

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

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Keywords: system level, factors, international study

ABSTRACT

This paper investigates the impact of the national/state policy on teaching and school learning environment on student achievement. School policy on teaching and school learning environment has been found to affect student outcomes at the level of the school. The assumption is that it will influence outcomes at the level of the system. Educational system provides support to schools and we look at the national/state policy that is promoted to improve student achievement. The specific study investigates the extent to which system level factors on teaching and school learning environment and their five dimensions suggested by the dynamic model of educational effectiveness can explain differences between six European countries (Cyprus, Belgium/Flanders, Germany, Greece, Ireland, and Slovenia) and schools within countries in promoting student learning outcomes. In each country a sample of at least 50 primary schools was drawn and tests in mathematics and science were administered to all grade 4 students (n= 10742) at the beginning and at the end of school year 2011-2012. For the construction of the tests, permission was obtained from IEA to use the released items of TIMSS 2007. A research tool developed at international level allowed the collection of evidences about the national/state policy in the way that originates in the official policy documents. Research teams from the participated countries collected official policy documents that included regulations

and guidelines on aspects related to the system level factors of the dynamic model and coded them in relation to the five dimensions suggested by the model. Multilevel analysis revealed that national/state policy on teaching and school learning environment explain student achievement gains in mathematics and science. Most of the system level factors that were investigated in the specific study were found to have significant effect on student achievement. Implications for research are drawn.

INTRODUCTION

Educational Effectiveness Research (EER) has shown great improvement in the last three decades both on methodological (Creemers, Kyriakides & Sammons, 2010; Goldstein, 2003) as well as on theoretical aspects (Levin & Lezotte, 1990; Scheerens & Bosker, 1997), by taking into account the criticism on the research practices used in the field. Methodological advances such as the development of multilevel mathematical models have enabled more efficient estimates of the different effects of all the levels of education on student achievement to be demonstrated (Teddle & Reynolds, 2000).

However, Reynolds (2000) argued that EER has shown heavily ethnocentric tendencies. Although there has often been acknowledgment of the seminal studies of Coleman et al. (1966), Edmonds (1979), Brookover, Beady, Flood, Schweitzer, and Wisenbaker (1979), Rutter, Maughan, Mortimore, and Ouston (1979) and Mortimore, Sammons, Stoll, Lewis, and Ecob (1988) most of the school effectiveness studies are conducted in one single country, in opposition to other scientific fields, such as psychology and the pure and applied sciences (Reynolds, 2000). Thus, based on the assumption that the educational effectiveness knowledge base can be used for the improvement of education, the need for international studies searching for methods that can increase national standards has extensively been discussed by researchers across countries (e.g., Reynolds, Creemers, Stringfield, Teddle, & Schaffer, 2002; Creemers, 2006; Sammons, 2006). The absence of cross-national perspectives

and relationships between educational effectiveness researchers, are however features of the present state of educational effectiveness studies which should be seen as intellectually damaging for at least two reasons.

First, over the last two decades a large number of comparative studies focusing on educational achievement in different outcomes of schooling have been conducted. The ultimate goal of these studies has been to isolate those factors related to student learning which could be manipulated through policy changes in curriculum, resource allocation, or instructional practice. It was expected that information that arose from such investigations could help policy-makers, curriculum specialists, and researchers better understand the performance of their educational systems (Mullis et al., 2000). However, media attention given to the results of this kind of study has put pressure on the educational systems within countries (Creemers, 2006). As a result of this pressure, simplistic suggestions for raising standards based on “transplantation” of knowledge from one country to another have been proposed. Many researchers in the area of educational effectiveness had become concerned about the over simple potential transfer of educational policies that was already going on between countries (e.g., Creemers, Kyriakides & Sammons, 2010; Reynolds, 2006). It can, therefore, be argued that in order to understand the very complex structures of education and explain the differences in student outcomes, international studies on educational effectiveness are needed.

The second reason for which educational research could gain considerably if there was an internationalization of EER is that comparative studies are able to search for the impact of system level factors on student achievement gains. Such findings may significantly contribute to the development of the theoretical framework of EER. Although theoretical models of educational effectiveness refer to factors operating at different levels (i.e., student, teacher, school and system) empirical support to the impact of system level factors cannot be provided unless international studies are conducted. As a consequence, suggestions to policy makers on how to improve the functioning of system level factors cannot be provided.

