European Research Studies
Volume IX, Issue (3-4), 2006

Productivity Improvements in Education: A Replay

By
Dr. Maria Darra*

Abstract

Productivity is a measure of how well resources are utilized to produce output. It is defined as a ratio of outputs to inputs. Then to manage productivity is to achieve more outputs for the same inputs, usually measured in money terms or the same outputs for less input. The modern notion of productivity includes both organizational efficiency and effectiveness. In education outputs are principally represented by teaching, outcomes by learning. The definition of productivity should not be confused with efficiency and effectiveness. Effectiveness is a measure of the outcome of an operational unit like a school or a university department. It is a measure of how well an operational unit was able to accomplish its objective. Efficiency is a measure of the degree to which an operational unit utilizes appropriate resources in the right manner.
The purpose of this paper is to analyze and critique the assumptions and developments of productivity measures, present productivity models with the main factors that affect behavioural and cognitive learning and to focus on the developments of productivity improvements in elementary, secondary and higher education.

Keywords: Productivity in education, efficiency, effectiveness, models of productivity

JEL classification: I20, I21, I23.

*Dr Maria Darra, Ph.D University of Piraeus, Department of Business Administration, E-mail: kazan@unipi.gr

1. Introduction

Education is an area of public service that is encountering increasing scrutiny and criticism for its low quality and productivity. Educators are being called on to function in an effective and efficient manner. In addition they are expected to adapt policies and methods that will permit even greater productivity.

The subject of "productivity" often evokes emotional, polarized reactions from labor, management, unions, stockholders and customers. Yet much more is said about productivity than is known on the basis of sound research and theory. Frequently, scholars and practitioners alike refer to "productivity" and "quality" as if they were two separate performance measures. Yet a significant part of any productivity equation is quality. There is no economic value in increased output levels if the increase is offset by lower quality. According to OECD (1989), "The pursuit of quality in education cannot be treated as a short-term, one-off exercise. It is a permanent priority. Education is not an assembly-line process of mechanically increasing inputs and raising productivity. How to improve its quality raises fundamental questions about societal aims, the nature of participation in decision making at all levels and the very purpose of the school as an institution."

Improvements in the educational attainment of the workforce have been a consistently important source of gain in labour productivity and the research and development activities of institutions of higher education have been major sources of innovation. Yet, the education industry's own performance appears poor. Costs have been rising steadily above the rate of wage increases, while labour productivity—in terms of students per teacher—has declined. A surprisingly limited amount of work has been devoted to measuring the output and productivity of the education industry, particularly within the growth accounting framework that applies to other industries.

Part of the difficulty is that many educational institutions are in the government sector and thus lack the competitive pricing that leads to a straightforward measure of output and productivity. In addition, education is an area where progress in measurement has been stymied by long-running debates over perceived changes in the quality of output.

2. Measuring Productivity in Education

Productivity measurement is difficult in most service industries and education is certainly no exception. Some observers seem to assume that quality "must" be higher when the student-faculty ratio is lower. Although one-on-one teaching has its place, some educators argue that a class of 25 is often better than a class of 5 because of student interaction. In any event, when we study productivity it is important to measure output directly and not make assumptions about what the case must be.

Before any measurement of productivity administrators need to decide what level or levels of the organization's productivity should be measured. For example, is the productivity of an individual, say a professor or an administrative assistant, or is the productivity of an academic department or a university as a whole? An important is that measures should not be constructed prior to setting goals and objectives. Doing so will lead administrators to value something that is measurable rather than measuring something with value.

Measuring productivity in education requires a measure of both efficiency and effectiveness. Efficiency is often measured using ratios, such as physical output relative to an input or money cost of an input relative to an output. The exact

efficiency measure used depends upon the objective set by the administration. Efficiency ratios such as enrolment per section or contact hours per faculty member are reasonable and useful. An objective of improving students' progress toward a degree would require measures such as a withdrawal rate and average course load taken. Examples of cost-efficiency measures include instructional costs per student, library expenditures per student, and administrative costs per student.

Measuring effectiveness can be difficult, though not impossible. Several ideas have been suggested in the literature. One way to measure effectiveness is to assess community or client conditions and benchmark them to community standards or those standards of other institutions of higher learning. An example could be the number of graduates who find a job within three months of graduation. Another option is to measure accomplishments, such as the number of graduates or the percentage of students taking a class that requires relatively advanced work, such as technical research paper. The number of graduates going on to receive advanced degrees is an alternative measure. Finally, client satisfaction is a third avenue to measure effectiveness. Clients can include alumni or businesses that frequently hire a university's graduates.

3. Productivity Improvement

Achieving excellent and acceptable levels of productivity requires careful attention to the following:

Adequate work climate and teamwork

Productivity improvements at the source are possible if the work environment is conducive to innovation and individual creativity. Total teamwork between management and employees, unions and other functional areas of the organization is also essential. An environment where school teachers and managers are able to participate in problem solving, decision making, process changes and planning improved performance provides fertile ground for improvement in productivity.

b. The right training

Training is essential because it prepares everyone to do his job well, by building the right knowledge for logical and intelligent actions and decisions. Well trained people attain efficient work habits and positive attitudes that promote co-operation and teamwork.

c. A balanced emphasis on people and service management

Often the pressure to provide more services can lead to neglect of employee development, degradation in the morals of employees and breakdown in communication within the organization. Productivity improvement requires focus on people and product requirements. The manager's role in the improvement process is to provide the right level of encouragement, training, guidance, support and help as required. Employees also have very important roles to play in ensuring that there is a mutual trust and confidence required to deliver the final output successfully.

d. Creation of awareness among management and employees

Everyone within an organization has both internal and external customers. The notion that educational service quality is only important to the final customer outside the organization should be discouraged. Increasing productivity at the individual level ensures that excellent services are delivered to the ultimate customer.

e. Adequate focus on providing the fundamentals at productivity excellence

The fundamentals of productivity excellence are the corner stones of process and program enhancement that lead to productivity improvement. Some of these fundamentals are:
Management and employee commitment
Process innovation
Adequate reward system
Systems innovation
Goal setting
Error cause removal

f. Adequate measure and data

Everyone within the organization is trained on how to use the various measures for planning, improvement and control. For measures to be meaningful and useful there is the need to collect accurate data.

g. Focus on managing the total system requirements

Productivity improvement at the source cannot be achieved through piecemeal ideas, actions and controls. Very good productivity results are obtainable through focusing on managing the total requirements of each operational unit as well as the total organization. Managing the total requirements involves the use of managerial skills to provide the right direction, supervising at the right level, defining responsibilities adequately, providing positive reinforcement, motivation, recognition and encouragement.

