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ABSTRACT

This review of the research literature on ability grouping and tracking draws on professional and scholarly research journals and electronic databases. Five assumptions have been used to support the recurring practices of tracking and ability grouping, but none of these assumptions has withstood close examination in 70 years of research. They are: (1) student potential can be determined by past scores on achievement or IQ tests; (2) prerequisites for achievement are obvious, simple, and easily identifiable and absolutely necessary; (3) student self-esteem is served by separating the "less able" and the "smarter" students; (4) student diversity can be accommodated through differentiated curricula; and (5) teacher work is more efficient if students are grouped homogeneously. The literature clearly shows the inadequacy of tracking and ability grouping. Research has consistently shown positive effects of the practice only for the highest ability groups, who were also given enriched curriculum and stimulating instruction. Ability grouping has been associated with discriminatory practices within the schools. A firm recommendation is made that the Fayette County (Kentucky) public schools discontinue tracking and ability grouping. (Contains 261 references.) (SLD)

REVIEW OF THE LITERATURE ON TRACKING AND ABILITY GROUPING

Second Draft

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Students cannot learn what they have not been taught.
(Slavin and Braddock, 1993, p.12).

Executive Summary

The following review is based on a variety of references including professional and scholarly research journals and electronic databases. The first section of this review delineates the objectionable aspects of tracking as criticized by these reports. In the second portion of this review, antidotes to harmful grouping and curriculum differentiation practices are presented from this literature and research.

Section 1: Assumptions and Reality

Five chronic assumptions have been used to support the recurring practice of tracking and/or ability grouping. None of these assumptions have withstood close examination in seventy years of research on the effects of tracking/ability grouping.

Assumptions:

[1] Student potential can be determined by past scores on achievement or IQ (intelligence quotient) measures.

Faith in tracking and ability grouping is based on beliefs about student intelligence and potential. In the past, and to a great extent currently, these beliefs about identifying students are a legacy from the Intelligence Quotient theory and Mental Measurement Movement of the late 19th and early 20th centuries. Extensive discoveries since World War II in cognitive theory, cybernetics, electronics, and information processing, refute these outmoded concepts of human potential and intelligence. Now new concepts of students' learning and potential must be incorporated into the ways schools and classrooms are organized. These new means of organization must be tied to emerging discoveries about learning and knowledge.

[2] **The prerequisites for achievement in all subject matter are obvious, simple, and clearly and easily identifiable. Furthermore, these prerequisites are absolutely necessary before students can acquire "higher" forms of knowledge. Finally, achievement is accomplished through finite steps toward complete competence in any subject.**

Common misunderstandings about learning drive well-meaning schools', teachers', even parents', desires for tracking and ability grouping. More than 40 years of research on learning and cognition, suggest those misunderstandings are derived from obsolete assumptions about knowledge acquisition and learning. Learning requires thinking --- not accumulation of minute basic skills. Thinking is based on problem solving using higher order cognition, that is, metacognition. Grouping children according to their perceived acquisition of basic prerequisites is a misguided practice simply not supported by research and practice on knowledge and learning. This practice does not improve achievement. Moreover, this misguided practice has had lasting harmful effects on all students' achievement and self concepts.

[3] **Student self-esteem can be preserved by separating "less able" students from "smarter" ones.**

Students' self-esteem is irreparably damaged by the practice of ability grouping/tracking. As a matter of fact, schools which use this practice are unintentionally legitimating a social/academic hierarchy among students which destroys self-concepts and creates inaccurate stereotypes among students. Good schools are recognized by their cohesive climates and sense of community. Any educational practice which promotes divisiveness among student bodies is contradictory to sound education practice. Sound educational practice also contraindicates curriculum differentiation.

[4] **Student diversity can be accommodated through differentiated curricula.**

In reality, the practice of differentiating the curriculum has been the practice of denying access to knowledge to the majority of students in U.S. public schools. There is no evidence that curricula has been effectively differentiated for any group but the top ability groups. Furthermore, what passes for curriculum differentiation for general, at-risk, and special education students is often poor instructional practices. Truly students are diverse, but those who are most at-risk need enriching curriculum and instruction. Tracking and ability grouping as currently practiced allows both students and teachers in the middle and lower tracks to be cognitively lazy, to just "get by," or to mentally, if not literally, drop-out. Issues of handling diverse student populations through tracking and ability grouping also are tied to assumptions about managing teachers' work.

[5] Teachers' work is more efficient requiring less planning, less individualization of lessons, and less stress if students are grouped homogeneously.

The assumption that teachers' work is enhanced by the practice of tracking may mask an incipient set of teacher norms. These norms are found in teacher assignments. Teachers with more experience are assigned the higher tracks while teachers with less experience, and presumably less ability, are assigned to lower tracks. Teachers may support tracking systems in order to preserve a semblance of professional hierarchy and a promotion system in a profession that is otherwise quite flat in career path options.

Section 2:
Accomplishing Change

Many of the strategies for overcoming the habitual abuses of tracking and ability grouping have been identified by the seventy years of literature and research condemning the erroneous premises of this practice. Fortunately, schools, especially schools in Kentucky are engaged in the major reform efforts required to eliminate tracking. These strategies and reforms include the following;

- restructuring all levels of schools (elementary, middle and high school) through heterogeneous grouping
- cognitively based and developmentally appropriate instruction,
- flexible pacing,
- enriched curriculum and high achievement standards expected for all students,
- authentic assessment,
- staff development and support for teachers, and
- parent involvement strategies.

