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Jennifer E. Patton
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AUTHOR: Jennifer E. Patton

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ADVISOR: Dr. Roberta Nauman

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ABSTRACT (100-200 WORDS): This research project discusses the issue of tracking, or ability grouping, in the education system. Using this type of system, students are grouped into low, medium, and high ability groups in all or at least several of their subjects in school. This type of grouping is the most commonly used instructional method to facilitate for students' differences. However, educational literature and research shows that although students have differences in abilities and learning styles, tracking is not the most effective, efficient, or equitable way of accommodating for these differences. Hence, this research project not only discusses the evidence for and against tracking, but it also discusses ways to effectively reach all students without homogeneous ability grouping.

The other section of this project discusses how to apply these ideas of heterogeneous grouping in a middle school mathematics classroom. Since middle school is an extremely critical time academically and socially for many students, it is imperative to use the most effective instructional strategies to reach them. Thus, the restructuring of the middle school mathematics classroom into an active, group building environment is necessary.

student name: Jennifer E. Patton

Approved by: Roberta W. Nauman, Ed.D.

Department of: Educational Psychology, Counseling
and Special Education

Date: May 14, 1994

To Track or Not to Track

One of the most commonly expressed maxims in education today is "All children can learn ...," and, yes, this is a truthful statement. However, not all children learn, or the types of cognitive structures children use to collect and store the information they receive, differs for every child. Until recently, the most widely accepted way of accommodating children's different needs was through a systematic method of ability grouping, commonly known as tracking. In theory, this system appears ideal. Teachers are allowed to meet students where they are and really focus on those students who need extra guidance. In fact, teaching a class of students all with the same abilities allows for teachers to plan a curriculum to satisfy their needs at once, rather than having to handle a heterogeneous, multidimensional classroom, where some are bored and others are falling behind. However, "studies over the past decade have shown that this way of organizing students for instruction is, in most instances, neither equitable nor effective." Jeannie Oakes defined this term "equitable" as the equal opportunity of students in the education system to learn (Oakes 1992). In American society, idealized as the land of equal opportunity, such practices as tracking, which may not uphold some basic democratic values, need to be examined and re-evaluated.

Since schools serve as one of the primary tools of citizens' socialization and preparation for participating in society, focusing on finding the best possible instructional methods for students is necessary. Our nation has decided that excellence is the desired outcome - to have students score high on national and international standardized tests, to have schools achieve high ACT and SAT averages,

and to have the best prepared citizens possible competing in the global economy (Bush, 1992). In trying to achieve these goals, we recognized students' differences and placed them according to what seemed best to suit their needs.

Several problems lie within this practice. Research has shown that the methods used to place or track students have not been equitable. Students are usually grouped after a systematic procedure which includes standardized tests, records of past performance, and teachers' recommendations. These tests that students take and the standards to which they are compared are centered around a group of what researchers call "norms of society." These norms are defined as "formal or informal standards of society that prescribe acceptable action in a setting" (Oakes, 1992). For example, a standardized test is constructed from what are judged to be the appropriate skills of a "standard" child at a particular grade level. However, this standard child usually lies in the majority, white middle-class population. Thus, students whose parents are not fluent in English, have English as a second language, or who simply are not privileged to the background appropriate to the test are not prepared to do well on these exams. Since the norm is inappropriate for these students, they are then classified as slower learners and placed in the lower tracks. Initially, they achieve only slightly lower than their peers. However, as the school years progress, students placed in higher tracks move further and further ahead, and it becomes harder for these lower students to catch up. In fact, few attempts are actually made to catch them up. Thus, the gap widens and lower track students are left behind. The net result is that students who enter the school system with less, stay with less, and are continually offered less opportunities.