4. General Approaches and Principles

4.1. General Approaches for Productivity Improvement

Each organization or educational unit has its own unique productivity problems. The choice of which approach is likely to be successful depends on the type of problem to be solved and the prevailing circumstances with the educational unit under analysis. The following approaches are recommended:

a. Work simplification and operation improvement

Work simplification is the systematic investigation and analysis of present work systems for the purpose of developing easier, quicker and more economical ways of providing high quality services.

b. Goal clarification

This approach focuses on identifying specific goals and objectives that will improve productivity, implementing these objectives and providing on- going assessment of the strengths and weaknesses of an organization.

c. Incentive systems

This approach focuses on methods and techniques for motivating individuals and work groups. The three most commonly used motivational approaches are the traditional economic incentive approach, the human relationship approach and the self-drive approach.

d. Helping the working employee

This approach focuses on identifying specific people oriented problems that affect employee performance.

e. Improving the task at the operational unit level

This approach focuses on thorough analysis of each task and elements at the operational unit level. The purpose of the task analysis is to eliminate barriers and bottlenecks that affect productivity.

f. Improving technology at the operational unit level

This approach focuses on selecting appropriate technologies that improve productivity.

4.2. General Principles for Productivity Improvement

The comprehensive use of the 6C principles of Control, Coordination, Co-operation, Contribution of analysis, Communication and Cost avoidance, assist productivity improvement analysts to be successful in managing productivity improvement attempts. More specifically:

a. Controls

It is important for the successful implementation of the project to define the objectives and understand the activities involved. Performance measures such as productivity ratios, cost curves and control charts should be used in measuring the results of implementing the objectives.

b. Coordination

Coordination of all activities can be achieved by designating a project manager to be in charge of these activities. He ensures that all project resources are controlled and allocated properly and that the project is going according to schedule. The successful project manager is one who has good interpersonal skills, good judgment and good organizational abilities.

c. Cooperation

The cooperation between members of productivity project team is a key requirement for success. Where the physical presence of all the team work members is impossible, communication channels should be put in place to promote cooperation.

d. Contribution of analysis

The contribution analysis of each phase of the improvement project can be performed by using the variable and result mapping technique which requires that for each activity performed the expected result must be matched against the true output or result. This provides a way of identifying deviations from project goals and objectives, as well as of understanding the causes of deviation from specifications.

e. Communication

Meetings for discussing open issues. On going communication among project team members is required to avoid things falling through the cracks.

f. Cost avoidance

It is required in order to avoid cost overrun in productivity improvement project implementation. Additional functions without value added should be avoided.

5. Models of Productivity Measurement and Improvement

5.1. General descriptive models of productivity improvement.

The primary purpose of a productivity model is to provide a conceptual blueprint of the complex interrelationships and interactions of the many factors that influence the quantity and quality of service output. The following four general descriptive models serve this purpose:

a. An organizational productivity disaggregating model

This model subdivides inputs, conversion technology and outputs into useful subclasses. The rational for selecting inputs and outputs as variables to be subdivided into classes, is that these are the basic components of a productivity index. Organizational productivity is used to measure a family of productivity measures. It is likely that organizational productivity measures will result in different families of measures depending upon the level within the organization that is being measured.

Sociotechnical systems have been proposed as a method of viewing organizations (Davis and Taylor, 1972). There are a multitude of psychological – sociological instruments to measure behavior and individual beliefs concerning the social aspects of productivity (Adam et. all. 1981)

b. Sutermeister's model of worker productivity

Sutermeister (1976) presents a comprehensive descriptive model which is a series of concentric circles surrounding productivity with factors closer to the centre

being more direct in their influence on productivity. The model divides all factors into two groups. The first is the technological development and the second the employee's motivation. Motivation is a function of ability and employees' job performance. Ability is composed of skill and knowledge whereas job performance is influenced by individuals' needs and the physical and social conditions at the workplace. Sutermeister's model provides an excellent overview of the many factors involved in productivity improvement.

c. A conceptual schematic model of factors affecting productivity

This model incorporates the major factors, both organizational and extra organizational that have a direct casual effect on the productivity of the individual employee. Major factors in this model of productivity are represented by rectangles. Circles are used to denote factors that act as filters or butters within the influential relationship between two major factors. Productivity in this model is a function of three primary factors. First the capacity at the task, second the individual effort brought by the worker to the task and third the interference that cannot be controlled by any individual. These three factors are combined through some form of work measurements to yield productivity data for the individual in some specified time period.

d. An input – output model of the organization productivity

The purpose of this elementary model is to emphasize that productivity is a function of all of the various inputs to the production function. This model focuses in productivity and enlarges it relative to the other factors in this system. In this model six sources of inputs are identified and combined within the total productivity. An attempt is made to indicate how these inputs are converted into goods or services. Output is a function of all these factors and productivity is a function of both the level of the inputs and the way in which they are combined.

5.2. Walberg's Model of Educational Productivity

According to Walberg (1981, 1983, 1986), nine factors are required to be optimized in order to increase affective, behavioural, and cognitive learning. These nine factors are consistent, and widely generalizable. The proposed theory of educational productivity has the following groups of factors:

a. Student aptitude variables

1. Ability or prior achievement, as measured by the usual standardized tests;
2. Development, as indexed by chronological age or stage of maturation;
3. Motivation, or self-concept, as indicated by personality tests or the student's willingness to persevere intensively on learning tasks.

b. Instructional variables

4. Quantity of instruction **(**amount of time students engage in learning);
5. Quality of instruction**,** including psychological and curricular aspects

c. Educationally stimulating psychological environment

6. Home environment;
7. Classroom or school environment;
8. Peer group environment outside the school;
9. Mass media environment, especially amount of leisure-time television viewing.

The first five aspects of student aptitude and instruction are prominent in the educational models of Benjamin Bloom, Jerome Bruner, John Carroll, Robert Glaser, and others (see Walberg, 1986, and Chapter 4 for a comparative analysis). Each aspect appears necessary for learning in school because the student can learn very little. Large amounts of instruction and high degrees of ability, for example, could count for little if students are unmotivated or if instruction is unsuitable. Each of the first five factors appears necessary but insufficient for effective learning. High-quality instruction can be understood as providing information cues, correctives, and positive reinforcement or encouragement that insures the fruitfulness of engaged time. Careful diagnosis and tutoring can help make instruction suitable for students. Inspired teaching can help students to persevere. Quality of instruction, then, may be considered an efficient enhancement of study time.

