LEADERSHIP AND CURRICULUM

Leadership in Mathematics Curriculum Development

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Abstract

This paper discusses mathematics curriculum development throughout the past century and incorporates a discussion of appropriate leadership style needed to bring about effective change. School leaders must be cognizant of the commitment and competence of the faculty within their school for successful curriculum development to take place. McGregor's Theory X and Theory Y concepts are applied to help the school leader identify the appropriate leadership model that will guide him or her to bring about effective change. Without buy-in from the faculty regarding the change initiative, groups can form that will hinder the mission of the school.

Introduction

Overview

This paper explores the development of mathematics curriculum on both the national and local levels as well as the most effective leadership models used in the process. The paper has been divided into the following sections: what are the geographic constructs to be considered; what is leadership and how does a leader contribute to curriculum development; what are current curriculum change initiatives and by whom were they initiated; and what are the roles of participants in this particular change process? Before one can look at specifics related to mathematics change initiatives, it is imperative to have a solid foundation about leadership styles and general issues related to curriculum development. It is also essential to have an understanding of the geographical constructs for which this paper is based.

Geographical Constructs

Ohio County High School (OCHS), located in Hartford, Kentucky, serves students in grades nine through 12. Students are provided access to rigorous applied and theoretical courses in the content areas of English, mathematics, science and social studies. Courses are also offered in technical/career fields of family and consumer sciences, agriculture, health services, automotive technology, carpentry, electricity, welding, business, and information technology. These courses build a framework that promotes both college and workplace readiness skills. As a

comprehensive high school, OCHS annually reviews curriculum mapping and content specific state and national documents as they relate to curriculum issues. Teachers continually review and assess teaching strategies and the delivery of the content based curriculum. The mission of OCHS, revised in 2003, is "Stick to the focus of proficiency in teaching and learning." The statement itself includes educational jargon implying that teachers, administrators, parents, and students are committed to exhibiting a depth of knowledge that meets or exceeds that of other high schools in the state. State assessments are administered annually to measure the progress of students at the school. Data is reported in two ways: No Child Left Behind (NCLB) progress and the Kentucky Performance Report. The NCLB report indicates whether or not the school has made adequate yearly progress (AYP) in the areas of mathematics and reading among whole group and sub-group populations. The most recent data indicates that 48.03% of juniors at OCHS were proficient or distinguished in the area of mathematics; 68.79% of sophomores at OCHS were proficient or distinguished in the area of reading (Kentucky Department of Education, 2009). While this data does not indicate AYP goals were met for students with special needs, mathematics and reading scores at OCHS are among the highest in the state.

Leadership

In the book *Leadership and Organization: A Behavioral Science Approach,* Tannenbaum, Weschler, and Massarik (1961) define leadership as "interpersonal influence, exercised in situations and directed through the communication process, toward the attainment of a specified goal or goals" (Vann, 2010). Lunenburg and Ornstein (2004), authors of *Educational Administration: Concepts and Practices*, indicate there are six distinctive categories of

leadership: instructional, transformational, moral, participative, contingency, and managerial. (Lunenburg & Ornstein, 2004). Identifying and utilizing the most appropriate leadership style require one to assess the levels of engagement and attainment of the subordinates.

Effective leaders must evaluate the competence and commitment of the employee in order to determine which leadership style will contribute to the successful attainment of the mission and goal(s) of the organization. Douglas McGregor (1960) theorized this thought process in the book *The Human Side of Enterprise*. McGregor's Theory X and Theory Y indicate that employees function at a specific level of attainment based on Abraham Maslow's Hierarchy of Needs; hence, authority figures must adapt leadership styles to meet the individual level of attainment for each employee (Vann, 2010). Theory X individuals function at the lower strata of Maslow's Hierarchy of Needs, indicating they possess physiological, safety and security, or love and belongingness needs. Theory Y individuals function at one of the higher echelons of Maslow's Hierarchy of Needs, indicating they have reached the self-esteem or self-actualization level. Administrators who lead individuals residing in the Theory X domain often have to direct, control, and threaten workers to perform tasks. Theory X workers are not intrinsically motivated to complete tasks. These individuals do not see that work is vital to their own personal growth nor do they view it as beneficial to the growth of the organization. Theory Y workers, on the other hand, are intrinsically motivated to complete tasks because they view operations as imperative to the organization's future and their own personal growth. Theory Y individuals are self-directed and oftentimes seek additional responsibilities or tasks to promote themselves and the organization. School leaders desire to have more intrinsically motivated faculty, but this is unfortunately not always the case.