In this context, the European project “Establishing a knowledge base for quality in education: Testing a dynamic theory of educational effectiveness” funded by the European Science Foundation (ESF) was developed. The project aims not only to contribute to the development of the international dimension of EER, but also to provide a response to the knowledge gaps in the field. The specific study, which is a part of the project, aims to develop a theoretical framework that may provide insight into improving student learning outcomes and on broader issues concerned with educational policies. It investigates 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. In this paper, we present the findings concerned with the impact of system level factors of the dynamic model on student achievement gains.

The dynamic model of educational effectiveness: the system level factors

The dynamic model refers to factors operating at four levels: student, teacher, school, and system. The teaching and learning situation is emphasized and the roles of the two main actors (i.e., teacher and student) are analyzed. Above these two levels, the dynamic model also refers to school-level factors. It is expected that school-level factors influence the teaching and learning situation by developing and evaluating the school policy on teaching and the policy on creating a learning environment at the school. The system level refers to the influence of the educational system through more formal avenues, especially through developing and evaluating the educational policy at the national/regional level.

The model also takes into account that the teaching and learning situation is influenced by the wider educational context in which students, teachers and schools are expected to operate. Factors such as the societal values for learning and the level of social and political importance attached to education play important roles both in shaping teacher and student expectations, as well as in the opinion formation of various stakeholders about what constitutes effective teaching practice.

In their attempt to define context-level factors, Creemers & Kyriakides (2008) took into account the two major overarching factors operating at the school level which may directly affect: a) student learning through improving teaching practice (i.e., school policy for teaching) and b) learning which takes place outside the classroom and is addressed to all the school stakeholders (i.e., policy for the school learning environment). As a consequence, a similar overarching factor at the national level is included in the dynamic model. The model refers to the national educational policy in relation to the teaching practice and the learning environment of the school and is expected to directly affect teaching practice and the SLE or even indirectly by providing support to the schools to develop their own policies on teaching and their SLE.

Actions taken for improving national policy in relation to teaching and the learning environment of the schools are also taken into account. Moreover, the term guidelines is used in a more broad way to indicate all kind of documents sent to schools from the system level which aim at ensuring teachers' and other stakeholders' understanding of the meaning of the national/state policy and of what they are expected to do.

However, it is acknowledged that the model mainly refers to policies at the national level rather than the specific actions. This is due to the fact that there is a variety of actions that can be taken in different countries due to the different structures of the national system and the societal context. On the other hand, in the case of classroom level, and maybe to less extent the school level, the range of actions taken in different countries is condensed due to the more generic nature of learning and teaching. Due to this reason, the dynamic model is focused on presenting more precisely the classroom- and school-level factors and gives more general guidelines on how the context level may affect student achievement. It is expected that international comparative studies may gradually help us further develop the model by collecting data not only on the policy level but also about the different ways of policy implementation in relation to school policy, teacher behavior, and in the end, student achievement.

It is finally important to note that the evaluation mechanism of the national educational policy that may contribute to the improvement of the national policy and, through that, to the improvement of educational effectiveness is also treated as an overarching factor operating at the system level.

The dynamic model is based on the assumption that, although there are different effectiveness factors, each factor can be defined and measured by using five dimensions: *frequency, focus, stage, quality, and differentiation*. *Frequency* is a quantitative mean of measuring the functioning of each effectiveness factor, and most effectiveness studies to date have only focused on this dimension. The other four dimensions examine the qualitative characteristics of the functioning of the factors. In this paper, a brief description of how the system level factors are measured in relation to these five dimensions is provided (for more information see Creemers & Kyriakides, 2008, Chapter 7).

METHODS

In each participating country (i.e., Belgium/Flanders, Cyprus, Germany, Greece, Ireland, and Slovenia), a sample of at least 50 primary schools was drawn (n=334) and written tests in mathematics and science were administered to all Grade 4 students (n=10742) at the beginning and at the end of school year 2010-2011. For the construction of the tests, permission was obtained from IEA to use the released items of TIMSS 2007. The properties of each item and the relation with the curricula of grades 3 and 4 in each country were taken into account for developing four parallel types of test in each subject. Test equating approaches were used to generate student scores in each administration period.

