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Review Article

Educational Effectiveness Research as the Knowledge Base of Improving Education

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ABSTRACT

Discussing the strategies to improve and maintain the quality of education has been the concern of various education stakeholders. This paper offers a comprehensive review on Educational Effectiveness Research (EER), which provides theory-driven and evidence-based information on what and how to improve the educational context. Several key words such as EER, factors influencing student outcomes, and the dynamic model of educational effectiveness research are used to find relevant literature. The dynamic model considered to be the most influential theoretical construct in the field has four levels: the national, the school, the classroom, and the student level. The classroom level is emphasized while the national and school levels are expected to provide necessary conditions for the effectiveness of the classroom level. There are eight factors in the classroom level and the teaching skills included in these factors could be divided into five stages, ranging from easy to more difficult skills. This paper suggests there is a need to improve education through teacher improvement programs, and five stages of teaching quality in the dynamic model is used to offer individually-tailored teacher development programs. In this way, school improvement efforts could offer a space for testing theories derived from EER. Finally, it is important to include student non-cognitive outcomes as parameters to measure the effectiveness of education, yet future studies should attempt to identify specific and measurable variables belonging to non-cognitive outcomes that are clearly attributed to schools.

Keywords: Educational effectiveness research, educational improvement, teacher development program, the dynamic model of educational effectiveness research

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INTRODUCTION

Improving education has been one of the top priorities worldwide. Lately, many countries in Europe, America and Asia have established educational standards as a strategy to improve education (Choi, de Vries, & Kim, 2009; Delandshere & Petrosky 2004; Faizi, Shakil, & Lodhi, 2011; Neumann, Fischer & Kauertz, 2010; Widmer, 2004). Standards, which commonly refer to the standards of performance and content, have been considered to improve learning outcomes by providing clear direction to education stakeholders, especially teachers (Chambers & Dean, 2000; Marzano& Kendall, 1996). It is strongly believed that by having such information, teachers will adjust their instruction to provide better learning opportunities (National Council for Research [NCR], 2001; Stosich, 2016; Volante, 2012).

However, only a few studies to date have been conducted to investigate the impact of standards on educational performance. Existing research, predominantly from the US, show that the performance of American students at the high school level is still the same if not worse compared to when A Nation at Risk was published in 1983, a book that marked the emergence of standards-based education (Hanushek, Peterson, & Woessmann, 2012; the US Department of Education, 2008, 2015). According to these studies, the situation is worse for students from minority backgrounds; half of who do not graduate on time and lag far behind the majority. At this point, Educational Effectiveness Research (EER), which attempts to provide empirical evidence on various factors strongly related to students' outcomes, is worth considering. Numerous studies in this field have shown rapid growth in terms of topic areas, methodological and theoretical advances, links between EER and improvement practices, and future directions (Reynolds et al., 2014). The key finding in this research is that teacher instruction or teaching quality has a greater influence on student outcomes compared to other factors (Goldhaber, 2015; Harris & Muijs, 2005; Luyten & Snijders, 1996; Marzano, 2007; Scheerens, 2013; Van Der Werf, Creemers, De Jong, & Klaver, 2000).

This paper reviews the result of educational effectiveness research. It clarifies the concept of EER, sheds light on its history and concludes important findings of EER. Several key words (i.e. educational effectiveness research, teacher effectiveness research, factors influencing student outcomes, and the dynamic model of educational effectiveness research) are used to find relevant literature. The first section presents the review of EER, followed by the dynamic model of educational effectiveness research. The second section offers the use of EER, especially the dynamic model of educational effectiveness research as the knowledge base of improving education.

REVIEW OF EDUCATIONAL EFFECTIVENESS RESEARCH

The review firstly defines the concept of EER and summarizes its development and major findings. Because the key finding is teacher instruction in the classroom,

the review is then focused on one model of EER, namely the dynamic model of educational effectiveness research (Creemers & Kyriakides, 2008). The dynamic model offers both a theoretically-driven and empirically-validated model of how teachers can be improved to enhance student outcomes, which is the ultimate goal of education.

Definition, History and Findings of Educational Effectiveness Research

Educational Effectiveness Research (EER) concerns characteristics that are empirically proven to be related to student outcomes. Several authors have defined effectiveness as the extent to which the expected goals are achieved (e.g. Creemers and Scheerens (n.d); Scheerens and Bosker, 1997). In education, student cognitive performance was largely used as the criterion to measure the effectiveness of different factors, although it has been criticized for narrowing the meaning and the scope of education. This could be due to the fact that non-cognitive outcomes were influenced more by other social institutions than schools (Van Der Werf , 1995). Therefore, although the attainment of non-cognitive outcomes is important, which is supported by educational psychology (Van Der Werf, Opdenakker, & Kuyper, 2008), looking at students' cognitive performance as an indicator of effectiveness is still deemed to be significant.

Doolaard (1999) provides a comprehensive review of three waves of educational effectiveness research. The first wave of EER was intended to counter the work of Coleman et al. (1996) and Jencks et al. (1972), whose studies showed that schools and schooling did not make a difference in student outcomes. Some research has proven that schools matter, which means that they play roles in improving learning outcomes (Doolaard, 1999). Furthermore, Doolaard (1999) explains that the second wave of EER attempted to open "the black box" of schooling, resulting in the lists of factors found to correlate with students' learning outcomes. Influenced by other research, the third wave was marked by the blend of various research traditions and the merge between effectiveness research and school improvement efforts. Furthermore, the fourth phase, which persists until today, observes the internalization of the field due to the growing opportunities for networking, joint research across different countries and a continued call for the merger of school effectiveness (SE) and school improvement (SI) (Reynolds et al., 2014).

With respect to the improvement effort, which is the focus of this study, Creemers and Reezigt (2007) emphasize the importance of characteristics that could be changed through intervention programs such as teacher instruction. Through this program, a link between research or theories and improvement practices may be promoted. School effectiveness research offers empirically validated theories of school improvement, whereas school improvement offers essential means of testing theories.