Other standards or norms which are deeply rooted in society lie in perceptions of intelligence. Traditional measurements of intelligence assess how well students are likely to perform in what former President Bush labeled in Goals 2000, "challenging subjects...math, science, geography, history, and English ..." (1992). Additionally, intelligence is usually viewed as a finite attribute. Thus, in a vast sea of knowledge and abilities, intelligence has not only been narrowed down to a selective set of abilities, but also the range of intelligence has been shrunken as if it were a cross-section of a continuous function. This view of intelligence also implies that anyone who is gifted in the arts, foreign languages, or athletics, but not necessarily gifted in the areas mentioned in Goals 2000 is not intelligent. Since our society needs all forms of intelligence in order to function effectively, we have illogically imposed a narrow view of intelligence on our students and have asked them to conform to it. When they cannot conform, their test responses are labeled wrong and they are consequently judged IQ intelligent. Thus, we have the beginning of our placement and labeling process in the school system.

Those students who are viewed as superior, because of their backgrounds and their possession of this narrowly defined intelligence, are tracked in what are called gifted classes. Typically, if students excel in one or two "challenging" subjects, they are then placed in all gifted or honors classes. This is not to say that these students are IQ gifted. However, according to researchers like Gardner and Renzulli (1993, 1983), most students are not gifted in all areas, but students may be gifted in a variety of areas, such as cognitive abilities, social abilities, artistic abilities, and even athletic abilities.

It is current practice to uphold a one-dimensional view of giftedness, determined by an IQ test, or something similar, and to place students with high scores in gifted programs. Although the stated purpose of these programs is to meet these students' needs and challenge them further, what actually occurs is the initiation of a labeling and classifying process. At a young age, these students are labeled as the brightest and most successful students in the school. Parents of these students feel important and successful as well, since their children are among the elite group, which, of course, favorably reflects their intelligence level. Teachers usually have more respect for these students, push them harder, and give them a more interesting curriculum in which students take a more active role in their learning. Emphasis in their classroom activities lies in such things as critical thinking skills, creativity, and searching for new ideas or patterns. The combined elements of this program enable most of these students to acquire a high sense of self-esteem and usually to become more involved with the school's extra-curricular activities, which research has shown improves students' success in school work (Stevens and Wood, 1992). Overall, these students are generally considered the good students of the school.

However, there are faults in this system of classification. As mentioned previously, the one-dimensional testing device used to select these students eliminates a great many from what could be a very beneficial program for their needs as learners. Additionally, for those students who do make it into the program, excessively high expectations from peers, teachers, and parents can lead some students into self-destructive behavior when they can find no other way to relieve the pressure. Similarly, students who have been classified as the smartest all their lives

may have significant adjustment problems academically and socially in early college years as they realize that they are not always the cream de la creme

At the other end of the spectrum, students who do not score well on these placement tests are placed with the lower group. These lower classes allegedly serve the same purpose for lower scoring students as the gifted classes do for higher scoring students - to meet students' specific needs. These classes usually contain significant numbers of students with behavior disorders, learning disabilities, and attention deficits. Even if only a few classes are tracked, scheduling results in these students' being grouped together much of the day. Since many of these students have behavior problems, continually grouping these students together only magnifies these behavior problems (Gamoran, 1992). Thus, rather than teachers' having one or two students to monitor in a given class period, they have a whole group of students who have the potential for causing discipline problems. Consequently, teachers of these lower level classes focus more attention on having students respect authority and keeping them in order than on learning. Most of the activities in these classrooms consist of independent worksheets and reading assignments in which the material emphasized usually consists of repetition of basic skills toward mastery. Thus, in these lower track classes, students not only have teachers whose primary focus is discipline rather than academic challenge, but they also miss the opportunity to learn from more knowledgeable and more highly motivated peers. Hence, these students experience a double loss (Stevens & Wood, 1992).

The irony in this type of instruction lies in the fact that these students are

those who need an active learning environment to keep their attention. These students have been labeled at an early age by the school environment -peers, parents, and teachers - as slower students. Consequently, these students often consider themselves the stupid group. They often maintain this self image throughout their school career, accepting their status as their proper placement in the school environment and mentally dropping out of learning. As they value learning less, their behavior problems usually increase. When this cycle starts, teachers and administrators usually try to correct these symptoms through coercive disciplinary acts, such as suspensions, detentions, and expulsions, which, in turn, only increase these students' dislike of school. By the time these students enter high school or even junior high, learning subjects such as math, science, and English have become meaningless to many of them. Although this situation does not happen in all cases, a great many students from this group follow a similar scenario (Gamoran, 1992 and Stevens & Wood, 1992).