The four remaining factors in Walberg's model are environmental variables. Three of these environmental factors as the psychological climate of the classroom group enduring affection and academic stimulation from adults at home and an out-of-school peer group with its learning interests, goals, and activities influence learning in two ways. Students learn from peers directly. These factors indirectly benefit learning by raising student ability, motivation, and responsiveness to instruction.

Classroom morale is measured by obtaining student ratings of their perceptions of the classroom group. Good morale means that the class members like one another, they have a clear idea of the classroom goals, and the lessons are matched to their abilities and interests. In general, morale is the degree to which students are concentrating on learning rather diverting their energies because of unconstructive social climates. Peer groups outside school and stimulating home environments can help by expanding learning time and enhancing its efficiency. Students can both learn in these environments becoming able to learn in formal schooling.

The last factor, mass media, particularly television, can displace homework, leisure reading, and other academically stimulating activities. It may dull the student's keenness for academic work.

In addition to encouraging and supervising homework and reducing television viewing, parents can improve academic conditions at home. What might be called "the alterable curriculum at home" is much more predictive of academic learning than is family (Walberg, 1984). This curriculum includes informed parent–child conversations about school and everyday events; encouragement and discussion of leisure reading; monitoring, discussion, and guidance of television viewing and peer activities; deferral of immediate gratification to accomplish long-term goals; expressions of affection and interest in the child's academic and other progress as a person.

Cooperative efforts by parents and educators to modify alterable academically stimulating conditions at home had beneficial effects on learning (Walberg, 1984).

Sticht and James (1984) have pointed out that children first develop vocabulary and comprehension skills by listening, particularly to their parents before they begin school. As they gain experience with written language between the first and seventh grades, their reading ability gradually rises to the level of their listening ability. Highly skilled listeners in kindergarten make faster reading progress in the later grades, which leads to a growing ability gap between initially skilled and unskilled readers.

The educational productivity model of Walberg does not contain interaction terms and, instead, it is assumed that the factors interact by substituting for one another with diminishing returns. This can be contrasted with the way that researchers typically conceive of interactions (e.g., aptitude-treatment interactions) in terms of different types of students achieving differentially under alternative instructional methods.

Other social factors not included in the productivity model influence learning in school but are less directly linked to academic learning. For example, class size, financial expenditures per student and private governance (independent or sectarian in contrast to public control of schools) correlate only weakly with learning, especially if the initial abilities of students are considered. Thus, improvements in the more direct and more alterable factors contained in the model in Exhibit A hold the best hope for increasing educational productivity (Walberg & Shanahan, 1983).

5.3. Carroll Model

Carroll (1963) argues that the basic component of a model of learning is time. The degree of learning is a function of the engaged time divided by time needed. Engaged time is equal to the smallest of three quantities. Opportunity or time allowed for learning, perseverance or the amount of time a learner is willing to engage actively in learning and aptitude or the amount of time needed to learn, increased or decreased by whatever amount of time is necessary as the result of the quality of instruction and the ability of the pupil to understand instructions. This last quantity (aptitude or time needed) is also the denominator in Carroll's equation:

Degree of school learning = f (time spent/time needed)

This emphasis on time or quantity of schooling has been incorporated in many subsequently developed models. Cooley and Leinhardt (1975, 1978 and 1980) re-labelled many parts of Carroll's model and preferred to study the classroom rather than the individual. This emphasis seems appropriate because most instruction takes place in groups and not individually. The four constructs in Cooley and Leinhardt's model were motivators, opportunity, the quality of instructional events, and the structure of instructional material.

Other models in which time is emphasized include those of Berliner (1979), who emphasized the kinds of teacher behaviours and instructional practices that increased academic learning time, and the mathematical models of Lau (1978) and Hanuschek (1979) that related achievement and time components. These 'time' models concentrate primarily on the various factors that affect time spent on task. Classroom environment and school effects are of peripheral importance as they contribute only to individual time-on-task.

5.4. Bloom's Model

Bloom (1976) switched emphasis from time-on-task to the learning history of the student. As it is stated in page 7 of his work "What any person in the world can learn, almost all persons can learn if provided with appropriate prior and current conditions of learning". The key to successful learning lies less with time and more with the extent to which students can be motivated and helped to correct their learning difficulties at crucial points in the learning process. While not explicit in Bloom's model, feedback is an important attribute. Bloom placed considerable emphasis on the cognitive characteristics that a pupil brings to the learning task. These characteristics, he claimed, were the single most dominant factors in predicting learning outcomes.

A major feature of Bloom's model is the provision of guidelines about the relative importance of the various facets of the model and the overall explanatory power of the model. Bloom estimated that cognitive entry behaviours correlated positive with a coefficient of about 0, 75 with academic achievement. Affective entry behaviours and quality of instruction correlated positive with a coefficient of about 0.50 with achievement. Together the three facets correlated 0.95 with achievement.

Thus, Bloom's model could account for more than 80 percent of the variation in the level or rate of achievement (Bloom, 1976). Under ideal conditions, the combination of all three facets could account for as much as 90 percent of the variation.

5.5 Glaser's Model

Neither Carroll nor Bloom and their successors pay much attention to learning processes. Indeed, Glaser (1980) pointed out that aptitude, learning, and instruction traditionally have been kept at a distance from each other. To minimize this distance, Glaser envisaged various macro- and micro-theories of teaching and instruction. Macro-theory concerns the large practical variables dealt with in schools. As it is stated in page 324 of his work "…such as the allocation and efficient use of time, the structure of the curriculum, the nature of feedback and reinforcement to the student, the pattern of teacher student interaction, the relationship between what IS taught and what is assessed, the degree of classroom flexibility required for adapting to learner background and the details of curriculum materials. Such variables need to be part of a theory of instruction (and), as this theory develops; it will be under girded by the more macro-studies of human intelligences, problem solving, and learning".

Glaser is representative of many recent psychologists/educators who have outlined models of learning primarily related to learning processes (Case, 1978; Greeno, 1980; Scandura, 1977; Sternberg, 1977). These models provide concentration on the procedures for effective learning and emphasis on the importance of feedback between learning processes and achievement outcomes. The models do not provide a focus on the role of the teacher, school, or curriculum in terms other than how these factors impede or aid the processes of learning. Glaser (1976, 1977, 1980 and 1982) identified four essential components for producing student learning.

a. Analysis of competent performance which includes identification of the information structures required for performance, as well as a description of the cognitive strategies that apply to the learning task.

b. The description of the learner's initial state which is similar to Bloom's cognitive entry behaviours.

c. The transformation process between the initial state and a state of competence; this is the unique contribution of Glaser-type models.

d. The assessment of the effects of instructional implementation. This assessment can be both short-term (immediately in the context of learning) or long-term (generalized patterns of behaviours and the ability for future learning).

