Applying Research on Effective Schooling at the High School Level

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Abstract

Data-based decision making is vital to the success of K-12 education. Many students graduating from high school lack the skills required for higher education and without them it is feared that they will not succeed. Programs based on variables that are known to improve learning are proposed for 12th grade students at Clark High School in San Antonio, Texas. These include: mastery learning, goals, and feedback. District officials, administration, the school principal, and the teachers themselves will be presented with data to assist them in specialized instruction and testing for tracking and modification. The goal is to raise the mean SAT scores of these students to equal or higher than the national average.

Research on Effective Schooling

Between 2000 and 2010 enrollment in higher education degree programs increased 37% from 15.3 million to 21.0 million with the number of females rising 39% while male students rose 35% (National Center for Education Statistics, 2012). As more young learners consider the benefits of a college degree program it is critical that secondary education, particularly senior year students (12th grade) have acquired the skills to meet the challenges and rewards of goal oriented, self-directed learning. The experience and expertise of successful higher education instructors, especially those who mentor incoming freshman, can assist in identifying and developing research based curriculum which will provide local schools and school districts with alternatives to traditional instruction. Mastery of learning, goal formation, and appropriate feedback mechanisms lead to increased student success as demonstrated in quantitative classroom assessment (Hattie, 2003).

Overview of the District Context

The Northside Independent School District (NISD) of San Antonio, Texas, includes 17 elementary schools, 18 middle schools, 15 high schools, and 8 special schools (Northside Independent School District, 2012). In 2011 85.9% of Texas high school students graduated; however, this figure does not take into account 86,170 students who left the program for various reasons including returning to their country of origin (San Antonio Express News, 2012). Texas has the worst percentage of adults in the United States with a high school education and ranks 22nd of those with at least some college (Thevenot, 2010). Even the renowned University of Texas at Austin has a 52.5% four-year and an 80.3% six-year graduation rate. It ranks 19th from the bottom in United States college graduation ("College Completion", 2010).

The concern for student success even with the recent improvement in academic achievement has inspired a program that involves instructors in higher education who have achieved extraordinary learning results to use their talents as consultants for San Antonio 12th graders with the goal of preparing them for the rigors of college life. Clark High School is a secondary school within the NISD located in the suburban, residential northwest area of San Antonio situated between the University of Texas at San Antonio and numerous medical research hospitals. Student population is 2,617 with 12th grade learners comprising 588; 75% of the 2012 graduating class have noted that they plan on attending a four-year university or college, with 15% indicating that they will attend a community college (Tom C. Clark High School, 2012). Hispanics total 46% of student demographics followed by white students at 41%, blacks 8%, and Asians 5%. Twenty-four percent of students qualify for free lunch (617) with 16.35% living below the poverty line (Public Schools K12, 2011; Movato, 2012). Although Clark High School is considered a college preparatory or "comprehensive" school, it lags behind the national averages in SAT scoring only in the 75 percentile (Clark High School, 2012).

School administrators and board members have dedicated themselves to improving these statistics and have requested data-driven research to be provided by instructors in higher education who represent the next phase in learning for the majority of these students. How does Clark High School prepare these young men and women for the demands of collegiate life while at the same time improving learning within their own secondary school curriculum?

Data Based Recommendations

As a successful college professor who teaches at all levels of freshman through fourth-year students, I have been asked to assist in developing, implementing, and tracking a research tested instructional model to achieve lasting and meaningful learning for these students. Hattie

(2003) identified the major sources of variance in student achievement including the students themselves, home, school, principals, peers, and teachers. Of these factors, it is the teacher (accounting for 30% of the variance in achievement test scores) that can be most effectively used to make a difference in improving student performance. A synthesis of achievement variables cannot occur unless teachers believe in, agree to, and commit to new methods of instruction particularly since they will require greater effort and classroom time (Zimmerman & DiBenedetto, 2008). Although education is a collaborative effort that requires community support, the focus here will be on implementation of programs at the instructional level (Huitt, 1999).

Using Hattie's (as cited in Huitt, Huitt, Monetti, & Hummel, 2009) criterion of effect size to establish which achievement teacher variables to consider for this project, it was determined that mastery learning (d = 0.58), goals (d = 0.56), and feedback (d = 0.73) should be employed to increase academic achievement for Clark High School's senior class.