Conclusion

The literature clearly shows the inadequacy of tracking/ability grouping as an obsolete practice based on antiquated notions of intelligence, learning, and the structure of knowledge. Over 70 years of research on ability grouping/tracking has failed to establish any obvious benefits for any group of students, except the highest groups. Not surprisingly, the highest groups benefitted because they were provided enriched curriculum and stimulating instruction. Groups deprived of these benefits have not only shown less achievement, but also exhibit demographic anomalies such as racial and socio-economic segregation. Tracking/ability grouping has been highly associated with discriminatory practices within schools, such as withholding challenging curriculum and/or subjecting lower track students to inconsequential instruction or inexperienced instructors. Because nearly all students are tracked/ability grouped in U.S. public schools, the finding that this practice harms all groups except the highest, is indefensible. No public school can afford to continually engage in a habit which abuses the majority of its students. Fayette County Public Schools cannot support the continuation of routine tracking/ability grouping in any of its schools.

REVIEW OF THE LITERATURE
ON
TRACKING AND ABILITY GROUPING

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Students cannot learn what they have not been taught.
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Overview

The common practice for handling large heterogeneous groups of students, especially in high schools, has been to subdivide them into more homogenous groups based on perceived ability. Once students have been subdivided, each group has been instructed using different methods and different curricula. Seventy years of research has shown that the only subgroup which has benefitted, yet minimally so, from this common practice has been the group exposed to the most comprehensive curriculum. This subgroup is comprised of the 20 to 40 percent of students in the "top" or advanced track. The vast majority (better than 60 to 80 percent) of students in the "general" and "low/basic" tracks are taught less, learn less, and drop-out more. In the rare schools where students are instructed according to their abilities, but given the same curriculum, all students demonstrate higher achievement and higher self-esteem.

The following review is based on a variety of references including professional and scholarly research journals and electronic databases. Members of the Task Force shared an initial compilation of 68 recent (*circa* 1989) articles and research reports during the summer of 1993. Additional sources for this review included the following;

- 583 articles, research reports, and books published since 1982,
- 21 school district, state and federal policies, and
- 19 primary and historic sources

on tracking, ability grouping, gifted and special education. Nearly all of the research sources overwhelming condemn "tracking," inflexible ability grouping, and the unfair/inequitable differentiation of curriculum by perceived student abilities. More than 250 of these reviews, reports and sources were used in this literature review.

The first section of this review delineates the objectionable aspects of tracking as criticized by these reports. In the second portion of this review, antidotes to harmful grouping and curriculum differentiation practices are presented from this literature and research.

Assumptions and Reality:
Reports from 70 Years of Research

Five chronic assumptions have been used to support the recurring practice of tracking and/or ability grouping. None of these assumptions have withstood close examination in seventy years of research on the effects of tracking/ability grouping (Slavin and Braddock, 1993). In this section, these assumptions and the research which refutes each will be summarized. These five assumptions are:

- Student potential can be determined by past scores on achievement or IQ (intelligence quotient) measures.

- The prerequisites for achievement in all subject matter are obvious, simple, and clearly and easily identifiable. Furthermore, these prerequisites are absolutely necessary before students can acquire "higher" forms of knowledge. Finally, achievement is accomplished through finite steps toward complete competence in any subject.

- Student self-esteem can be preserved by separating "less able" students from "smarter" ones.

- Student diversity can be accommodated through differentiated curricula.

- Teachers' work is more efficient requiring less planning, less individualization of lessons, and less stress if students are grouped homogeneously.

Assumptions about IQ

"Testing and tracking in U.S. schools have had a symbiotic relationship" (Coley, 1991, p. 1). Although many schools today use more than tests to sort students into ability groups, the routine use of tests is a legacy from the inception of common schools and comprehensive high schools (Coley, 1991; Spencer, 1988; Swanson, 1993). Frequently educators use ability and IQ interchangeably in discussing student potential and student placement (Page, 1991).

In the late 19th century Louis Terman, a professor at Stanford University, modified a French psycho-metric test resulting in a much disputed mental measurement instrument, the Stanford-Binet Intelligence Quotient (IQ) Test. Like most historical developments larger socio-political concerns influenced the IQ test. In the late 19th and early 20th centuries these concerns were over disparity in wealth and social class. The Mental Measurement Movement used IQ tests as evidence of genetic, hereditary inferiority of minorities, women, and those from non-Western, non-European, and even, non-English-speaking cultures (Goodlad and Oakes, 1988; Gonzalves, 1983; Gould, 1981; Swanson, 1993). For a while use of IQ tests was wide-spread across the military, business and education, but after World War II, such use declined everywhere except in education (Gagné, 1985; Lefrancois, 1985).

There were several reasons for this decline; (1) unreliability of IQ tests, (2) built-in bias of IQ tests, and (3) inability of IQ tests to predict success in fields requiring other than verbal/numerical knowledge. The whole theory of an Intelligence Quotient has been called into question based on these reasons. An explanation of each is presented below.

Despite a conviction that IQs were supposedly fixed from birth, no evidence supports this notion. In fact, IQ tests have been found to be so unreliable that depending on which IQ test was administered a person's "intelligence" could vary as much as 40 points. The same nearly 40 point variance also can be produced by varying environmental factors. With a normal IQ established as 100 points, the 40 point variance represents remarkable instability for a supposedly "fixed" score (Clark, 1992a; George, 1990; Lefrancois, 1985).