5.6 Fraser's et al A Synthesis of Models

A number of critical elements of the above models have been incorporated by Fraser et al. **a.** This rearrangement places the pupil in the centre of the various influences. The three components in the box pupil, learning processes/methods of instruction, and outcomes are closely entwined. **b.** There is an allowance for feedback between appropriate components. While there can be reciprocal relations between every element, some lines can be omitted. For example, instructors and social factors of pupils seldom interact in their effects on school learning. **c.** It is the outcomes of the learning processes that typically affect the instructor and the instruction. To some exteme, this could be considered unfortunate in that it would be desirable that pupils' learning processes have more direct feedback on the instructor and instruction. But, for others, this could be fortunate in that modifications should be made relative to achievement outcomes not improved processes. Perhaps some of the researches on learning-to-learn can serve as a middle ground (e.g., Anzai & Simon, 1979; Greeno, 1980: Klahr & Wallace. 1976). **d.** The model not only has cognitive outcomes, but also has affective outcomes. The disposition to learn is a critical goal of this model of learning. Should a child acquire a favorable attitude to learning during the school years, this probably will have more impact on subsequent life-time learning than increased school achievement. Affective components include self-concept, self-actualization, and reciprocity (Rawls, 1971). **e.** The role of learning processes and learning styles are clearly specified. **f.** The outcomes apply to both general and specific cognitive outcomes.

6. Productivity in Elementary and Secondary Education

In the USA unlike most sectors of its economy that steadily increase their productivity over time, schools become less rather than more efficient, a serious matter given the size of the education sector and the central and increasing importance of learning in the American economy and society. School productivity or the relation of achievement to costs was 65% higher in 1970–71 than in 1998–99 (Hoxby, 2001).

6.1 Factors that affect learning

One of the purposes of this section is to present some of the large-scale surveys that reveal the factors that affect learning.

Though economic, sociological, and political factors affect learning, their influence is indirect. Learning is fundamentally a psychological process; student motivation, instruction, and other psychological factors are the well-established, consistent, and proximal causes of learning. Thus, we start with psychological factors before analyzing the social conditions that affect learning directly.

Herbert Simon, the Nobel economist and psychologist, combined these fields to synthesize what might be called the economics of cognitive learning. His synthesis sets the stage for understanding what helps students learn. If a lifetime were devoted to acquisition of information, according to Simon's estimates, about 200 million items could be stored. "Hence, the problem for humans is to allocate their very limited

processing capacity among several functions of noticing, storing, and indexing on the input side, and retrieving, reorganizing, and controlling his effectors [actions] on the output side" (Simon, 1981, p. 167).

Language mastery, the fundamental and pervasive skill necessary for achievement in school, is determined more by experience than by psychometric intelligence. Decisive is the amount and intensity of the experience rather than age or psychometric intelligence (Walberg, Hase, & Rasher, 1978).

To foster learning, that it can best provide logical, readily understood explanations suitable to learners as well as the time, opportunity and incentives for them to learn. These simple, commonsense principles set the stage for understanding research on the psychological causes within and outside school that foster achievement.

Practice makes perfect, says an old adage. An analysis of time effects on learning suggests the obvious: 88% of 376 study estimates revealed the positive effects of various aspects of study time such as preschool participation, school attendance, amount of attention to lessons, amount of homework, and length of the school year (Walberg, 1998b). The positive effect of time is perhaps most consistent of all causes of learning.

This taxonomy of nine factors in three sets derives from an early synthesis of 2,575 study comparisons (Walberg, 1984) suggesting that these factors are the chief psychological causes of academic achievement. Subsequent syntheses have shown results consistent with the original findings. Each of the first five factors—prior achievement, development, motivation, and the quantity and quality of instruction—seems necessary for learning in school. Without at least a small amount of each factor, the student may learn little. Large amounts of instruction and high degrees of ability for example, may count for little if students are unmotivated or instruction is unsuitable. Each of the first five factors appears necessary but insufficient by itself for effective learning.

6.2 Motivation

Motivation as a form of human resource development can be tailored into greater productivity for teaching professionals with the development of a strong organization and a positive working environment. With the United States economy becoming ever more interdependent on the global economy motivation of professionals and an understanding of employee behavior in educational facilities has taken an even greater importance. Schools in the public and private sector should continue to view staff members as an asset. Personnel will be able to achieve high levels of productivity and a positive working environment.

Teacher motivation and its effect on the educational process have been examined and analyzed in detail from the early educational reform movements in New England to present day educational theorists. Motivation and productivity can be enhanced through the situational/environmental approach. Traditional administrative practices may prove to be obsolete or no longer useful.

a. Tailoring Motivation into Productivity

Employee satisfaction and productivity are goals that administrators should stress in order to accomplish the objectives of an educational facility, whether those decisions are made through a traditional or non-traditional approach. However,

principals should accept the diversity of human attitudes, feelings and motives and professionalism while working with each teacher to personalize his/her needs.
Moreover, as commercial concerns broadened, Lawrence (1975) believed that individual interests should be adapted to increase motivation, morale, and productivity, thereby reducing employee turnover and alienation within the organization.

While motivation varies between individuals, the administrator in the current educational climate must understand the beliefs, desires, and values of his or her employees and how these attributes will affect job performance. The ability to understand motivated behavior of employees is only the initial stage. Limited unmotivated behavior is the desired outcome for administrators and managers alike.

Much motivated research has concluded that a strong organization and positive work environment will encourage, and even promote greater motivation and productivity. Administrators who offer professional employees the possibility of doing new and original tasks in an effort to motivate them to set high standards of performance often exceed organizational standards.

Motivation itself is closely associated with how much students can learn. Multivariate analysis of surveys and control-group studies of reinforcement corroborate its causal influence. This effect sharply contradicts the prevalent idea in education that learning must be intrinsically motivated for its own sake.

b. Home Environment

The effect of the home environment can be taken very seriously for several reasons. Control-group studies corroborate many correlational findings. The home effect is far larger than apparent socioeconomic effects. Something can be done about home environments. School–parent programs can help parents academically stimulate their children by reading to them, taking them to libraries, guiding and discussing leisure television viewing, cooperating with home visitors and teachers and similar practices.

c. Grouping

Grouping students reflects common sense. If students with similar levels of knowledge and skills are grouped together, teachers can avoid teaching them what they already know and what they are yet incapable of learning; with instruction more suited to them, students should find learning more efficient and pleasant.

d. Student Incentives

Similarly student incentives particularly high standards, promote learning. The threat of grade retention, for example, can serve as an incentive for greater effort, although intensive remediation seems necessary.

