



## EDUCATIONAL EFFECTIVENESS: KEY FINDINGS

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*Abstract.* This paper reviews recent and advanced studies on educational effectiveness. Section on integrated school effectiveness research is followed by a section on conceptually integrated models. The subsequent two sections focus on more methodological limitations of past research: the failure to accommodate the hierarchical nature of schooling and the inability to capture teacher effects. Finally, the last section sums up all relevant facts and research strands. *Key words:* school effectiveness, integrated studies, conceptually integrated studies, hierarchical linear modeling, teacher effects.

### *Integrated School Effectiveness Research*

In recent school effectiveness studies, the three research paradigms and student background factors described in the first part of the literature review have been integrated in terms of modeling and choice of variables.<sup>1</sup> In integrated research, schools are depicted as nested, hierarchical layers (student, classroom, school, and higher level), and key variables from each of the three paradigms, as well as key student background variables, are included at the appropriate layer (Scheerens, 2000). Student background factors are placed at the student level, instructional-effectiveness factors are placed at the classroom level, effective-schools factors are placed at the school level, while input-output factors are appropriately divided between the classroom and school levels (e.g., teacher qualifications belong to the classroom level, while per-student expenditure belongs to the school level). Then, all the variables are tested simultaneously using hierarchical linear modeling (HLM) to appropriately assess the relative net importance of each variable and schooling level on student achievement (more will be said about HLM in a later section).

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<sup>1</sup> Even though the term “educational effectiveness” is more appropriate for studies that integrate student background factors and schooling-related factors, the more common, earlier term, “school effectiveness”, is used interchangeably in this paper.

In industrialized countries, integrated studies usually showed that differences between student scores on achievement tests were more attributable to differences between individual students (between-student variance) than to differences due to attending different classrooms and schools (between-classroom and between-school variances). In their meta-analysis of over a hundred school effectiveness studies, Bosker and Witziers (as cited in Scheerens & Bosker, 1997) estimated that around 19% of variance was between schools (including classrooms), but the range of the results was quite varied. PISA 2003 found that the average between-school variance within OECD countries was 28%, but individual countries varied greatly between each other. For example, in Scandinavian countries, between-school variance (including classrooms) took up a small amount of total variance (3.8% in Iceland, 4.8% in Finland, 6.6% in Norway, and 10.5% in Sweden), while in countries of Central Europe that have similar education systems, between-school variance took up over half of total variance (58.3% in Hungary, 52.9% in Austria and 51.7% in Germany).

Since classrooms and schools mostly differ in student recruitment / intakes, individual student-level factors usually explain not only a portion of the between-student variance, but also a certain portion of between-classroom and between-school variances (OECD, 2004; Opdenakker *et al.*, 2002; Scheerens & Bosker, 1997). In addition, some studies have found that student background factors aggregated to the classroom or school level – so-called compositional effects – influenced student achievement beyond what would be expected from individual student background factors alone (OECD, 2004; Opdenakker *et al.*, 2002; Scheerens & Bosker, 1997). In other words, characteristics of individual students and their peer groups explain a considerable amount of the variance in student results on achievement tests.

A part of the unexplained, residual variance is likely due to the effect of unobserved student-level variables, and a part is due to classroom-level and school-level variables that affect student achievement. Even though many studies suggest that this unexplained, residual variance is small in absolute terms (about 5-15%, OECD, 2004; Rowan *et al.*, 2002; Scheerens & Bosker, 1997), there are ongoing efforts in the educational research community to identify those specific classroom and school variables that explain this part of the residual variance.

Results of the integrated studies on the effects of classroom-level factors in industrialized countries identified significant, but small effects of those variables on student achievement.

In a large, three-year mixed study of 50 London schools, Mortimore *et al.* (1988) found that, after controlling for student background, around 10%

of variation in student attainment in both English and mathematics in third grade was attributable to classrooms and schools. After the initial attainment was controlled for, 25-30% of variation in student learning was attributable to classrooms and schools. The authors determined that the most salient classroom-level variables were structured lessons, intellectually challenging teaching, a work-centered environment, limited focus within lessons, maximum communication between teachers and students, record keeping, parental involvement, and a positive climate at the classroom level. However, the authors neither indicated the magnitude of the effects of specific variables, nor how much variation attributed to classrooms and schools was due to these classroom-level variables and how much was due to school-level factors that were also examined.