Therefore, the findings presented in this section focuses more on changeble characteristics, especially as they relate to teacher instruction in the classroom, although other findings are also described. To begin, it is important to note that various characteristics have been listed by different authors and they could be situated at different levels such as student, classroom/ teacher, school, and context or policy levels. At the student level, gender, socio-economic status (SES), and ethnicity have been proven to be strong predictors of learning attainment (Coleman et al., 1996; Jencks et al., 1972; Sammons, 1999). This was the context for the emergence of the fist wave of EER (Reynolds et al., 2014), which therefore was intended to prove that schools mattered. Some programs were then established in order to address the gap of educational attainment across different backgrounds, such as race and ethnicity. This was also one of the main reasons for the emergence of education standards, particularly in the US (Marzano & Kendall, 1996; Ravitch, 1995). Another factor that has been under study is student motivation, which EER has treated as both a stable trait characteristic capable of predicting cognitive outcomes and a non-cognitive outcomes. However, research finds that motivation is an unstable condition and that it does not clearly predict student outcomes (Van Der Werf, Opdenakker, & Kuyper, 2008). Therefore, it is arguable to consider motivation as a non-cognitive outcome in which schools and teachers are expected to explain the variance in student motivation. Moreover, a study by Ahmed, Minnaert, Van Der Werf and Kuyper (2010) shows that teachers influence student motivation, which in turn is related to achievement.

At both classroom and school levels, several factors were also identified. Scheerens and Bosker (1997), for instance, list 13 core effectiveness-enhancing factors that are usually mentioned in reviews of effectiveness studies. Additionally, Muijs and Reynolds (2011) recognize there were nearly 60 characteristics produced by different authors. Fortunately, consensus on several factors has been reached. Those factors include high expectations (Cotton, 2005; Doyle, 1986; Marzano, 2000), curriculum quality/opportunity to learn (Creemers, 1994) school climate, classroom climate, effective learning time/classroom management (Muijs & Reynolds, 2011), structured instruction (Kane, Taylor, Tyler, & Wooten, 2010), effective questioning, feedback and reinforcement (Brophy & Good, 1986; Muijs & Reynold, 2011 Scheerens & Bosker, 1997; Seidel & Shavelson, 2007), differentiation/adaptive instruction (Creemers & Kyriakides, 2008) parental involvement as well as purposeful leadership (Muijs & Reynolds, 2011).

The context or policies at the national level, as Creemers and Kyriakides (2008) have pointed out, are expected to provide necessary conditions for the effectiveness of school and classroom levels. Thus, it is very important to understand effectiveness enhancing factors at both levels. Yet, because schools are expected to facilitate the effectiveness at the classroom level, the

bottom line to emphasize for both schools and context levels is the effectiveness enhancing factors at the classroom level. This argument is supported by the research findings in the field (Creemers & Kyriakides, 2008; Doolaard, 1999). As previously mentioned, the effect size of classroom/ teacher factors is larger than other factors such as school and national factors, which could be because learning takes place in the classroom and has a direct effect on student outcomes whereas the above levels (i.e. school and national levels) have indirect effect.

Concerning the effect size of each level, student background characteristics such as socio-economic status were found to play a major role, which accounts for 75% up to 83% (Creemers, 1994; Teddlie & Stringfield, 1993). This finding indicates the roles of other factors are small. Based on some studies, Creemers (1994) concludes that the characteristics of schools and teachers together explain the variance of student attainment between 10% and 20%. However, when both classroom and school are separated, the effect size of the classroom characteristics are clearly bigger (Kyriakides, Campbell, & Gagatsis, 2000; Luyten & Snijders, 1996; Luyten, 2003; Teddlie & Reynolds, 2000; Van Der Werf et al., 2000).

It is true that the above findings show the bigger effects of family and individual effects than school and teacher levels. Yet, it should be noted that student background is nearly impossible to be intervened. Therefore, it is important to pay attention to factors that affect student outcomes and can be improved through intervention programs. In this case, EER has clearly seen that teacher level was consistently found to have bigger roles compared to school and national levels.

Furthermore, the remaining questions at this point are what teacher factors led to improved student performance. Several perspectives such as teacher and student perception, classroom observation (e.g. Money, 1992) and the "process-product" paradigm (Antoniou, 2009; Kane et al., 2010; Lavy, 2011) have been exercised to investigate effective teacher instructions in the classroom. In line with this, some factors such as teacher subject knowledge (Darling-Hammod, 2000; Heck, 2007), academic qualification and teaching experience (Reynolds & Muijs, 1999), as well as teaching behaviour have been measured (Harris, 2002; Muijs, 2006).

The findings of various studies show that compared to other factors, what teachers do in the classroom was found to explain a large proportion of classroom level variance (Creemers, 1994; Creemers & Kyriakides, 2008; Muijs & Reynolds, 2010). In this case, although different terms have been used, teacher instruction both in terms of quantity and quality has been largely found and recognized to be the most important aspect in teacher behaviour (e.g. Brophy & Good, 1986; Marzano, 2000; Muijs & Reynolds, 2011; Powell, 1980; Wang & Walberg, 1991). Furthermore, teacher instruction in this case refers to teacher efforts in maximizing student opportunity to learn (Creemers,

1994; Rosenshine, 1983). Several activities were identified and empirically validated in supporting the provision of learning opportunity, such as emphasis on academic goals and achievement (Cotton, 1995; Doyle, 1986; Powell, 1980), clear and step-wise presentation of materials as well as effective questioning and feedback (Brophy & Good, 1986; Kane et al., 2010; Scheerens & Bosker, 1997; Seidel & Shavelson, 2007; Smith & Land, 1981), and clear structures and routines (Brophy & Good, 1986).

In order to contribute to the development of effectiveness theories, Creemers (1994) developed a model of the effective classroom. The model recognizes teacher instructional roles as the most important factor at the teacher/classroom level and sums up different aspects of instruction into three categories, namely curriculum, grouping procedure, and teacher behaviour. The validity of this classroom model was examined by several studies (e.g. Antoniou, Demetriou & Kyriakides, 2006; De Jong, Westerhof, & Kruiter, 2004; Kyriakides, 2005; Kyriakides, Campbell, & Gagatsis, 2000) and is considered to be one of the most influential theoretical constructs in the field (Teddlie & Reynolds, 2000). This model was then further developed into a dynamic model of educational effectiveness (Creemers & Kyriakides, 2008), which covers not only the classroom level but other levels i.e. the context / national level, school level, and students' levels. The model is dynamic because it recognizes multidimensional constructs of effectiveness enhancing factors. Therefore, the model is complex, which is attributed to its attempt to describe in more detail the complex nature of educational effectiveness research. In addition, the model also considers teaching and learning as a dynamic processes that is constantly adapting changing needs and opportunities.