This section will focus on the developments of productivity improvement appropriate to that segment of education called schooling, specifically in public elementary and secondary schooling.

If the only purpose of schools were the dispensation of knowledge or the provision of training and skills the selection of a productivity indicator would be straight forward. The numbers of children enrolled in school or the numbers of hours of teaching provided are a set of output measures. The fact that the above mentioned, less noted services are provided by schools make the choice of indicators more

complex. The difficulty with output indicators is the selection of which indicator is the best measure of a schools performance. Schools priorities are shaped through a political process and the multifaceted school programs reflect the outcome at such a process. Schools exist for all the above purposes with others that have not been listed.
The roots of school improvement can be seen historically as having two-distinct threads of research: the first, spanning many years, is concerned with educational innovation; while the second is more recent and involves the study of effective schools.

Loucks- Horsley and Hergert (1985) in a very useful Action Guide to school Improvement state some of their beliefs which appear to contradict the conventional wisdom about improving schools.
Considerable work has been undertaken on the study of educational innovation, and this is admirably summarised by Michael Fullam in his book, "The meaning of Educational Change (1982)".

6.3 Effective Schools

In recent years a lot of research has developed on effective schools and excellent reviews of the literature are provided by Purkey and Smith (1983) and Rutter (1983). Schools, in which students achieve good academic results, after controlling for home background factors and ability measures, are called "effective". While a number of methodological problems exist, including the narrow definition of outcome measures largely in terms of academic achievement the different studies have produced fairly consistent findings and have identified a set of factors which seem to be related to pupils' performance.

Most of these approaches have seen schooling as something that is done for the students, rather than thinking about education as something that students essentially do for themselves. An argument is developed that makes students the key factor in shaping school's outcomes and therefore a central issue of our thinking about productivity.

Of course such an argument is a simplification and not uncontroversial. One could take issue with every statement within it. For example, there are all sorts of reasons beyond spending levels as to why students and schools perform the way they do. In many countries public support for education remains high, and there is not the same sense of crisis that envelops education policy in the United States. Some critics see the attack on schooling as a neo-conservative effort to move away from commitments to equity and the public sector (Boyd, 1991). But those who criticize the neo-conservative agenda in education they have also concerns about the quality and appropriateness of schooling. Regardless of the political solution advocated, it seems that systems of mass schooling are not as effective as they should or could be. One way of thinking about this problem is to see it as a problem of productivity.

The leading writer on production functions in elementary education is David Monk of Syracuse University. In his book, *Educational Finance: An Economic Approach (1990),* and in an article in *Educational Evaluation and Policy Analysis (1992),* Monk outlines an informed and sophisticated view of the history of educational productivity studies and of the status of thinking in the area. His work is the most complete published analysis of the literature on educational production functions and stands as the definitive synthesis of present knowledge. Monk's basic view is that production studies of schooling have not yielded very much useful

knowledge yet and therefore they face serious obstacles to doing so, but that it is too soon to give up on the attempt.

Monk uses the production function as the basic element for studying productivity in schools. He defines a production function as a model which links conceptually and mathematically outcomes, inputs, and the processes that transform the latter into the former in schools. He notes that production functions are important for improving both technical and allocate efficiencies. However, despite their potential benefits, Monk recognizes the major obstacles that face the creation of production functions for education. Outcomes, inputs and processes are not easily understood.

Monk is aware of the difficulties in dealing with both micro and macro analyses. He concludes that there is no any other better approach. As he points out in page 327: "... it is not always the case that micro-level data are better than macro-level data. The proper level of analysis depends largely on the nature of the phenomenon being studied. Some phenomena are district rather than school or classroom phenomena and have effects that are felt throughout entire school districts".

The inputs of the school itself are relatively easy to recognize--buildings, teachers, textbooks, and the like-- although Monk notes difficulties here, too, in knowing which inputs do reach students, and in what form.

What does it mean to say that a resource flows to a student? A teacher might spend time providing tutorial instruction for a single student. But the student may or may not be attentive to the instruction being provided. The student may "... decline the assistance, either overtly or covertly. In such a case, did the resource flow, as he points out in page 328.

Time is another significant problem for studying educational productivity. It seems reasonable to believe that students will learn at different rates. Yet this seemingly innocuous conclusion creates enormous difficulties for analysis, since it means that different resources at different times and in different arrangements may be necessary for different students. Indeed, there could be a unique production function for each child or even several functions for each child under different circumstances as it is stated in page 344 in Monk's book.

Analysts also agree that learning is influenced significantly by factors outside the school. A vast array of home and background variables, Monk indicates, have been used at various times as part of the specification of the inputs of schooling, not always accompanied by a strong theoretical rationale for their importance. Even when identified, these input variables are difficult to measure. Monk cites intelligence as a particularly important and difficult to resolve instance.

Finally, as if these problems were not enough, Monk mentions various technical problems for studying productivity in education. These include the limited variation among schools in many of their attributes, the possibility that both input and outcome variables are collinear, and the likelihood that inputs and outcomes influence each other. Finally, there is the real possibility that certain aspects of education are "anarchistic," by which Monk means that actors are not goal-oriented, so that even if the best way of doing things was known, people would not pay attention to it as it stated in page 339.

Monk raises the possibility that there is no production function for education. In page 342 of his book, he states that no "systematic process governs the transformation of inputs into outcomes" (p. 342). Many of the same themes are reprised in Monk's (1992) article. He begins by pointing out the current policy towards what he calls "outcomes as standards". He notes that there is a paradox

between pessimistic assessments of productivity research in education and the growing drive towards improving productivity which requires "a nontrivial store of knowledge regarding the ability of state, district, and school officials to enhance productivity" as it is stated in page 307. Monk's view is that
"...the underlying model of education productivity is inadequate and has not evolved much.... The weakness of the conceptualization gives rise to much of the policy-making frustration" (p. 308), "...(a) it is premature to conclude that the production function lacks meaning within education contexts; (b) ...approaches to the outcomes-as-standards policy-making response have merit and involve increased efforts to monitor and make sense of the experimentation that occurs; and (c) the embrace of the outcomes-as-standards response ought not to crowd out alternative, more deductively driven strategies." (p. 320).

Monk goes on to advocate the study of productivity through looking at the properties of classrooms. This proposal is based partly on the belief that teachers will use different instructional approaches with different classes of students. He discusses the ways in which these responses by teachers might occur depending on the students, and suggests that teachers may have individual patterns of adjustment that could be studied and defined in terms of their impact.