School leadership, as categorized above, is dependent upon the follower's frame of mind. Traditionally, school leaders have taken a laissez-faire approach to curriculum development (Marsh & Willis, 2003). Recent research into curriculum development indicates that student acquisition of knowledge and achievement has increased as a result of administrator involvement in the curriculum development process (Marsh & Willis, 2003; Wanzare & Da Costa, 2001). Passive involvement in the curriculum development process is not sufficient. The leader must choose to actively engage the most appropriate leadership model. In terms of curriculum development, one might consider the transformational leadership style to be the most appropriate leadership style to use. The transformational leader is one who possesses charisma, consideration and creativity (Vann, 2010). The school leader must be able to utilize McGregor's theories and implement them. The leader must have the charisma to persuade faculty to follow paths they may not normally pursue, consider alternative approaches to goal attainment, and creatively devise plans of action to accomplish the goal(s) of the organization (Vann, 2010).

In addition to possessing knowledge about leadership styles, leaders must also be cognizant of the concept of andragogy. According to Buddy Lyle of the University of Arkansas, andragogy is defined as the "art of helping adults learn" (Vann, 2010). Educational theorist Malcolm Knowles wrote about the concept of andragogy during the 1980s. Knowles's theory on adult learning asserts six suppositions: adults have a "need to know" why they are learning; adults must possess a foundation of knowledge regarding what is to be learned; adults must have self-concept regarding the decisions on their education; adults must see relevance in what is to be learned; adult learning must be problem-centered; and adults respond better to intrinsic motivators than they do to extrinsic motivators (Knowles, 1990). Andragogy implies that adults are self-directed learners (Vann, 2010). School leaders engaged in the curriculum development

process must consider these salient assumptions as they guide their faculty in the curriculum development process. Without ascertaining the engagement level of the faculty, the leader may unintentionally create an environment conducive to bad cohesion (Vann, 2010). Bad cohesion implies workers may bind together to form a dissenting voice which will evidently create strife and stagnate progress toward the goal(s) of curriculum development.

Curriculum Development

Historically, school leaders have deferred the development of curriculum to faculty members who typically possess greater content knowledge about the subject. School leaders have also disregarded the need to monitor the process of curriculum development when delegating this task to others. This indicates that school leaders have traditionally followed a laissez-faire approach to curriculum development. Before one can adequately discuss the process of curriculum development, it is imperative to understand what curriculum entails. Although researchers have not come to a consensus regarding an operational definition of the term *curriculum*, Lunenburg and Ornstein (2004) offer the following definition: curriculum is "a plan for action, or written document, which includes strategies for achieving desired goals or ends" (Lunenburg & Ornstein, 2004, p. 478). Hence, mathematics curriculum is the written document that establishes goals and objectives of the discipline and solidifies how these goals and objectives will be achieved.

Secondary school education has been subject to considerable change over the past century. During the latter half of the nineteenth and first quarter of the twentieth century, the National Education Association (previously known as the National Teachers Association)

promulgated much of the curriculum for secondary schools (Marsh & Willis, 2003). In 1918, an established committee of the association issued a report entitled *Cardinal Principles of Secondary Education*. This report "created a statement of principles intended to broaden the curriculum of American secondary schools to encompass virtually all of life's experiences, not merely academic subjects" (Marsh & Willis, 2003, p. 42). The goal of secondary education at that time was to give students a diverse appreciation for all subjects including vocational coursework. Educational theorist John Dewey had previously established the need for a diverse curriculum. Marsh and Willis (2003) reported that Dewey (1900) advocated that "life within the school itself could emulate life within a democratic community" (Marsh & Willis, 2003). In other words, the diversity among the school curriculum should be as diverse as the opportunities within the community the school serves. Educational reform focused on vocational and career oriented training that would allow students to be successful in the workplace. This is reminiscent of America's budding industrial movement and the need for factory and skilled workers.

