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Quality of teaching and quality of education: a review of research findings

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Quality of teaching and quality of education.
A Review of research findings

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Contents

Several decades of pedagogical research have now clearly shown that what teachers do in the classroom is undoubtedly the key educational determinant in student learning and achievement. It goes without saying that not all teaching practices are equal in this respect. It is therefore important to identify and promote the most effective practices, that is to say, practices which help pupils to achieve desired learning outcomes in the most effective way. From this perspective, there is a general rejection (on the part of researchers, decision-makers, teacher trainers, educational support staff, parents, classroom practitioners) of what is referred to as "traditional" teaching. This is an essentially expository form of teaching, dominated by the teacher, which relegates pupils to a passive role, reduces their classroom activity to the memorization of data to be recited to the teacher, and in particular, leads to the acquisition of skills of a lower taxonomic level. The proposed alternatives to this form of teaching may be grouped into two main categories: structured teaching approaches and discovery-based approaches. The advocates of each category agree on one fact: the acquisition of knowledge is a constructive process. How to support this process effectively in the school environment is the question dividing them. For obvious reasons, the answer to this question is particularly important for developing countries. Indeed, in these countries, largely as a result of economic constraints, learning conditions are not optimal[1] and indicators relating to education provision, both quantitative and qualitative, are weak. Moreover, "traditional" teaching is in fact the prevalent practice. In such contexts and in the light of the objectives of quality basic education for all, both the question of educational effectiveness and that of efficiency must be raised.

[1] Such conditions include – in addition to competent teachers – a relevant curriculum, a safe school environment with sufficient educational resources, optimal use of allocated time, a well-designed and managed learning assessment system, reasonable pupil/teacher and pupil/class ratios, and healthy, well-fed learners who do not have to walk long distances to go to school and back.

This document attempts to answer the following questions: **Which pedagogical practices have the most positive influence on the teaching-learning process and its subsequent outcomes? Which practices are most promising in the context of developing countries?** To this end, in the following pages, first we examine teacher effect and value added by the teacher. We then review research on the alternatives to "traditional" teaching mentioned above. In the latter part, which constitutes the core of the document, we lay special emphasis on the ability to read as the most important skill to develop at school since it is one of the best predictors of school performance. We end our study with a discussion which includes a brief critical review followed by a few recommendations.

1. Teacher effect and value added by the teacher

1.1. Teacher effect

Most sociological studies on education conducted from the 1960s onwards, including the well-known report by Coleman *et al.* (1966), confirm that pupils from disadvantaged backgrounds are at greater risk of experiencing difficulties at school than pupils from wealthier backgrounds. The convergence and significance of the conclusions of these studies have contributed to fuelling the belief that school and teaching staff have only very little impact on academic achievement among pupils from disadvantaged backgrounds. Nevertheless, while observing the strong link between disadvantaged backgrounds and low school performance, Coleman *et al.* also noted in their report that this situation was not irreversible and that school itself could counterbalance the weight of pupils' socio-economic background. In that connection, they illustrated that the *teacher* variable has a more pronounced effect on school achievement among pupils from modest backgrounds and

ethnic minorities. Coleman *et al.* also underline that, regardless of the pupil's ethnic group, good teachers exert a greater influence on the achievement of pupils from poor socio-economic backgrounds (Crahay, 2000).

Identifying effective teaching practices necessarily implies that teachers have the power to influence student learning. Is this influence more or less important than other factors such as family background, student motivation, intellectual potential, etc.? The works by Wang, Haertel and Walberg (1993) provide an answer to this question. Indeed, these American researchers performed an important meta-analysis which enabled them to identify the factors most likely to help pupils to learn. In the framework of this study, they analysed 179 reviews and book chapters, compiled 91 research syntheses, and surveyed 61 education researchers in order to set up a database of 11,000 statistical results. They identified 28 factors influencing learning and then classified them in order of priority. The two most prominent factors are directly related to the teacher. ***Teachers are thus the most influential factor in student learning***, ahead of the family, which only ranks fourth. As Coleman *et al.* pointed out in their 1966 report, although it has an important influence on achievement, the pupil's background does not constitute an insurmountable barrier. In fact, a synthesis of 134 meta-analyses published in 1992 by Hattie demonstrates that the *overall effect-size* on school performance of factors related to the family and social environment is 0.38 whereas it reaches 0.53 for factors related to teachers and school[2]. It should be noted that a result is considered significant for an overall effect-size equal to or greater than 0.25 (Adams et Engelmann, 1996). Other research syntheses (Brophy and Good, 1986;

[2] Effect-size is the difference of the experimental group mean and the control group mean, divided by the standard deviation of the control group (Crahay, 2000).

Rosenshine and Stevens, 1986; O'Neill, 1988; Gauthier, 1997) also confirmed that teachers, through class management and management of teaching, have a direct impact on student learning.

1.2 Value added by the teacher and school effect

Traditional standardized assessments make it difficult to establish a direct link between the quality of teaching and the achievement outcomes of pupils. The performance observed with this form of assessment is influenced by several other factors, including pupils' prior knowledge, their skills, the quality of prior instruction, and socio-economic level. Such a form of assessment does not isolate teacher impact from other educational or non-educational factors influencing academic performance (Meyer, 1997). The limitations of traditional assessments may nonetheless be offset by measuring teacher value-added (Drury and Doran, 2003).

When pupils are assessed annually by tests which are standardized, aligned and congruent with scheduled curricula, it becomes possible to measure teacher value-added. The scores of all the pupils are then compiled from one year to the next and plotted on a common scale, in order to compare their progression. Value-added is obtained by various statistical calculations which endeavour to significantly isolate or adjust the effect of factors other than the teacher (socio-economic level, ethnic origin, prior school experiences, etc.) over performance gains achieved per student over a period of a year (Drury and Doran, 2003). The measure thus obtained is more objective because it directly assesses the impact of teaching on student learning (Meyer, 1997).

In the mid-1990s, on the request of the Department of Education of the State of Tennessee, Sanders established an accountability system measuring teacher value-added, called *The Tennessee Value-Added Assessment System (T.V.A.A.S.)*. In a study conducted in 1996, by using a cross-section of statistical data, the system demonstrated that when low-performing pupils are

placed under the tutelage of teachers identified as the most effective in the state, over an academic year, their school performance places them on average at the 53rd percentile rank. That is thirty-nine points above the performance achieved (14th percentile rank) when the same category of pupils are in classes led by teachers identified as least effective (see Figure 1).[3] The same achievement outcomes were observed among average and high-achieving pupils. Annual performance gains spurred by effective teachers (with high value-added) among average and high-achieving pupils are about 25 percentile ranks higher than the achievement of these pupils when placed under the tutelage of less effective teachers.

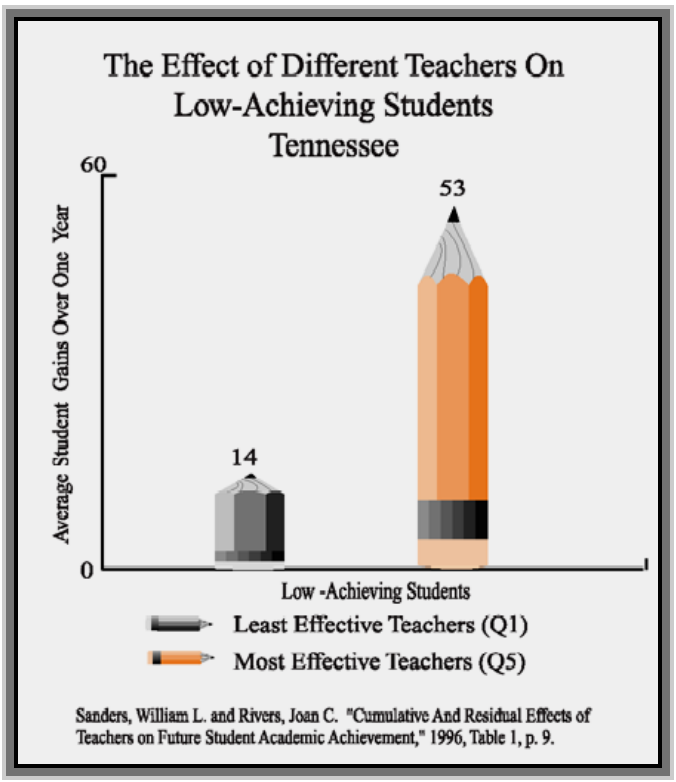

FIGURE 1

[3] It should be noted that a percentile rank of 20 or below relates to the performance of a child experiencing learning dificulties, while a percentile rank of 50 displays average performance (Adams and Engelmann, 1996). Sanders thus demonstrates that the teacher can make a difference as to whether the pupil is identified as experiencing learning difficulties and requiring re-education, or achieves average class performance without any particular support needs.

Moreover, annual performance gains are cumulative. Sanders (1996) showed that average students assigned to effective teachers from the 3rd to 5th grade of primary school, inclusive, achieve a performance in mathematics tests which places them at the 83rd percentile rank, as compared to the 29th percentile rank when they are placed under the tutelage of less effective teachers (see Figure 2). There is thus a variation of 50 percentile ranks, which is, to say the least, substantial.

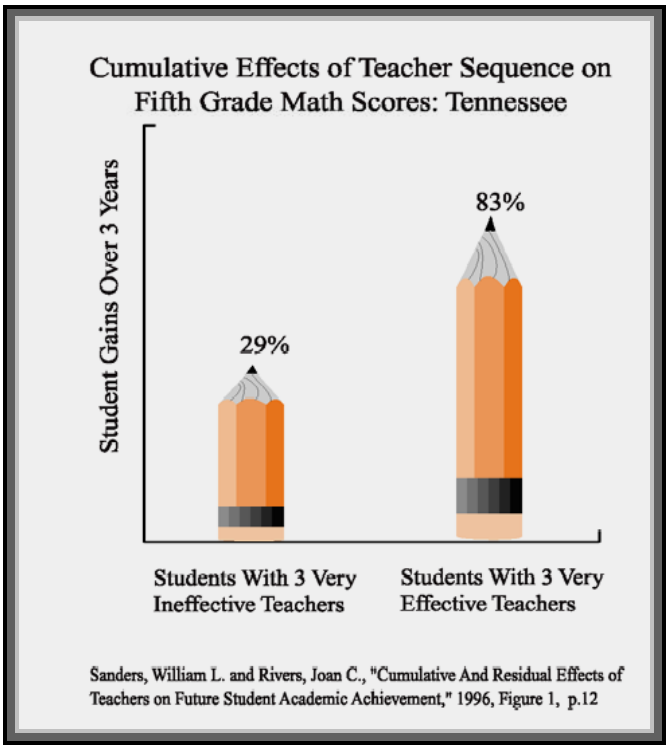

FIGURE 2

The research conducted by this author shows that the teacher effect, that is to say, value-added, undeniably has an impact on the academic performance of all pupils and that, among the latter, low-performing pupils are the largest beneficiaries.