Monk's work provides a good review of what has been done in the area of productivity research in education and useful lenses for viewing the value of the work and possible directions for its development. He draws our attention particularly to weaknesses in the way in which the idea of educational process has been conceived. The study of productivity in education has been greatly hampered by underestimating the central role played by students in generating educational outcomes. A better understanding of productivity in education requires much more attention to what students think and what they do.

Students do not stand in relation to schools either as raw materials to be processed or as workers doing the processing. Education is a unique kind of production because it requires learners to create knowledge and meaning in the context of their own lives. The key aspect of social situations such as schooling, as has often been pointed out by theorists, is that humans are intentional; they can alter their actions according to their developing understanding of a given situation. This understanding is best captured in the phenomenological sociology of Alfred Schutz (1967, 1970), who wrote extensively about human intention and action and their development through a person's life experiences. Schutz's work, and that of others in the same vein (e.g., Natanson, 1970; Greene, 1988), illustrates the ways in which people make sense of their world, and how these relevancies shift constantly as their ideas and situations change.

The idea of a production function for education depends, of course, on seeing education as being a production process, which means that inputs are transformed into outputs in a standard way. The essential exemplar of a production relationship is the factory, in which raw materials are turned into finished products through various production processes. One can easily recognize the powerful role that the metaphor of the factory plays in much of the current policy conversation around schooling.

Many of the problems of production studies hinge on the role of students whether they are producers or materials. As soon as students are viewed as individuals with unique capacities and interests the problems of specifying a production relationship in schools become enormous, as Monk points out. Imagine a factory in which the raw materials had minds, and could make autonomous decisions about whether they would be part of whatever was being produced. Just as one was about to

weld a piece of metal to be the roof of a car the part that one had in hand would announce its unwillingness to play the assigned role and its desire instead to be part of an art gallery instead of being part of a car, or to become a piece of cloth instead of a piece of metal.

The idea of the student as worker seems more promising than that of the student as material to be worked on, since it acknowledges that learning is something that students do. In economic processes workers are doing something to some material or for someone else. Although students often do think of schooling in this sense, as doing something for their teachers or their parents, the concept of education is centrally concerned about what happens to learners, not what happens to others around them. If students are the workers, then they are working on themselves rather than on external materials.

Every teacher knows it. Every teacher realizes that what happens in a class is fundamentally dependent on who the students are, how they make sense of the world and what they want or do not want to do. Students are constantly making decisions about the amount of effort, attention and interest they will put into their school work. They decide to come to school or not, to pay attention in class or not, to take the material seriously or not, to focus on grades or not (Doyle, 1986). These decisions are not entirely independent of what schools and teachers do. Neither are they determined by what happens in schools. We may arrange schooling on the basis of relatively standard treatment of all while every educator recognizes that the best laid plans may come to nothing in the face of students with different agendas.

If what students do and think is central to education, then it must also be central to the way schooling is organized. Yet that is far from being the case. Most of the policy attention about schools focuses on such matters as curriculum, teachers, school organization, or governance. Policies in these areas are presumed, almost unthinkingly to yield changes in what students do, think, or learn.

Consider various sides of the debate over restructuring schooling. One approach has been what Fullan (1991) calls the "intensification" approach -- stricter curriculum requirements, closer supervision of teachers and students, external examinations, and so on. Here the assumption is that teachers and administrators will be tougher on students, and that students will respond to the changes by intensifying their own efforts at school. The strategy could be phrased as one of "making them learn whether they want to or not". Presumably we would already have taken steps to make sure all students learned what we wanted them to. As soon as we see students as both workers and product, clearly a strategy of intensification will not be successful, since it does not take into account the power and the range of students' ideas and the motivations.

The main alternative policy currently being proposed is the "professionalization" approach in which more authority is given to teachers to take the steps they see as most desirable. In some versions authority is moved to school communities which include teachers, parents, and sometimes students (Zeichner, 1992). But if we think of students as the central element, then this strategy seems unlikely to succeed. It assumes that teachers know what to do to create more learning, and that they will do so by giving them the authority. Neither assumption seems credible. It is reasonable to think that most teachers have a real concern about students and their welfare. It is not reasonable to think that all teachers have a tremendous store of knowledge about how to educate that they are waiting to unleash with dramatic effect as soon as they are freed from the shackles of bureaucratic restrictions.

Perhaps, we would need to pay much more attention to the issue of motivation. If students are the producers of their own learning, then their motivation is absolutely critical. There is a substantial literature on motivation, both in education and in psychology (Ames & Ames, 1984, 1989; Deci & Ryan, 1985; Hastings & Schwieso, 1987). Various strategies for the organization of schooling and teaching have been advanced based on this research. Nolen and Nicholls (2007), in reviewing the literature, come to the conclusion that the most effective strategies have to do with treating students as capable persons, capitalizing on their knowledge and interests, and involving students in determining goals and methods of learning. Berliner (1989) suggested that classrooms where different kinds of tasks are occurring simultaneously provide more ways for students to demonstrate ability and feel competent. DeCharms (1984), suggested that teachers need to provide students with choices and encourage "responsible pupil-influence attempts and independent activity", with students learning gradually to make more and larger choices.

6.4 Factors inhibiting Improvement in Productivity

Although the basic options for change are evident, there is increasing evidence that schools are remarkably resistant to change. One explanation for this resistance is the absence of adequate incentives. Pincus in his work (19…) "Incentives for Education in the Public Schools", offers six contrasts between schools and organization functioning in a competitive sphere. He notes that schools should be expected to:

a. Be more likely than the competitive firm to adopt cost-raising innovations since there is no marketplace to test the value of the innovation (e.g. smaller class size) in relation to its cost.

b. Be less likely than the competitive firm to adopt cost-reducing innovations unless the funds so saved become available for other purposes within the district.

c. Be less likely than the competitive firm to adopt innovations that significantly change the resource mix (e.g. a higher ratio of teacher aides to teachers, sharply increased use of capital-intensive technologies) because any consequent productivity increases are not necessarily matched by greater profits to the district and because replacement of labor by capital may threaten the guild structure of the schools.

d. Be more likely than the competitive firm to adopt new instructional processes or new wrinkles in administrative management that do not significantly change institutional structure.

e. Be less likely than the competitive firm to adopt innovations that change accustomed authority roles and established ways of doing business because changes in these relations represent the heaviest kind of real cost bureaucracies.

f. Be equally unwilling as competitive firms to face large-scale encroachments on protected markets (voucher systems, metropolitan are wide open enrollment), although for somewhat different reasons.

7. Productivity in Higher Education

Productivity in higher education is somewhat different from that in elementary and secondary education. Higher education and more specifically university, poses a number of characteristics that result in an organizational culture that makes pursuing productivity in a systematic way difficult.