Mastery Learning

Mastery learning is not new; developed in the 1920's and 1930's, students were required to prove mastery of each lesson before proceeding onto the next through formal testing (Washburne & Marland in Kulik, Kulik, & Bangert-Drowns, 1990). In 1963, Carroll (as cited in Zimmerman & DiBenedetto, 2008) theorized that a student can learn as long as they have an adequate amount of time in which to do so. Based on Carroll's work, two approaches to mastery learning have been employed: Bloom's Learning for Mastery (LFM) which concentrates on group learning and is used in K-12 education, and Keller's Personalized System of Instruction (PSI) which focuses on individual learning and is used primarily in higher education (Kulik, et al., 1990; Zimmerman & DiBenedetto, 2008). Bloom's model will be recommended here.

Bloom's LFM model is based on four components: defining mastery, planning for mastery, and grading for mastery (Schunk as cited in Zimmerman & DiBenedetto, 2008). Frequent learner assessments are given to provide both instructor and student with feedback as to whether goals have been achieved; if they have not, corrective measures can be taken to help the student better master the curriculum. Bloom (as cited in Zimmerman & DiBenedetto, 2008) predicted that this method would assist 90% of students to reach a level that only the top 10% had accomplished under traditional instruction and that weaker students would excel since they would be allowed additional time to master subject matter.

The most comprehensive study of mastery learning and its impact on education was done by Kulik et al. (1990) in a meta-analysis of 108 studies that met rigorous criteria standards. Outcome measures of student learning were examinations given at completion of instruction, performance follow-up (retention) testing, attitude toward instruction and subject matter measurement, course completion, and amount of time needed for learning (Kulik et al., 1990). Results showed that all but seven studies indicated mastery learning programs had improved examination scores. The average effect size was to raise student achievement scores by 0.52 standard deviations with a standard of error of 0.033 with the average learner scoring in the 70th percentile. The average student in a classroom without learning mastery performed significantly lower, in the 50th percentile (Kulik et al., 1990).

Kulik et al.'s (1990) study confirmed that mastery learning was effective with weaker students and that follow up testing averaging eight weeks after initial mastery examination produced a strong subject retention effect. In addition, Guskey and Gates (as cited in Zimmerman & DiBenedetto, 2008) discovered that instructors in mastery learning classrooms felt "personal responsibility for their student's learning outcomes, held higher expectations for

their students, and reported more positive attitudes toward teaching than teachers in traditional

classrooms" (p. 210).

Goal Setting

Mastery learning cannot be accomplished without the exercise of setting goals for

learning outcomes by both educators and learners. According to Locke and Latham (as cited in

Hattie & Jaeger, 1998), goals are crucial to the education process and should be challenging in

that they link the past to the future performance, direct the student to achieve "relevant

outcomes, convey normative information to the individual by suggesting or specifying what level

of performance is goal setting is more effective than naming general objectives and should

stimulate the student to persist in their studies (Hattie & Jaeger, 1998). Sadler (as cited in

Campbell & Levin 2009) discussed the role of goal formation in education as giving the student

a standard in which to aim, a place to analyze performance within guidelines, and as motivation

to perform an action which permits "closure of the gap" in learning (p. 48).

Ames and Archer (1998) performed a study of 176 students (91 boys and 85 girls) in

grades 8-11 who attended a junior high and high school for academically progressive students.

Findings indicated that when mastery goals were promoted through classroom instruction,

learner involvement, challenging task pursuit, and a positive attitude toward instruction occurred.

Fleming (2002) explored the effects of goal setting by examining 67 students enrolled in entry

level college psychology courses mainly consisting of first year pupils. Using goal-setting forms,

students were expected to set and keep goals established from the second through seventh units

of instruction. Strategies for exam and learning performance were included in classroom

curriculum with the result that students who used goal setting as part of their learning process

scored and retained as much information as fourth year students, while the first year control

group fared much worse in these areas (Fleming, 2002). Additionally, introducing mastery

learning in the classroom provides an opportunity for goal formation that is both challenging and

promotes self-efficacy (Ames & Archer, 1988).

Feedback

The final and most important variable to be considered when introducing a new research-

based instruction model is Hattie's (as cited in Huitt et al., 2009) employment of feedback as a

learning tool. Just as mastery learning cannot be successfully accomplished without goal setting,

the latter is not possible without the inclusion of feedback. According to Hattie and Jaeger

(1998), setting difficult yet reachable goals that should be followed by evaluation that provides

"feedback to teachers and learners about students' progress towards achieving these challenging

goals" (p. 122). The resulting feedback that the instructor would pass along to the learner would

not be based on grades or test scores per se; instead it would concentrate on what was accurate or

inaccurate and how steps might be taken to improve learning and achievement (Gentile and

Hunter in Lalley & Gentile, 2009).