> *Despite ongoing debates about whether, and how much teachers make a difference in student learning relative to a host of other factors assumedly affecting student learning (Wang, Haertel and Walberg, 1993), and whether particular elements of teaching can be systematically and causally linked to student*

> *achievement (Scriven, 1990),* ***the results of this study well document that the most important factor affecting student learning is the teacher****. In addition, the results show wide variation in effectiveness among teachers. The immediate and clear implication of this ending is that seemingly* ***more can be done to improve education by improving the effectiveness of teachers than by any other single factor****. Effective teachers appear to be effective with students of all achievement levels, regardless of the level of heterogeneity in their classrooms. If the teacher is ineffective, students under that teacher's tutelage will achieve inadequate progress academically* (Wright *et al.* 1997, p.63).

Also according to Sanders (1998), research conducted using the data collected by *the Tennessee Value-Added Assessment System (T.V.A.A.S.)* shows that ethnic origin, socio-economic level, teacher/pupil ratio and classroom heterogeneity are very poor predictors of improvement in student performance. It is rather teacher effectiveness which determines the progress achieved by pupils. The teacher effect on student performance is additive and cumulative. Furthermore, the data collected so far indicate that is unlikely an effective teacher may subsequently counterbalance the negative impact of an ineffective teacher on a pupil's performance.

More recent works (Babu and Mendro, 2003; Rivkin *et al.*, 2002) confirm the findings of Sanders. During the 1990s, the Dallas District, in the state of Texas, established an accountability system measuring teacher value-added. Babu and Mendro analysed academic performance among primary school pupils from 4th to 7th grade in the mathematics tests used by the Dallas District, to partially measure teacher value-added. For the purpose of the study, the researchers set up two groups of pupils. A first group was assigned exclusively, over three consecutive years from 5th to 7th grade, to teachers with positive value-added, and a second group was assigned only to teachers with negative value-added. The results of the study reveal that 90% of low-performing students in the first group [teachers with positive value-added] passed their mathematics test at the end of 7th grade, as compared to only 42% of low-performing students in the second group [teachers with negative value-added]. Thus the difference in achievement rates observed between the two groups is dramatic (see Figure 3).

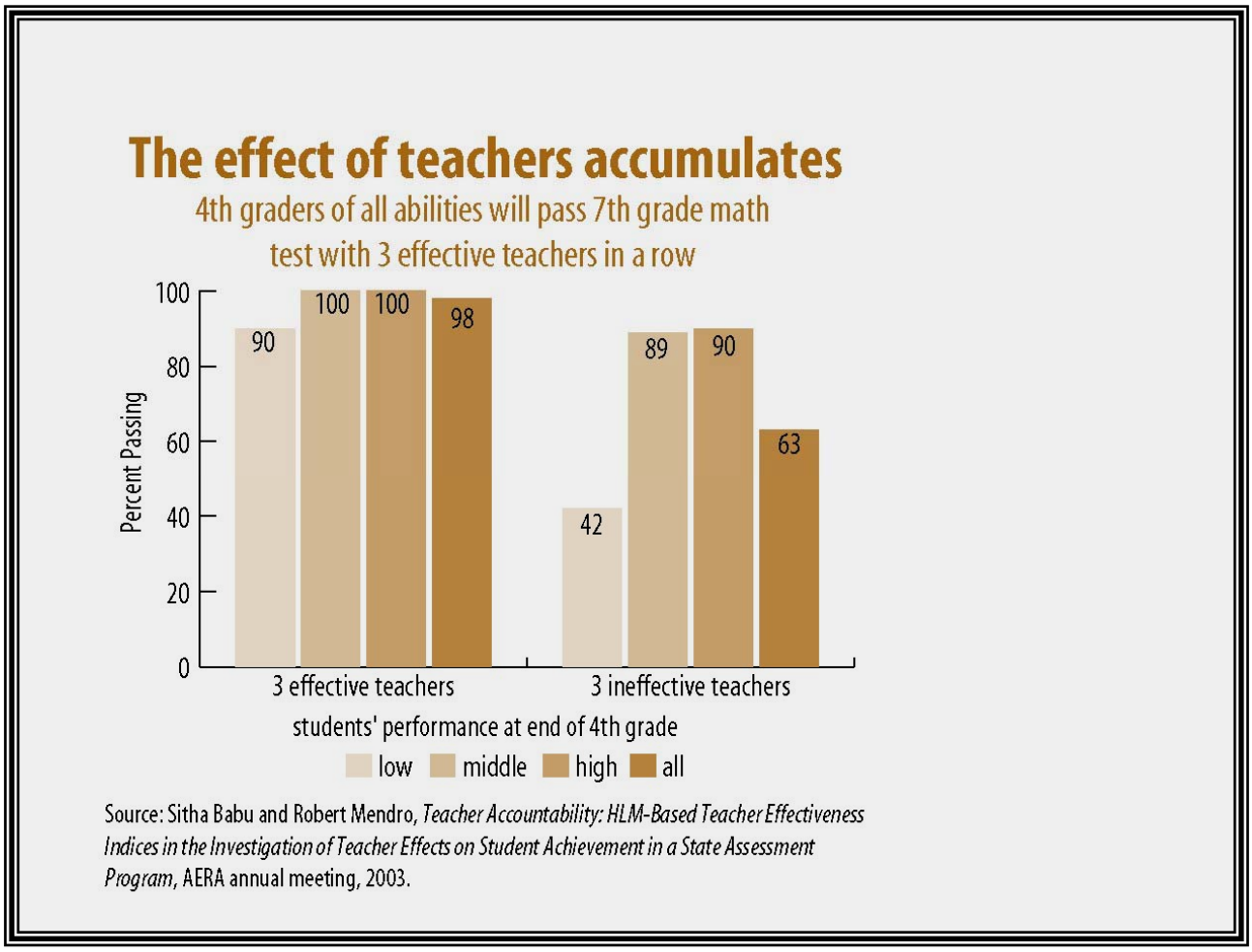

FIGURE 3

Additionally, Rivkin *et al.* (2002) analysed the achievement outcomes of about half a million pupils from 3000 primary schools in Texas in order to measure the value added by teachers. These researchers concluded that:

> *The results show large differences among teachers in their impacts on achievement. Our estimates, which are based on just the within school variations in teacher quality, reveal the effects of teacher quality to be substantial even ignoring any variations across schools.* ***They indicate that having a high quality teacher throughout elementary school can substantially offset or even eliminate the disadvantage of low socio-economic background*** (Rivkin, Hanushek et Kain, 2002, p.3).

The research mentioned earlier thus confirms the major determining effect of teaching on student learning, through value-added. In short, an increasing number of studies are pointing to the following conclusions: the teacher, through class management and management of teaching,

influences student learning; consequently, by improving teaching practices, student performance can be improved. Teaching practices thus have substantial power to influence student achievement, in particular among pupils from low socio-economic backgrounds. **But precisely which teaching practices are considered most effective?**

2. Alternatives to "traditional" teaching

2.1. A brief overview

As mentioned in the introduction, alternatives to the commonly criticized "traditional" form of teaching are divided into two main categories: structured teaching approaches and discovery-based approaches. They may be briefly described as follows:

	Salient features	Learning objectives	Dominant approaches
Structured teaching approaches	✓ Basic principles: mastery learning; progression from simple to complex ✓ Directiveness ✓ Explicit teaching of contents ✓ Modelling ✓ Independent and guided practice	✓ Mastery of content ✓ Academic achievement ✓ Acquiring learning strategies	✓ Direct instruction ✓ Explicit teaching
Discovery-based teaching approcaches	✓ Basic principles: the child, focus of attention; progression from complex to simple ✓ High interactivity ✓ Building knowledge through investigation/discovery ✓ Inter-learning ✓ Situated cognition	✓ Conceptual understanding of contents ✓ Critical analysis ✓ Problem-solving skills	✓ Whole language ✓ Constructivism/discovery learning ✓ Cognitively oriented curriculum ✓ Developmentally Appropriate Practices

What does the research tell us about the practices linked to these categories and the results produced? As regards structured teaching approaches, it is apparent from the research that:

- they are well-established and widely studied, mainly in industrialized countries;
- they are successfully institutionalized;
- the results derived from their application are conclusive with respect to student learning;
- their effectiveness is proven, in particular among children from disadvantaged backgrounds
- they are apparently accessible to any ordinary teacher and appropriate for large classes;

- there is operational clarity around these approaches and they are therefore subject to consistent interpretations.

As regards discovery-based approaches, the following arises from the research:

- the majority of current programmes have been developed recently and on a small scale.
- attempts to institutionalize them, both in industrialized and developing countries, have met with limited success.
- their effectiveness is not yet established insofar as learning outcomes are mixed or inconclusive.
- they are apparently inaccessible to ordinary teachers.
- Finally, they lack operational clarity and are therefore subject to a variety of interpretations.

In a report to the *Society for Advancing Educational Research (S.A.E.R.)* of Canada, Freedman wrote in 1993: *"There is no large-scale empirical research which shows that child-centered, activity-based learning is superior to direct instruction in the teaching of basic skills… all the large-scale studies show direct instruction is superior"* (SAER, 1993, p. 22). This observation remains valid, although several studies carried out in developing countries appear to contradict this (see for instance Avalos, 1992; Avalos and Haddad, 1981; Little, 2001).

