The Generation and Verification of Theory: A Bridge to the Continuing Quest for a Knowledge Base

Fred C. Lunenburg
Sam Houston State University

ABSTRACT

A theory is an organized body of interrelated constructs and propositions that enable us to understand, predict, and control phenomena. One of the best criteria of a profession is that it has matured as a science; that is, it has developed a solid theoretical base—a body of organized and tested knowledge. Such is the case with educational administration as a social science. Scientific rigor replaces speculation and untested assumptions. Social science researchers acquire empirical evidence by using one or more of five broad categories of research designs: laboratory studies, field studies, meta-analyses, survey studies, and case studies. Furthermore, theories serve several useful purposes: identifying relevant phenomena, classifying phenomena, formulating constructs, summarizing phenomena, predicting phenomena, and revealing needed research. Thus, theories contribute to the advancement of knowledge in the field.

What is Theory?

Educational administrators are professionals who have a code of ethics (American Association of School Administrators, 2012) and are licensed by state boards of education. Thus, their behavior is guided by acceptable standards of practice. One of the best criteria of a profession, however, is that it has matured as a science; that is, it has developed a solid theoretical base—a body of organized and tested knowledge. Such is the case with educational administration as a social science. Theory in educational administration has been evolving since the 1950s (Halpin, 1958; Griffiths, 1959). To an increasing degree, educational administration is characterized by using theory to explain and predict phenomena in educational organizations.

Fred Kerlinger (1986) defines theory as "a set of interrelated constructs (concepts), definitions, and propositions that present a systematic view of phenomena by specifying relations among variables with the purpose of explaining and predicting phenomena." (p. 9) Daniel Griffiths (1988) includes many of the same ideas in his discussion of theory. He adds that a theory is a deductively connected set of empirical

laws and that all statements in a theory are generalizations that explain the empirical laws and unify the areas of subject matter.

A theory, then, is an organized body of interrelated constructs and generalizations that systematically explains and predicts some observed phenomena. To illustrate what this definition means, consider Jean Piaget's (1950) theory of intellectual development. Piaget's theory is familiar to most educators and has had a significant influence on curriculum and instruction. Piaget's theory, for example, identifies many isolated infant behaviors as instances of sensorimotor intelligence. In other words, theoretical constructs identify commonalities in otherwise isolated phenomena so that we can make sense of experience. Furthermore, the laws of a theory enable us to make predictions and to control phenomena. For example, meteorologists have well-developed theories. Usually they can make very accurate predictions about the occurrence of hurricanes, tornados, earthquakes, and other atmospheric phenomena. Professionals in special education work from a well-developed theory of learning (referred to as *behavioral theory*). Consequently, they can facilitate instructional interventions that typically lead to positive changes in student behavior. Other examples of well-developed theories that enable us to predict phenomena include Albert Einstein's *theory of relativity* and Isaac Newton's *theory of universal gravitation*.

Theory and Research

It is important to note that theory and research are tied together. The theory guides the researcher in what to look for, and the research provides the researcher with what was found. What was found also provides the researcher with an indication of what to look for in the future (Adams, 2012). It is also important to note that the researcher may not see what he/she does not conceptualize. What the researcher sees must be understood and verified by others. This process of seeing, understanding, and verifying is generally accomplished through the scientific method (Kosso, 2011).

The *scientific method* involves four steps. First, a research problem is specified. Then one or more hypotheses or predictive statements of what the researchers expect to find are formulated. These may come from several sources, including observation, previous experience, and a thorough review of the related literature. Next, a research design is developed to conduct the research and test the hypotheses. Finally, data collection, data analysis, and interpretation of the findings are performed (Check, 2012).

Returning to our previous reference to the term hypothesis, we can define a *hypothesis* as a predictive statement about the relationship between two or more variables. A *variable* is a measure used to describe some phenomena. For example, a researcher may count the percentage of students who pass the state mandated achievement test as a measure of a school's productivity. Then a hypothesis might be formulated that increased productivity will result in high job satisfaction for the principal and school faculty. Confirmation of the aforementioned hypothesis would lead to the following implication: If you want to increase the job satisfaction of the principal and school faculty, increase the productivity of the work unit by increasing the passing rates of students on the state mandated achievement test.