The Dynamic Model of Educational Effectiveness

The model is multilevel in nature. It refers to factors operating at four levels, as shown in Figure 1. The model argues that the higher levels (i.e. context/national and school levels) influence educational outcomes indirectly by influencing the classroom level. Therefore, this model highlights that teaching and learning at the classroom level should be emphasized and that it is very important to understand what happens at the classroom level and the aspect of teacher performance in learning. Creemers (1994) even argues that defining effectiveness factors at the classroom level is seen as a prerequisite for defining effectiveness at the school and the context level. Responding to the criticism that EER does not explicitly refer to the measurement of each effectiveness factor, the dynamic model proposes five dimensions to measure the effectiveness of factors in each level, which have been argued to provide a better picture of effectiveness enhancing factors and thus more specific strategies for improving educational practice could be established.

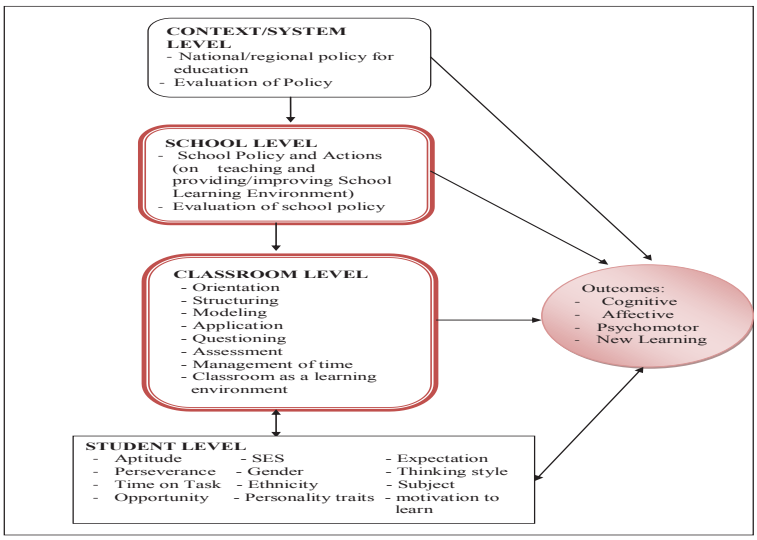

Figure 1. The dynamic model of Educational Effectiveness (Creemers & Kyriakides, 2008)

These dimensions are frequency, focus, stage, quality and differentiation. Frequency refers to the quantity of activities associated with effectiveness factors, whereas focus deals with the specificity of the activity: whether an activity is too specific or too general in relation to the goals of the activity. Effectiveness factors can happen in different periods and therefore the dimension of stage looks at the period at which activities take place. Furthermore, certain effectiveness factors may happen for some time but do not necessarily increase students' outcomes. Their quality need to be also considered, for instance by looking at the properties of the activities or whether they are supported by literature or whether students understand and can follow the activities. Finally, differentiation concerns with the diversity of subjects involved, which for the case of the classroom, are students. Teachers are expected to address different groups of students in such a way that makes all students have the opportunity to learn.

During the last decade, several studies were conducted to test the validity of the dynamic model, especially in Cyprus. In the school year of 2004, a longitudinal study was conducted and the findings supported both the validity of the model at the classroom level and the proposed dimensions for measuring the functioning of each effectiveness factor (Antoniou, 2009). The second was a meta-analysis to estimate the effect size of school effectiveness factors on student achievement, which provided support for the school level of the model (Antoniou, Demetriou & Kyriakides, 2006). Therefore, it is worthwhile to review and consider the model as guidance in improving education. Due to space

limitation, the presentation of the model in this section focuses more on the school and the classroom levels.

As previously indicated, the model expects the higher level to support the effectiveness of the lower level. Since the definition of the dynamic model at the classroom level refers to the key concept of quality, time on task (quantity) and opportunity to learn (provision of learning opportunities), the policy at the school level should also support these aspects. Therefore, the dynamic model emphasizes four factors at the school level: a) school policy for teaching and actions taken for improving teaching practice; b) evaluation of school policy for teaching and actions taken to improve teaching; c) policy for creating a school learning environment and actions taken for improving the school learning environment; and d) evaluation of the school learning environment (Creemers & Kyriakides, 2008). The following table explains in detail the description of each.

Table 1
School Level Factors and Their Description (Creemers & Kyriakides, 2008)

Factor		Description
1.	School policy on teaching and action to improve teaching	
	a. Quantity of teaching	Consists of 1) management of teaching time, 2) absenteeism of teacher and student, 3) homework, 4) lesson schedule and timetable.
	b. Provision of learning opportunities	Concerns with the mission of schools in providing 1) content of curriculum, 2) teaching aims, 3) textbook and other resources, 4) extracurricular activities for teaching and learning, 5) extra support for students with extra needs.
	c. Quality of teaching	Concerns with teacher attempts to make use of time and learning opportunities to help students learn.
2.	Evaluation of policy in teaching	Concerns with the mechanism, the quantity and period, the aspects involved and the emphasis of teaching evaluation.
3.	Policy and action on the development of learning environment	
	a. Student behaviour outside the classroom	Refers to the rules that schools have developed to establish learning outside the classroom.
	b. Collaboration and interaction between teachers	Refers to the mechanism to enable collaboration and interaction among teachers, which can contribute to teacher development and has effect on teaching practice and thereby improve student learning.
	c. Partnership policy	Refers to schools' policies to build relations between schools and community, parents, and advisors.
	d. Provision of sufficient learning resources to teachers and students	Refers to schools' policies on providing resources for learning and thereby ensuring the provision of more learning opportunities to students.
	e. Values in favour of learning	Refers to strategies to encourage students and teachers to have positive attitude toward learning.
4.	Evaluation of learning environment	Refers to the extent to which schools attempt to evaluate its learning environment.

