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# REENGINEERING IN THE CONTEXT OF QUALITY MANAGEMENT THEORY: A CAUTIONARY NOTE TO EDUCATORS

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## ABSTRACT

This paper compares and contrasts Reengineering and Quality Management (QM), and provides analyses of Reengineering in the context of Quality Management, for the purpose of discussing the implications of Reengineering to the quality educational system.

## INTRODUCTION

Faced with shifting demographics, changing social and technological imperatives, and shrinking resources, U.S. educational institutions are working hard to maintain their effectiveness in educating the country's learning populations. As educators struggle to adapt their organizations to an increasingly difficult environment, they may be tempted to embrace change methodologies and techniques developed in settings with very different objectives, values and challenges. While receptivity to new ideas is essential, it is also important to recognize when the successful application of a methodology requires a specific context, or when, under different circumstances, the method may impose unacceptable costs.

The purpose of this paper is to review a relatively new but widely popular change methodology, business reengineering, in the institutional context of education. We analyze reengineering by contrasting it with quality management theory. Although each approach has the potential to transform the way educational institutions function (and despite some important similarities), they rest on dissimilar, even contradictory, assumptions about the nature of work and the relationship between individual and organization. Our basic premise

is that while each system has its place as a method of organizational change, the concurrent application of both can be problematic and requires careful integration of potentially conflicting components. Clearly, the initiation of either program needs to be preceded by thoughtful analysis of an institution's specific challenges, goals and values.

We begin by reviewing the fundamentals of both quality management and reengineering. We identify their underlying assumptions and conclude with an analysis of the essential differences that distinguish these two approaches to large-scale organizational improvement.

## **FUNDAMENTALS OF QM THEORY**

QM theory is defined in this paper as Dr. W. Edwards Deming's theory of management, called the System of Profound Knowledge. [1] It is practiced in the Western world by following his "14 points". [2]

### **Purpose of Dr. Deming's Theory of QM**

The System of Profound Knowledge is a theory of transformation for an organization, be it a corporation, school system, or university. Its purpose is to transform western leaders [3] so that they will:

1. Improve and innovate their organizations so that all people can take joy in their work and pride in the outcome.
2. Optimize their organizations' interdependent systems of stakeholders over the long term so that everybody wins.
3. Improve and innovate the conditions of society to make the first two purposes a reality. Society includes local, regional, national and international systems.

### **Assumptions of Dr. Deming's Theory of Quality Management**

Dr. Deming's theory of management is based on the assumptions that managers will:

1. Create, in the long run, a win-win environment for all the stakeholders in their organizations' interdependent systems of stakeholders.
2. Promote cooperation, instead of competition. Cooperation is a precondition for a win-win environment. In a competitive environment most people lose. The exact costs from competition are unknown and unknowable, but they are huge.
3. Maintain a long-term process-and-results orientation, not just a short-term results-only orientation.
4. Motivate people by creating a balance between intrinsic and extrinsic motivation that is appropriate for each stakeholder. Intrinsic motivation is the desire to do something for the joy of it. Extrinsic motivation is the desire to do something for a specific reward or to simply avoid punishment.

Accepting the four assumptions of the System of Profound Knowledge will help western leaders transform their organizations to achieve quality, productivity, and competitive position. In educational institutions, competition among organizations has traditionally taken the form of performance against administratively established standards or competition through political processes for centrally administered resources. It appears likely, however, that bureaucratic control of educational institutions and resources increasingly will be supplemented, or even supplanted, by market-based controls. To the extent market-based

mechanisms become the primary determinant of resource allocation, rivalry among educational institutions will more closely resemble rivalry in the commercial sector, i.e., fierce competition for students/clients through technological innovation and product/service consistency. Proponents of quality management would thus argue that organizational transformation through the application of QM principles is likely to become critical to the competitive survival of educational institutions.