For the data collection three methods were used in each participating country:

- a) Detailed content analysis of the policy documents in each country
- b) Semi-structured interviews with policy-makers and other stakeholders holding key positions regarding the implementation of the national policy at the school level. Each

country team based on the context of the national educational level was responsible for selecting the interviewees.

- c) A questionnaire which measured the perceived impact of educational policy at the school level and was completed by the head teachers of the schools that participated in our survey in each country.

This paper refers to the first method of data collection. It investigates the impact of the national/state policy in the way that originates in the official policy documents on student achievement gains.

To collect data on the function of the system level factors in each educational system, analysis of each country's official policy documents was conducted. Official policy documents that included educational regulations and guidelines on aspects related to a) the policy on teaching, b) the policy on the school learning environment and c) on evaluation were collected. The official policy and the non-statutory guidance collected through this process were coded, using an instrument (profile) that enabled the coding in relation to the factors and the five dimensions. Additionally each one of the eight factors was examined looking a number of aspects. After the preparation of each country's profile, the qualitative data were transformed into numerical data using a second instrument. This type of content analysis and the numerical scores enabled the comparison between the countries. For validity reasons, coding was repeated by two different persons of the same country.

RESULTS

Multilevel analysis was conducted to identify the impact of the system level factors on student achievement in each subject (mathematics and science). In multilevel

analysis, the empty model revealed that the variance for mathematics was 23.7% at the school level and 78.4% at the student level whereas the variance for science was 30.9% at the school level and 69.1% at the student level. In Model 1, the system level variables were added to the empty model and was found out that both the students' prior achievement and the students' prior achievement at the school level had a statistically significant effect.

At the next step, for each student outcome (mathematics and science), different versions of Model 2 were established. In each version, the factor scores of the SEM models which refer to the system factors of the dynamic model were added one by one to Model 1. Thus, the fitting of each of these models was tested against Model 1, and the likelihood statistic (X^2) shows a significant change between Model 1 and each version of Model 2 ($p < .001$). This implies that the variables measuring the system factors have significant effects on student achievement in mathematics and science.

All the eight factors of the system level were found to have a statistically significant effect on achievement in mathematics and science, except of the factor concerned with the behaviour of the students outside the classroom. In addition, each version of Model 2, explained approximately 48% of the total variance of student achievement in mathematics and 44% of the total variance of student achievement in science.

DISCUSSION

This study contributes to existing knowledge on educational effectiveness by exploring the perceived impact of the system level factors included in the dynamic model on student progress in mathematics and science across six countries with different educational systems. Thus, in the last part of this paper implications of findings for research, policy and practice

are drawn. Suggestions for conducting international effectiveness studies searching for the impact of system level factors are also provided.

For the analyses of the data, multi-level modelling techniques were used, which have substantial benefits in educational research (Goldstein, 1997) as they allow us to identify the effect of each level and each factor on student's achievement. Through the multilevel analysis of the data, it was shown that all the system factors have an effect on student achievement in mathematics and science. These results demonstrate the need of establishing educational policies at national level, which are able to increase the quality of the education provided in different educational contexts and consequently enhance student learning. Of course, the results from the analysis of policy documents data should be compared with the results of the analyses of the data collected through the interviews with the educational policy-makers and other key stakeholders and the analysis of the head-teachers' questionnaire from each participating country to ensure reliability.

Implications of the findings of this study for research investigating the impact of the system level factors on student achievement can also be drawn. This study reveals the strengths of conducting international studies especially since international studies can help us test the extent to which these factors can be treated as generic.

Therefore, in spite of the fact that this study was in a position to identify factors that have an effect on student achievement, we need more longitudinal and experimental studies to search for the impact of system factors such as the national policy in the SLE and the national policy on teaching. Such studies may help us expand the dynamic model of educational effectiveness at the system level by searching for the effect of different aspects of the factors included, on student achievement. Experimental studies may help us develop not only a solid theoretical framework which can be used for promoting effective educational practices, but may also help the establishment of research practices in the field of EER, that make use of the available knowledge-base in the field and are based on empirical evidence.

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