Leadership is not dealt with in the dynamic model because meta-analysis of studies investigating the impact of the principal's leadership on student achievement (e.g. Scheerens, 1992; Teddlie & Stringfield, 1993) confirms earlier research findings on the limitations of the relationship between leadership and student achievement. However, instructional leadership, rather than administrative leadership, was strongly related to student outcomes (Scheerens, 1992; Teddlie & Stringfield, 1993). Nevertheless, it has been questioned due to inconsistent results, which could be due to different school settings and the role played by the principal as well as research theories and methodologies (Doolaard, 1999). The dynamic model, instead of leadership, is concerned with the content of school policy and the type of activities that take place in schools, not on who oversees designing and/or implementing school policy.

At the classroom level, eight factors are included, details of which are provided in Table 2, is followed by further explanation of each element.

Orientation

Orientation is concerned with teacher action in providing the objective of the lessons or tasks to facilitate student understanding regarding the importance of learning activities. Teachers can both present the objectives themselves or challenge students to guess the objectives of the lessons they learn. Several studies have shown that clear or explicit explanation of goals increases student motivation and active participation in the classroom as learning becomes relevant and meaningful to them (e.g. Althoff, Linde, Mason, Nagel, & O'Reilly, 2007; De Corte, 2000; Padak, 2002; Paris & Paris, 2001). Based on several studies, Creemers (1994) concludes that explicit goals, especially when they are listed in a hierarchical way, contribute to effectiveness. It is also possible that teachers stimulate their students to come up with suggestions on possible objectives of the lessons or specific tasks during the lessons (Kyriakides & Creemers, 2006). The increase in student motivation and participation in the classroom is expected to mediate students' outcomes but also the results of orientation activities provided by teachers.

Structuring

Structuring is the teachers' attempt to clearly order and present the lessons. It is recommended that the materials or the activities be linked to the goals and organized into small parts (Joyce, Weil, & Calhoun, 2000). Some studies reviewed by Brophy and Good (1986) indicate that students achieve more when teachers not only present materials but also structure them by: 1) starting with overview or review of objectives; 2) outlining the content to be covered and signalling transitions between lesson parts; 3) calling attention to main ideas at the end of the lesson. In addition to review or overview of the objectives, it is also advisable to start the lesson with a review or practice of what students have learnt in the previous lesson, for instance by going

Table 2
School Level Factors and Their Description (Creemers & Kyriakides, 2008)

Factors	Main elements
1) Orientation	a) Providing the objectives for which a specific task/lesson/series of lessons take(s) place;
	b) b) Challenging students to identify the reason for which an activity takes place in the lesson.
2) Structuring	a) Beginning with overviews and/or review of objectives;
	b) Outlining the content to be covered and signalling transitions between lesson parts;
	c) Calling attention and reviewing main ideas.
3) Questioning	a) Raising different types of questions (i.e. process and product) at appropriate difficulty level;
	b) Giving time to students to respond;
	c) Dealing with student responses.
4) Teaching modelling	a) Encouraging students to use problem solving strategies presented by the teacher or other classmates;
	b) Inviting students to develop strategies;
	c) Promoting the idea of modelling.
5) Application	a) Using seatwork or small group tasks in order to provide needed practice and application opportunities;
	b) Using application tasks as starting points for the next step of teaching and learning.
6) The classroom as a learning environment	a) Establishing on task behaviour through the interactions they promote (i.e. teacher-student and student-student interactions);
	b) Dealing with classroom disorder and student competition through establishing rules, persuading students to respect them and using the rules.
7) Management of Time	a) Organizing the classroom environment and maximizing engagement rates.
8) Assessment	a) Using appropriate techniques to collect data on student knowledge and skills;
	b) Analysing data to identify student needs and report the results to students and parents;
	c) Evaluating their own practices.

over homework (Muijs & Reynolds, 2011; Rosenshine & Stevens, 1986) to connect what students have learned and what they are going to learn. Creemers (1994) notes that the results of integrating homework in the curriculum are encouraging, especially for the disadvantaged groups.

When outlining learning content, it is important to consider how much time is needed for each activity and in this case appropriate pacing is crucial. Especially for primary students and basic skills, higher pacing is recommended (Smith et al. 2004). Muijs and Reynolds (2011) argue that this

becomes possible because it maintains momentum and the interests of students and allows more content to be covered. The elements of structuring are argued to build connection among different activities of the lesson (Case, 1993). Then, reviewing or repeating main ideas will lead to a degree of redundancy of information, which has been found to increase achievement (Leinhardt, Weidman, & Hammond, 1987; Smith & Sanders, 1981). Finally, teacher expectation is another important aspect that could influence students' outcomes but belong to background characteristics rather than teacher behaviour in the classroom (Creemers, 1994). However, teacher expectation will play major roles when teachers outline the lessons to be covered.

Questioning

Effective teachers guide classroom discussion through questioning (Muijs & Reynolds, 2011). In reading for instance, questioning has generated higher achievement (Kane et al., 2010). Furthermore, effective teachers vary questions in terms of difficulty level and types (process and product) in accordance with the objectives. Product questions ask for specific answers, whereas process questions require processes and procedures used to get the answers (Muijs & Reynolds, 2011). In terms of difficulty level, some studies recommend that teachers create questions 75% of which are estimated to be correctly answered by students in general (Creemers & Kyriakides, 2008). Difficulty level of questions should also take different contexts into account. When teaching basic skills for instance, a great deal of drill and practice with frequent, fast-paced review is required in which rapid and correct answers at the same time are also needed. However, when teaching complex cognitive skills such as generalizing and evaluating, usually only few students can answer correctly and there may be no single correct answer (Brophy & Good, 1986).

Concerning types, effective teachers raise more process questions (Askew & William, 1995; Brophy & Good, 1986; Everston, Anderson, Anderson, & Brophy, 1980; Muijs, Armstrong, & Chapman, 2010). Brophy and Good (1986) furthermore suggest that teachers raise around 25% of high level questions. In addition, effective teachers also equally distribute questions, provide appropriate feedback to students' answers, for instance providing hints or clues or changing questions into easier language when students cannot answer. Finally, the questions are clear and teachers provide enough time for students' answers.