Universities are stuffed by professionals with a tradition of autonomy. Unlike most other employees, professors maintain control over their own time. Control is further complicated by the fragmentation of university into academic departments. This decentralised structure creates problems at coordination and compliance.
In this setting any attempt to improve productivity outputs and outcomes needs to be realistic. The suggestions contain here focus on a practical institutional approach.

Although universities are understood to have three brand missions – teaching, research and public service – the focus in this part is teaching, especially undergraduate teaching. Universities are a classic example of a multiple output firm with additional outputs, including research, housing and entertainment (sports) to education. All of these activities are reflected in the measure of expenditures, but not measure in the price.

The university, it is increasingly argued, is the logical setting for developing and helping to implement the scientific and technological innovations demanded by a modern, complex and rational social system. As Schaffer (19…) argues, the rise of the technocratic norm of higher education is part of the historical process of "rationalization" which sociologist Max Weber viewed as transforming modern western society.

Faculties within these institutions have increasingly come under scrutiny themselves for how "productive" they are in providing technical answers to the concerns of everyday life. Assessment methods like prestige rankings and citation analysis as indicators of "scholarly productivity" are increasingly championed as legitimate ways to help college and university administrators evaluate faculty quality.

Academics working in public institutions of higher learning have historically heard, and recognized at least in principle, that the public was the ultimate beneficiary of their efforts. In the 1980s, however, many faculties have come to realize that the public expects specific and measurable outcomes for tax dollars invested in public institutions. The professoriate at most public institutions of higher learning today face an array of faculty assignments and distribution-of-effort forms rarely conceived of a generation ago.

Faculty members in both public and private research universities can easily recount their duties in the university. These include teaching, research, and often service. The assessment of teaching and service functions is usually straightforward; service by the number of hours spent in community activities consistent with the mission of the university, teaching by the number of hours spent in class and in preparation for it during the semester. Although both of these duties have themselves been the target of increased scrutiny during the past several decades, neither has proved to be a major stumbling block to basically mathematical methods of tracking faculty activity. A more difficult task, however, faces those administrators and scholars who desire increased knowledge about "scholarly productivity." Under the assumption that academic scholarship in the university is technically assessable, numerous attempts have been made to quantify this component of academic life. Dimensions of faculty quality, upon which several important studies were based, were investigated by scholars who themselves were well located in academic research departments.

The investigation of factors involved in academic scholarship can be and has been based on the scientific quest for understanding. Even in more conscientiously performed studies, unexamined assumptions, which thwart both the investigations attempted and conclusions reached, can be observed. One important study in the literature laid the groundwork thusly. Spurred especially by the scientific and

technological revolution of the 1960's a concern with increasing research productivity has generated a prodigious number of research studies on research. By and large, however, these inquiries have been directed to answering one question. What are the correlates of research? In addition, these studies have been limited by an over-reliance on a single measure of research productivity, namely, scholarly publications. The questions of how and why faculties go about pursuing their research interests have remained largely not investigated. (Pellino et al 1984)

The more general belief that the field of education is in essence, a scientific endeavour contains several conceptual weaknesses. One has to do with the assertion that the foundation of educational scholarship is to be located within the scientific enterprise. Another is that the fruits of scholarship are in some way related to school policy. The notion that scholarship must yield some type of product appears to be taken for granted. Neither of the first two of these assumptions is well documented in the literature of educational research and policy implementation. The last assumption typically is mistaken as proof that there are in fact unproductive academics.

It is conceivable that the assessment of the scientific nature of scholarly productivity within colleges of education might be done at the department level as opposed to the college as a whole. For example, several studies on scholarly productivity have found that educational psychologists typically dominate the ranks of the most productive and have more journals in which to be cited. This observation suggests that since educational psychologists are the "high priests" of the technological myth in college education, analysis of productivity among them might be meaningful. On the other hand, those whose scholarship is less tied to scientific claims or technological application may, by definition, be less "productive." There is no unanimous agreement that the social and behavioural sciences are the starting point in educational scholarship; thus when researchers find various departments overrepresented or underrepresented in objective profiles of scholarly productivity, what they are finding represents the diversity of orientations and interests within such colleges, not more or less productive faculty.

Analysis of scholarly productivity that focuses on the scientific nature of educational scholarship might be useful in assessing how scientific one's faculty is, but less useful in assessing the other forms of academic scholarship not dependent on some particular version of science.

Students entering a higher education institution exhibit certain characteristics and competencies. Evaluating the impact of university necessitated assessing changes resulting from the university environment, on the value added by a university. Any attempt to measure student outcomes is related to institutional goal-setting. Alexander Astin (1975) and his associates divide type of outcomes into cognitive and affective and type of data into behavioural and psychological as shown in Exhibit A.

		Type of Outcome	
		Cognitive	Affective
Type of Data	**Psychological**	Knowledge General Intelligence Critical- thinking ability Basic skills Special aptitudes Academic achievement	Self-concept Interests Values Attitudes Beliefs Drive for achievement Satisfaction with college

	Behavioral	Level of educational attainment	Choice of major career
		Vocational achievements:	Avocations
		Level of responsibility	Mental health
		income,	Citizenship
		Awards of special recognition	Interpersonal relations

Exhibit A. Taxonomy of student-outcome Measures

7.1 Showing Productivity Improvements.

After setting productivity objectives, defining productivity and measuring productivity, the next step is to demonstrate productivity improvements, which can be done in several ways. One is to show an increase in revenue or participation that derives from efforts that did not require an increase in tuition, fees, or taxes. Another is to show a significant increase in effectiveness, such as the employment rates of recent graduates, without increasing costs or using additional resources. Numerous measures are possible and each university should concentrate effort on those that best fit to its own circumstances.

7.2 Strategies to Increase Productivity

There is an abundant literature on possible strategies for increasing productivity in higher education, which can help universities to understand how they can reduce costs and increase student quality. Many of these strategies require changes in the administrative culture and the mindset of faculty and administrators. Attempts to implement these strategies may be met with resistance or even legal challenges from the various professional organizations and associations that support faculty and administrators.

Strategies for increasing productivity focus on improving the two key components of productivity that were defined earlier - effectiveness and efficiency. These strategies include privatization, decentralization, improving student quality, and increasing the flexibility of faculty.

a. Privatization

One way of increasing the cost-efficiency of higher education is through the privatization of certain services. Most universities are vertically integrated. While these services contribute to student learning, there is no reason why these services cannot be performed by private contractors.