Reynolds *et al.* (2002) listed the following variables as important in several industrialized countries (USA, UK, Taiwan, and Norway): positive feedback, emphasis of key lesson points, checking for student understanding, frequent high-quality, academic-related questioning, motivating students, and showing high expectations. Hill and Rowe (1998) found that teacher's attendance of a specialist literacy in-service course, teacher's high expectations and successfully matching instructional level and student ability significantly influenced student achievement in literacy. D'Agostino (2000) discovered that homework assignments, emphasis on basic skills in early elementary grades, introduction of advanced skills in the middle elementary grades, and ability grouping associated with student progress in reading and / or mathematics (the last variable was negatively associated with progress).

However, Reynolds *et al.* (2002) did not indicate the magnitude of the effects of specific variables. In the Hill and Rowe (1998) study, the effect of variables – except for teacher's attendance in a specialist literacy course – was small, while the effect of variables examined in the D'Agostino (2000) study was unstable across different cohorts and two subjects. In addition, both latter studies examined a rather small number of classroom-level variables.

Several studies that examined a broader range of classroom-level variables found that only a few showed a statistically significant, albeit small, effect on student learning. For example, Opdenakker *et al.* (2002) found that only the calm, learning-focused climate in classrooms had a net significant effect on student learning. Driessen and Slegers (2000) found that student achievement associated negatively with the individual didactic approach (in both mathematics and Dutch), and positively with checking student work to assign a grade and the emphasis on basic skills acquisition (both only in mathematics).

On the other hand, Muijs & Reynolds (2000) found that the composite teaching quality variable explained between 60% and 100% of the unexplained between-classroom variance in student learning in various grades after accounting for student prior achievement and other student background factors (the composite was derived by summing the scores on individual classroom-level variables: classroom management, behavior management, direct teaching, individual practice, interactive teaching, varied teaching, and classroom climate). This finding implies that various effective teaching behaviors go together and that they have a large impact on student achievement. The drawbacks of this study, however, were that it did not control for classroom compositional effects, which could potentially reduce the effect of the composite variable (Opdenakker *et al.*, 2002), and that it did not examine other classroom-level variables, (e.g., teachers' preparation) or school-level variables.

Rowan *et al.*'s (2002) analysis of Prospects data in the U.S. concluded that time teachers spent in whole-class, active instruction had an effect on student learning in both mathematics and reading, as did teachers' emphasis on word analysis, reading comprehension, and writing process in reading, and the difficulty of covered content in mathematics. Like Muijs and Reynolds (2002), the authors also suggested that many small instructional effects need to be combined to produce a large effect on student learning. Finally, when HLM was used in PISA 2000 to analyze the effects of classroom-level variables that were constructed out of several indicators, teacher-student relations and the disciplinary climate were found to have a significant impact on student achievement. It should be noted that PISA 2000 analyzed classroom and school variables at the same level, which can significantly alter the results (Opdenakker *et al.*, 2000).

Overall, classroom-level variables can have a significant effect on student achievement, with the effect of composite variables on student achievement being larger than the effect of individual, more specific variables.

Integrated studies that examined school-level factors showed mixed effects on student achievement. Hill and Rowe (1998) found that none of the 12 indicators of teachers' perceptions of their work environment could explain the variance in student literacy progress in early grades. PISA 2000 also found no effect of variables such as formal student assessment, teacher-related factors regarding school climate, principals' perceptions of teacher morale and commitment, and teacher and school autonomy (OECD, 2001). Webster and Fisher (2000) found no effect of general, mathematics, or science resources on achievement of Australian 13-year old TIMSS participants.

On the other hand, Mortimore et al. (1988) determined that the most important school-level variables were purposeful leadership of the staff by the head teacher, the involvement of the deputy head, the involvement of teachers, consistency among teachers, record keeping, parental involvement, and positive climate. However, the authors did not indicate the magnitude of the effects of specific variables, nor did they specify how much variation was due to these school-level variables and how much was due to the classroom-level factors mentioned previously.

Also, D'Agostino (2000) found that mathematics progress in school was positively influenced by social support and the shared mission of teachers, and negatively influenced by decision-making, development, and planning activities in school.<sup>2</sup> Opdenakker and Van Damme (2000) concluded that teaching staff cooperation over teaching methods and pupil counseling had a significant impact on student achievement in mathematics, and an orderly learning environment had a significant impact on student achievement in Dutch, after controlling for student numerical and verbal intelligence. PISA 2000 found that a teacher-to-student ratio greater than 50 showed a negative effect on student reading literacy performance, while the intensity of students' use of school resources had a positive impact on student achievement (OECD, 2001).