## **FUNDAMENTALS OF REENGINEERING**

### **Purpose of Reengineering**

An overview of some definitions of reengineering should help in clarifying its purpose. Hammer and Champy (1993) argue that the purpose of reengineering is to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service, and speed, through the fundamental rethinking and radical redesign of business processes. This means starting all over, starting from scratch.[4] Lowenthal (1994) states that the purpose of reengineering is to achieve dramatic improvements in organizational performance through the fundamental rethinking and redesign of operating processes and organizational structures, focused on the organizations core competencies.[5] Core competencies in this context are "the systems that enable an organization to identify and use — to the best competitive advantage — the knowledge embedded within the organization".[6] Roberts (1994) indicates that reengineering does require that business processes be reexamined from a fundamentally new perspective. By so doing, managers may in fact discover that a total overhaul of the process is justifiable or even essential. He claims that redesigning does not necessarily have to begin from scratch. It is one alternative to achieving radical process reform, whether it proves tenable or not in the end. [7]

Johansson et al. (1993) define the purpose of business process reengineering as achieving radical change in performance as measured by cost, cycle time, service, and quality. This requires the application of a variety of tools and techniques that focus on the business as a set of related customer-oriented core business processes rather than a set of organizational functions. [8] Shores (1994) states that reengineering is a process of renewal, using new technologies and methods to achieve better performance and customer satisfaction; these methods are called world class manufacturing methods (WCM). According to Shores, after reengineering, continuous improvement (kaizen) must be applied to the new process. [9]

### *Similarities in purpose*

The above definitions of reengineering have two things in common. First, they all revolve around the idea of renewal. Renewal creates major changes in the conduct of business in order to improve performance. Second, they all focus on processes. That is, if a process is broken down into small and simple tasks, then the sum of the tasks may not achieve the desired performance for the original process. Fragmentation of work is a major source of inferior quality.

### *Differences in purpose*

There is also a noteworthy difference between the various definitions. They all differ slightly in expressing targeted measures of performance. Some do not include measures at all, where others explicitly define critical measures. For example, Shores is the only author who includes customer satisfaction in the definition of reengineering.

## **Assumptions of Reengineering**

Hammer and Champy (1993) note that reengineering takes nothing for granted. It ignores what is and concentrates on what should be. [10] "Tradition counts for nothing". [11] "Reengineering begins with no assumptions and no givens; in fact, companies that undertake reengineering must guard against the assumptions that most processes already have embedded in them." [12] In assessing this statement it becomes obvious that reengineering, as defined by Hammer and Champy, is not based on assumptions. It is a tool, a method to achieve dramatic improvements, which has been empirically derived from successful experiences of the authors and their colleagues. It is no theory. While Hammer and Champy (1993) discuss the principles of reengineering throughout their book, [13] these principles do not coalesce to form the foundation for a holistic theory of organizational transformation.

Roberts (1994) proposes twelve tenets which comprise a practical guide to process reengineering. [14] These tenets seem to articulate the assumptions on which support his model of reengineering. These twelve tenets are:

1. The customer and the customer alone is responsible for defining what constitutes product or service value.
2. The organization should be structured from the top down to support its value added processes.
3. Business processes — the domain of the so-called white collar worker — hold the potential for quantum leaps in improvement.
4. Dramatic improvements in cycle times, process costs, and/or customer satisfaction ratings are the key indices of the success of most process reengineering projects.
5. The people who directly support the business process should be given a central role in analyzing and redesigning the process.
6. Senior management must be involved throughout the process reengineering project.
7. Process reengineering seeks to optimize the performance of the process in relation to other considerations.
8. Communication and trust are pivotal to the success of the process reengineering project.
9. A carefully planned system of measurements is necessary to
10. Establish how well a process is performing and to compare before and after results.
11. Process reengineering begins by asking whether an existing process is essential to the organization. If so, improvement is sought by streamlining the process and then optimizing it in relation to other processes.
12. The psychological and emotional barriers to change must be accounted for and carefully managed throughout the process reengineering project.
13. Users of the reengineered process need to understand their role in support of the process and be trained accordingly to perform their new responsibilities.

## **Key Issues of Reengineering**

It is possible to extract the following key principles of reengineering by studying the definitions and assumptions articulated in the above-cited writings.

