics and Greek language) and at two different phases of schooling (pre-primary and primary education) were identified.
  - b. The assumption that teacher factors are **generic** was mainly supported but some factors were found to be more important for one age of schooling than another.
3. A quantitative synthesis of school effectiveness studies conducted during the last 25 years provided some support to the validity of the model at the **school level**. Factors excluded from the model were only weakly associated with student achievement (Kyriakides, Creemers, Antoniou & Demetriou, 2010).

# TESTING THE VALIDITY OF THE MODEL: FINDINGS AND NEW RESEARCH QUESTIONS

4. A replication study in the same 50 primary schools where the original study investigating the validity of the dynamic model was conducted. The design of the study was identical to that of the original study.
- # This study investigates one of the essential differences of the dynamic model which has to do with its attempt to relate changes in the effectiveness status of schools to the changes in the functioning of school factors.



# TESTING THE VALIDITY OF THE MODEL: FINDINGS AND NEW RESEARCH QUESTIONS

- # The results of DFA revealed that we can predict changes in the effectiveness status of schools by looking at changes in the teaching practice and changes in the functioning of school factors (Creemers & Kyriakides, in press).
- # We did not predict changes that occur in schools which remained among the most effective.
- # Schools cannot remain among the most effective unless improvement in the functioning of school factors is observed.
- # Further studies to test the generalizability of these results are needed.
- # Effectiveness studies should not simply try to understand variation on the effectiveness status of schools during one academic year but explain why specific changes in their effectiveness status take place.

# TESTING THE VALIDITY OF THE MODEL: FINDINGS AND NEW RESEARCH QUESTIONS

- # To test the generalisability of the findings of these studies by investigating
  - the impact of factors upon different learning outcomes
  - the impact of factors upon achievement of different age group of children
- # To identify which factors of the dynamic model are associated with learning outcomes irrespective of the context and which factors have differential effects and are therefore more relevant for policy making in specific socio-cultural contexts.
- # To measure and identify the impact of system factors

# THE ESF PROJECT: MAIN AIMS

- # To **investigate and explain differences** between countries and schools within countries in the average and differential added value of education for different learning outcomes.
- # to **inform policy makers about effective practices at system, school, and classroom level** contributing to the improvement of educational quality in terms of higher average achievement and better opportunities for disadvantaged students.
- # to **develop further and test the validity of the dynamic model** in relation to diversity of student intake, processes, and prospective outcomes in order to improve the effectiveness of education based on scientific validated models.
- # to elaborate on **the system level factors of the dynamic model**, explore their relationships with educational outcomes and with the school and classroom level factors, and draw implications for policy and research.



# THE ESF PROJECT: RESEARCH DESIGN AND METHODS

- # In each country, a sample of at least **50 primary schools** is drawn. Tests in **mathematics and science** to all grade 4 students are administered at the beginning and at the end of school year 2010-2011.
- # **Student level factors**: We restrict ourselves to **prior-knowledge, SES, ethnicity, and gender**.
  - These factors explain the majority of variance at student level and can be used to search for differential effects of classroom and school factors.
- # All **classroom and school level factors** of the model will be measured.

# THE ESF PROJECT: RESEARCH DESIGN AND METHODS

- # **System level factors:** A description of the actors at different layers of the system level in each country will be conducted. Based on this analysis, we will determine which actors have to be addressed in each country in order to get full information about the system factors operating in each country.
- # Data on system level factors will be generated through not only a **content analysis of policy documents** but also by **interviews** to policy makers and other stakeholders and professionals.
- # A **questionnaire** will be developed to measure the **perceived impact of national policy** on schools and will be administered to teachers and head teachers of the school sample in each country.

# THE ESF PROJECT: RESEARCH DESIGN AND METHODS

- # We will measure the perceptions of policy makers, teachers, and school leaders about what constitutes the **wider educational environment** and how this affects policy at national and school level.
- # **Questionnaires** will be administered to policy makers, teachers, and head teachers investigating the functioning of factors associated with the wider educational environment in each country.
- # **Pilot studies** will be conducted in each country in order to test the face validity of each instrument.



# THE ESF PROJECT: RESEARCH DESIGN AND METHODS

- # **Structural equation modelling** techniques will be used to test the construct validity of the instruments.
- # **Within-country** analyses will be conducted in order to identify the extent to which each classroom- and school-level factor is associated with achievement in each outcome.
- # **Across-countries** analysis will help us identify generic and differential factors operating at different levels.
- # We will search for **differential impact** of factors for different groups of students in order to provide suggestions on how education addresses the diversity in the society.

# THE ESF PROJECT: POTENTIAL IMPACT

- # The ESF project may provide **support to the dynamic model** and also investigate some further issues concerned with the effective functioning of education.
- # The first issue is concerned with the extent to which factors of the dynamic model are associated with learning outcomes irrespective of the context whereas others have **differential effects** and are therefore more relevant for policy making in specific socio-cultural contexts.

# THE ESF PROJECT: POTENTIAL IMPACT

- # The project may **help policy makers** understand the complexity of educational effectiveness and avoid a simplistic transplant of some factors which seem to be imported without any detailed knowledge of possible contextual factors that might explain how factors that work in one country may be ineffective in another.
- # Second, only an international study may provide strong evidence about the **effects of the system level factors** and such study may also help us **expand the system level** further.
- # By looking at the impact of overarching system factors, we will explore **relations of these factors with student outcomes** in different countries and search for impacts on the functioning of classroom and school level factors.



# THE ESF PROJECT: POTENTIAL IMPACT

- # The study may produce information about system level factors operating in different countries, which can be used to **develop the dynamic model** at system further and formulate research questions on the impact of specific national policies on outcomes in different socio-cultural contexts.
- # This is in line with arguments in the literature supporting the importance of **re-designing comparative studies** by drawing on **theoretical frameworks** that define precisely the significant variables in the process of education (Gustafsson & Rosen, 2006; Lassibille & Gomez, 2000).

**Thank you for  
being attentive ...**