Also related to the instability problem of IQ tests is extensive evidence that the tests are culturally biased. The reason Terman had to modify Binet's original test was because the questions were associated with French culture, heritage, and history. Even adjusting for U.S. history and culture, the development of norms for any IQ test is predicated on an average response from the majority of the population. Until very recently, that majority was frequently middle to upper class Caucasian males. The very definition of norming is predisposed to work against minorities and under-represented groups. Because the tests were originally designed to discriminate, that is exactly what they do. In the name of science and statistics, these tests are still used in schools as a so-called **fair** way to discriminate among students (George, 1990; Lefrancois, 1985; Mitchell, Haycock and Navarro, 1990; Swanson, 1990; Walker, 1993).

IQ tests were supposed to predict and explain the disparities in wealth and social success, but based on demonstrated unreliability, the predictive abilities of IQ also have been called into question. IQ tests seem to predict only certain kinds of success related to only certain kinds of school work. Verbal and numerical skills appear to be related to high IQs. But research on cognition, knowledge and information processing show that verbal and numerical skills are a minor part of human intelligence. Spurred by watershed studies during and after World War II on complex human performance, cybernetics, and electronic information processing, the definitions of intelligence, knowledge and learning have broadened far beyond the limiting theories of Mental Measurement and IQ (Gagné, 1985; Lake, 1988; Lefrancois, 1985; Leinhardt, 1992).

Intelligence is now defined more broadly than that which is measured by IQ tests. Theories about the breadth of intelligence range from J.P. Guilford's 16 dimensions to Howard Gardner's seven multiple intelligences (Guilford, 1956; Gardner, 1983). No IQ test has been designed which successfully measures more than verbal and numerical aptitudes (Getzels and Jackson, 1962; Sattler, 1982; Walters and Gardner, 1985). IQ tests do not measure other intelligence factors such as critical thinking, creativity, interpersonal or intra-personal skills, musicality, visual-spacial artistry, or physical-kinesthetic skills (Gardner, 1983; Lefrancois, 1985; Reis and Renzulli, 1985; Renzulli, 1982; Sattler, 1982; Sternberg, 1985a; Treffinger and Renzulli, 1986).

Although this discussion has focused on problems with IQ testing, similar problems have been identified with achievement testing in general (Berliner, 1988; Fernandez, 1988; Johnson, 1990; McClellan, 1988; Neill and Medina, 1989; Vickery, 1993; Walker, 1993; Walters and Gardner, 1985). Most of the complaints about achievement testing were spurred by studies in the 1970s and 80s. These complaints included concerns about how tests narrowed curriculum and focused pedagogy on low-level basic skills and memorization (Reardon, Scott, and Verre, 1994; Wiggins, 1989). The test themselves fail to measure students' higher order thinking (Resnick, 1987; Sternberg, 1985a, 1985b). Furthermore, these tests have not been used diagnostically, but primarily for sorting and excluding students (Darling-Hammond, 1994; Glaser, 1981).

Problems with IQ and achievement testing and challenges to the theories of Mental Measurement and IQ suggest that the assumption that students can be tested and grouped according to ability is quite simply wrong. Without reliable, unbiased tests, there is no way to sort students into homogeneous ability groups. In fact, because the tests are socially and culturally biased, the only homogeneity represented in groups defined by IQ or achievement tests are racial, gender, and socio-economic groups. In other words, the top groups tend to be white, male and middle to upper class with few females or minorities. Some have termed this phenomenon the "second generation of segregation" as individual classrooms within integrated schools using ability grouping/tracking become all white or all minority. This phenomenon has also raised the specter of the legality and constitutionality of tracking/ability grouping practices (Black, 1993; Braddock, 1990; Chunn, 1988; Cook *et al*, 1981; Davenport, 1993; Dawson, 1987; Dunlop, 1993; Fact Sheet, 1985; George, 1993; Hilliard, 1990; Lines, 1983; Mehan, 1991; Meier *et al*, 1990; Morgan and McPartland, 1981; Oakes, 1983, 1987a, 1988; Schneider, 1989; Thompson, 1991; Vanfossen *et al*, 1987; Veves, 1989; Virginia Department of Education, 1992; Walker, 1986; Wenning, 1992).

Faith in tracking and ability grouping is based on beliefs about student intelligence and potential. In the past, and to a great extent currently, these beliefs about identifying students are a legacy from the Intelligence Quotient theory and Mental Measurement Movement of the late 19th and early 20th centuries. Because of extensive discoveries and developments in cognitive theory, cybernetics, electronics, and information processing, ability grouping and tracking should no longer continue founded as they are on outmoded concepts of human potential and intelligence. Instead new concepts of students' learning and potential must be incorporated into the ways schools and classrooms are organized. These new means of organization must be tied to emerging discoveries about learning and knowledge.

Assumptions about knowledge and prerequisites

The prevailing presumption about student learning is that knowledge acquisition follows an orderly progression through subject matter. Underlying this presumption is the set of assumptions that learning is simply following a series of systematic steps from simple, basic facts and skills through more complex comprehension of any subject. Practically all American public schools are organized around subjects such as reading, English, math, science, and social studies.

As students move through the grades to the secondary level, the subject headings change to more specialized versions of these academic categories. Unfortunately, this structure, moving from skills to content and supported by cherished assumptions about knowledge is obsolete, undermined by more than 40 years of cognitive theory and research (Darling-Hammond, 1994; Jones, Palincsar, Ogle, and Carr, 1987; Jacques, 1985; Kamii, 1984; Leinhardt, 1992; Marzano and Arredondo, 1986; Marzano *et al,* 1988; Mitchell, Haycock and Navarro, 1990; Perkins and Salmon, 1988; Presseisen, 1986; Resnick, 1987; Sternberg 1985a, 1985b; Vygotski, 1978, 1986).