Under the tracking system, educators and administrators make the assumption that ~ have the authority to decide students' academic future. Consideration of both the gifted and the lower level classes makes it obvious that stereotypes and attitudes cannot be separated from the curriculum. From an early age, members of each of these groups encounter two completely different experiences in the school environment. Gifted students are continually encouraged to move forward and get the very most they can out of their learning. Not attending college is not usually an option for this group, as the school environment encourages their academic development. . At the same time, however, students 1Q1 in this program are not encouraged nearly so often to pursue higher education and many finish high school

not academically prepared to do so. Thus, in American society where upward social mobility stands as a highly valued democratic ideal, it would seem both unjust and unwise to limit certain individuals' opportunities. Since limiting opportunities of this segment of the population will, in turn, maintain the status quo and not permit their optimal development, the current system needs to be re-evaluated. Examining again the schools' placement strategies suggests that on the strength of a standardized test, schools are classifying those who are simply different from the standard, or different from the norm, as deficient.

Howard Gardner analyzed people's differences and different abilities in his book, Multiple Intelligences: The Theory in Practice (1993), "Your *intelligences* - musical, bodily-kinesthetic, and so on - are what others call talents or gifts." In fact, he further concludes "...Placing logic and language on a pedestal reflects the values of our Western culture and the great premium placed on the familiar tests of intelligence ..." "The dominant American culture - white, middle-class - has valued these two forms of intelligence highly. This value system has been reflected in the material on which these "familiar" tests have focused. Hence, forms of intelligence other than logical-mathematical and linguistic are not routinely assessed in the public school system. Gardner has labeled these other forms of intelligence as musical intelligence, bodily-kinesthetic intelligence, spatial intelligence, interpersonal intelligence, and intrapersonal intelligence. All Gardner's forms of intelligence are developed in specific areas of the brain, and all "entail the ability to solve problems or fashion products that are of consequence in a particular cultural setting or community." Gardner points out that the traditional view and traditional assessment of intelligence holds that "the general faculty of intelligence does not change with age

or training or experience," (Gardner, 1993). Thus, by using the traditional methods of classifying students in the school system, not only are a wide range of abilities ignored, but also the further developments of~ ability is ignored. Students scoring lower in linguistic and logical-mathematical intelligence are classified at or near the outset and are not allowed to gain enriching experience which might reveal to them that they may, in fact, have gifted abilities in these other areas. Along with this conclusion, the obvious occurs - assessment and development of other dimensions of giftedness are largely ignored.

If the current practices seem inappropriate, given the needs and range of abilities of students, what can be done to change the situation? Simply removing the labels and clumping students together in heterogeneous groups will not suffice. Educators may then simply try to teach to the middle of the class, and the fears of all teachers, administrators, parents, and even students themselves will be confirmed. Those who are slower learners will become lost and those who are quicker learners will be bored. Reforming the system necessitates surveying the underlying assumptions and values, such as those previously mentioned. These beliefs support and maintain the institution of tracking. For example, in American society the competitive, individualistic mindset is valued more than the cooperative, communal mindset, although it is not necessarily more prevalent. Moreover, in American society it is generally accepted that one should try to use the resources available to improve situations on an individual basis rather than on a community basis. These values are reflected in the school community as well. Citizens who make up the school community often work to make certain that they and their families are

maximally benefitting from the school. This attitude is reinforced by the tracking system, since the institution of tracking implies that one group is elite, another group is average, and a third group is substandard. Parents are subsequently forced to contend for their child's placement and to ensure that their child receives the best education. Thus, if untracking is the desired action to take, all parties involved need to be assured that all students receive the best education. As superintendent Kara Deletis notes in Anne Wheelock's article "The Case for Untracking," "Academically, we're working to raise the floor and the ceiling," (1992).