In the light of this brief overview of the two alternative categories to "traditional" teaching, the rest of this part of the document focuses on structured teaching approaches. First we present evidence of the effectiveness of such approaches, then we provide details on explicit teaching, an example of a structured teaching approach whose effectiveness is established.

The *Follow Through* project is the largest-scale experiment ever conducted in the West in the field of education (Slavin, 2002). This research was aimed at comparing and analysing the effectiveness of some twenty teaching approaches used with pupils from disadvantaged socio-economic backgrounds[4]. The experiment was performed with children in nursery school and in the first three years of primary school[5]. It is a longitudinal study which was carried out over a

[4] These are children mainly from disadvantaged backgrounds, whose academic performance places them on average at the 20th national percentile rank (Stebbins, St-Pierre, Proper, Anderson and Cerva, 1977).

[5] The testing and evaluation of the *Follow Through* project were carried out between 1967 and 1976, but the project was continued until 1995.

period of some ten years, involving 70,000 pupils from 180 schools. Data concerning about 10,000 pupils were collected annually and analysed for the purpose of the study.

The nine most popular teaching approaches or models used for the final analysis in the framework of the *Follow Through* project were divided into two main categories: structured approaches and pupil-centred approaches. Structured teaching approaches came under the ***Basic skills model***, because they were particularly geared towards systematic teaching of basic learning skills such as reading, writing and mathematics. With regard to pupil-centred teaching approaches, they were grouped under the ***cognitive skills model*** or the ***affective skills model***.

The cognitive skills model focused primarily on the cognitive development of pupils, taking into account their maturity level and style of learning. It was based on stimulating higher intellectual skills deemed essential for achieving learning outcomes and on developing the ability to "learn to learn". As for the affective skills model, it was geared mainly towards respecting the rhythm, requirements and interests of pupils. In this framework, learning objectives were achieved as a function of pupils' choices, on the basis of centres of activity involving all forms of stimulation. These strategies were aimed at fostering optimal affective development which, according to advocates of this type of model, is necessary for academic learning[6].

The pupils' final assessment, which was held at the end of 3rd grade, measured the three broad dimensions of learning divided into three types of skills: ***basic skills*** such as reading, writing, mathematics and vocabulary; ***cognitive skills***, such as non-verbal reasoning and problem-solving; and finally, ***affective skills***, that is to say, self-esteem and self-image. To this end, five standardized tests[7], selected as a result of agreement between advocates of the different approaches assessed, were administered to about 15,000 pupils.

The achievement outcomes obtained in the various tests by pupils in the groups experimenting the nine approaches were then compared to the outcomes of control groups which received traditional instruction only[8]. The outcomes of this assessment were gathered and analysed by two

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[6] For a detailed description of the nine approaches, see the article by Gary Adams "Project Follow Through and Beyond" in *Effective School Practices*, Volume 15 Number 1, Winter 1995-96.
http://darkwing.uoregon.edu/~adiep/ft/adams.htm

[7] *Metropolitan Achievement Test, Wide Range Achievement Test, Raven's Colored Progressive Matrices, Intellectual Achievement Responsibility Scale, Coopersmith Self-Esteem Inventory.*

[8] One of the methods used, whose results are illustrated in Figure 6, consisted of assigning an overall efficiency percentage rating to each approach by compiling its positive and negative effects and dividing them by the total number of comparisons performed with the control groups, for the three dimensions measured. For instance, 10

impartial and independent agencies, one of which dealt more specifically with collecting data, while the other analysed data. The scores obtained by the nine models are illustrated in Figures 4 and 5.

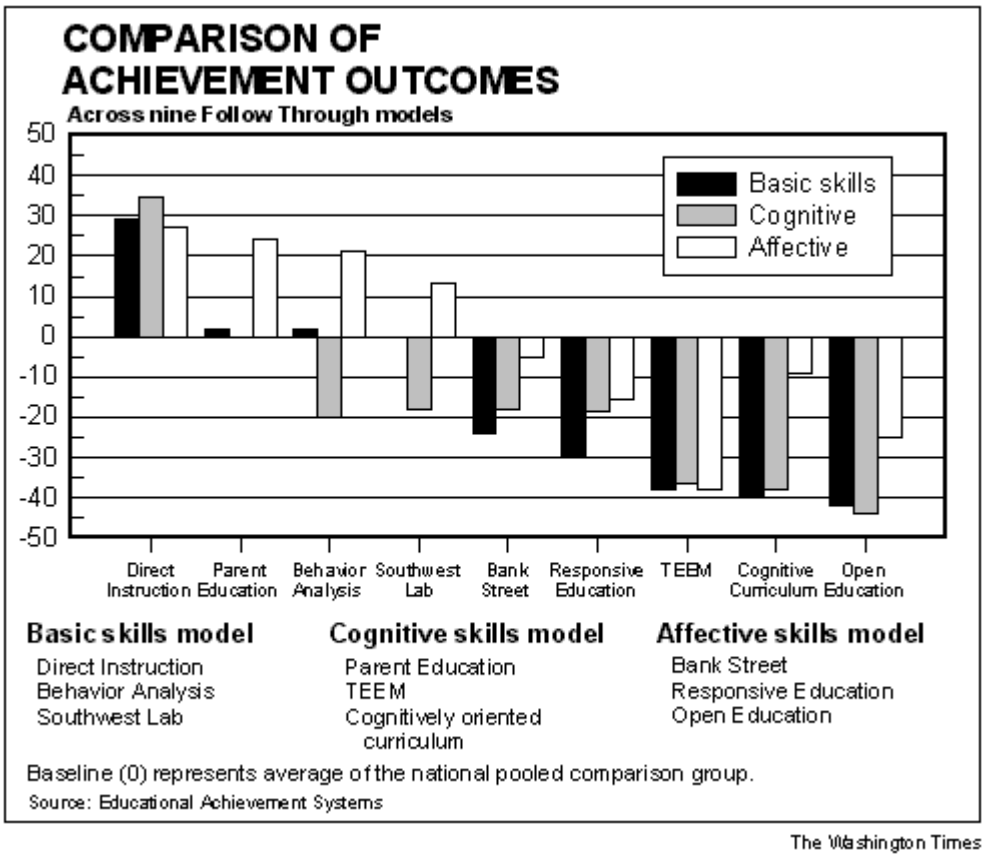

FIGURE 4

significant negative effects obtained by an approach, combined with 20 significant positive effects, over a total of 100 comparisons of affective skills produced an approach with a +10% overall efficiency rating for affective skills compared to the control groups which received only traditional instruction.

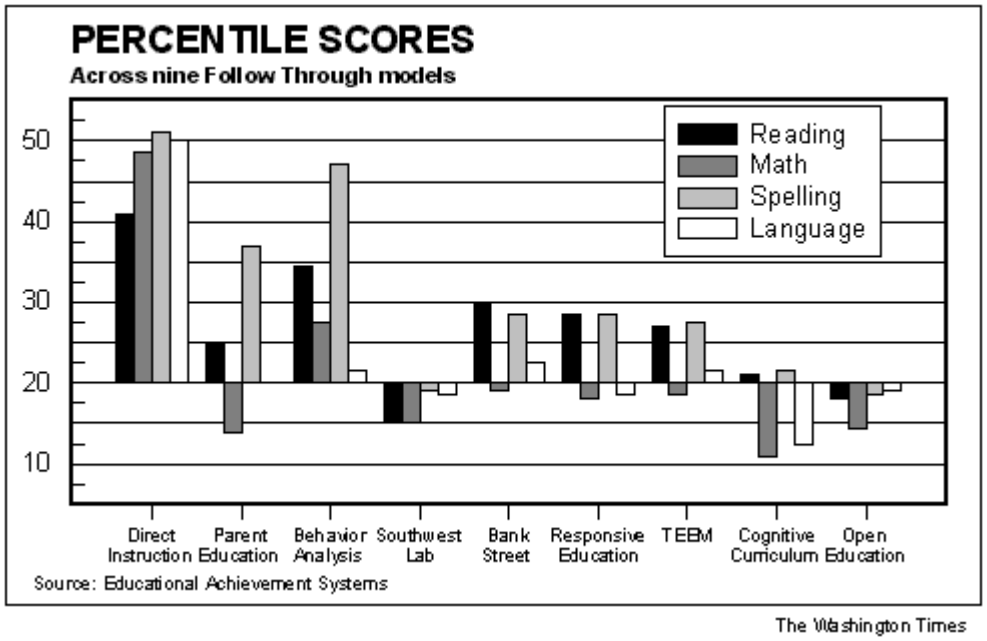

FIGURE 5

The data presented in Figure 4 clearly indicate that the basic skills model, whose three approaches focus on learning/teaching contents, generally performs better for most measures than pupil-centred teaching approaches, that is to say, the cognitive and affective skills models. **This entails that for five out of the six models placing emphasis on a pupil-centred teaching approach, achievement outcomes were considerably lower than those obtained with a typically traditional teaching approach (represented by a rating of 0 in Figure 4).** It should be noted that *Direct Instruction*, a highly structured teaching method specifically geared towards learning basic skills, is the only teaching approach which, as compared to the control groups which received traditional instruction, displayed positive outcomes for the three aspects assessed: basic, cognitive and affective skills (see Figure 4). Furthermore, achievement outcomes (see Figure 5) of pupils having experienced the *Direct Instruction* model generally reflect average or near-average national performance[9] (Adams and Engelmann, 1996; Kame'enui and Gersten, 1997).

Two other studies concerning methods for teaching reading in primary school (Evans and Carr, 1985; Stalling *et al.*,1978) suggest that structured, systematic and explicit teaching of reading,

[9] The average performance achieved at the various reading, writing and mathematics tests is at about the 50th percentile rank.

such as that recommended in *Direct Instruction*, results in superior outcomes than implicit, less structured teaching methods.

It should be noted that the researchers who drafted the report produced by the independent firm responsible for analysing the results of the *Follow Through* project revealed how particularly surprised they were to observe the impact of pupil-centred teaching approaches on the affective and cognitive dimensions of the pupils tested. Although one of the key objectives of these models was to respect the rhythm and requirements of pupils with a view to promoting, in particular, the development of their affective and cognitive skills, negative effects were observed on self-esteem and self-image, and also on cognitive skills.