Teaching Modelling

Modelling is a demonstration of procedures or strategies of learning to students, which is more effective than using verbal explanation, especially with younger learners (Muijs & Reynolds, 2011). Effectiveness research shows that effective teachers help their students to use or to develop their own strategies to enable them to solve various problems so that self-regulated learning can be promoted and students are able to organize their own learning (Creemers & Kyriakides, 2008). Teachers can

demonstrate the procedures themselves or challenge students to show them to their peers in a clear, structured and sequential way (Muijs& Reynolds, 2011).

Application

For the modelling activities to be effective, students are required to understand and imitate (Muijs & Reynolds, 2011). Therefore, teachers are expected to provide practice and also monitor how students use the procedures and provide appropriate feedback (Bohn, Roerig, & Pressley, 2004). Seatwork or small-group tasks could be used to facilitate needed practice and application opportunities (Borich, 1992). The grouping can be based on students' ability or students' speed of learning (pacing) (Creemers, 1994). The application activities are intended to provide immediate exercise of the lessons taught and direct feedback for both an individual and a group of students (Creemers & Kyriakides, 2008). Effective teachers provide encouragement for student effort more frequently to low-SES and low-achieving students (Kyriakides & Creemers, 2006).

Building Classroom as a Learning Environment

Classroom climate has been largely found to be positively related to student outcomes (e.g. Creemers & Reezigt, 1996; Muijs & Reynolds, 2011). The climate in this case is associated with the behaviour of the stakeholders (Heck & Marcoulides, 1996), which according to Doyle (1986) involves two aspects, namely learning and order. Learning is the instructional side whereas order is the managerial side. Creemers (1994) points out that management is necessary to create learning but management itself is not sufficient to improve students' outcomes. Previous research has put both the learning and managerial sides in isolated constructs and therefore Creemers and Kyriakides (2008) view classroom climate or classroom learning environment to be teacher actions in creating classroom as a learning environment. Five elements are considered: 1) teacher-student interaction; 2) student-student interaction; 3) students' treatment by teacher; 4) competition between students; and 5) classroom disorder. The emphasis is on the roles of teachers in establishing the four first aspects and in dealing with the last aspect.

Management of Time

Opportunity to learn and time spent on tasks is considered to be two of the most significant effectiveness factors (Brophy & Good, 1986; Creemers, 1994). Furthermore, Brophy and Good (1986) explain that opportunity to learn could be measured in different ways, such as the number of pages of books, of topics covered, percentage of test-items taught, length of school day and school year. However, not all time allocated for academic activities are actually spent on such purpose. Therefore, teachers are expected to engage students in such a way to make them work on tasks and not to spend too much time on other purposes such as personal adjustment (Brophy

& Good, 1986; Creemers & Reezight, 1996; Evertson, et al., 1980). Moreover, achievement is maximized when teachers emphasize academic instruction (Brophy & Good, 1986).

Assessment

Several studies consider assessment to be an integral part of the teaching and learning processes (Delandshere & Petrosky, 2004). At the classroom level, formative assessment is one of the most important effectiveness factors (De Jong, Westerhof, & Kruiter, 2004; Kyriakides, 2005). It is ongoing assessment during learning processes that serves as a practice for students and for teachers to check their students understanding and to guide teacher decisions about future instruction. Effective teachers use various ways of measuring students' understanding of the lessons (Rao, Collins, & DiCarlo, 2002) and use the results to identify their students' needs as well as to evaluate their own teaching (Krasne, Wimmers, Relan, & Drake, 2006; Kyriakides, 2005). In short, assessment is the use of appropriate techniques to collect data on student knowledge, skills and the analysis of the data to identify student needs and evaluate teaching practices and to report to parents and students (Creemers & Kyriakides, 2008).

To sum up, the classroom factors of the dynamic model provide important information on what teachers can do to enhance their teaching quality. An experimental study conducted by Antoniou (2009) by using classroom factors of the dynamic model found that teaching quality and student performance significantly improved. Moreover, Antoniou (2009) also found that teaching skills included in the classroom factors of the dynamic model could be divided into five stages, ranging from easier to more difficult skills. The first three stages refer to direct and active teaching, in which quantity of activities are more emphasized than quality. The last two stages are related to both quality and differentiation, which are more demanding because teachers are required not only to be capable of providing quality activities but also of addressing different needs of students. Thus, teacher development programs could be developed based on current teachers' teaching quality and teaching skills in the next level, which could make improvement efforts more focused.

THE USE OF EER IN EFFECTIVE SCHOOL IMPROVEMENT

School Improvement (SI) and School Effectiveness (SE, which in this paper is used interchangeably with Educational Effectiveness Research) have been considered by some as two different traditions. Reynolds et al. (1996) for instance differentiate the characteristics of SE and SI. On the one hand is SE which focuses on school organization, is quantitative in orientation, data driven with emphasis on student outcomes, based on research knowledge and concerned with effective schools. On the other hand, SI focuses on individual teachers or group of teachers, and school processes. In addition,

SI is rarely completed with empirical evaluation of effects of changes, and is more concerned with the journey of school improvement than its destination, and how schools become effective and have multiple outcomes.

However, there have been some efforts to merge the two traditions. In his review of some action projects that arise out of the blended tradition, such as Lewisham school improvement project, Schools Make a Difference (SMAD), Improving the Quality of Education for All (IQEA), and Quality Development Initiative (QDI), Stoll (1996) concludes that despite the differences in orientation, methodology and aims, the separate traditions of SE and SI possess many complementary features. Furthermore, he explains that through their improvement endeavours, effectiveness knowledge can be tested and greater understanding about improvement gained. In other words, SI can provide an excellent possibility for SE to carry out research in a quasi-experimental, natural setting (Creemers & Reezigt, 1997).

Furthermore, Hopkins (1996) provides a definition of SI that shows the blend of the two traditions. He regards school improvement to be a strategy for educational change that enhances student outcomes as well as strengthening the school's capacity for managing change. In this sense school improvement is about raising student achievement through focusing on the teaching-learning process and the conditions which support it. Similarly, Creemers and Kyriakides (2008) regard the effective school as one that is always in the process of improving and / or maintaining the quality of teaching and the quality of the learning environment.