Skills are not prerequisites to content. The contrary has been found in cognitive studies. Skills have no meaning unless tied to content. In learning, nothing new is learned unless it is meaningfully tied to previous experiences (Bruner, 1965; Chomsky, 1977). Frequently students "exhibit all the overt signs of success --- faithful attendance at good schools, high grades and high test scores, accolades from their teachers --- [but] typically do not display an adequate understanding of the material and concepts with which they have been working" (Gardner, 1991, p. 3; see also Ravitch and Finn, 1987). The problem for all our students is that they were taught skills apart from content, being made to demonstrate competence out of context from the subject matter or discipline where competence in the skill would, literally, **make sense**. The way most schools deliver knowledge, students never make connections, end up with only partial information, and have no sense of the whole (Brooks and Brooks, 1993; Bruner, 1971; Darling-Hammond, 1994; Dewey, 1938; McKnight *et al,* 1987; Task Force on Education of Young Adolescents, 1989).

Tracking and ability grouping are predicated on obsolete assumptions of how knowledge is learned. The desire to group students, especially in "basic" or lower tracks, is founded on a belief that students cannot perform "higher order" thinking tasks without certain prerequisite skills (Christian Science Monitor, 1993; George, 1990; Mitchell, Haycock and Navarro, 1990; Ross, 1989; Schwartz, 1987).

On the contrary, numerable research reviews and extensive mega-studies discredit the notion that tracking/ability grouping can improve achievement for any group of students (French and Rothman, 1990; George, 1993; Hoffer, 1992; Johnston and Markle, 1983; Kulik, 1992; Maxwell, 1986; Noland and Taylor, 1986; Peterson, 1989; Slavin, no date, 1987;Vanfossen *et al,* 1985). Debate (which is outlined in Appendix A) persists on whether the most talented or gifted pupils benefit even marginally from the practice of tracking/ability grouping (Clark, 1992b; Gallagher, 1993; Feldhusen, 1989; Hoffer, 1992; Kulik, 1992; Rogers, 1992). For middle and lower track students, considerable evidence refutes the value of separated classes and programs consisting of endless drill and practice on simplistic skills (Brandt, 1992; Johnson, 1990; Ferguson, 1992; Marzano *et al,* 1988; Mitchell, Haycock, and Navarro, 1990; Mumme and Shepard, 1990; Mumme and Weissglass, 1989; Nystrand, 1990; Oakes, 1987b; Walker, 1993; Wang, Walberg, and Reynolds, 1992).

Furthermore, except in rare cases, all children, even the youngest and lower achieving students, are capable of higher order cognition (American Association of State Colleges and Universities, 1989; Englert, Raphael, Anderson, Anthony and Stevens, 1991; Lindquist, 1987;

Marzano *et al*, 1988; Pogrow, 1988, 1990a; Resnick, 1987; Schwartz, 1987; Wheelock, 1993; Wong and Siew, 1989). In most subject areas, complex cognitive skills --- known as *metacognition* --- are prerequisites to acquiring information about any subject (Collins, Brown and Holum, 1991; Flavell, 1976; Hart, 1985; Heller, 1986; Marzano *et al*, 1988; McTighe and Lyman, 1988; Rosenshine and Meister, 1992; Winograd and Paris, 1988/89).

Another confounding piece of evidence against the orderly knowledge myth is the revelation that the majority of school-studied subjects are not "well-structured" disciplines (Berliner, 1986; Brooks and Brooks, 1993; Chi, Glaser and Rees, 1981; Glaser, 1987; National Education Association, 1990; Resnick, 1988; Rosenshine and Meister, 1992; Simon, 1973). With the possible exception of some of the computational elements of mathematics, most other subject areas do not have absolute, sequenced prerequisites. Even in mathematics, children demonstrate commensurately high problem solving skills often before they have mastered computational facts (Carpenter, 1985; Charles and Silver, 1988; Hart, 1985; Lindquist, 1987; Schoenfeld, 1985; Wong and Siew, 1989).

Common misunderstandings about learning drive well-meaning schools', teachers', even parents', desires for tracking and ability grouping. More than 40 years of research on learning and cognition, suggest those misunderstandings are derived from obsolete assumptions about knowledge acquisition and learning. Learning requires thinking --- not accumulation of minute basic skills. Thinking is based on problem solving using higher order cognition, that is, metacognition. Grouping children according to their perceived acquisition of basic prerequisites is a misguided practice simply not supported by research and practice on knowledge and learning. This practice does not improve achievement. Moreover, this misguided practice has had lasting harmful effects on all students' self concepts.

Assumptions about self-esteem

Another persistent and inaccurate belief about tracking/ability grouping is that students with lower perceived abilities feel inferior to the "smarter" members of their classroom or age groups. This line of thinking promotes tracking/ability grouping as a kinder way to preserve at-risk, under-achieving and "lower/basic" students' self esteem (Cone, 1992; George, 1990; Ohanian, 1990). There is no evidence to support this assumption.