With respect to the *Direct Instruction* model, whose objective was to explicitly teach pupils a strict learning approach which they should then apply systematically in learning basic subjects, in addition to the positive effects on this particular aspect, there was a substantial impact on the affective and cognitive skills of the pupils tested.

The knowledge acquired by pupils at school thus contributes to developing their cognitive skills, while the academic achievement they experience increases their self-esteem – which is pivotal to the development of affective skills (Adams and Engelmann, 1996). These findings are corroborated by Fraser (1987) who points out in a synthesis of 92 meta-analyses concerning the affective dimensions of learning, that *Mastery Learning*, the guiding principle of the *Direct Instruction* model, is, among the factors measured, the factor showing the highest correlation with the affective dimensions of learning. It should be recalled that educational achievement is the real driving force behind intrinsic motivation and is the cornerstone of positive self-esteem and self-image (Adams and Engelmann, 1996; Ellis and Worthington, 1994).

Following the publication of these findings, the *Follow Through* project, in view of the new issues raised, prompted more in-depth research (House and Glass, 1979; Bereiter, 1981; Becker and Carnine, 1981). However, these new analyses, which drew on a yet more sophisticated methodological approach than that used initially, served to confirm the greater effectiveness of the *Direct Instruction* approach, compared to the other approaches used in the framework of the *Follow Through* project (Watkins, 1995-96).

Moreover, a follow-up study conducted by Gersten and Keating in 1987 among pupils taking part in the *Follow Through* project revealed that pupils taught according to the *Direct Instruction* model achieved superior outcomes, a higher graduation rate and lower repeat rate than pupils

from the control groups, who received traditional instruction only. A meta-analysis published by Lipsey and Wilson in 1993 also confirmed that *Direct Instruction* delivered substantially superior results to *Whole Language* and *Open Education* in respect of academic performance.

In March 2001, the *Wisconsin Policy Research Institute*, a neutral, non-profit organization responsible for studying educational and pedagogical trends in the State of Wisconsin, prepared a comprehensive research report (levels 1-2-3 according to the taxonomy of Ellis and Fouts) entitled: "Direct Instruction and the Teaching of Early Reading: Wisconsin's Teacher-Led Insurgency". After analysing the research published on *Direct Instruction* over a twenty-five year period and visiting six schools experimenting this approach, the organization confirmed its remarkable effectiveness among all categories of pupils (including pupils from disadvantaged backgrounds) and concluded its report with a recommendation to use this model. Additionally, a study performed by Herman *et al.* (1999) comparing the effectiveness of some twenty teaching approaches revealed that the *Direct Instruction* model had the highest impact on student performance.

More recently, the effectiveness of *Direct Instruction* was confirmed again in the meta-analysis by Borman *et al.* (2002 and 2003). The objective of this study was to measure and compare the impact of a series of teaching models when implemented throughout a school. More precisely, this meta-analysis calculated the overall effect-size of 29 models used across the United States. To achieve this project, Borman *et al.* (2002 and 2003) selected 232 studies involving 145,296 pupils attending schools in which one of the 29 preconceived models had been introduced. From these studies, 1,111 measures were drawn. The studied models had been introduced for about three years in schools admissible to the *Comprehensive Schoolwide Reform Demonstration Program* (C.S.R.D.). Borman et *al.* conclude that:

> *"The overall effects of CSR, though, appear promising and the combined quantity, quality, and statistical significance of evidence from three of the models, in particular, set them apart from the rest [1st Direct Instruction, 2nd Success for All, 3rd School Development Program]"* (Borman *et al.*, 2002, p.v).

Furthermore, three meta-analyses (see Figure 6) show that the overall effect-size produced by *Direct Instruction* is very high (0,82 à 0,93)[10] both in reading and mathematics – equally among pupils with learning difficulties and those in regular classes.

[10] It ought to be specified that an overall effect-size of 0.25 or below is considered marginally significant or non-significant; when the effect is between 0.25 and 0.50 it is significant but small, when it oscillates between 0.50 and 0.74 it is significant and average, while an overall effect-size of 0.75 and above is significant and large (Adams & Carnine, 2003).

Meta-analysis	Target population	Average overall effect-size Reading and mathematics
White (1988) **25 studies**	Pupils with learning difficulties	**0.84**
Adams & Engelmann (1996) **34 studies**	Pupils with learning difficulties Pupils in regular classes	**0.90** **0.82**
Adams & Carnine (2003) **17 studies**	Pupils with learning difficulties	**0.93**

FIGURE 6

The effectiveness of this teaching model was demonstrated again, in June 2003, when the 1st grade pupils at *City Springs* – one of the most disadvantaged primary schools of the Baltimore School District in the United States – had **an average achievement outcome placing their performance at the 99th percentile rank** in the standardized reading and mathematics tests. This school, which introduced the *Direct Instruction* model in 1998 in all its classes and at all levels, witnessed an improvement in the performance of its 1st grade pupils, of 71 percentile ranks in reading and 91 percentile ranks in mathematics, within only six years. The gains observed among 5th grade pupils are similar: an increase of 73 percentile ranks in reading and 70 percentile ranks in mathematics (see Figures 7 to 10). City Springs is one of the schools which recorded the fastest improvement in the entire history of American education:

"Take a school in a high-poverty area of a large U.S. city—a school that has experienced years of utter failure—and implement the full-immersion model of Direct Instruction faithfully for more than 6 years, and what are the results? Possibly the most dramatic turn-around of a school from failure to success in the history of the United States" (Engelmann, 2003, p. 12).