Many quantitative research studies are designed to test a theory that has been developed to explain some educational phenomena. However, studies also can be designed so that data are collected first, and then a theory is derived from those data. The resulting theory is called *grounded theory*, because it is "grounded" in the particular set of data the researcher has collected (Glaser & Strauss, 1967). In this research tradition, hypotheses are the outcome of the study rather than the initiators of it. The usefulness of the theory can be tested in subsequent research. This approach to theory development is more applicable to case studies (Glaser, 1978).

In sum, many theories are based on actual studies of organizations (Sahlin-Andersson, 2012). They offer a lens, or way of thinking about how organizations function. You will find that different theories offer different ways of thinking about the same issue. This is the value of theory; by using different lenses, you will broaden your understanding about how organizations can be structured and managed in more effective ways (Cunliffe, 2008; Wang, 2012).

Methods of Research Used by Social Scientists

Educational administration as an academic discipline earns credibility by being research driven. Scientific rigor replaces speculation and untested assumptions about behavior in the workplace. Physical scientists have certain methods for obtaining information. So do social scientists. These usually are referred to as research designs. Social science researchers acquire empirical evidence by using one or more of five different categories of research designs: laboratory studies, field studies, meta-analyses, survey studies, and case studies (Gall, Gall, & Borg, 2007; Gay, Mills, & Airasian, 2009).

Laboratory Studies

A *laboratory study* is potentially the most rigorous of scientific techniques. The essence of conducting a laboratory study is making sure that the variable being manipulated (the independent variable) influences the results. The independent variable (e.g., a motivational technique) is thought to influence the dependent variable (e.g., student achievement). Because laboratory studies are conducted in contrived situations, generalizing the results to practice requires caution.

Field Studies

In a *field study*, the investigator attempts to manipulate and control variables in the natural setting rather than in a laboratory. Early field studies in organizations included manipulating physical working conditions such as rest periods, refreshments, and lighting. See, for example, the classic Hawthorne Studies (Mayo, 1933; Roethlisberger & Dickson, 1939). Because field studies involve real-life situations, their results often have immediate and practical relevance for school administrators.

Meta-Analyses

A *meta-analysis* is an examination of a range of studies for the purpose of reaching an aggregated result. The logic of meta-analysis is that researchers can arrive at a more accurate conclusion regarding a research area by combining the results of many studies in a specific area of inquiry. It is assumed that combining the results of many studies provides a more accurate picture than would be found in any single study.

Survey Studies

In a *survey study*, samples of people from specified populations respond to questionnaires. The researchers then draw conclusions about the relevant populations. Generalizability of the results depends on the quality of the sampling techniques and the validity and reliability of the questionnaires used.

Case Studies

A *case study* is an in-depth analysis of a single individual, group, or organization. Because of their limited scope, results of case studies are not generalizable. Despite this limitation, the case study is widely used as a method of studying organizations. It is extremely valuable in answering exploratory questions.

Uses of Theory

Many school administrators feel uncomfortable with theories. They prefer that social scientists provide them with practical prescriptions for administering their schools. Upon closer examination, however, almost every action a school administrator takes is based to some degree on a theory. For example, a school administrator may include others in a decision involving an issue that is relevant to them and that they have the expertise to make, instead of making the decision unilaterally. Such action is referred to in the research literature as participatory decision making (Kaner, 2011). Participatory decision making, also referred to as shared, collaborative, or group decision making, focuses on decision processes that involve others.

In education, participatory decision making is based on the idea that active involvement of teachers, parents, or community members in school decisions will lead to improved school performance. It is believed that those closest to teaching and learning, namely teachers, and those with the most knowledge about the children, namely parents, should be involved in decisions because they have expertise that is crucial to improving school performance. Furthermore, it is believed that when teachers and parents are involved in decision making, they will be more committed to implementing and supporting the decision, and a sense of ownership in the school will result (Lunenburg & Ornstein, 2012). Without knowing it, the school administrator made the choice to involve others in the decision-making process on the basis of a theory.