Of all the notions debunked by research on tracking/ability grouping, this particular myth is among the most studied and most consistently attacked. Perhaps the most harmful effect of tracking and ability grouping is the lasting damage to lower-tracked students' self-esteem (Feeney, 1992; George, 1993; Hoffer, 1992; Oakes, 1985; Page, 1991; Pink, 1984; Rosenholtz and Rosenholz, 1981; Wells, 1989; Wheelock, 1992a). Even more shocking is the evidence suggesting that tracking/ability grouping also does damage to middle and top group's self-concept and social stereotypes (Dawson, 1987; Gamoran and Berends, 1987; George, 1993; Noland and Taylor, 1986; Indiana State Department of Education, 1991; Poppish *et al*, 1990; Rosenholtz and Rosenholtz, 1981; Ross, 1989; Walker, 1986). The harm done to **all** students is directly attributable to the "caste system" inherent in a tracking/ability grouping program (Berliner and

Rosenshine, 1987; Gamoran and Berends, 1987; George, 1990; Kozol, 1991; National Center for Research in Vocational Education, 1992; Rosenbaum, 1976; Scherer, 1992/93; Travers, 1983; Wheelock, 1992a).

Students' self-esteem is irreparably damaged by the practice of ability grouping/tracking. As a matter of fact, schools which use this practice are unintentionally legitimating a social/academic hierarchy among students which destroys self-concepts and creates inaccurate stereotypes among students. Good schools are recognized by their cohesive climates and sense of community. Any educational practice which promotes divisiveness among students is contradictory to sound education practice. The self esteem problem is directly tied to the practice of differentiating curriculum.

Assumptions about differentiating curriculum

Another prevailing belief about the efficacy of ability grouping/tracking is that a differentiated curriculum is an efficient accommodation to student diversity (Anderson, 1993; Good, 1982; Greenbaum, 1990; Gursky, 1990; National Education Association, 1990; Oakes, 1986; Ohanian, 1990). The definition of curriculum differentiation ostensibly is to fit pupil needs/deficits with specialized access to knowledge (Anderson, 1993; Feldhusen, 1989; Kulik, 1992; Nevi, 1987; Page, 1991). The ideal form of differentiation would be individualized, but the reality of schools, especially large schools and particularly comprehensive high schools, is that learning is not personalized (Goodlad, 1984; Jones *et al*, 1987; Sizer, 1984; Task Force on Education of Young Adolescents, 1989; Wells, 1989).

Although teachers of at-risk, special needs and gifted children are supposedly prepared to differentiate curriculum, regular or general educators typically are not (Berger, 1991; Hart, 1992; Hunt, 1992; Lewis, 1992; Slavin, no date; VanTassel-Baska, 1988; Weston, 1992; Wheelock, 1993). Moreover, increasing evidence suggests that differentiating curricula for at-risk and special needs populations is not effective at maximizing individual potential (Adams, 1993; Brandt, 1992; Darling-Hammond, 1994; Donellan, 1984; Dunn, 1968; Gallagher, 1990; Gartner and Lipsky, 1987; Skrtic, 1991; Wang and Birch, 1984; Wang, Walberg and Reynolds, 1992). In fact, students in these program are more likely to drop-out (Oakes, 1985; Massachusetts Advocacy Center, 1990; Meyers, 1991; Wheelock, 1992a). The largest problem with curriculum differentiation is that the students most in need of an enriched, environmentally ameliorating curriculum are often subjected to stultifying, watered-down curriculum (Gamoran and Berends, 1987; Gartner and Lipsky, 1987; Lake, 1985; Massachusetts Advocacy Center, 1990; National Association of State Boards of Education, 1990; Wheelock, 1993).

The tragedy of curriculum differentiation is that it all too often results in "curriculum ambiguity" (Page, 1991, pp. 233-234). Because teachers are not well-versed in designing curriculum, because centralized curriculum, tests, and textbooks dominate school classrooms, curriculum ambiguity reigns at all grade levels except the top secondary classes where college

entrance tests and Advanced Placement (AP) credits often dictate a specific, content-rich curriculum (Page, 1991; Reardon, Scott and Verre, 1994; Slavin, no date; Vanfossen *et al*, 1985).

Teachers perpetuate low performance of middle and lower track students by lowered expectations rather than enriched, differentiated curriculum (Goodlad, 1982, 1984; Manning *et al*, 1985; Schell and Rouch, 1988). Instead of cognitively, developmentally appropriate curriculum or instructional adaptation, lower track students are subjected to less challenging curriculum and poorer instruction (Bigelow, 1993; Dawson, 1987; Ferguson, 1992; Gamoran, 1986, 1992; Hammer, 1983; Nystrand, 1990; Passow, 1989; Piel, 1987; Raze, 1984; Slavin, no date; Winn and Wilson, 1983). Such poor instruction is tied to insidious outcomes such as low self esteem and "learned helplessness" (Oakes, 1987b; Spence and Stan-Spence, 1990). Students and teachers in the lowest tracks report more time devoted to discipline rather than cognition or content (Coley, 1991; Johnston and Markle, 1983; Lockwood, 1990; Oakes, 1981; Peterson *et al*, 1987; Spencer, 1988; Valli, 1986).

Further evidence that curriculum differentiation is not useful for middle and lower track students is found in reports that females and minorities are consistently advised not to take coursework which might fill-in the gaps in their experiences and education. Teachers and counselors deliberately steer students in middle and lower tracks, often minorities and females, away from challenging advanced coursework and expressly away from math and sciences (Dawson, 1987; Kozol, 1991; Matyas, 1984; Page, 1989; Scherer, 1992/93; Schwartz, 1987). Females, minorities and other at-risk students show better achievement when placed in challenging cognitively-rich courses and encouraged by their teachers to have positive feelings about their performance (Dawson, 1987; Matyas, 1984). The temptation of recognizing individual differences has not been to accommodate those differences with enriching experiences and curriculum, but to differentiate the curriculum in such a way as to exaggerate and perpetuate those differences (Bigelow, 1993; Goodlad and Oakes, 1988).