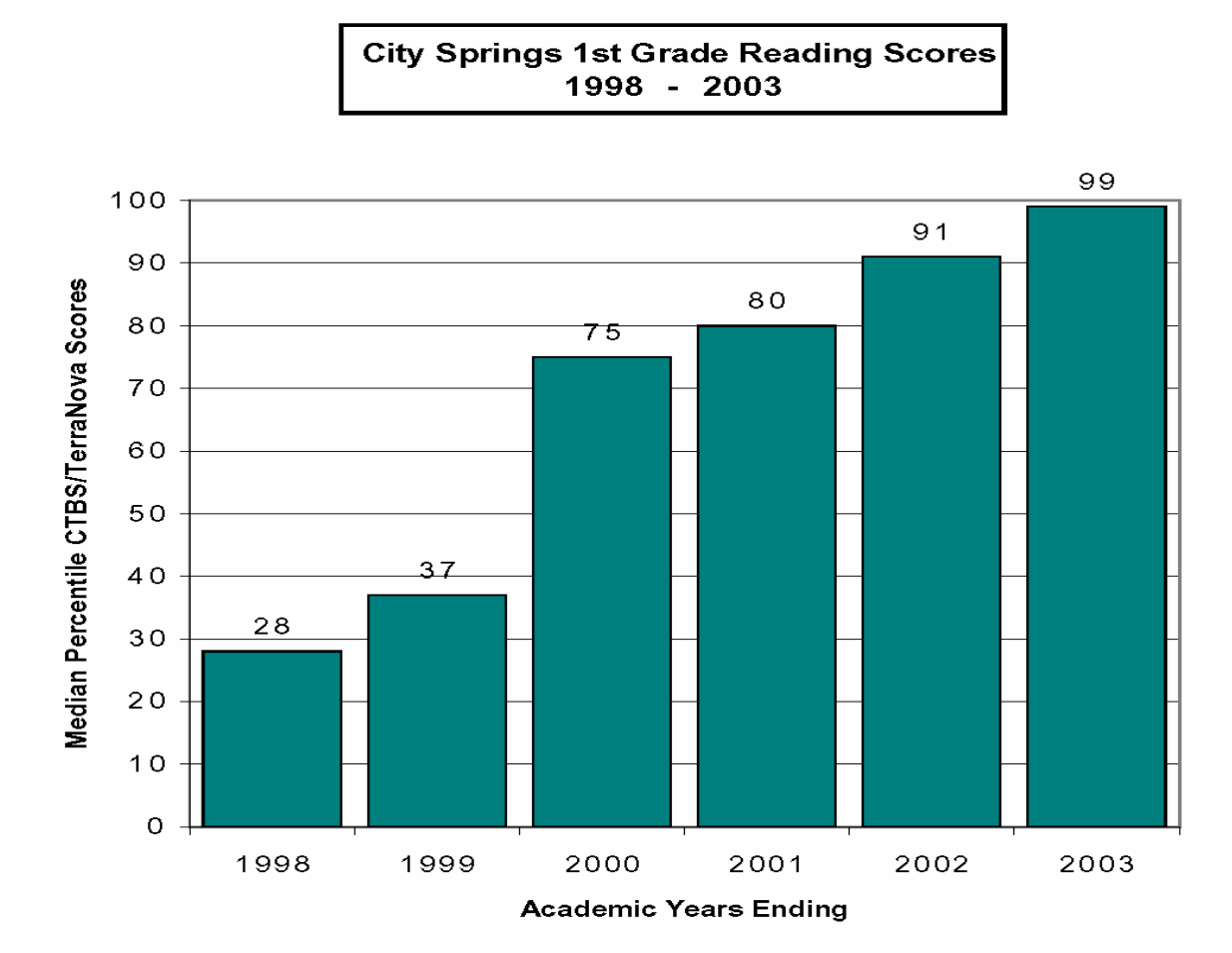

FIGURE 7

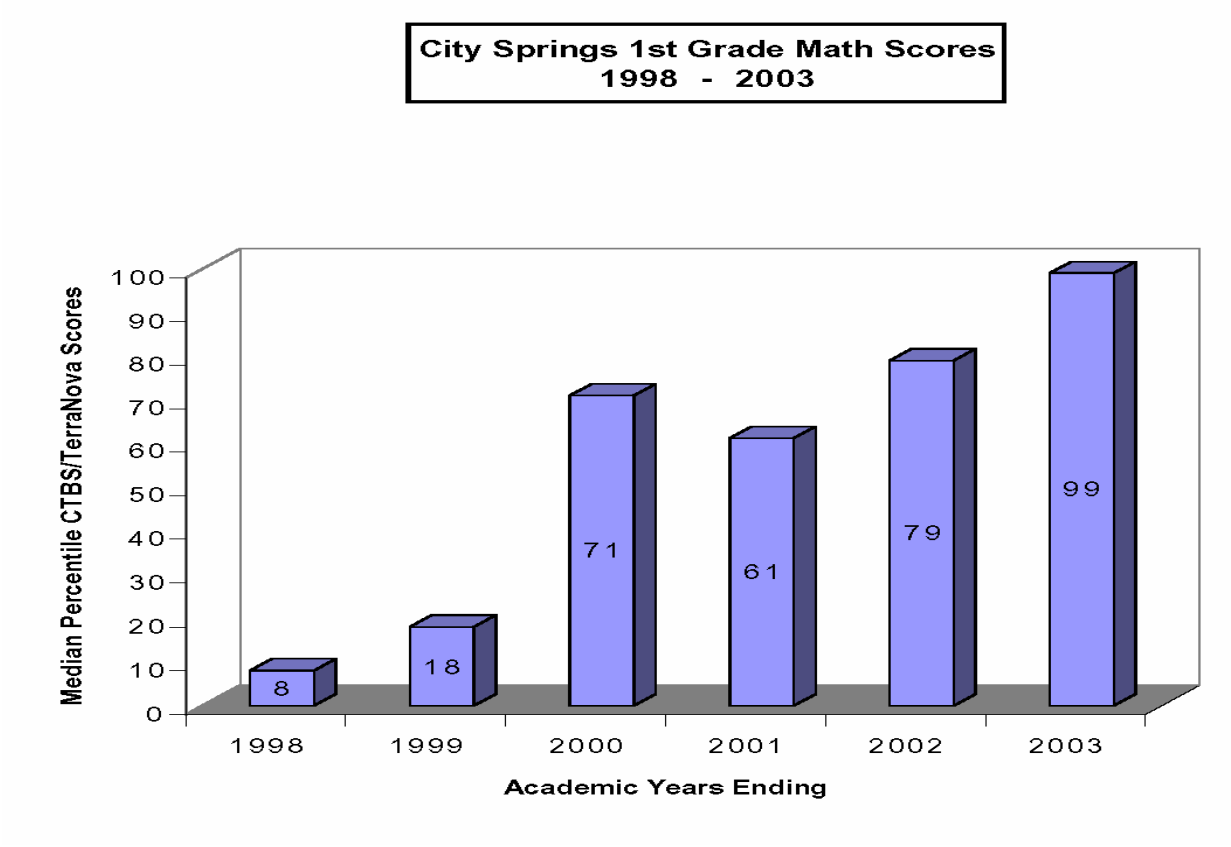

FIGURE 8

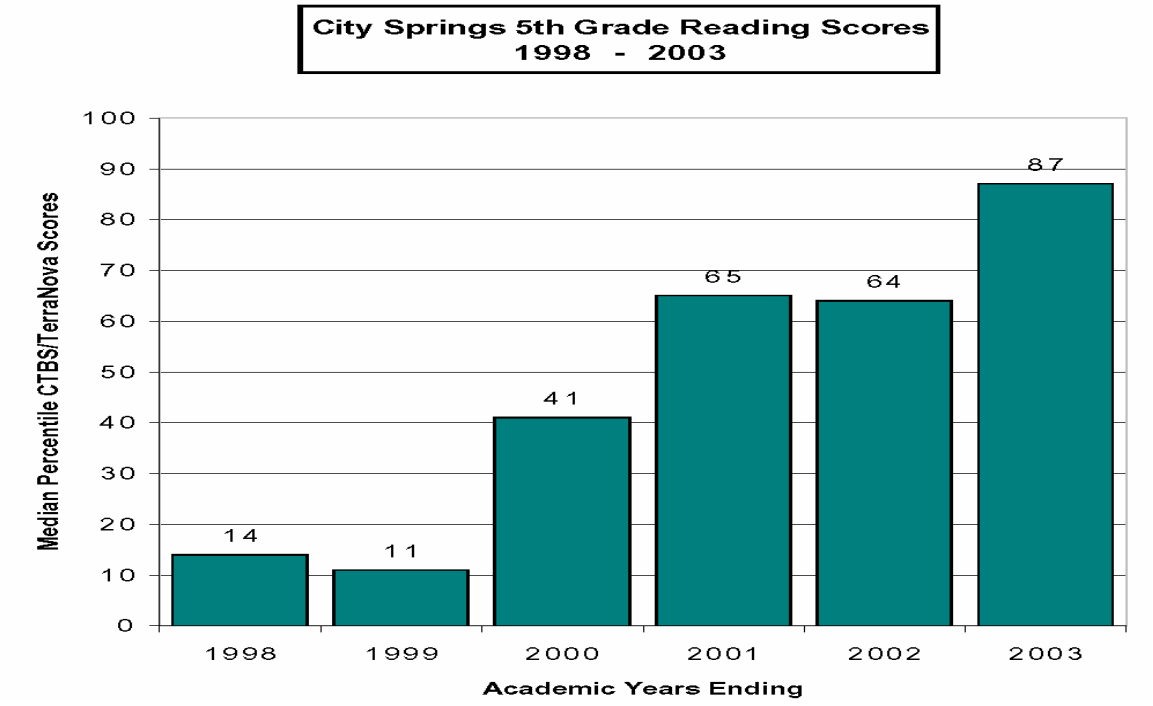

FIGURE 9

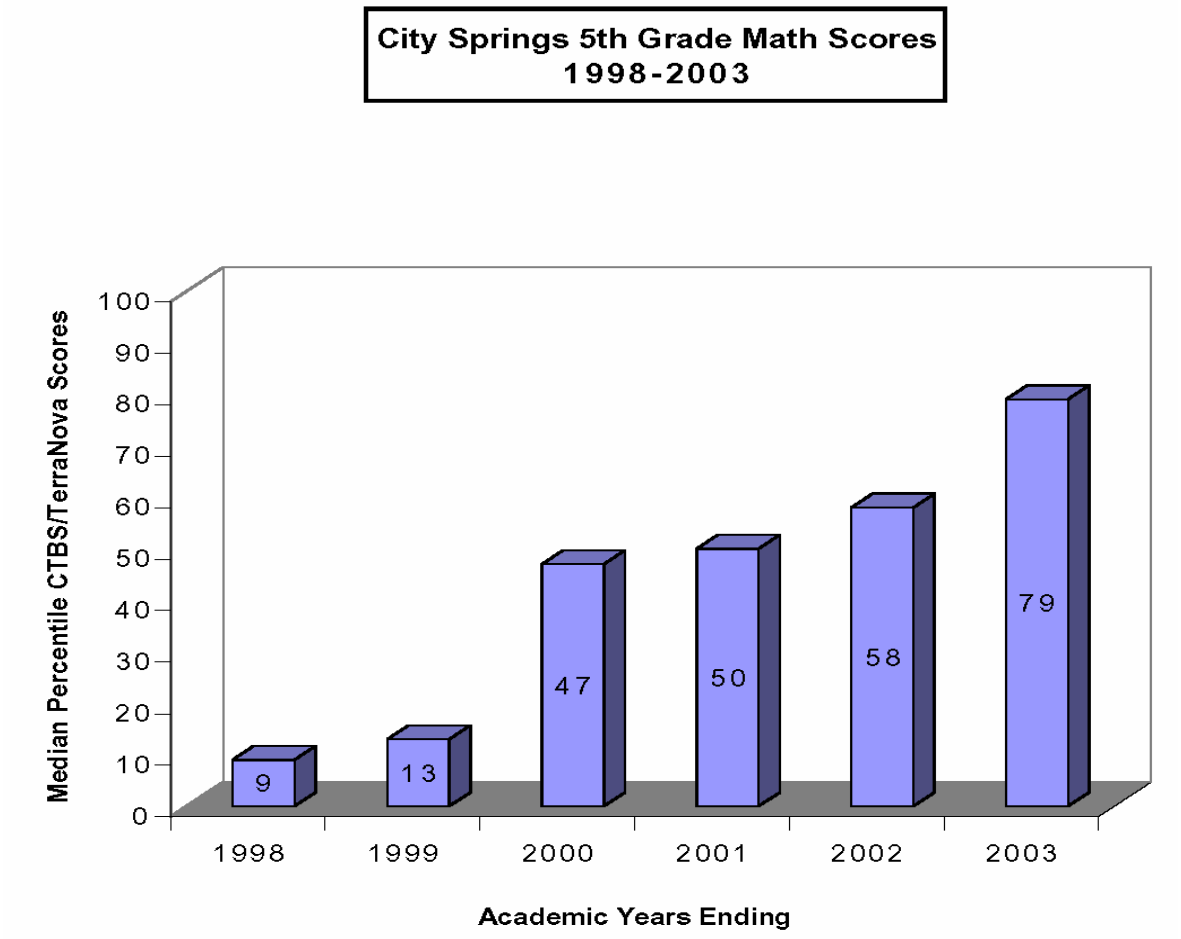

FIGURE 10

Paradoxically, as highlighted by Carnine (1998 and 2000), although *Direct Instruction* currently still produces equally good achievement outcomes, if not better than those produced by the *Follow Through* project between 1970 and 1980, two of the most popular teaching models today are derived from approaches which had generated the worst outcomes, twenty years earlier. Indeed, Carnine[11] points out that these two approaches are still used today, but under different names. These are child-centred approaches: 1 – a cognitive model that is currently very much in vogue, the *Whole Language* model derived from the *Tucson Early Education Model (TEEM)*, and 2 – an affective model, the *Constructivism/Discovery Learning* model which is related to the

[11] Furthermore, Carnine indicates that the *Open Education* and *Cognitively Oriented Curriculum* models, currently better known under the name of *Developmentally Appropriate Practices*, are teaching approaches also used today which had, at the time of the *Follow Through* project, showed negative outcomes for all the dimensions measured.