Education administrators would most likely flounder without theories to guide them in making choices. Thus, theories provide a guiding framework for understanding, predicting, and controlling behavior in organizations. Theories also contribute to the advancement of knowledge in the field (Donmoyer, 1999). Deobold Van Dalen (1979) has suggested six functions of theories: identifying relevant phenomena, classifying phenomena, formulating constructs, summarizing phenomena, predicting phenomena, and revealing needed research. Each one will be discussed in turn.

Identifying Relevant Phenomena

Theories determine the number and kinds of phenomena that are relevant to a study. A theory tells a social scientist what to observe and to ignore. For example, social scientists may study school administration from the open systems perspective (Scott, 2007). A relevant component in the open systems approach is the external environment that impacts the organization. Several subsystems exist within this environment. Among the more important are economic, political, productive, distributive, and resource systems. Social scientists may study the external environment from within all these frameworks. Multiple phenomena are associated with each subsystem. Social scientists will not know precisely what phenomena to observe until they construct theoretical solutions for each problem area under investigation.

Classifying Phenomena

Scientists rarely work efficiently with masses of phenomena; therefore, they construct theoretical frameworks for classification. The physical sciences have been successful in developing such conceptual schemes. Biologists have developed classifications into such categories as phylum, class, order, family, genus, species, and variety. Geologists have developed schemes for classifying rocks. Botanists have devised systems for classifying plants. Scientists have found their classifications markedly helpful as a means of insuring accuracy of communication about their science and as a means of understanding the organization and interrelation of the various parts of the animal, mineral, and plant worlds.

Curriculum builders, test developers, and classroom teachers have been using a scheme for classifying educational objectives into categories descriptive of the kinds of behavior they seek from students in schools. The taxonomy was this means. Benjamin Bloom (1956) divides the way people learn into three domains. One of these is the *cognitive domain* which emphasizes intellectual outcomes. This domain is further classified into categories which are arranged in a hierarchical order from simple to complex levels of thinking: knowledge, comprehension, application, analysis, synthesis, and evaluation.

Another example comes from the work of Henry Mintzberg (1990). After extensive, structured observation of five executives (one a school superintendent), Mintzberg classified managerial activities into ten administrative roles: figurehead, leader, liaison (interpersonal); monitor, disseminator, spokesperson (informational); and entrepreneur, disturbance- handler, resource- allocator, negotiator (decisional). If

educational administrators fail to develop theoretical frameworks for classifying phenomena, they will limit the advancement of knowledge in the field.

Formulating Constructs

Reliable information can be obtained through direct observation and measurement. However, many aspects of behavior cannot be directly observed. Intelligence is not an observable entity; it is inferred from using instruments that sample subject behavior. Affective predispositions such as attitudes, interests, and opinions cannot be observed directly; they are observed indirectly as they manifest themselves in behavior. Consequently, social scientists have developed constructs to explain why certain types of behavior occur. These constructs are often referred to as *hypothetical constructs* to imply that they are a construction of the social scientist's imagination. Kurt Lewin's (1951) force field analysis is an example of a theoretical construct.

School administrators play a key role in initiating change. A well-documented finding of organizations of all kinds is that their members resist change (Fullan, 2012). Lewin developed the concept of *force-field analysis* to better understand resistance to change. Lewin looks on a level of behavior within an organization not as a static custom but as a dynamic balance of forces working in opposite directions within the organization. School administrators can think of the current condition in a school as an equilibrium that is the result of driving forces and resisting forces working against each other. School administrators must assess the change potential and resistance and attempt to change the balance of forces so that there will be movement toward a desired condition. There are three ways of doing this: increasing the driving forces, reducing the resisting forces, or considering new driving forces.

Lewin points out that increasing one set of forces without decreasing the other set of forces will increase tension and conflict in the organization. Reducing the other set of forces may reduce the amount of tension. Although increasing driving forces is sometimes effective, it is usually better to reduce the resisting forces because increasing driving forces often tends to be offset by increased resistance. Put another way, when we push people, they are likely to push back. This is the type of situation that school administrators face and must work with on a daily basis when attempting to effect change.