To begin a successful reform program, a school district needs the active support of parents, teachers, administrators, and members of the community at large - including students. Studies by Jeannie Oakes (1992), Anne Wheelock and Adria Steinberg (1992), Thomas Payzant and Dennie Palmer Wolf (1993), and Anita Merina (1993) have all stated that reform movements can be successfully implemented and maintained only when these four groups of people are working together cooperatively. Additionally, these researchers have all agreed that reform takes significant commitment for an extended period of time. Some school systems will start with the reform of a single class or grade level, and curriculum reform is made every year as the class advances to the next higher grade level. Other school districts will start by eliminating all the low level classes such as Practical Math or Consumer Math and set a core curriculum for all students to pass in order to graduate (Payzant and Payzant, 1993). Also in, "Piloting Pacesetter: Helping At-Risk Students Meet High Standards," several teachers in the San Diego City schools stated that simple communication changes towards the students, especially the lower students, made a great difference. For example, changing the comment, "Well, if you

get to college ..." to the statement, "When you get to college, you'll have to..." (Payzant and Wolf, 1993). Along with this, teachers should offer encouragement and current facilities to prepare all students for continuing their education.

Other methods of reform lie in changing assessment strategies. For instance, in a math class, traditional forms of assessment are multiple-choice and short answer tests. Although these are usually easy to grade and short answer tests often allow for partial credit, these types of tests may not be complete enough in measuring students' understanding. Especially for those students who do not test well under a time and curriculum constraint, this form of assessment will not provide an accurate measurement for the student or the extent of what that student has learned in class. Looking again at a math class, another form of assessment may be to give students writing assignments. These writing assignments may simply be to assign students to record their reasoning behind some of their homework problems, or they can be as extensive as having the students research a particular mathematician. The latter may be particularly effective and motivational for a multi-cultural classroom. Students can study the many contributions in mathematics from different cultures. Thus, students who formerly may have seen no relationship of mathematics to themselves and their people may be able to take pride in contributions made by members of their culture. Jaime Escalante, for example, stressed to his Latin American students in a poor East Los Angeles high school the contributions of the Mayans to mathematics. Another form of assessment could be a thematic project centered around a particular area of mathematics on which students are working or a portfolio of homework assignments.

A third way to reform curriculum could be similar to the ideas presented in Nel Noddin's book, The Challenge in Schools (1992). She describes a curriculum where students are presented with course descriptions, including specific expectations, and they are allowed to choose whether or not they sign up for any given course, (1992). For instance, a school in San Diego has used the Advanced Placement program as an equity tool, "...these courses do not require cutoff scores or special certification: any willing student can enroll, and any teacher can take up the challenge of teaching a rigorous and inventive course ..." (Payzant and Wolf, 1993). In both of these examples, the curriculum calls for student empowerment. Students are allowed to make their own decisions and be responsible for the consequences. Relating these ideas to Gardner's view of intelligence and giftedness, it would also be appropriate to assess students' particular talents. Students should be made aware of their particular gifts. Furthermore, schools should structure programs which help students to continue developing all their intelligences.

Other instructional strategies which aid in successful reform lie in cooperative learning, discovery learning, and peer tutoring. All three of these practices can be very effective not only in developing students' communication skills, but they can also greatly encourage the importance of cooperation in the successful completion of a task. Just as all students are held accountable for the success of the group, all students are important to the group. Practices and ideas such as these become extremely important in the middle school curriculum.

During the early adolescent years of middle school, social and academic

connections are crucial to the success of these students. Many middle schools have adopted and implemented the teaching team philosophy. This doesn't necessarily mean that each subject is taught by a team of teachers or even a pair of teachers. In most middle schools, a specific team of teachers is associated with a particular group of students for the whole year. Each team includes a math teacher, science teacher (or combination of the two), reading teacher, English teacher, and social studies teacher. This close knit structure allows for the students to have a group to which they can relate themselves and their school experiences. Since social relationships serve as a primary concern for many young adolescents, this format works extremely well. Additionally, in this team structure, each group of teachers devises a thematic curriculum for the team. Each theme integrates all of the disciplines, and draws curriculum connections for the students as well. Writing, problem solving, reasoning, and creativity skills are implemented across the curriculum. This idea of curriculum connections is also important for the success of the middle school student, "Using the theme ..., subject areas begin to relate to one another rather than being isolated," (Beane, 1993). Finally, thematic instruction makes the learning material more significant to the middle school child. Since students at this age are experiencing new awarenesses of self and the world, interest in learning isolated subjects drops significantly. Thematic programs can, therefore, not only interest students in the respective subject areas but also in learning in general. Unlike the experience with tracking, non-traditional learning programs like these allow for all students to experiment with very enriching activities.