However, it is important to note that D'Agostino (2000) examined effective-schools variables in several unusual two-level HLM. PISA 2000 analyzed classroom and school variables at the same level, which cannot properly disentangle classroom from school effects (Luyten, 2003). Opdenakker and Van Damme (2000) did not explore the influence of classroom-level variables at the same time (i.e., there were no factors at the classroom level), which can again alter the importance of school-level variables.

One exemplary study that controlled for individual student differences, classroom compositional, and classroom instructional variables, found that school-level variables – teacher attention to student differences and the amount of teacher consultation in school – negatively associated with student achievement (Opdenakker *et al.*, 2002). This may have happened if the teacher attention to student differences translated into lower expectations and demands placed on lower-achieving students, and if the amount of teacher consultation in a school took away from time needed to prepare for lessons.

Overall, no consensus exists currently on the importance of school-level factors: Some studies found no association of those variables with

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<sup>2</sup> The latter finding was explained by the assumption that teachers who were overly involved in decision-making and planning had less time for instructional responsibilities that impact student learning.

student achievement, and some found certain variables to be significantly associated with student achievement.

In summary, the following conclusions emerge from the integrated studies undertaken in industrialized countries: (a) student-level factors are extremely important in determining student achievement; (b) classroom-level variables exhibit significant association with student achievement, with composite variables having a considerably larger effect than individual variables; and (c) school-level factors show the least consensus, with their likely effect sizes ranging from zero to modest.

Integrated studies undertaken in developing countries also showed that between-student variance was larger than between-classroom and between-school variances, but to a lesser extent than in industrialized countries. In Zimbabwe, for example, 48% of the variance in student English test scores was between students, 44% was between schools, and 8% was between classrooms, while comparable percentages for mathematics were 59%, 26%, and 14% (Nyagura & Riddell, 1993). In Thailand, 68% of the total variance in student scores in mathematics (after controlling for pre-test scores) was due to between-student differences, and 32% of total variance was due to between-school differences (classroom effects were not examined separately, Lockheed & Longford, 1989). In 12 Latin American countries, between-student variance in both mathematics and language was around 50-70% (Willms & Somers, 2001).

Student-level factors that were identified as important in developing countries were prior achievement, student age, student gender, SES, first language, family size, parental education, parental occupation, possession of more than 10 books at home, daycare attendance, educational expectations, parental encouragement and involvement, perceived ability, motivation, and whether the student was a repeater (Lockheed & Longford, 1989; Nyagura & Riddell, 1993; Dowd, 2001; Willms & Somers, 2001).

The same integrated studies showed that the impact of various classroom-level factors in developing countries could be considerable, but were not consistent in regards to the magnitude of the effects, subjects, or countries. For example, Nyagura and Riddell (1993) found that achievement in mathematics in Zimbabwe was significantly correlated with amount of instructional time, the amount of teacher-supervised study, and the number of classroom math textbooks. In Malawi, Dowd (2001) found that after the intake of students had been controlled for, teacher's certificate and two composite variables capturing child-centered teaching and participatory teaching explained 43.78% variance in student scores that existed between schools. In Thailand (Lockheed & Longford, 1989), mathematics achievement was

higher if an enriched mathematics curriculum was used and if textbooks were used frequently. In Latin America, Willms and Somers (2001) found that students had higher scores in both mathematics and language if they were not in multigrade classrooms and not grouped by ability, if they were regularly tested, and if there was strong parental involvement and a positive classroom climate (these effects were as large as student-level effects and larger than school-level effects).

Integrated studies in developing countries showed mixed effects of school-level factors on student achievement. More specifically, the role of school-level input-output variables varied across countries, while school-level effective-schools variables were not sufficiently explored in developing countries.

For example, in Zimbabwe, the percentage of trained teachers, the availability of textbooks, and pupil-teacher ratio explained 20% of total variance in student English achievement, compared to 17% explained by student-level factors. Comparable percentages in mathematics were 11% and 11% (Nyagura & Riddell, 1993). However, had school composition been included in the analysis, the effect of these three school-related variables may have been smaller.

On the other hand, in some developing countries outside Africa, school-level input-output factors appeared to play smaller role in student achievement. While student mathematics achievement was associated with number of qualified teachers in Thailand, it was more impacted by student background variables than by school-level input-output variables (Lockheed & Longford, 1989). In Latin America, significant positive effects were discovered for student-teacher ratio, the availability of instructional materials, the size of the library, and teacher training, but these effects were smaller than effects of student background factors or classroom-level variables<sup>3</sup> (Willms & Somers, 2001).