As with all educational reform, the time comes when the pendulum reverses course. The 1950s saw this change in American curriculum as curriculum returned to the basics. The 1957 launching of Sputnik by Soviet astronauts led American educators, policy designers, and other members of the attentive public to reexamine curriculum needs, especially in the areas of science and mathematics. The passage of the National Education Defense Act (1958) and President Kennedy's 1960 challenge to Americans led educators to instruct a generation of science-oriented individuals who by the end of that decade had placed the first man on the moon (Woodward, 2004). In the early 1980s, President Ronald Reagan formed a national committee charged with evaluating the American education system. The National Commission on Excellence in Education issued the 1983 report *A Nation at Risk*. The report stated that many

American schools were underachieving and called for educational reform to address the concerns found in the commissions research (Woodward, 2004). The mathematics education reform did not stop there; mathematics curriculum development continues to garner national attention even as we enter the twenty-first century. Kentucky's passage of the Common Core State Standards (CCSS) for mathematics instruction in early 2010 marked yet another change in mathematics curriculum. The CCSS document was also adopted by 47 other states, two territories, and the District of Columbia. It contains mathematics standards that refine national mathematics initiatives and promote a more streamlined and standardized grouping of content specific skills (CCSSO/NGA, 2010).

Released on June 2, 2010, the 93-page mathematics standards document contains research-based best practices for implementation of common core curriculum that dictates what knowledge all students should possess prior to graduation. In great contrast with the curriculum documents written at the beginning of the twentieth century, these standards are intended to provide both college and career readiness skills. The standards document contains information from research institutions, educators, college faculty, and career and community members (CCSSO/NGA, 2010). The document lists eight "process and proficiency" standards identified by the National Council of Teachers of Mathematics (NCTM) and the National Research Council (CCSSI, 2010). Many of these strands are familiar to Kentucky educators because the current mathematics standards were based on the research conducted by NCTM in the mid-1990s.

Roles of participants

Levels of participant involvement in the curriculum development process have changed dramatically over the past century. As aforementioned, early nineteenth century curriculum decisions didactically implemented change for the sake of ensuring all students received an education beneficial to the needs of the community. Educational decisions of the mid-twentieth century focused on a national need for stringent education standards. As evidenced by the 1983 report *A Nation at Risk*, the need for curriculum revisions were again a focus of national attention. This increased awareness prompted education leaders to look at how curriculum development took place and at what level it was most beneficial to develop the curriculum. As a result of legal challenges to school funding and the increased need for educational reform, Kentucky school leaders, state legislators, and teachers began the process of updating Kentucky's failing education system in 1990. The initial reform mandated sweeping changes to many facets of education (KDE, 2010). The state department of education sought input from teachers and administrators for the curriculum component of the legislation. This reform movement lasted until 2009 when state legislators abandoned the legislation in search of a better plan. Kentucky Department of Education leaders have been charged with the development of new tests based on the CCSS standards. Little, if any, research studies have been conducted in this area to determine involvement levels of constituents.

OCHS school administrators and teachers are no different in regard to constructive feedback regarding curriculum decisions. The current state of curriculum development in Kentucky reflects an autocratic leadership style. The process of issuing new curriculum standards without the benefit of input from local teachers and administrators signifies a potential for bad cohesion. Without a sense of ownership or buy-in into any educational reform, many

teachers will fail to embrace the new standards with the vigor and enthusiasm necessary to convey the rigorous standards to the students. Bad cohesion leads to apathy. School administrators across the commonwealth need to be cognizant of teachers forming groups that will deter from the mission of the school they serve. Mathematics curriculum development may not readily appear to be an area where teachers would revolt against administration, but as stress levels increase and directives to implement curriculum deemed unrealistic are issued, teachers may rebel.

Conclusion

Changes in curriculum are inevitable. Responsibility of the school leader is imperative for successful change. Without school administrators leading competent and committed individuals, change initiatives are likely to fail (Vann, 2010). Successful leadership styles must be chosen that representatively involve the constituents in the change process. If curriculum development or refinement is occurring at the local level, then the administrator should utilize a leadership style appropriate for his or her current faculty's level of commitment and competence. However, it does not appear that mathematics curriculum decisions are being made at the local level; mathematics curriculum appears to be mandated at the state and national level. The current body of knowledge indicates little, if any, input from local communities and schools in Kentucky was solicited for the current mathematics curriculum reform. To bring about effective change within an organization, constituents must have good cohesion and understand the mission and goals of the organization. Failure to seek input and from the knowledgeable faculty and leaders of schools suggests bad cohesion or disregard for the individual missions and goals of local schools.

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