Hattie and Jaegar's (1998) research into the meta-analysis that studies feedback

concluded that it is the most important component in positive learning. The feedback referred to

here is not reward or punishment for a task well done or discipline for a task poorly executed;

rather it is frequent and constructive assessment of progress to remedy confusion or recognize

goal completion with the purpose of moving on to the next challenge. Feedback that

concentrates on personal qualities rather than the assignment at hand is known to be

counterproductive in that it may discourage student risk taking for fear of failure (Black &

William as cited in Hattie & Jaeger, 1998).

As mentioned previously, Bloom's LFM model involves grading for mastery (Schunk as cited in Zimmerman & DiBenedetto, 2008). Guskey (as cited in Zimmerman & DiBenedetto, 2008) indicated that in Bloom's model "frequent, targeted assessments are used formatively (i.e. for guiding learning and instruction)" which assist both teacher and student with understanding of learning mastery achievement (p. 208). It is therefore of paramount importance that data from these assessments be properly interpreted by the educator, shared with the student immediately, and then used to develop corrective learning or goal advancement.

Implementation

The three variables of mastery learning, goals, and feedback have been selected for assistance in preparing Clark High School seniors for success in higher education as well as a more meaningful final year of secondary instruction. Data have been provided to support best practices in improving student learning with the goal of implementing a more effective program. In order to achieve this success, district officials, administrators, principals, and most importantly, the educators themselves must be involved in the process. Huitt et al. (2009) suggested a holistic approach to education which involves the wider community and considers the home environment, spiritual support systems, and the students themselves as part of the equation for a better learning experience. This sentiment is echoed by Flowers and Carpenter (2009) who stressed involvement of as many instructors as possible, encouraging parents and the community to assist in participation, meter out responsibility to those who are involved, keep up with current demands, and where all groups associated with the project can share information.

According to Lalley and Gentile (2009) mastery learning that includes goal setting and feedback "requires that each student achieve a preestablished standard of performance on a specified set of instructional objectives in a criterion-referenced manner" (p. 30). These authors

list two steps in implementation of such a program which includes 1) identification of objectives

in order of their importance to achieve future learning that involves student learning until

mastery is demonstrated, and 2) provide "enrichment objectives" for students to excel beyond

mastery to excel and use their knowledge or abilities in real world contexts (p. 30).

Educators not only need to make use of data to help them provide meaningful learning,

goal setting, and feedback resources should also be made available to them to measure success,

correct behavior, or continue with current programs that work (Huitt, 1999). In order to

accomplish this, Block, Efthim, & Burns, and Gentile and Lalley (2003) (as cited in Lalley and

Gentile 2009) recommend the following: prepare clearly stated goals that utilize past student

knowledge to future competencies; promote a high standard for mastery learning; use several

feedback assessment methods, and provide incentives to stimulate students to go past goals or

subject mastery to exhibit expertise (p. 31).

Tracking

According to Zimmerman and DiBenedetto (2008) although mastery learning testing

exists in schools across the United States very few districts have established guided learning

valuations or programs which have adapted to this educational process. The authors postulate

that the lack of instructor motivation may be a key reason for this phenomenon. In terms of

accountability over a one to three year period the most obvious indicator of student success

would be aligning Clark High School SAT mean scores to be equal or higher than the national

average. If the previously cited data is any indication, this should be accomplished within a

relatively short time span if mastery learning programs are correctly implemented (Kulik et al.,

1990).

Curriculum based measurement (CBM) has been used over the past 20 years to measure basic skill achievement using weekly or monthly examinations (Zimmerman & DiBennedetto, 2008). These tests determine achievement as far as a student's ability in a subject matter and identify need for improvement that can be compared with scores of other students in similar grades. Curriculum based measurement (CBM) is a better tool of predicting extended goals than evaluating mastery learning, and while it may provide general progress information for groups of learners it does not provide assessment of individual learning needs (Zimmerman & DiBennedetto, 2008). Teacher evaluations, student surveys, and classroom evaluation by administrators are the most effective evaluation of success or failure of mastery learning, goal setting, and feedback oriented instruction methods. This should be performed by the school itself, encouraged by the community, and supported by both teachers and students.

Conclusion

Data-driven research has the power to help create credible and lasting school reform. Now more than ever, it is critical to prepare our young people for a college education that will assist them in the challenges of the 21st century. As an instructor in higher education I have made a recommendation to reform 12th grade curriculum which concentrates on variables proven to have a positive impact in improving education: mastery learning, goals, and feedback. If implemented correctly, these measures should improve learning outcomes that can be verified through regular testing and evaluation. Support from the teachers themselves is vital to the success of this project; without the data to substantiate the success of these programs, support would be minimal.

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