The question is how can SE or EER be implemented in SI efforts? Some school improvement efforts usually start with an understanding of the goals to be achieved and the strategies to achieve the goals. At this point, as Creemers and Kyriakides (2008) have suggested, EER (especially the dynamic model) can be a useful tool for helping the stakeholders to realize that the ultimate aim of any school reform effort should be to improve student outcomes. In the next stage, the knowledge base of SE could be used to outline the actual contents of the improvement project. Then, action plan in accordance with the previous stage should be designed and developed. Finally, evaluation should be carried out and the success should be seen from student outcomes.

Referring to the classroom factors of the dynamic model of educational effectiveness, it is important to emphasize school improvement efforts on teaching quality. The five stages of teaching quality resulted from the teaching skills included in the classroom factors of the dynamic model could be used to design individually-tailored teacher development program. Hence, when teachers are found in stage 1, they can focus their improvement to move to stage 2 and so on. In this way, teacher development programme is likely to be more successful because it can be more focused, address individual needs of different teachers, and promote teachers'

sense of belonging to the programme. Finally, improvement efforts should include not only student cognitive achievement but also non-cognitive outcomes as the indicator of effectiveness because focusing only on cognitive achievement has been considered to narrow down the goal of education (Creemers & Kyriakides, 2008).

CONCLUSION AND IMPLICATION FOR EDUCATION

This paper addressed both the strategies of improving and maintaining the quality of education. Dowson et al. (2007) for instance concludes that the promises of education standards to promote equity and excellence have not been empirically proven. Therefore, it is worth considering EER because it offers both theory-driven and evidence-based information on what to prioritize in an educational improvement program.

In this paper, the dynamic model of educational effectiveness developed by Creemers and Kyriakides (2008) was comprehensively explained. The model emphasizes the importance of the classroom level and requires the higher levels, i.e. the national and school levels, to provide necessary conditions to support the effectiveness of the classroom level. This implies that educational improvement programs should focus on classroom effectiveness enhancing factors and that both the government and schools should work together to enable the effectiveness of teacher.

In this case, continuous teacher professional development is indeed very important. The eight classroom factors of the dynamic model may serve as the basis on what teachers should improve in order to enable them to deliver effective teaching and learning processes. Moreover, the five stages of teaching quality resulted from the teaching skills included in the classroom factors of the dynamic model offers an individually-tailored teacher development program. When teachers are found to be in the first stage for instance, they can focus their improvement efforts on teaching skills in the second stage and therefore individual needs of teachers could be addressed. It is highly recommended for future researchers to do experimental studies employing the five stages of teaching quality in teacher development programs.

Concerning student outcomes as the indicator of effectiveness, it is important not to consider student cognitive outcomes that are normally represented in scores as the only parameter. This is because schools are also responsible for developing student non-cognitive outcomes. Yet, referring to some previous studies revealing the bigger roles of other social institutions in influencing student non-cognitive outcomes, future studies should attempt to identify specific and measurable variables belonging to non-cognitive outcomes that are clearly attributed to schools. Finally, it is suggested that both government and schools should provide an enabling mechanism for teachers to enhance their quality and those of their students.

REFERENCES

Ahmed, W., Minnaert, A., van der Werf, G., & Kuyper, H. (2010). Perceived Social Support and Early Adolescents' Achievement: The Mediational Roles of Motivational Beliefs and Emotions. *Journal of Youth and Adolescence, 39*(1), 36-46.

Althoff, S. E., Linde, K. J., Mason, J. D., Nagel, N. M., & O'Reilly, K. A. (2007). *Learning objectives: Posting and communicating daily learning objectives to increase student achievement and motivation.* Saint Xavier University & Pearson Achievement Solutions Chicago, Illinois.

Antoniou, P. (2009). *Using the dynamic model of educational effectiveness to improve teaching practice: building an evaluation model to test the impact of teacher professional development programs.* (Unpublished PhD thesis). University of Cyprus: Department of Education.

Antoniou, P., Demetriou, D., &Kyriakides, L. (2006). Towards a Dynamic Model of Educational Effectiveness. A Meta-analysis of Studies Investigating the Impact of School Factors on Student Achievement Gains. In *Proceedings of the IX Conference of the Cyprus Pedagogical Association. Nicosia*.

Askew, M., & William, D. (1995). *Recent research in Mathematics education* (pp. 5-16). London: Office for Standards in Education.

Bohn, M., Roehrig, A. D., & Pressley, M. (2004). The first days of schools in the classrooms of two more effective and four less effective primary-grade teachers. *The Elementary School Journal, 104*(4), 269-287.

Borich, G. D. (1992). *Effective teaching methods* (2nd Ed.). New York: Macmillan.

Brophy, J. E., & Good, T. L. (1986). Teacher behaviour and student achievement. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (pp. 328 -375). New York: Macmillan.

Case, R. (1993). Theories of learning and theories of development. *Educational Psychologist, 28*(3), 46-50.

Chambers, L., & Dean, C. (2000). N*oteworthy perspectives on implementing standards-based education*. Aurora, CO: Mid-continent research for education and learning.

Choi, D., Vries, H. J. de, & Kim, D. (2009). Standards Education Policy Development: Observations based on APEC Research. *International Journal of IT Standards and Standardization Research, 7*(2), 43-63.

Coleman, J. S., Campbell, E. Q., Hobson, C. F., McPartland, J., Mood, A. M., Weinfeld, F. D., & York, R. L. (1996). *Equality of educational opportunity*. Washington, DC: US Government Printing Office.

Cotton, K. (1995). *Effective student practices: A research synthesis*. Retrieved from http://www.nwrel.org/scpd/esp/esp95.htm1#1.

Creemers, B. P. M. (1994). *The effective classroom*. London: Cassel.

Creemers, B. P. M., & Kyriakides, L. (2008). *The dynamics of educational effectiveness*. London: Routledge.