A very few integrated studies in developing countries that examined school-level effective-schools variables showed their small effect on student achievement. In Zimbabwe, no variable of those examined (a head teacher's training, teacher supervision by the head teacher, teacher stability, and school-based activities) proved to be significant (Nyagura & Riddell, 1993). In Malawi, the inclusion of community monitoring of teachers helped explain around 5.5% of variance that could be explained by all school and teacher

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<sup>3</sup> However, since authors controlled for compositional effect of SES on the school level, and since this school SES was correlated with some input-output factors, such as school infrastructure, the impact of these input-output factors in this study likely appeared smaller (since it was partly contained in school SES) than in studies that did not control for school SES.

variables (Dowd, 2001). Integrated studies undertaken in Thailand or Latin America did not examine effective-schools factors.

The relative importance of classroom-level and school-level factors varied across countries. In Zimbabwe, for example, school-level input-output variables explained more variance in mathematics and English than classroom-level variables (Nyagura & Riddell, 1993). On the other hand, Glewwe *et al.* (1995) showed that in Jamaica the effects of classroom-level factors – in-class textbook use and testing students in English – were more important than the effects of all school-level factors. These apparent discrepancies may be due to the possibility that classroom-level factors may begin to show their effects when the educational system of a developing country begins to resemble educational systems of industrialized countries (Glewwe *et al.*, 1995). Therefore, school-level input-output factors may begin to show smaller effects, and classroom-level variables larger effects, as developing nations equip their schools with basic infrastructure, textbooks, and qualified human resources (Scheerens, 1999).

Overall, the following conclusions emerge from the integrated studies undertaken in developing countries: (a) student background factors are important for student success, equally as school-level factors in poor developing countries and more than school-level factors in better-off developing countries; (b) classroom-level variables associate considerably with student achievement, more so in better-off developing countries; and (c) school-level input-output variables are very important for poor developing countries and less so for the better-off developing countries, while there is insufficient evidence on the impact of school-level effective-schools factors, with their likely impact being small.

#### *Conceptually Integrated School Effectiveness Research*

Even though more integrated studies are being undertaken, many have been atheoretical, a multivariate statistical sifting, often of whatever data happen to be available. Also, many studies explored only two levels of schooling, which likely resulted in inaccurate estimates of the examined variables' contribution to student achievement (Opdenakker & Van Damme, 2000). Thus, many integrated studies fell short of examining a comprehensive, conceptually integrated model of how all school effectiveness factors might influence student achievement.

During the 1990s, several conceptually integrated models were proposed based on authors' extensive literature reviews and meta-analyses of

school effectiveness research. Four such theory-encompassing approaches are presented in figures below.

Figure 1 shows Scheerens' model of school effectiveness in which specific school inputs and contextual factors interact with specific school-level and classroom-level processes, which, in turn, affect student achievement after adjusting for student background factors (Scheerens, 1990). The constructs in the model were chosen based on several meta-analyses of current research in field of school effectiveness.