Summarizing Phenomena

Theories summarize isolated lists of data into a broader conceptual scheme of wider applicability. These summaries can be stated with varying degrees of comprehensiveness and precision. They may range from simple generalizations to complex theoretical relationships. A school superintendent making a generalization about granting certificates of achievement to outstanding teachers in the school district is an example of low-level summarizing; this type of summary is not usually referred to as a theory. But the superintendent might construct a more complex generalization, one that describes the relationship between phenomena. For example, after observing the granting of certificates of achievement to deserving teachers, the superintendent may note a

relationship: public recognition is a means of motivating teachers. Summarizing and explaining phenomena permit deeper understanding of data and translate empirical findings into a more comprehensive, theoretical framework.

In the natural sciences, for instance, the theory of oxidation brings many of the chemical reactions common to everyday life into focus. The more comprehensive the theory, which is supported by verified observations, the more mature the science becomes.

Predicting Phenomena

A theory permits social scientists to predict the existence of unobserved instances conforming to it. For example, Abraham Maslow (1970) made the following generalization: people at work seek to satisfy sequentially five levels of needs arranged in a prepotency hierarchy. A deprived need dominates the person's attention and determines behavior. Once this deficit is satisfied, the next higher-level need is activated, and the individual progresses up the hierarchy. When the level of self-actualization is reached, progression ceases. The more this need is satisfied, the stronger it grows. On the basis of this theory, one can expect to find a similar pattern of behavior in a variety of work settings where no statistics have been generated. That is, theory enables one to predict what should be observable where no data are available.

Revealing Needed Research

Theories generalize about phenomena and predict phenomena. They also pinpoint crucial areas to be investigated and crucial problems to be solved. For example, test theory and development have had a long history in education. Test developers have made significant contributions to the practice of education. Teachers have always used some type of test to measure their students' achievement of academic content. The development of tests of academic achievement relies heavily on test theory and validation.

An important problem in educational practice today revolves around the results of testing in our schools. For example, it has been well documented that there is an achievement gap between white students and certain groups of ethnic-minority students (Darling-Hammond, 2010; Howard, 2011; Paige, 2011). This problem might have gone unnoticed if it were not for the documentation provided by state-mandated achievement tests. The No Child Left Behind Act (NCLB) was enacted primarily to close the achievement gap. Thus, the work of educators at all levels is being shaped by national accountability standards designed to improve the performance of *all* students on state-mandated tests. Consequently, tests seem to be driving educational practice.

If one accepts the premise that tests are driving educational practice, perhaps the easiest way to improve practice and increase student achievement is to construct better tests. Critics argue that many state mandated tests require students to recall obscure factual knowledge, which limits the time teachers have available to focus on critical thinking skills (McNeil, 2000). However, according to Yeh (2001), it is possible to design force- choice items (multiple-choice tests items) that test reasoning and critical

thinking. Such tests could require students to *use* facts, rather than *recall* them. And test questions could elicit content knowledge that is worth learning.

Yeh (2006) argues that to prepare students to think critically, teachers could teach children to identify what is significant. Teachers could model the critical thinking process in the classroom, during instruction, through assignments, in preparing for tests, and in the content of the test itself. By aligning test content with worthwhile questions in core subject areas, it may be possible to rescue testing and instruction from the current focus on the recall of trivial factual knowledge. Test items could be created for a range of subjects and levels of difficulty. Then there would be little incentive for teachers to drill students on factual knowledge. In sum, more research is needed in the area of test development and validation.

Conclusion

A theory is an organized body of interrelated constructs and propositions that enable us to understand, predict, and control phenomena. One of the best criteria of a profession is that it has matured as a science; that is, it has developed a solid theoretical base—a body of organized and tested knowledge. Such is the case with educational administration as a social science. Scientific rigor replaces speculation and untested assumptions. Social science researchers acquire empirical evidence by using one or more of five broad categories of research designs: laboratory studies, field studies, meta-analyses, survey studies, and case studies. Furthermore, theories serve several useful purposes: identifying relevant phenomena, classifying phenomena, formulating constructs, summarizing phenomena, predicting phenomena, and revealing needed research. Thus, theories contribute to the advancement of knowledge in the field.