In summary, the practice of differentiating the curriculum has been more often the practice of denying access to knowledge to the majority of students in U.S. public schools. There is no evidence that curricula has been effectively differentiated for any group but the top ability groups. Furthermore, what passes for curriculum differentiation for general, at-risk and special education students is often poor instructional practices. Truly students are diverse, but those who are most at-risk are in need of enriching curriculum and instructional practices. Tracking and ability grouping as currently practiced allows both students and teachers in the middle and lower tracks to be cognitively lazy, to just "get by," or to mentally, if not literally, drop-out. Issues of handling diverse student populations through tracking and ability grouping are also tied to assumptions about managing teachers' work.

Assumptions about teachers' work

Another persisting assumption about the effectiveness of tracking/ability grouping is that teachers are better able to prepare and deliver instruction to homogeneous groups of students

(Cocking, 1990; French and Rothman, 1990; George and Rubin, 1992; Johnston and Markle, 1983; Lake, 1988; National Education Association, 1990; Nevi, 1987; Shavelson, 1982; Slavin, no date). Much of the literature on this belief suggests that rather than contributing to more reasonable work loads for teachers and better instruction for students, tracking is really designed to fit teachers' norms about their own professional abilities and standards (Anderson and Barr, 1989; Finley, 1984; Good, 1982; Hammer, 1983; Oakes, 1987b, 1992a; O'Donnell, 1991; Page, 1987; Sanacore, 1993; Scott, 1993; Sigafus, 1994).

Teachers who support tracking tend to be teachers of higher track students. Because of the ways teachers receive teaching assignments, many teachers are assigned to the basic and lower tracks when they begin their teaching careers. Teachers earn their way to the higher tracks through seniority and reputation. So persistent is this informal hierarchy that teachers who chose to work with at-risk, special education, and lower track students are often viewed suspiciously by their colleagues. Given the above discussion about curriculum differentiation where the perseverance of inadequate instruction and low expectations for lower tracks was revealed, the suspicion seems to be that teachers who choose the lower track are themselves professionally lower track (Coleman and Gallagher, 1992; Finley, 1984; Goodlad and Oakes, 1988; Hammer, 1983; National Center for Research in Vocational Education, 1992; O'Donnell, 1991; Raudenbush *et al*, 1992; Raze, 1984; Schell and Rouch, 1988; Sigafus, 1994; Slavin, no date; Spencer, 1988; Winn and Wilson, 1983).

The assumption that teachers' work is enhanced by the practice of tracking may mask an incipient set of teacher norms. These norms are found in teacher assignments. Teachers with more experience are assigned the higher tracks while teachers with less experience, and presumably, less ability are assigned to lower tracks. Teachers may support tracking systems in order to preserve a semblance of professional hierarchy and a promotion system in a profession that is otherwise quite flat in career path options.

Accomplishing Change: Moving from Assumptions to Reality

Seventy years of research on the effects of tracking and ability grouping also contains a number of suggestions for ending the abuses of this practice. Fortunately, schools, especially schools in Kentucky, are engaged in the major reform efforts required to eliminate tracking. These strategies and reforms include the following;

- restructuring all levels of schools (elementary, middle and high school) through heterogeneous grouping
- cognitively based and developmentally appropriate instruction,
- flexible pacing,
- enriched curriculum and high achievement standards expected for all students,
- authentic assessment,
- staff development and support for teachers, and
- parent involvement strategies.

Each of these developments with the supporting literature and research is reported in this section. Strategies associated with these developments are summarized herein, but a detailed handbook for teachers is available under separate cover from the Task Force and the Fayette County Public Schools.

Restructuring and heterogeneous grouping

The structure of public schools in the United States has been primarily five to six years of elementary school, three years of middle or junior high school and three to four years of senior high school. This 6-3-3 configuration has predominated since World War II. Placing children in groups known as grades according to their birth dates has dominated schooling throughout the 20th century. Although several mid-level configurations, first, junior highs, and then middle schools have been tried with young adolescents and pre-pubescent youth, and kindergarten has been added to the elementary schools, the structure of the early school years and the secondary years has been fairly stagnant until recently.

In fact, the educational, psychological, and physiological research associated with the junior high and middle school phenomena as well as developmental research on very young children, has led to broader concern with how schools have been structured for students all through the school years (Pavan, 1993; Schatz, no date; Task Force on Education of Young Adolescents, 1989; Wells, 1989). This research has been partially explicated above, but can best be summarized as revealing patterns of thinking and learning which is best stimulated by challenging problems appropriately geared to development. Moreover, children's development is stimulated by the support of other children near or slightly advanced in developmental levels. Development is not completely nor reliably predicted by chronological age. Given these findings, designing school advancement around age-groupings known as grades does not make sense (Anderson and Pavan, 1993).

As a result of these findings, schools enacting reform are grouping students in multi-age configurations. Grouping is more personalized if students have continuing contact over more than one year with the same teacher or team of teachers (The Round Table, 1990; Veves, 1989; Wells, 1989). Block scheduling also provides more sustained interaction between student, teacher, and subject matter (Canady and Rettig, 1992). These new ways of grouping children are typically found in early elementary school and middle schools. High schools are also beginning to experiment with groupings of students formed around developmental interests, personalizing instruction through sustained relationships with teachers, interdisciplinary teams, and block scheduling (Canady and Rettig, 1992; Sizer, 1984).