Responsive Education model. It should be noted that, according to the data in Figure 4, both these pupil-centred approaches had, at the time, displayed negative outcomes for all the dimensions measured. Moreover, a recent study (Horn and Ramey, 2003) which had listed several studies conducted on the cognitive model *Cognitively Oriented Curriculum*, currently better known as *Developmentally Appropriate Practices*, concluded that this model is ineffective in improving academic performance:

> *This study also contributes to the research literature by evaluating the effects of three different aspects of DAP [Developmentally Appropriate Practices]: Integrated Curriculum, Social/Emotional Emphasis, and Child-Centered Approaches. The finding that none of these three aspects of DAP is consistently related to improved students outcomes provides evidence that these aspects of classroom practices whether in combination or alone, do not relate to student academic performance...* ***The most immediate implication of the results is that the widespread implementation of DAP is unlikely to result in increases in student achievement, especially as measured by standardized achievement tests*** (Horn and Ramey, 2003, pp.965-966).

Unfortunately, political decision-makers do not always take the initiative to consult scientific studies as illustrated by the examples of England and California. In the 1990s, the State of California introduced in all its primary schools a reading curriculum based on the *Whole Language* model, and at secondary level, several mathematics curricula inspired from *Constructivism/Discovery Learning*. The data collected show that these curricula had a very negative impact on academic performance, both in reading and mathematics. This was demonstrated in the national reading tests of 1994[12] and in university entrance mathematics examinations[13]. In the case of England, the *Open Education* teaching model was tested for over twenty years, from 1967 to 1991, and finally discarded in 1992. Thus in 1991, at the time when pupils in England were sitting the international science tests for the first time in the country's history, 61% of its schools were found to achieve a lower performance than the worst-performing Japanese school tested (Grossen, 1993). As a result, school curricula in England – as in the state of California – were revised to adopt **structured teaching models**.

Furthermore, the superiority of structured teaching models was reconfirmed by the educational reform undertaken in Wisconsin in the mid-1990s. This reform was aimed at improving teaching quality and had adopted the strategy of reducing the ratio of pupils to a maximum of 15 per class,

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[12] Between 1988 and 1994, the reading scores of Californian pupils at N.A.E.P. (*National Assessment of Educational Progress)* dropped from about the 25th percentile rank to the lowest rank among all American states. See: **http://mathematicallycorrect.com/calif.htm**

[13] Between 1989 and 1998, the failure rate at mathematics examinations for entrance to the University of California rose from 23% to 54%. Failure rates as high as 80% were reported in some student cohorts. See: Jim Milgram: **ftp://math.stanford.edu/pub/papers/milgram/white-paper.html**

from nursery to the 3rd grade of primary school. The experiment, which was conducted gradually from 1995 to 2001, found – as previously shown by the *S.T.A.R*. (*Tennessee's Student Teacher Achievement Ratio* 1985-1989) - that small classes have higher achievement outcomes than ordinary, larger classes. Nevertheless, in order identify the most effective interventions which may optimize teacher effect in such a context, a comparative analysis of teaching practices used in reduced-size classes was performed (Molnar *et al.*, 2001). To this end, a research team of the University of Wisconsin met, observed and assessed some twenty 1st to 3rd grade teachers. After the collected data were analysed, the teachers were divided into two groups, according to their level of effectiveness: a group of teachers recognized as effective, having enabled their pupils to obtain higher than standard achievement outcomes, and a group of teachers recognized as ineffective, whose pupils showed lower than average achievement (Zahorik *et al.,* 2000; Molnar *et al.,* 2001). The relevance of this study lies in the fact it highlighted substantial differences between effective and less effective teachers, both in terms of class management and management of teaching. The majority of effective teachers in reduced-size classes use teaching practices focusing on teaching/learning contents while ineffective teachers tend to adopt pupil-centred practices:

> *The more effective teachers believe in the importance of acquiring basic learnings as a first priority. Other learnings are attended to when and if basic learnings are mastered.* ***They also believe that the most effective way for students to acquire basic learnings is to explicitly teach them rather than to discover them through problem solving activities****. Experiential learning is not neglected by more effective teachers, but they believe it is more effective after students have acquired foundational learnings* (Molnar *et al.,* 2001, p.123).

An important conclusion arises from this study: a reduction in the teacher/pupil ratio is only effective if teachers apply structured teaching practices, drawing on an explicit teaching approach. In other words, reducing the number of pupils per class without previously addressing the teaching methods implemented by teachers is not the right approach. An ineffective teacher with thirty pupils will be just as ineffective, if not more, with fifteen pupils (Crahay, 2000). Thus the effective practices observed in reduced-size classes consist of structured teaching approaches, such as *Direct Instruction* in the framework of the *Follow Through* project.
The challenging literature review published by Chall in 2000 under the title *The Academic Challenge. What Really Works in the Classroom?* confirms the findings of the *Follow Through* project. Based on the synthesis of her research, Chall concluded that structured teaching approaches result in better outcomes in terms of basic learning, cognitive skills and affective

dimensions than pupil-centred approaches, in particular for pupils from disadvantaged socio-economic backgrounds.

Similar conclusions to those of the studies reviewed by Chall with regard to the greater effectiveness of structured approaches are found in the works of the *Society for Advancing Educational Research (S.A.E.R.),* a Canadian organization (see S.A.E.R. 1993, p.3). Moreover, a report published by the Council of Ministers of Education, Canada (C.M.E.C., 2003) on mathematics teaching and learning in the Canadian context, among pupils aged 13 and 16 years, reveals that:

> *In general, classroom activities and the use of resources which indicate that a structured teaching approach is used (eg.: working on textbook exercises, the teaching staff shows pupils how to complete tasks, gives homework) result in more positive outcomes than those indicating the use of more informal teaching (eg.: working on projects, discussing topics other than those contained in the lesson and inviting speakers) (Council of Ministers of Education, Canada, C.M.E.C., 2003, p.96).*

Finally, three recent meta-analyses concerning the teaching of reading (National Reading Panel, 2000), writing (Gersten and Baker, 2001) and mathematics in primary school (Baker *et al.,* 2002) also confirm the effectiveness of structured teaching approaches, more particularly those advocating explicit teaching.

It should be noted that effective teaching approaches among pupils from disadvantaged backgrounds, such as *Direct Instruction*, are just as effective among average and high-achieving students (Adams and Engelmann, 1996; Marchand-Martella *et al.,* 2004). In this respect, Slavin *et al.* wrote, as early as 1989:

> *Most successful innovations in classroom practices or school organization have positive effects on low as well as average and high-achieving students. A major goal of education is to bring all students to an acceptable level of achievement… Research generally finds that teacher behaviors that are successful with low achievers tend to be very similar to those successful with all students. Thus it is likely that if programs focusing on improving teachers' general instructional skills are successful with low achievers, they will also be effective with other students* (Slavin *et al.,* 1989, p.16)

In short, the various experimental studies carried out among pupils from disadvantaged backgrounds show that emphasis should be laid, first and foremost, on the learning provision through which pupils will develop their cognitive and affective skills. When attempts are made to achieve the opposite, that is, to enter via the affective or cognitive channel, as recommended by the advocates of student-based teaching approaches, then academic achievement is most at risk among pupils from disadvantaged backgrounds.

In the light of the results collected in the framework of the various studies mentioned earlier, it would seem appropriate, as demonstrated by the *Direct Instruction* model, to give precedence to **explicit teaching of basic learning skills such as reading, writing and mathematics, through which pupils will develop their cognitive and affective skills.** However, to achieve this, it is important to identify the various characteristics of explicit teaching.

2.3. Explicit teaching

Explicit teaching stems from research conducted on effective teaching practices. This line of research endeavoured to list the various teaching strategies and techniques used by expert teachers, and then compare them with those used by inexperienced teachers, in order to identify the most effective teaching interventions for learning. Experimental research subsequently demonstrated that by training inexperienced teachers to use "effective" interventions, student achievement was significantly improved (Brophy and Good, 1986; Gage, 1986; Good *et al.*, 1983; Rosenshine and Stevens, 1986). The effective teaching observed consists of explicit and systematic teaching (Brophy and Good, 1986; Gage, 1986; Gauthier *et al.*, 1997 and 1999; Geary, 1994, 2001 and 2002; O'Neill, 1988; Rosenshine and Stevens, 1986).

In that respect, Rosenshine (1986) points out that explicit and systematic teaching, which consists of presenting material in small steps, pausing to check for student understanding and eliciting active and successful participation from all students, is a particularly appropriate method for learning reading, mathematics, grammar, mother tongue, sciences, history, and partly, foreign languages. Moreover, this type of teaching proves to be adapted to young pupils and to all slow learners, regardless of age. Explicit and systematic teaching is also beneficial for all pupils when the material is organized, new or complex, including for high-achieving students.

Furthermore, research on the effectiveness of teaching found that teaching practices are effective when teaching:

> *begins by reviewing prerequisites, connects the material of the day to prior learning and then tackles new material, in small steps. Short presentations are alternated with questions. Following the presentation, the teacher organizes tutorial exercises, until all the pupils have been assessed and given feedback, then moves on to individual exercises which are continued until the pupil masters the new material independently* (Rosenshine, 1986, p.95).

Moreover, Rosenshine (1986) notes that a shift in teaching practices towards greater systematicity enhances student performance, without this resulting in the emergence of negative attitudes among pupils towards school or themselves.

Finally, the effectiveness of explicit and systematic teaching was confirmed again by cognitive psychology studies (Bruer, 1993; Geary, 1994, 1995, 2001 and 2002; Rosenshine, 1986, 1997a, 1997b, 2001 and 2002). These works shed light on the reasons for the success and effectiveness of this form of teaching with respect to the acquisition of knowledge, but also the acquisition of cognitive and metacognitive strategies (Kame'enui, 2002; Palincsar and Klenk, 1992; Pressley, 1995; Rosenshine, 1992, 1997a, 1997b, 2001 and 2002).

The explicit teaching approach involves a series of actions which may be grouped into three phases: (1) the setting of the context, (2) the learning experience, (3) objectivation (Bissonnette and Richard, 2001; Jitendra *et al.*, 2001).

Phase 1: Setting the context

In the teaching-learning act, the setting of the context is the phase that precedes teaching *per se*. This is the phase during which pupils prepare to learn. The setting of the context is based on three principles: (1) presentation of the learning objective; (2) translation of the objective into expected learning outcomes; (3) activation, assessment, and if necessary teaching, of prior knowledge.