References

Adams, J. (2012). *Applying theory to educational research: An introductory approach*. New York, NY: Wiley.

American Association of School Administrators. (2012). *Code of ethics for school administrators*. Arlington, VA: Author.

Bloom, B. S. (1956). *Taxonomy of educational objectives: Handbook I, Cognitive domain*. New York, NY: David McKay.

Check, J. W. (2012). *Research methods in education*. Thousand Oaks, CA: Sage.

Cunliffe, A. L. (2008). *Organization theory*. Thousand Oaks, CA: Sage.

Darling-Hammond, L. (2010). *The flat world and education: How America's commitment to equity will determine our future*. New York, NY: Teachers College Press.

Donmoyer, R. (1999). The continuing quest for a knowledge base: 1976-1998. In J. Murphy & K. S. Louis (Eds.), *Handbook of research on educational administration* (2nd ed.) (pp. 25-43). San Francisco, CA: Jossey-Bass.

Fullan, M. (2012). *The six secrets of change: What the best leaders do to help their organizations survive and thrive*. New York, NY: Wiley.

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An introduction* (8th ed.). Boston, MA: Pearson/Allyn & Bacon.

Gay, L. R., Mills, G. E., & Airasian, P. (2009). *Educational research: Competencies for analysis and application* (9th ed.). Upper Saddle River, NJ: Pearson/Merrill.

Glaser, B. G. (1978). *Theoretical sensitivity: Advances in the methodology of grounded theory*. Mill Valley, CA: Sociology Press.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago, IL: Aldine.

Griffiths, D. E. (1959). *Administrative theory*. New York, NY: Appleton-Century-Crofts.

Griffiths, D. E. (1988). Administrative theory. In N. J. Boyan (Ed.), *Handbook of research in educational administration* (pp. 27-51). New York, NY: Longman.

Halpin, A. W. (1958). *Administrative theory in education*. New York, NY: Macmillan.

Howard, T. G. (2011). *Why race and culture matter in schools: Closing the achievement gap in America's classrooms*. New York, NY: Teachers College Press.

Kaner, S. (2011). *Facilitator's guide to participatory decision making*. New York, NY: Wiley.

Kerlinger, F. N. (1986). *Foundations of behavioral research* (3rd ed.). San Diego, CA: Harcourt Brace.

Kosso, P. (2011). *A summary of the scientific method*. New York, NY: Springer.

Lewin, K. (1951). *Field theory in social science*. New York, NY: Harper & Row.

Lunenburg, F. C., & Ornstein, A. O. (2012). *Educational administration: Concepts and practices*. Belmont, CA: Wadsworth/Cengage Learning.

Maslow, A. (1970). *Motivation and personality* (rev. ed.). Reading, MA: Addison-Wesley.

Mayo, E. (1933). *The human problems of an industrial civilization*. New York, NY: Macmillan.

McNeil, L. (2000). *Contradictions of school reform: Educational costs of standardized testing*. New York, NY: Routledge.

Mintzberg, H. (1990). *The nature of managerial work*. New York, NY: HarperCollins.

Paige, R. (2011). *The black-white achievement gap: Why closing it is the greatest civil rights issue of our time*. New York, NY: Amacom.

Piaget, J. (1950). *The psychology of intelligence*. New York, NY: Harcourt.

Roethlisberger, F. J., & Dickson, W. J. (1939). *Management and the worker*. Cambridge, MA: Harvard University Press.

Sahlin-Andersson, K. (2012). *Institutional theory in organization studies*. Thousand Oaks, CA: Sage.

Scott, R. W. (2007). *Organizations and organizing: Rational, natural, and open systems perspectives*. Upper Saddle River, NJ: Prentice Hall.

Van Dalen, D. B. (1979). *Understanding educational research* (4th ed.). New York, NY: McGraw-Hill.

Wang, S. (2012). *Organization theory and its applications*. New York, NY: Routledge.

Yeh, S. S. (2001). Tests worth teaching to: Constructing state mandated tests that emphasize critical thinking. *Educational Researcher, 30*, 12-17.

Yeh, S. S. (2006). *Raising student achievement through test reform*. New York, NY: Teachers College Press.