Creemers, B. P. M., & Reezigt, G. J. (1996). School level conditions affecting the effectiveness of instruction. *School Effectiveness and School Improvement, 7*(3), 197-228.

Creemers, B. P. M., & Reezigt, J. G. (1997). School effectiveness and school improvement: sustaining links. *School Effectiveness and School Improvement 8*(4), 396-429.

Creemers, B. P. M., & Scheerens, J. (n. d). *Developments in educational effectiveness research programme*. Retrieved from http://doc.utwente.nl/26843/1/Creemers94developments.pdf.

Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Educational Policy Archives, 8*(1), 1-44. Retrieved from http://epaa.asu.edu/epaa/v8n1.

De Corte, E. (2000). Marrying theory building and the improvement of school practice: a permanent challenge for instructional psychology. *Learning and Instruction, 10*(3), 249-266.

De Jong, R., Westerhof, K. J., & Kruiter, J. H. (2004). Empirical evidence of a comprehensive model of school effectiveness: A multilevel study in mathematics in the 1st year of junior general education in the Netherlands. *School Effectiveness and School Improvement, 15*(1), 3-31.

Delandshere, G., &Petrosky, A. (2004). Political rationales and ideological stances of the standards-based reform of teacher education in the US. *Teaching & Teacher Education: An International Journal of Research and Studies, 2*0(1), 1-15.

Doolaard, S. (1999). *Schools in change or schools in chain? the development of educational effectiveness in a longitudinal perspective*. Enschede: Twente University Press.

Dowson, M., McInerney, D. M., & Van Etten, S. (2007). The state of play in standards and standards reform. In D. M. McInerney, S. Van Etten & M. Dowson (Eds.), *Standards in education*. Charlotte, NC: Information Age Publishing.

Doyle, W. (1986). Classroom organization and management. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (pp. 392-431). New York: Macmillan.

Everston, C. M., Anderson C., Anderson, L., &Brophy, J. (1980). Relationships between classroom behaviour and student outcomes in junior math and English classes. *American Educational Research Journal, 17*(1), 46-60.

Faizi, W., Shakil, A. F., & Lodhi, F. A. (2011). The main reasons of declining educational standards at secondary level in Karachi, Pakistan. *Educational Research and Reviews, 6*(2), 152-160.

Hanushek, E. A., Peterson, P. E., & Woessmann, L. (2012). *Achievement Growth: International and U.S. State Trends in Student Performance*. Retrieved online from https://www.hks.harvard.edu/pepg/PDF/Papers/PEPG12-03_CatchingUp.pdf.

Harris, A. (2002). *School improvement: what's in it for school?* London: Falmer Press.

Harris, A., & Muijs, D. (2005). *Improving schools through teacher leadership*. London: Open University Press.

Heck, R. H. (2007). Examining the Relationship between Teacher Quality as an Organizational Property of Schools and Students' Achievement and Growth Rates. *Educational Administration Quarterly, 43*(4), 399-342.

Heck, R. H., & Marcoulides, G. A. (1996). School culture and performance: Testing the invariance of an organizational model. *School Effectiveness and School Improvement, 7*(1), 76–95.

Hopkins, D. (1996). Towards a theory for school improvement. In J. Gray, D. Reynolds, C. Fitz-Gibbon & D. Jesson (Eds.), *Merging traditions: the future of research on school effectiveness and school improvement*. London: Cassell.

Jencks, C., Smith, M., Acland, H., Bane, M. J., Cohen, D., Gintis, H., Heyns, B., & Michelson, S. (1972). *Inequality: a reassessment of the effects of family and schooling in America*. New York: Basic Books.

Joyce, B., Weil, M., & Calhoun, E. (2000). *Models of Teaching*. Boston: Allyn and Bacon.

Kane, T. J., Taylor, E. S., Tyler, J. H., & Wooten, A. L. (2010). Identifying effective classroom practices using student achievement data. T*he Journal of Human Resources 46*(3), 587 – 613.

Krasne, S., Wimmers, P. F., Relan, A., & Drake, T. A. (2006). Differential effects of two types of formative assessment in predicting performance of first-year medical students. *Advances in Health Sciences Education, 11*(2), 155–171.

Kyriakides, L. (2005). Extending the comprehensive model of educational effectiveness by an empirical investigation. *School Effectiveness and School Improvement, 16*(2), 103-152.

Kyriakides, L., Campbell, R. J., & Gagatsis, A. (2000). The significant of the classroom effect in primary school: An application of Creemers comprehensive model of educational effectiveness. *School Effectiveness and School Improvement, 11*(4), 501-529.

Kyriakides, L., & Creemers, B. P. M. (2006). Using the dynamic model of educational effectiveness to introduce a policy promoting the provision of equal opportunities to students of different social groups. In D. M. McInerney, S. Van Etten & M. Dowson (Eds.), *Research on sociocultural influences on motivation and learning, vol. 6: Effective schooling*. Greenwich CT: Information Age Publishing.

Lavy, V. (2011). *What makes an effective teacher? Quasi-experimental evidence*. Working paper 16885. Cambridge, MA: National Bureau of Economic Research.

Leinhardt, G., Weidman, C., & Hammond, K. M. (1987). Introduction and integration of classroom routines by expert teachers. *Curriculum inquiry, 17*(2), 135-176.

Luyten, H. (2003). The size of school effects compared to teacher effects: an overview of the reserach literature. *School Effectiveness and School Improvement, 14*(1), 31-51.

Luyten, J. W., & Snijders, T. A. B. (1996). School effects and teacher effects in Dutch elementary education. *Educational Research and Evaluation, 2*(1), 1-24.

Marzano, R. J., & Kendall, J. S. (1996). *The fall and the rise of standards-based education. Issues in brief.* Aurora, CO: Mid-Continent Regional Educational Lab.

Marzano, R. J. (2007). *The art and science of teaching*. Alexandria, VA: Association for Supervision and Curriculum Development.

Maslowski, R., Doolaard, S., & Bosker, R. J. (2008). Much more than the effective classroom: a lifetime of research, evaluation, improvement, and dissemination. *School Effectiveness and School Improvement, 19*(4), 353–363.