*Figure 1: An integrated model of school effectiveness (Scheerens, 1990)*

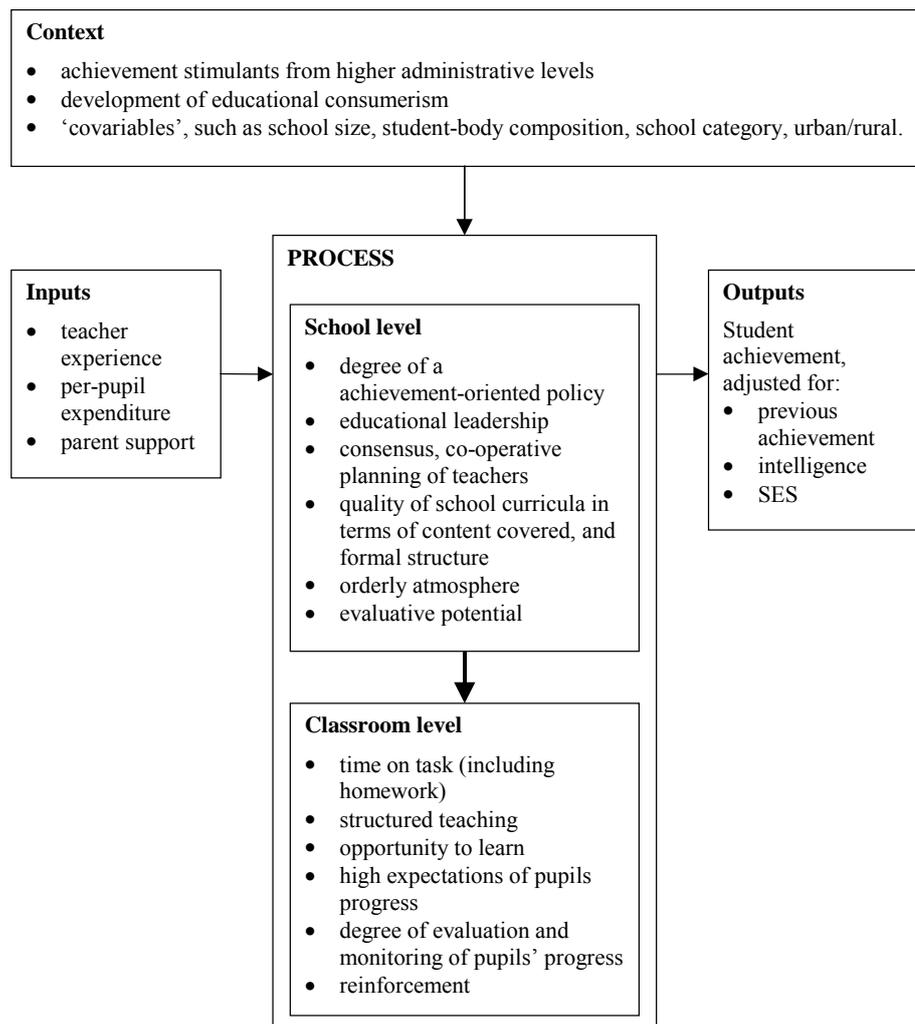


Figure 2 shows Creemers’ model on school effectiveness in which each of the hierarchical levels is characterized by variables that enhance time for learning (e.g., orderly atmosphere), quality of learning (e.g., clarity of presentation), and opportunity to learn (e.g., alignment between a curriculum and test). These variables, together with student background factors, are thought to impact student achievement (Creemers, 1994).

Figure 2: Basic model of educational effectiveness (Creemers, 1994)

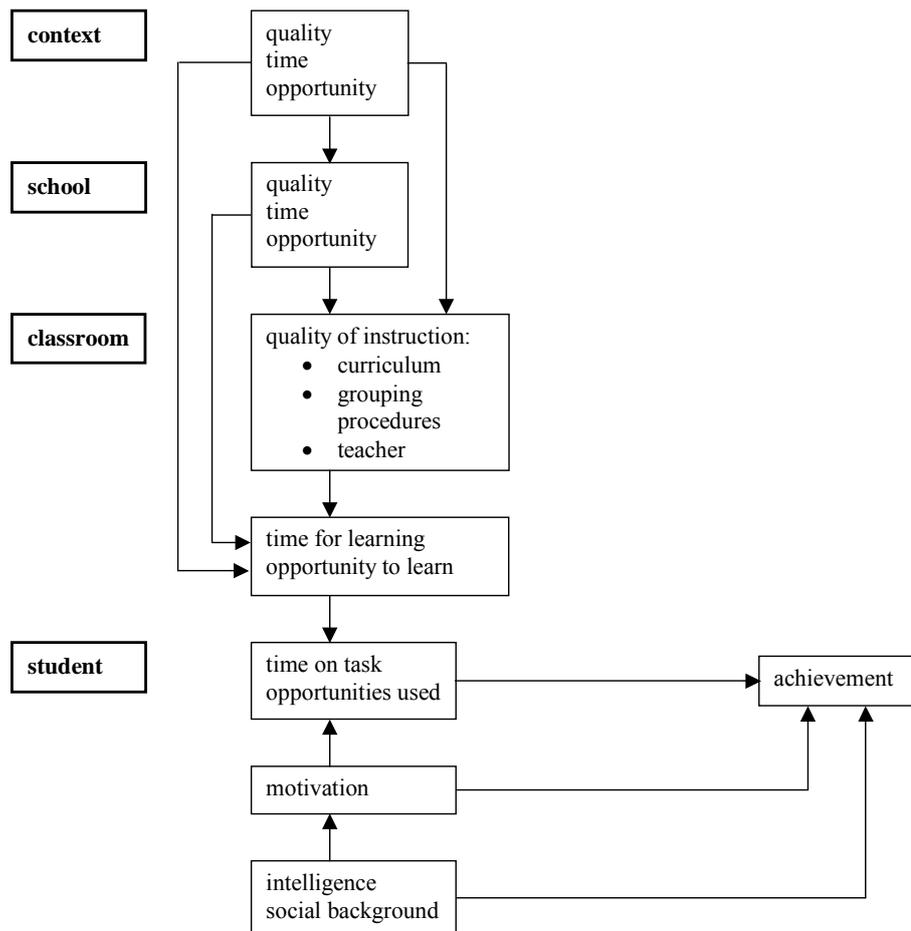


Figure 3 shows a model proposed by Heneveld and Craig (1996) where school inputs and student background interact with school-level and classroom-level constructs to produce certain student outcomes. The model was

based on the authors' literature review of school effectiveness studies undertaken in developing countries.