When vertical integration exists, the full costs of inside staff, such as wages and benefits, may be accounted for in other budget or service categories, thus making it difficult to assess the full costs of a certain service. The fees charged by outside contractors, however, will more clearly represent the full cost of providing a particular service. In addition, competitive pressures will increase the likelihood that private contractors will provide an efficient quantity and quality of labor for each service.

b. Decentralization

Privatization is part of a larger strategy aimed at increasing productivity in higher education—the decentralization of the current administrative structure. While decentralization frequently occurs in the private sector, universities have generally not followed suit. Centralized administrative structures in universities have been criticized for several reasons. For one, administrators can generally add staff to meet their needs without having to justify the additions to anyone except other administrators.

Decentralization can result in several benefits for universities. First, academic departments will have more control over their costs and staffing needs. Departments will have more flexibility in aligning their resources to meet changes in student demands. Universities provide too little in the way of support staff for faculty, thus forcing faculty to perform clerical duties. If individual academic departments had more control over their own budgets, they might decide to replace a faculty position with several support staff to improve efficiency. At the same time, university administrators would have to resist the temptation to cut support staff in times of budget stringency. Creating a structure that gets the incentives right is not easy, but will be an essential feature of longer run reforms to improve efficiency.

c. Improving Student Quality

The quality of students—the knowledge and skills they gain from a university education—should be the primary goal of any institution of higher learning. However, just how to increase student quality remains unclear to many faculties. One reason for this lack of clarity is that many faculties, especially those at research institutions, see teaching as a secondary job responsibility behind publishing in academic journals and acquiring research grants. Another reason is that most faculty members do not have training in good teaching strategies.

Arthur Chickering and Zelda Gamson summarize good teaching practices in their article, "Seven Principles for Good Practices in Undergraduate Teaching."*(19)* These practices include encouraging student/faculty contact, encouraging active learning, encouraging cooperation among students, giving prompt feedback, communicating high expectations, encouraging more time on each task, and respecting diverse talents and ways of learning. An important point is that the current passive lecture format in most universities does not account for most of the practices just discussed. Even in smaller teaching-oriented colleges many of these practices are likely to be absent. And, there are huge new opportunities to employ new technologies such as the Internet to improve efficiency. For example, there is no reason for libraries to subscribe to statistical publications when the same data are readily available through the Internet.

d. Increased Flexibility of Faculty Staffing.

Instructional expenditures have historically accounted for nearly 35 percent of total university expenditures nationwide. Although universities spend roughly one-third of every dollar on instruction, different productivity concepts are appropriate for research and teaching functions. With respect to research, it is appropriate to measure productivity in terms of the quantity and quality of academic research and the amount of external funding acquired. With respect to teaching, it is appropriate to measure productivity by teaching loads and academic advising.

Much of the discussion relating to the role of faculty in contributing to productivity in higher education involves increasing the time that faculty spend in the classroom, enhancing the quality of instruction, and increased flexibility of faculty staffing. Given the expense of instruction relative to overall university expenditures, an important cost-saving and quality-enhancing strategy is to better align faculty with student needs. Currently, in many universities, as student demands for certain majors

or classes ebb and flow over time there is little change in the number of faculty in each department. A failure to match teaching capacity with student demand is completely opposite the private sector, where changes in business conditions directly influence staffing levels.

Several policies can increase the flexibility of faculty. But, arguably, the greatest obstacle to increased flexibility of faculty is tenure. An economic argument for tenure is that it saves initial expense on the part of the university. The saving arises because faculty with tenure, or those hired with the possibility of tenure, will work at a lower salary in return for the guarantee of lifetime employment. However, while there may be initial cost savings from tenure, the resulting inflexibility imposed by tenure has greater costs in terms of both dollars and student quality. Tenure prevents significant staffing changes in response to changes in student demands, and also may prevent lower quality faculty from being replaced by higher quality faculty.

Administrators and management professionals have suggested strategies that can increase faculty flexibility in the presence of tenure, although each of these strategies is not without problems. Some of these strategies may be met with opposition from faculty or even legal challenges. One strategy is to impose tenure quotas on the number or percentage of the faculty who may hold tenure at any one time.

e. The use of citation analysis to assess scholarly productivity

The current state of the art in the analysis of scholarly productivity, citation analysis, unfortunately provides a good illustration of this latter phenomenon. The conceptual difficulties besetting those who use this methodology are suggested by their entering focus as well as by their technique. John Smart provides an adequate working definition of this approach: "Citation analysis is a special form of bibliographic research used to assess the quality or importance of scientific contributions. This methodology is based on reference citations found in scientific publications and assumes that citation frequency data can be used to assess the significance of scientific contributions of individual scientists, academic departments, and scholarly journals."

8. References

Ames, R. & Ames, C. (Eds.). (1984). Research on Motivation in Education, Vol. 1: Student Motivation. San Diego: Academic Press.

Ames, R. & Ames, C. (Eds.). (1989). Research on Motivation in Education, Vol. 3: Goals and Cognitions. San Diego: Academic Press.

Berliner, D. (1989). Furthering our understanding of motivation and environments. In R. Ames & C. Ames (Eds.), Research on Motivation in Education, Vol. 3: Goals and Cognitions (pp. 317-342). San Diego: Academic Press.

deCharms, R. (1984). Motivation enhancement in educational settings. In R. Ames & C. Ames (Eds.), Research on Motivation in Education, Vol. 3: Student Motivation (pp. 275-313). San Diego: Academic Press.

Deci, E. & Ryan, R. (1985). Intrinsic Motivation and Self- determination in Human Behavior. New York: Plenum.

Fullan, M. (1991). The New Meaning of Educational Change. New York: Teachers College Press/ OISE Press.

Hastings, N. & Schwieso, J. (Eds.). (1987). New Directions in Educational Psychology, 2: Behavior and Motivation in the Classroom. East Lewes: Falmer Press.

Glennan T.K. and Melmed, A., (2000). Forecasting the use of educational technology:

Nolen, S. & Nicholls, J. (In press). A place to begin (again) in research on student motivation: Teachers' beliefs. Journal of Teaching and Teacher Education.

Glenn R. Pellino et al., (1984). "The Dimensions of Academic Scholarship: Faculty and Administrator Views," Research in Higher Education 20 (1984): 103-115; this quote is from page 103.

Peslak R. Alan, (2005). The educational Productivity Paradox communications co of the ACM October /Vol. 48 No. 10.

Edward Shaffer, (1980) "The University in Service to Technocracy, Educational Theory 30, no. 1, 47-52.

John C. Smart, (1983). "Perceived Quality and Citation Rates of Education Journals," Research in Higher Education 19, no. 2, 175-82.

Lawrence, Paul R., (1975). Organizational and Environment: Management Differentiation and Integration. Homewood: IL. Irvin.