Money, S. M. (1992). *What is teaching effectiveness? A survey of student and teacher perceptions of teacher effectiveness.* Ontario: Humber College of Applied Arts and Technology.

Muijs, D. (2006). Measuring teacher effectiveness: Some methodological reflections. *Educational Research and Evaluation, 12*(1), 53-74.

Muijs, D., & Reynolds, D. (2010). *Effective teaching: Research and practice*. London: Paul Chapman.

Muijs, D., & Reynolds, D. (2011). *Effective teaching: Evidence and practice.* London: SAGE.

Muijs, D., Armstrong, P., & Chapman, C. (2010). *The impact of Teach First Teachers in Schools: Final Report.* London: The Maximum Impact Project for Teach First.

National Research Council. (2001). *National science education standards*. Washington, DC: National Academy Press.

Paris, S. G., & Paris, A. H. (2001). Classroom applications of research on self-regulated learning. *Educational Psychologist, 36*(2), 89-101.

Padak, N. (2002). *Strategies that work: What does the evidence tell us? research to practice.* Columbus: Ohio State Literacy Resource Centre, Ohio State Department of Education.

Pemerintah Indonesia. (2005). *Peraturan Pemerintah Republik Indonesia Nomor 19 Tahun 2005 Tentang Standar Pendidikan Nasional*. Jakarta.

Powell, A. (1980). *The uncertain profession: Harvard and the search for educational authority.* Cambridge, Massachusetts: Harvard University Press.

Rao, S. P., Collins, H. L., & DiCarlo, S. E. (2002). Collaborative testing enhances student learning. *Advances in Physiology Education, 26*(1), 37–41.

Ravitch, D. (1995). *National standards in American education: A citizen's guide.* Washington, DC: Brookings Institution.

Reynolds, D., Creemers, B., Bollen, B., Hopkins, D., Stoll, L., & Lagerweij, N. (Eds.) (1996). *Making good schools, linking school effectiveness and school improvement.* London, New York: Routledge.

Reynolds, D., Sammons, P., De Fraine, B., Van Damme, J., Townsend, T., Teddlie, C., & Stringfield, S. (2014). Educational effectiveness research (EER): A state-of-the-art review. *School Effectiveness and School Improvement, 25*(2), 197-230.

Rosenshine, B. (1983). Teaching functions in instructional programs. *Elementary School Journal 83*(4), 335-351.

Rosenshine, B., & Stevens, R. (1986). Teaching functions. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (pp. 376-391). New York: Macmillan.

Sammons, P. (1999). *School effectiveness: coming of age in the twenty-first century.* Lisse: Swets & Zeitlinger.

Scheerens, J. (1992). *Effective schooling: Research, theory, and practice.* London: Cassel.

Scheerens, J. (2013). The use of theory in school effectiveness research revisited. *School effectiveness and school improvement, 24*(1), 1-38.

Scheerens, J., & Bosker, R. J. (1997). *The foundations of educational effectiveness.* Oxford: Pergamon.

Seidel, T., & Shavelson, R. J. (2007). Teaching effectiveness research in the past decade: The role of theory and research design in disentangling meta-analysis results. *Review of Educational Research, 77*(4), 454-499.

Smith, F., Hardman, F., Wall, K., & Mroz, M. (2004). Interactive whole class teaching in the national literacy and numeracy strategies. *British Educational Research Journal, 30*(30), 395-411.

Smith, L., & Land, M. (1981). Low-inference verbal behaviors related to teacher clarity. *Journal of Classroom Interaction 17*(1), 37-42.

Smith, L., & Sanders, K. (1981). The effects on student achievement and student perception of varying structure in social studies content. *Journal of Educational Research, 74*(5), 333-336.

Stoll, L. (1996). Linking School Effectiveness and School Improvement: Issues and Possibilities. In J. Gray, D. Reynolds, C. Fitz-Gibbon & D. Jesson (Eds.), *Merging traditions: the future of research on school effectiveness and school improvement.* London: Cassell

Stosich, E. L. (2016). Building teacher and school capacity to teach to ambitious standards in high-poverty schools. *Teaching and Teacher Education, 58*, 43-53.

Suryadarma, D., Suryahadi, A., Sumarto, S., & Rogers, F. H. (2004). *The Determinants of Student Performance in Indonesian Public Primary Schools: the Role of Teachers and Schools.* Jakarta: SMERU Research Institute.

Teddlie, C., & Reynolds, D. (2000). *The International Handbook of School Effectiveness Research.* London: Falmer Press.

Teddlie, C., & Stringfield, S. (1993). *School make a difference: Lesson learned from a 10-year study of school effects.* New York: Teachers College Press.

US Department of Education. (2008). A *nation accountable: Twenty-five years after "A nation at risk".* Washington D.C.: US Department of Education.

US Department of Education. (2015). *School Composition and Black-White Achievement Gap. Retrieved from https://nces.ed.gov/nationsreportcard/subject/studies/pdf/school_composition_and_the_bw_achievement_gap_2015.pdf.*

Van der Werf, M. P. C., Creemers, B. P. M., De Jong, R., & Klaver, L. (2000). Evaluation of school improvement through an educational effectiveness model: The case of Indonesia's PEQIP project. *Comparative Education Review, 44*(3), 329–356.

Van der Werf, M. P. C., Opdenakker, M. C., & Kuyper, H. (2008). Testing a dynamic model of student and school effectiveness with a multivariate multilevel latent growth curve approach. *School Effectiveness and School Improvement, 19*(4), 447-462.

Van der Werf, M. P. C. (1995). *The Educational Priority in the Netherlands: content, implementation and outcomes.* The Hague: SVO.

Volante, L. (Ed.). (2012). *School leadership in the context of standards-based reform: International perspectives* (Vol. 16). Springer Science & Business Media.

Wang, M., & Walberg, H. (1991). Teaching and educational effectiveness: Research synthesis and consensus from the field. In K. J. Rehage (Series Ed.), H. C. Waxman & H. J. Walberg (Vol. Ed.), *Effective teaching: Current research* (pp.63-80). Berkeley, CA: McCutchan Publishing.

Widmer, T. (2004). The development and status of evaluation standards in western Europe. N*ew Directions for Evaluation, 2004*(104), 31-42.