Figure 3: Factors that determine school effectiveness (Heneveld & Craig, 1996)

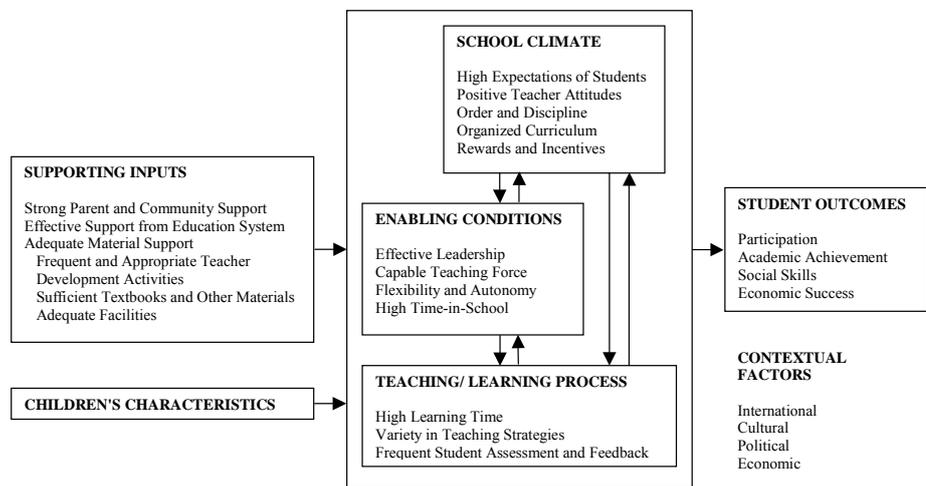


Table 1 showcases the constructs proposed by Wang *et al.* (1993) that were based on the authors' literature review and meta-analyses of existing studies, as well as expert analysis of important school effectiveness factors. Even though the authors did not categorize their constructs by hierarchical level of schooling, a comparison of these constructs with those described in other models allows for the easy assignment of each construct to its appropriate level.

These conceptually integrated models have only begun to be tested by researchers. Kyriakides *et al.* (2000) tested Creemers' model in Cyprus, and confirmed that student background factors account for a large portion of variance of the test scores. However, once the compositional variables were taken into account (average socioeconomic status and average prior knowledge in mathematics on the classroom and school levels), the only other factors from Creemers' model that significantly impacted student achievement were the amount of homework assigned (classroom level, positive association) and the amount of school rules (school level, negative association).

Reezigt *et al.* (1999) also tested Creemers' model and showed that the school-level and classroom-level effectiveness factors they studied in the Netherlands failed to explain large portions of between-classroom and bet-

ween-school variances after controlling for student background variables. It should be noted, however, that between-school and between-classroom variances in achievement gains were very small after the influence of student background variables was controlled for (around 5% on average for each type of variance). This may well be due to little variation in school and classroom variables among the Dutch schools. Thus, in the countries like the Netherlands, where between-classroom and between-school variances are small and where school effectiveness factors may be almost uniformly distributed after student background characteristics have been taken into account, it may be harder to pinpoint particular school effectiveness variables that explain differences in student achievement.

*Table 1: Description of theoretical constructs and categories incorporated into the theoretical framework (Wang et al., 1994)*

<b>1. State and District Governance and Organization</b>	a. District Demographics
	b. State and District Policies
<b>2. Home and Community Educational Contexts</b>	a. Community
	b. Peer Group
	c. Home Environment and Parental Support
	d. Student Use of Out-of-School-Time
<b>3. School Demographics, Culture, Climate, Policies, and Practices</b>	a. School Demographics (urban/rural, school size)
	b. Teacher/Administrator Decision Making
	c. School Culture (Ethos conducive to teaching and learning)
	d. School-wide Policy and Organization
	e. Accessibility
	f. Parental Involvement Policy
<b>4. Design and Delivery of Curriculum and Instruction</b>	a. Program Demographics
	b. Curriculum and Instruction
	c. Curriculum Design
<b>5. Classroom Practices</b>	a. Classroom Implementation Support
	b. Classroom Instruction
	c. Quantity of Instruction
	d. Classroom Assessment
	e. Classroom Management
	f. Student and Teacher Social Interactions
	g. Student and Teacher Academic Interactions
	h. Classroom Climate
<b>6. Student Characteristics</b>	a. Student Demographics
	b. History of Educational Placement
	c. Social and Behavioral
	d. Motivational and Affective
	e. Cognitive
	f. Metacognitive
	g. Psychomotor