The presentation of the learning objective provides pupils with a clear indication of the contents to be covered during the lesson. The use of an organizational diagram or of an "*advanced organizer*" may facilitate the presentation of the learning objective as such a tool formally demonstrates the existing links between new and prior knowledge. Presenting the learning objective also enables the activation of related knowledge. The second principle, the translation of an objective into learning outcomes, gives concrete expression to what will be acquired in terms of knowledge, know-how and life skills. In a teaching context, the formulation of this principle generally begins with the following statement: "At the end of this lesson, you will be able to: do…, know…, etc.". The use of these two principles contributes to spurring academic motivation. Nevertheless, the latter is largely dependent on the third principle: mastery of prior knowledge. Indeed, pupils who do not master prior knowledge usually develop a feeling of powerlessness, and even of incompetence when faced with the proposed tasks, which causes loss

of motivation (Adams and Engelmann, 1996). The introduction of this third, pedagogical design principle requires that the teachers ask questions to check the suitability of pupils' prior knowledge before instruction. Such questioning may also take place in the form of a diagnostic assessment aimed at evaluating pupils' prior knowledge more precisely. Prior knowledge assessment reveals whether it is necessary to proceed to teaching such knowledge again. Finally, in the context of reading, beginning this activity by clarifying the meaning of new words before suggesting to read the text is also a possible action consistent with the pedagogical principle relating to prior knowledge. In this example, providing a list of definitions of new words, similar to a glossary, further contributes to the acquisition of prior knowledge. Figure 11 presents a summary table gathering the three principles involved in the context-setting phase.

Once achieved, this is followed by the second phase of the teaching-learning act: the learning experience.

Phase 1. Setting the context
1. Presentation of the learning objective action: provides pupils with a clear indication of the contents to be covered during the lesson 2. translation of the objective into expected learning outcomes action: gives concrete expression to what will be acquired in terms of knowledge, know-how and life skills 3. activation, assessment, and if necessary teaching, of prior knowledge. actions: involves questioning, diagnostic assessment and vocabulary clarification
N.B. The use of organizational charts is recommended

FIGURE 11

Phase 2: The learning experience

Phase 2, the learning experience, is achieved using the explicit teaching approach in three distinct and complementary stages: modelling, guided practice and independent practice.

Explicit teaching begins with the modelling stage. During this stage, the teacher will endeavour to illustrate, through language, all the links to be made between new knowledge and prior knowledge, and any form of reasoning, strategy or procedure that may foster understanding among the majority of pupils. To this end, the teacher "expresses his/her thoughts on a loudspeaker" by explaining orally to pupils the links he/she makes to understand a task, the questions raised and the strategies used in completing this task. It is important to recall that, during the modelling stage, information is presented in small units, in a sequence that generally progresses from simple to complex, thus taking into account the limits of the pupils' working memory.

The use of examples and counter-examples illustrates the pedagogical design principle

underlying this stage of explicit teaching.

The use of examples and counter-examples facilitates understanding of the subject of learning and improves the quality of modelling. Nevertheless, the effectiveness of this pedagogical principle depends on the quantity of examples and counter-examples used – which should generally be between 3 and 5 (Jitendra *et al.*, 1999)[14] – but especially on their relevance with regard to the stages of the learning process. Thus the presentation of examples and counter-examples which cannot be used again by pupils during the subsequent stages of the explicit teaching process (guided and independent practice) constitutes an ineffective teaching practice, because it may generate confusion and misunderstanding since pupils do not have the possibility of applying what has been demonstrated. Furthermore, a disorderly presentation of examples and counter-examples which does not follow a progression from easy to difficult, or which is communicated imprecisely or ambiguously, may also produce comprehension difficulties. Thus the quantity and quality of examples and counter-examples presented at the modelling stage, together with the type of language used to communicate the latter, are the key ingredients of this pedagogical design principle. Finally, a learning support, such as the summary of a procedure to be followed, may be handed out to pupils in the form of a checklist, in order to facilitate the next stage of explicit teaching: guided practice.

After modelling, the explicit teaching process continues with the guided practice stage. It is during this stage that the teacher checks the quality of student understanding, by proposing to do tasks similar to those completed during the modelling stage, and by means of which he/she will ask pupils questions regularly. In fact, only such an assessment process can enable the teacher to ensure that pupils they not apply ill-understood material which may result in fostering incorrect knowledge. Guided practice enables pupils to validate, adjust, strengthen and further their understanding of what is learnt in class, in order to integrate this new knowledge with their long-term memory knowledge. Two principles of action govern the guided practice stage: (1) questioning and feedback; (2) a sufficient amount of practice and attaining a high achievement threshold.

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[14] The quantity recommended here (3 to 5) concerns examples only and comes from a single study performed on the teaching of mathematics in primary school. Thus no information is provided on the quantity of counter-examples. Nevertheless, during the modelling stage, all authors recommend the use of more than one example and more than one counter-example (Carnine and Engelmann, 1991; Engelmann and Steely, 2004; Jitendra and Kame'enui, 1994; Jitendra and Nolet, 1995; Jitendra *et al.*, 2001). The quantity of examples and counter-examples goes hand-in-hand with their quality.

During guided practice, questioning is frequent and feedback is constant throughout the duration of this stage, to make sure that understanding of the subject of learning and student actions are adequate. In addition, the quantity of tasks given to pupils must be sufficient to enable them to achieve a high level of performance, i.e. 80%. Achieving a high threshold of achievement (80%) is an important pedagogical principle to be respected during guided practice, before leading pupils to the next stage – independent practice.

Indeed, how will a pupil with a mediocre performance in guided practice be able to successfully complete tasks alone, at the independent practice stage? As a matter of fact, the pupil's level of achievement in guided practice must be sufficiently high to ensure successful achievement in independent practice. When the 80% threshold is reached, the explicit teaching process is completed by independent practice.

Independent practice is an extension of guided practice. It aims to give pupils enough opportunities to practice with a view to strengthening their achievement, in a context of over-learning, thus fostering memory retention and skill development. Two pedagogical principles are associated with this last stage of explicit teaching: (1) a large amount of practice geared towards fluency and automaticity; (2) learning assessment.

Performing additional tasks in independent practice allows pupils to develop the ease and fluency necessary for the automaticity of knowledge and acquired skills. Such automaticity helps learning to be retained in long-term memory, thus freeing the working memory which may possibly be used for more complex aspects, during a similar learning task. For instance, the development of reading comprehension necessarily requires automaticity of the written code, enabling the pupil to focus attention on the meaning or message of the text (*National Reading Panel,* 2000). However, automaticity also requires many subsequent opportunities to practise and revise. Finally, assessment of the average performance level achieved during the stage of independent practice provides an overview of the ease and fluency displayed by pupils during this final stage of the process. During this stage, the highest possible level of performance is sought. A low level of performance might indicate a teaching deficiency. All the pedagogical principles associated with phase 2 (the learning experience) are gathered in Figure 12. Phase 3, objectivation, completes the teaching-learning act.

Phase 2. The learning experience

MODELLING

1. Examples and counter-examples

   -quantity and quality
   -clarity of language

GUIDED PRACTICE

2. Questioning and constant feedback

3. A sufficient amount of practice and a high achievement threshold: 80%

INDEPENDENT PRACTICE

4. A large amount of practice
   - fluency and automaticity

5. Learning assessment

N.B. The use of organizational charts is recommended

FIGURE 12

Phase 3: Objectivation

The objectivation phase, which completes the teaching-learning act, provides a special opportunity to formally identify and extract, from what has been seen, heard and done in a learning context, concepts, knowledge, strategies or attitudes which are essential to retain. This third phase contributes to embed the subject of learning in the pupil's memory. The selection and synthesis of elements which are essential to retain form the underlying principle of objectivation. This pedagogical principle is achieved, first, through questioning by the teacher, with a question such as: "What is essential to retain?". This encourages pupils to name the important elements to be memorized, on the basis of the learning activity performed. Secondly, the essential elements identified can be organized in the form of charts, diagrams, conceptual networks, etc., and be recorded in a log book. Questioning and written synthesis enable pupils to initiate a metacognitive activity aimed at raising awareness of what is important to retain. Pupils who are not given the opportunity to become aware of what they are learning generally feel that they have

not learnt anything. This is the reason why various pupils eventually say that they learn nothing at school. But pupils who can put words to what they have learnt experience the pleasure of knowing, which fuels the desire to learn more! Figure 13 presents the third phase of the teaching-learning act – objectivation – and the principle associated with it: the selection and synthesis of elements which are essential to retain.

Phase 3. Objectivation
1. Selection and synthesis of essential elements to retain actions: asking the question: “What is essential to retain?” recording essential elements in a log book
N.B. The use of organizational charts is recommended

FIGURE 13

PÉDAGOGICAL PRINCIPLES DRAWN FROM DIRECT INSTRUCTION AND EXPLICIT TEACHING

SETTING THE CONTEXT

1. Presentation of the learning objective
   action: provides pupils with a clear indication of contents to be covered during the lesson

2. Translation of the objective into expected learning outcomes
   action: gives concrete expression to what will be learnt in terms of knowledge, know-how and life skills

3. Activation, assessment, and if necessary, teaching of prior knowledge
   actions: involves questioning, diagnostic assessment and vocabulary clarification

THE LEARNING EXPERIENCE

Modelling

4. Examples and counter-examples
   - quantity and quality
   - clarity of language

Guided practice

5. Questioning and constant feedback
6. A sufficient amount of practice and a high achievement threshold of 80%

Independent practice

7. A large amount of practice
   - fluency and automaticity
8. Learning assessment

OBJECTIVATION

9. Selection and synthesis of essential elements to retain
   actions: questioning: "What is essential to retain?"
   recording of essential elements in a log book

N.B. The use of organizational diagrams is recommended throughout the teaching-learning act

FIGURE 14

Although experimental research conducted in the classroom corroborates the effectiveness of explicit teaching on student learning, many education stakeholders, in the light of these positive effects, tend to confuse lecture-based traditional teaching with an explicit teaching approach,

claiming that it draws on the same teaching approach. This only too often leads to the misconception that this approach has always been used in our schools.