Cognitively based and developmentally appropriate instruction

Inappropriate testing and instructional practices have been blamed for a narrow curriculum and an inordinate emphasis on lower-level cognitive skills, such as rote memory. As mentioned in the first portion of this review, more than 40 years of research on cognition, artificial intelligence, cybernetics, and brain physiology has revealed the importance of higher order

thinking in stimulating learning for all students.

Metacognition, the awareness of one's own learning strategies, is a prerequisite for any acquisition of even the simplest factual knowledge (Flavell, 1976). Stimulating students' metacognitive strategies has emerged as a new facilitative role for teachers. Because metacognition, by definition, is a higher order thinking skill, the obsession with basic skills for low-achieving students has been shown to be not a remedy, but a cause of lower achievement. Teachers need to start with higher order thinking, especially metacognitive skills to increase student achievement (Derry, 1990; Loper, 1989; Sheeline, 1988).

Developmentally appropriate instruction is instruction which follows students' readiness and interests. Usually the phrase is associated with the education of young preschool and early elementary aged-children, but has come to be associated with all levels of schooling (Schatz, no date; Stevens, 1992). As opposed to preventing children from pursuing interesting and challenging questions in lieu of establishing "the basics," developmentally appropriate instruction allows students to progress continually. Developmentally appropriate instruction is designed around the mental and physical growth of students. The curriculum and instruction encourages active rather than passive learning activities (Nystrand, 1990; Wheelock, 1992b).

Flexible pacing

Flexible pacing is the practice of recognizing that student development is not an orderly progression (Daniel and Cox, 1988; Hereford, 1993; Maxwell, 1986; McKeough, 1992; Piel, 1987; Schatz, no date). Flexible pacing is arranging lessons to reflect student experience and readiness to integrate new learning. Sometimes the same student will require faster or "compacted" learning, and other times s/he will need a more relaxed experience (Reis and Renzulli, 1992; Schatz, no date; Slavin, 1990). Student progress is not directly attributable to chronological age nor necessarily innate ability, but to his/her intensity and variety of life and world experiences. Flexible pacing allows students to receive more enriching experiences when needed to enhance learning. Rather than forcing all students to proceed when only some are ready, flexible pacing allows teachers to regroup, to enrich, and to accelerate experiences as appropriate for individual students (Crowley, 1991; Maxwell, 1986; Piel, 1987). Flexible practices produce lower inequality in achievement (Gamoran, 1990).

Enriched curriculum and high achievement standards expected for all students

Many of the above practices have referred to the importance of enrichment for all students. The current practice of reducing curriculum to "basic" skills for students who do not have enough background experiences for mainstream or advanced tracks is the exact opposite of what is indicated for disadvantaged or at-risk students. Students from deprived backgrounds need greatly enriched environments, instruction and curriculum (Levin, 1991; Peterson *et al,* 1987; Ross, 1989; Schwarz, 1987). The federal government's success with the Head Start program has proved this for over thirty years.

In the same period of time, numerous other programs of enriched even accelerated programs for youth who had been condemned to lower-track, basic skills classes have demonstrated amazing results (Baas, 1991; Bean *et al*, 1993; Calfee, 1991; Calfee and Wadleigh, 1992; Passow, 1989). HOTS (Higher Order Thinking Skills) by Stan Pogrow has been highly successful with Chapter 1's remedial students because it focuses on higher cognitive, challenging problems rather than repetitive drill and practice (Pogrow, 1988, 1990a, 1990b). Henry Levin's Accelerated Schools also have revealed that all students are capable of learning with a highly enriched curriculum (Ascher and Burnett, 1993; Chenowith, 1992; Christensen, 1992; Davidson, 1993; Davidson and Allen-Haynes, 1991; Ferrara and Knight, 1993; Gutherie and vanHeusden-Hale, 1990; Harrington-Lueker, 1992; Hopfenberg, 1991; LeTendre, 1990; Levin, 1987a, 1987b, 1988a, 1988b, 1989, 1991; Levin and Hopfenberg, 1991; Lumsden, 1993; Passow, 1989; St. John *et al*, 1992). Howard Gardner's Multiple Intelligences theory has been tested in numerous schools through the implementation of a varied curriculum built around all seven intelligences (logical-mathematical, linguistic, musical, spatial, bodily-kinesthetic, interpersonal and intrapersonal) (Blythe and Gardner, 1990; Gardner, 1983; Gardner and Hatch, 1989). The success with Gardner's approach can be measured by the mistaken rumors that students in these programs were only the gifted and talented. In fact, the programs accept the full range of public school students (ABC News, 1991).

All of these programs implement high standards for students with a focus on higher order cognitive thinking and authentic discourse rather than rote memorization, and obsolete curricula framed by basic skills (Calfee, 1991; Calfee and Wadleigh, 1992; Newman *et al*, 1991; Nystrand, 1990; Sheeline, 1988; Wells, 1989; Wheelock, 1992b). Students are expected to solve challenging problems throughout their years in schools. They are expected to think, to question, to talk, and to push themselves to further their growth and development (Calfee and Wadleigh, 1992; Polkinghorn *et al*, 1990). They are stimulated to excel by exciting opportunities, enthusiastic teachers and through curriculum which is focused on the complexity and intrinsic beauty of each subject (Richardson, 1988). This is in direct contrast to the ambiguity of so-called differentiated curriculum practices which saved the best of each subject only for the higher tracks, and offered only minimal facts and watered-down versions to the vast majority of students (Calfee, 1991; Calfee and Wadleigh, 1992; Spencer, 1988).