Creemers' model was also tested by van der Werf *et al.* (2001) in Indonesia. The authors controlled for student background variables and school compositional effects and found the following: At the school level, student achie-

vement was associated with classroom observations by the principal (positive association in Bahasa), evaluation of teacher quality (positive association in mathematics and negative in science) and evaluation of school quality (positive association in science). Those three school-level factors explained 7%, 2.6%, and 1.2%, respectively, of variance that could actually be explained by all school and teacher variables. At the classroom level, student achievement was associated with time spent on subject and frequent questioning by the teacher (positive association in mathematics), explaining 9.6% of the variance that could be explained by all teacher and school factors and innovative teaching (positive association in Bahasa and science) explaining 12.3% and 17.8%, respectively of the variance that could be explained by all teacher and school factors. Together with parental involvement, these classroom- and school-level variables explained around half of the between-school and between-classroom variances that remained unexplained after partialing out student background and compositional effects. It appears that Indonesia is a country where it is easier to identify important school effectiveness variables since they are probably more unevenly distributed among the schools, and since student achievement is not uniform after taking into account student-level and compositional factors. However, because the findings varied across subjects, there is a possibility that they were chance alpha errors resulting from a large sample, or that Creemers' model needs to allow for differential effects of school effectiveness factors in different subjects.

In summary, the number of studies that tested conceptually integrated models is too small for any conclusions to emerge. From the limited evidence however (from industrialized and better-off developing countries), it appears that student background factors likely play the most salient role in student achievement, followed by classroom-level and then school-level variables. It also seems that a sufficient number of all relevant school effectiveness factors needs to be examined. Also, concluding from the results of earlier-mentioned integrated studies by Muijs and Reynolds (2000), PISA 2003 (OECD, 2004), and Rowan *et al.* (2002), factors that relate to the same larger construct (such as teacher quality) may need to be combined for the effect to be discovered.

#### *Failure to Accommodate the Hierarchical Nature of Schooling*

Fragmented research presented in the first part of the literature review has neglected inherently hierarchical nature of schooling, and most researchers have analyzed either student-level data or data aggregated to the classroom, school, district, or even state level. The analysis of student-level data ig-

nores the fact that students who are in the same classroom or school are not independent of each other since they share some educational experiences. Consequently, the statistical assumption of independent observations is violated, and the contribution of classroom-level and school-level factors to achievement is underestimated in favor of student-level factors (Raudenbush & Bryk, 2002). When aggregated data are analyzed, the variability between individual students is artificially reduced, which tends to inflate the effect of classroom-level and school-level variables (Raudenbush & Bryk, 2002).

These problems have been overcome by hierarchical linear modeling (HLM), which was designed to accommodate multiple units of analysis and therefore avoid underestimation and aggregation bias. HLM simultaneously considers all schooling levels and partitions variance in student achievement into variances that can be attributed to each individual schooling level (e.g., between-student variance, between-classroom variance, and between-school variance). Also, when various educational factors that belong to different schooling levels (e.g., parental education, teacher experience, or school resources) are included at the appropriate level, they are simultaneously examined in HLM in order to properly assess their association with student achievement<sup>4</sup>.

Integrated studies mentioned in this part of the literature review used HLM as their methodology. However, even when researchers used HLM, many failed to include all nested schooling levels into their investigation. In many studies (e.g., PISA 2003), student and school levels were explored, while the classroom level was disregarded. This omission, just like the omission of important variables, can have a major effect on results: If an important intermediate level is ignored, the variance components and variable coefficients of levels immediately above and below that level may be overestimated, and standard errors are affected as well (Opdenakker & Van Damme, 2000). This shortcoming can therefore lead to erroneous conclusions and policy decisions.