In fact, **the difference between explicit teaching and traditional teaching is considerable.** The confusion with traditional teaching arises from the equivalence drawn by various stakeholders between lectures and modelling, and independent practice, which is erroneously assimilated to drill and practice. Nevertheless, it is in the second stage of phase 2 of the experiment – guided practice – that explicit teaching fundamentally distinguishes itself from traditional teaching. While a lecture is focused on the transmission of contents, explicit teaching mainly focuses on the understanding and memory retention of material. Whereas, often, traditional teaching will only enable students to check whether they have understood the material when it is time for corrections, after drill and practice, explicit teaching makes it possible for the teacher to validate the pupils' level of understanding as early as the stage of guided practice. It is only through such a validation process that the teacher can ensure that pupils will not apply ill-understood material which may result in fostering incorrect knowledge. In secondary school, teachers considered to be most effective (those who make learning easier) spend on average 23 minutes out of a 50-minute period to modelling and guided practice, before leading pupils to the stage of independent practice, while less effective teachers only spend 11 minutes on the former (Gauthier *et al.*, 1999).

Explicit teaching thus sets out, first, to activate or present any information enabling pupils to develop an adequate representation of learning, that is to say, to foster understanding. Second, this form of teaching also provides strategies, procedures or processes facilitating the ways in which representation is addressed, with a view to producing a quality answer. Questioning and feedback are therefore essential throughout this teaching process, in order to provide the pupil with the feedback and remedial teaching that may be necessary for the latter to adequately achieve learning objectives. These strategies prevent the development of incorrect knowledge which can lead directly to failure.

2.4. The priority: the ability to read

The ability to read is the most important skill to be developed at school since it is one of the best predictors of school performance. Indeed, studies show that a pupil who experiences reading difficulties at the end of the 1st grade of primary school has 9 chances of 10 of exhibiting low

performance at the end of 4th grade (Juel, 1991). However, there is a 90% probability that this pupil might still exhibit low performance in secondary school. Since reading is required for every subject, it can be asserted that a pupil who has reading difficulties at the end of the 1st grade of primary school is a potential dropout (Carnine, 1998). These studies highlight the importance of taking action as quickly as possible regarding the development of pupils' reading ability, in particular among pupils from disadvantaged backgrounds.

The longitudinal study by Hanson and Farrell (1995) performed among students mainly from poor and multi-ethnic socio-economic backgrounds, shows that the establishment of a formal programme for teaching reading in nursery classes can generate long-term positive effects until the end of secondary school. This study evaluates the development of reading skills among 3,959 secondary school-leavers, throughout their schooling, which began in 1973-1974 and ended in 1985-1986. These pupils were from 24 different school districts located across a total of 10 American states. The aim of the study was to consider the potential effects of formal reading instruction at pre-school level with nursery school children. Over a third of the pupils who formed the sample for the study had attended nursery classes in which a programme entitled the *Beginning Reading Program (B.R.P.)* had been introduced, in 1973. The findings show clear, constant and positive differences linked to the fact that the pupils had received formal reading instruction starting in kindergarten. Pupils having followed the B.R.P. in nursery school, mainly from disadvantaged backgrounds, performed better in reading skills tests, attained a higher level of education and required less remedial teaching in primary and secondary school than pupils from wealthy backgrounds who did not follow the programme.

Furthermore, the study conducted by *The Institute for Academic Excellence* (1996) among 659,614 American primary and secondary school pupils showed the need to increase the time spent on reading, thereby enabling pupils to practice reading regularly, and making it the subject of explicit teaching. Moreover, based on his meta-analysis results, Swanson (2000) draws two main conclusions: first, *Direct Instruction* is the best-performing model with regard to word recognition[15]; second, *Combined Instruction* is the model which best develops reading

[15] The characteristics of the ***Direct Instruction*** model are as follows: sequentiality (proceeding from simple to complex), segmentation (breaking down a skill into components) and the use of organizational principles such as material overview, focus on certain information, provision of additional information and presentation of objectives.

comprehension[16]. In short, the studies we consulted tend to demonstrate that in order for pupils to develop their reading ability, explicit teaching is essential, combined with decoding mechanisms and reading comprehension strategies, and pupils should be given the opportunity to practice this process intensively, regularly and systematically.

Conclusion

Educational research will never provide us with guaranteed solutions in view of the large number of variables that come into play and the complexity of the dimensions to be considered. This is why caution is always called for when proposing courses of action. But research remains nonetheless essential: it informs us, forms our judgement so that we may make more enlightened, informed and evidence-based decisions. The following are some of the thoughts and recommendations which should be considered in this context.

On the teaching front

The importance of teaching effect is by and large equally recognized in developed countries and developing countries. Various findings concur. Particular reference is made to the importance of teachers having positive expectations regarding their pupils and the progression of the latter, to the flexibility and also order and discipline maintained by the teacher in the classroom, to teacher participation in overall planning with colleagues, to increase student *time on task* and homework, and to frequent assessments in order to ensure appropriate feedback and corrective action.

It nonetheless remains that, in certain aspects, the findings differ. Indeed, while a substantial number of studies on the effectiveness of teaching in developed countries conclude that the discovery-based teaching approach is weak (as we saw in the first section), several studies conducted in developing countries appear to produce contradictory findings, presenting this approach as a factor of academic achievement. This is somewhat perplexing and prompts us to interpret the findings of some of the research with great caution. Several reasons warrant the adoption of such an attitude.

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[16] The characteristics of the ***Combined Instruction*** model, in addition to those linked to ***Direct Instruction***, are the following: questioning and answering conducted by the teacher, assessment of the level of difficulty of tasks and assistance in achieving them, explanation and teaching of procedures, frequent teacher modelling, small-group interaction, explicit teaching of strategies.

- Indeed, it should be recalled that **methodological flaws** in certain studies were reported by several authors and that the **lack of recent research** has been noted in developing countries (Saunders, 2000).

- It should also be taken into consideration that many teaching approaches may be qualified as *pedagogical movements*. That is to say, they extend beyond the mere enactment of a series of teaching strategies promoting learning, and in fact represent the realization of a particular political discourse which requires **exceptional dedication and commitment on the part of the innovators promoting this discourse.** Examples might include the Freinet teaching approach or even the Paulo Freire approach. These "discovery"-based approaches have produced very positive outcomes in classes taught by exceptional and highly committed educators. However, it must be recognized that considerable time and energy is required on the part of the individuals teaching such classes, which the average teacher is undoubtedly not in a position to contribute. Indeed, is it realistic to believe that these discovery-based teaching approaches, however interesting they might be, can be introduced and generalized across classes in developing countries, in particular in sub-Saharan Africa?
- Moreover, not surprisingly, **any new teaching formula which is in any way distinguishable from the dominant traditional model in developing countries, particularly in sub-Saharan Africa,** generates fascination among pupils and teachers. The "breath of fresh air" provided by discovery-based teaching approaches and the enthusiasm of those involved in it no doubt explain their perceived effectiveness. Nevertheless, it should be borne in mind that beyond the novelty syndrome of the pilot project, and beyond the whims of fashion trends, it is important to measure the stability of student learning gains.
- Finally, it must be realized that the **label "active pedagogy", "discovery-based method" may embrace a very wide array of practices.** If researchers do not specify what they are referring to when mentioning active or discovery-based teaching methods, the reader might associate the findings of their research with totally contrasting approaches such as explicit teaching or open education. For it must not be forgotten that <u>explicit teaching is an active pedagogy even if though it is highly structured.</u>

One thing remains clear, though: all stakeholders (those advocating discovery-based approaches and those promoting explicit teaching and *Direct instruction*) denounce the shortcomings of the traditional teaching approach. Nevertheless, in the context of developing countries faced with overcrowded classes, poorly trained or untrained teachers, and lack of material, it is difficult to conceive how approaches as complex as discovery-based teaching can be implemented.

Amid the shortcomings of the traditional teaching approach, on the one hand, and the high costs, strong personal commitment of teachers and complexity for teachers to use discovery-based approaches, on the other hand, **it appears to us that there is an intermediate pedagogical space, which can be adapted to the context of developing countries, in particular African countries, and which would consist of explicit teaching and *Direct Instruction*.** The effectiveness of this approach has been proven; so has its efficiency. Furthermore, it is not so different from what teachers are already skilled for but enables them to perform even better, does not require sophisticated materials and is easier to apply.

On the teacher-training front

If there is a consensus that school is more important than home and that internal school factors are predominant, then it is necessary to focus on teacher training in order to enable teachers to overcome the shortcomings of the traditional teaching approach and make teaching more effective.

However, on the teaching approach front, we believe that **the wider the gap between teacher skills and the training skills targeted for them, the greater the risk of failure**. The various forms of discovery-based teaching are interesting but difficult to master. Besides, we have seen that their actual effectiveness is questioned. That is why we think it is more reasonable to opt for simpler teaching methods whose effectiveness has been demonstrated at the level of the classroom, school, education system, both among wealthy and disadvantaged backgrounds.

In order to make the shift from a traditional teaching approach to explicit teaching possible, a number of minimum requirements must be satisfied. First, it should be specified that training for a teaching approach consists first and foremost of training to teach specific professional acts. From this perspective, initial training focusing exclusively on school subjects would not be suitable. Whether training is conducted in a normal school or in a school environment during

practical training placements, it must be vocational, that is to say, it must train teaching professionals to behaviours they will have to apply in working with their pupils. For instance, training a chemist is different from training a chemistry teacher. Additionally, a "programme approach" in which the training activities proposed show overall coherence and are focused on the model of the worker to be trained seems preferable to the classic, eclectic training model in which lessons are juxtaposed and are devoid of any conceptual unity. Moreover, with regard to continuing professional education, many studies performed in the United States emphasize how little change there is in teaching practices following day training sessions. The fact that they are held infrequently, without any continuity between them, and are not constructed in a sequence from simple to complex which makes guided practice possible, are the main reasons for their ineffectiveness. Lastly, it should be noted that any change in teachers' pedagogical practices must be endorsed by the education authorities (school and school board management, management of the Ministry of Education) which will not hesitate to support, insofar as possible, these front-line stakeholders who take the risks associated with change.

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