The focus on challenging problems and higher order thinking presses students to achieve because they must participate in their learning actively and meaningfully (Spence and Stan-Spence, 1990; Wheelock, 1992b). In contrast, past practice forced the majority of students to study for the tests without any explicit expectation that learning had any other purpose than passing tests. High expectations, and enriched curriculum also has changed test-making and test-taking (Oakes, 1992b).

Authentic assessment

Today's tests ought to be geared toward more realistic problems, in other words, authentic assessment. Rather than several days or weeks of study on a topic with a test to follow, authentic assessment forces teachers and students to measure learning as they go. Authentic

assessment can be a final event in the course of study, such as a culminating task or project, but authentic assessment can also be a daily event around which learning and instruction is designed (Nystrand, 1990). In secondary science, authentic assessment can be found in lab experiments, but authentic assessment is used in other subjects as well (Schwartz, 1987).

The use of authentic assessment, higher order thinking skills, and enriched even accelerated curriculum is a challenge for teachers who were prepared and have practiced under conditions encouraging obsolete conceptions of thinking and knowledge. Teachers need support and access to information about cognition, active learning, authentic assessment and other practices which do not require homogeneous grouping (Nystrand, 1990; Oakes, 1992b).

Staff development and support for teachers

Summaries of teacher staff years of experience clearly show that many teachers have been practicing teaching while radical discoveries were made in areas of learning theory, cognition and intelligence. Frequently described as an isolated and isolating occupation, it should not be surprising that many teachers are not fully aware of these changes (Carnegie Forum, 1986; Holmes Group, 1986). Naturally, teachers need further training and support in learning new practices and developing higher expectations for their students (Cohen, 1993; Levin, 1991; Oakes, 1992b; Pisapia and Gross, 1991; Richardson, 1988; Spencer, 1988).

As part of the school reform movement, more professional development is being provided teachers these days, but the form often violates the very principles of learning that it is supposed to promote. Most professional development is of limited duration with intermittent lectures provided by "experts" (Lake, 1988). Teachers need time for actively learning more about cognition, especially the engagement of metacognition among all students (Derry, 1990; Larson and Gerber, 1984; Loper, 1989; Sheeline, 1988; Spencer, 1988). Teachers also need time and support for practicing more facilitative teaching strategies such as authentic discourse, block scheduling, cooperative learning, the Socratic method, seminars, teaming and problem-based instruction as they make the transition from traditional grouping practices and lectures (Calfee, 1991; Canady and Rettig, 1992; Creek and Vollmer, 1991; Crosby and Owens, 1993; French and Rothman, 1990; Johnson and Johnson, 1993; Johnson, Johnson, and Holubec, 1991; Newman *et al*, 1991; Nystrand, 1990; Pogrow, 1990b; The Round Table, 1990; Schatz, no date; Slavin, 1990; Stevens *et al*, 1989; Swartzbaugh, 1988; Wells, 1989; Wheelock, 1992b).

Finally, teachers require support in any classroom of greater than 15 students. Repeated research on classroom size suggests that optimal class sizes are smaller than 15 students. Despite these findings teachers still face classrooms of 25 or more students (Anderson and Barr, 1989; Hentz, 1989; Johnston and Markle, 1983; National Education Association, 1990).

Parent involvement strategies

Parents are unaware of the findings on thinking and learning and unfamiliar with more active learning strategies. Parent are children's first teachers and can do much to provide the

enriching experiences which stimulate cognition. Because of these two important facts, parents are critical, yet, unprepared partners in schools' efforts to provide enriched curriculum and high expectations for all students (George and Rubin, 1992; Passow, 1989; Schwartz, 1987).

Parents are now recognized as a critical resource by the federal government in major education legislation supporting educational reforms known as Goals 2000: Educate America Act passed by the U.S. Congress in April, 1994. Numerous provisions for including parents in education have become standard features of a number of programs which detrack kids and support public education for all students, including gifted, disadvantaged, at-risk, and special needs pupils (Ferrara and Knight, 1993; French and Rothman, 1990; Fruchter *et al*, 1992; Sanacore, 1993; Useem, 1992; Wheelock, 1992b).

Conclusion

Literature and research overwhelmingly illustrate the inadequacy of tracking/ability grouping. Tracking and ability grouping is an obsolete practice based on antiquated notions of intelligence, learning, and the structure of knowledge. Over 70 years of research on ability grouping/tracking has failed to establish any obvious benefits for any group of students, except the highest groups. Not surprisingly, the highest groups benefitted because they were provided enriched curriculum and stimulating instruction. Groups deprived of these benefits have not only shown less achievement, but also exhibit demographic anomalies such as racial and socio-economic segregation. Tracking/ability grouping has been highly associated with discriminatory practices within schools, such as withholding challenging curriculum and/or subjecting lower track students to inconsequential instruction or inexperienced instructors. Because nearly all students are tracked/ability grouped in U.S. public schools, the finding that this practice harms all groups but the highest and least number of students, is indefensible. No public school can afford to continually engage in a habit which abuses the majority of its students. Fayette County Public Schools cannot support the continuation of routine tracking/ability in any of its schools.

Fortunately, more than forty years of research on learning, thinking, and intelligence suggests a number of viable alternatives to ability/grouping and tracking. (See Handbook for Teachers.) These practices include

- restructuring all levels of schools (elementary, middle and high school) through heterogeneous grouping
- cognitively based and developmentally appropriate instruction,
- flexible pacing,
- enriched curriculum and high achievement standards for all students,
- authentic assessment,
- staff development and support for teachers, and
- parent involvement strategies.

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