#### *The Inability to Capture Effects of Teacher-Related Variables*

Some integrated school effectiveness studies (Muijs & Reynolds, 2000), reviews on instructional effectiveness (Walberg & Paik, 2000), and studies

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<sup>4</sup> In addition, HLM allows researchers to examine cross-level interactions – how variables at one level impact relationships occurring at another. For example, researchers can study how a teacher's experience, school location, and community involvement affect the relationship between student gender and achievement that may exist at the student level. In other words, factors can be identified at different schooling levels that potentially mitigate or enlarge the achievement gap that may exist between students of different socio-economic backgrounds, different ethnicities, or different genders. Finally, HLM can improve the estimation of effects in an individual school (that has small sample of students) by pooling information that exists in similar schools without aggregating data (Raudenbush & Bryk, 2002).

that utilized value-added methods (Rivkin *et al.*, 2000; Sanders & Rivers, 1996; Wright *et al.*, 1997) suggest that teacher effects on student achievement are large. Muijs and Reynolds (2000) reported that teacher quality explained around 60-100% of total variance adjusted for student background, and Wright *et al.* (1997) showed that a teacher's effect on student achievement gain from grade to grade was most often the greatest of several other tested variables (class size, heterogeneity of the class, and student achievement level).

However, identifying specific teacher-related factors that affect student achievement remains elusive in current school effectiveness research. That might be because most of the studies have been conducted in countries where students change teachers on an annual basis, obscuring possible cumulative effects. Relatively strong and weak teachers will tend to cancel each other out, resulting in a weak overall relationship between teacher-related variables and student achievement. For example, Sanders and Rivers (1996) compared students with repeated exposure (three times in a row) to well-qualified teachers to those with same repeated exposure to poorly qualified teachers. The authors found that, after controlling for student prior achievement and background factors through the value-added method (which tracks the same student longitudinally), "students benefiting from regular yearly assignment to more effective teachers [had] an extreme advantage in terms of attaining higher levels of achievement. The range [was] approximately 50 percentile points in student mathematics achievement" (p. 6)<sup>5</sup>. Taking these findings into account, it is especially worthwhile to devise superior methodological tools to better identify teacher effects and / or explore teacher-related variables in school systems without annual changes in teacher assignments.

### *Synthesis of Findings*

In summary, the following conclusions emerge from the integrated, conceptually integrated and teacher-effect studies: (a) Student-level factors are very important in determining student achievement in industrialized countries and better off developing countries, while their effect is less pronounced in poor developing countries; (b) classroom-level variables exhibit significant association with student achievement in industrialized and better off developing countries, and less so in poor developing countries, with composite variables having a considerably larger effect than individual variables; and

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<sup>5</sup> However, it should be noted that peer effect was not controlled for in this study, and therefore potential effects of peer group were attributed to teacher effects (Lanahan *et al.*, 2005).

(c) school-level factors show the least consensus, with their likely effect sizes ranging from zero to modest in industrialized and better off developing countries, but school-level input-output variables are very important for poor developing countries.

To improve school effectiveness research in future, it seems that a sufficient number of all relevant school effectiveness factors needs to be examined, all nested layers (student, classroom and school) examined simultaneously, factors that relate to the same larger construct (such as teacher quality) combined, and methods that capture potentially very large teacher-related effects better designed.

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ШКОЛСКА ЕФИКАСНОСТ: КЉУЧНИ НАЛАЗИ  
*Анстракт*

У раду се разматрају новија и напредна истраживања образовне ефикасности. Део о интегрисаним истраживањима школске ефикасности праћен је делом који се бави концептуално интегрисаним моделима. Два дела која следе фокусирају се на још нека методолошка ограничења претходних истраживања: неуспех да се обухвати хијерархијска природа школовања и немогућност да се обухвате ефекти на наставнике. На крају, завршни део сумира све релевантне чињенице и правце у истраживању.

*Кључне речи:* школска ефикасност, интегрисано проучавање, концептуално интегрисана истраживања, хијерархијско линеарно моделовање, ефекти на наставнике.

Јелена Теодоровић  
ШКОЛЬНАЯ ЭФФЕКТИВНОСТЬ: КЛЮЧЕВЫЕ ВЫВОДЫ  
*Резюме*

В работе рассматриваются современные и прогрессивные исследования образовательной эффективности. Часть, касающаяся интегрированных исследований школьной эффективности сопровождается частью, занимающейся концептуально интегрированными моделями. Две следующих части сосредоточены на некоторые дополнительные методологические ограничения предыдущих исследований: неудачная попытка охватить иерархическую природу обучения и невозможность охватить воздействие на преподавателей. Наконец, заключительная часть суммирует все первостепенные факты и направления в исследовании.

*Ключевые слова:* школьная эффективность, интегрированное изучение, концептуально интегрированные исследования, иерархическая линейная моделировка, эффекты воздействия на преподавателей.