Connections, reasoning, and problem-solving are a few of the concepts listed

in the Curriculum and Evaluation Standards for School Mathematics, issued by the National Council of Teachers of Mathematics (NCTM, 1989). These Standards have called teachers to a new way of approaching mathematics in the classroom. They require a more student centered classroom which involves "...teaching based on guided inquiry rather than didactic instruction, and assessment that is open-ended rather than machine scoreable ..." (Levinson and Wiske, 1993). To implement these Standards, the curriculum calls for many problem-solving activities for which students need to utilize reasoning skills to support their answers. To accommodate these two activities, the course material and the approach by which it is taught should result in forming connections among mathematical concepts. The material should also connect mathematics to the students and their environment.

Ways suggested by the NCFM Standards, for incorporating some of these ideas into classroom practice lie in strategies such as cooperative learning and discovery learning. The article, "How Middle Schools Are Untracking," (Steinberg and Wheelock, 1993), concludes that these two strategies are essential in successfully implementing these standards and detracking altogether. Not only are the students empowered to experiment and search for their own connections, but they are also learning to reason effectively and communicate with each other as well. In this way, the teacher has become a facilitator to nudge the student rather than pull answers from the student.

Another very effective tool suggested by the Standards, is the use of technology. Technology can play a very powerful role in the learning of middle school students. As a result of their stage of development, visualization is a key factor

in understanding and applying mathematical concepts. Technology is a tool with enormous capacity for helping students with visualization. Since computer programs range from tutoring aides to creating geometric shapes, technology can benefit students with all levels mathematical ability. Although, this type of instructional method is limited by available funding, educators may also use a wide variety of manipulatives to enhance understanding. For example, in introducing the concept of volume, students could work in cooperative groups in making rectangular solids out of centimeter cubes. If the directions are simply to make two rectangular solids each having a volume of 24 cubic centimeters, students will build rectangular solids with all different dimensions. Additionally, students approaches to building the rectangular solids will vary. Some students will use the formula they know of volume to determine their dimensions and what the solid will look like. Others will count out 24 cubic centimeters from their pile and then form some sort of solid with them. Both approaches are correct, and when the activity is over, both methods should be discussed. These types of instructional tools combined with cooperative and discovery learning have served as essential elements in the success stories of those schools who have chosen to reform their curricula (Smith & Romberg, 1993; and Levinson & Wiske, 1993; and Steinberg & Wheelock, 1993; and Tankersley, 1993; and Merina, 1993).

If mathematics programs in schools adopt programs such as those outlined in the NCfM Standards, the need for tracking will be limited or eliminated entirely. Additionally, in focusing on the middle school student, the idea of the teaching team/thematic curriculum program serves as a powerful tool to give all students an

enriching curriculum as well as to serve their emerging social needs. Messick and Reynolds discuss in Middle School Curriculum in Action (1991), the fact that students at this age begin developing their positive and negative viewpoints of the education system. The educational environment in which these students participate reinforces their viewpoints, and thus, contributes directly to the success or failure of their future educational experiences. Therefore, it is imperative that curriculum changes be instituted at this level. As emphasized by the author of, "In Search of a Middle School Curriculum," the "central purpose of the curriculum ought to be to help early adolescents move toward broader and deeper understanding of themselves and their world," (Beane, 1993). Thus educators, administrators, parents, and community members all need to cooperate in developing new learning programs that will not only help these students recognize and enhance their particular gifts, but also keep them excited about and active in the learning process throughout their lives.

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