### *Processes*

A process is a set of interdependent activities that transforms inputs to outputs which create value for a customer. Customers do not care if a particular subprocess works; they are only interested in its output.

Reengineering requires that processes be kept simple. [15] Complex processes need to be restructured and simplified.

1. Process structure is determined by a natural order of steps. Subprocesses are moved to where they make sense.
2. Only one interface should exist between any two processes, or between a process and its customers. This will reduce opportunities for errors. It will also reduce redundancies because the redesigned processes will not overlap.
3. Standardization creates highly inefficient processes. Standardized processes try to serve every possible extreme, therefore making them complex and slow. Processes should have multiple versions. Reengineered processes should have a decision point prior to multiple simple processes. Thus, cycle time will be dramatically reduced.
4. Control in a reengineered process will be done only to the extent where it makes economic sense; it will be aggregated and deferred. This may cause problems, but since the reengineered processes will reduce costs, the benefits will outweigh the costs.
5. Workers are empowered in a reengineered process. Empowerment means giving workers wider latitude in making decisions and changing job preparation from training to education.

Some authors develop methodologies for analyzing and improving processes. Roberts (1994) states that reengineering has to be a balanced approach. His methodology is based on the notion that starting all over, and discarding tradition, is overly risky and often unnecessary. [16] Shore goes beyond this. He argues that Quality Management is the root of reengineering and should be considered as the framework for implementing a reengineering process. [17]

#### *Customer satisfaction*

Clients' needs and wants provide the basis for a business's existence. Clients define the value of products or services through their buy-no buy decisions.

#### *Leadership and commitment of management*

A major responsibility of management is the development of the organization's vision and mission. These determine the context in which the organization operates. Management should keep the vision aligned with the changing environment and the organization aligned with the vision. [18] Reengineering is a top down process. Management must convey to every employee the reasons for reengineering. Managers must be coaches and leaders, take on responsibility, and act as motivators. [19]

#### *People*

People are a company's greatest asset. Their values and beliefs will determine the success of a reengineering project. Jobs will change from simple to multidimensional and cross-functional. Work therefore becomes more rewarding and challenging. [20]

#### *Information Technology*

Information technology is an essential enabler in making reengineering work. "How can we use technology to do things that we are not already doing?" [21] The correct use of information technology must not be confused with automation. Automation, according to Hammer, "provides more efficient ways of doing the wrong kinds of things; it is analogous to paving cow paths." [22] Used correctly, technology can create new and more efficient ways to work. [23]

Cole (1994) presents a comparative analysis of reengineering and Quality Management (QM). [24] This paper extends Cole's comparative analysis, explains how reengineering fits into the context of Quality Management theory, and relates the discussion to educational institutions.

#### *Comparative Analysis of General Concepts: Theory versus Tool*

Quality Management, in Deming's sense, is based on a holistic theory of management called the System of Profound Knowledge. If leaders follow the fourteen points noted earlier, management will achieve quality, productivity, and competitive position.[25] Reengineering, on the other hand, is a tool [26] developed empirically by examining common patterns in various organizations. These patterns led to a general approach to improving organizations called business reengineering. It is a new field with room for multiple approaches. [27]

The distinction between theory and tool is especially salient for educational institutions. Theory allows the user to predict outcomes on the basis of a combination of logically derived expectations (deductive reasoning) and empirical observation (inductive reasoning). The design and introduction of an educational innovation can be predicated on theories pertaining to how students learn, how teachers teach, how the use of electronic media affects student retention, or other issues. Theory thus guides design prior to intervention. By contrast, the application of tools in the absence of theory amounts to trial-and-error learning, learning that is uninformed by an understanding of complex structures of cause and effect. While a theoretic experimentation may be appropriate to enterprises engaged in manufacturing, retailing, or the provision of entertainment, it seems unlikely that the mission and values of educational institutions would be served by such an approach.

#### *Degree of change*

Some experts believe that the major difference between reengineering and Quality Management is manifested in the degree of change involved. They claim Quality Management utilizes slow and continuous improvement (*kaizen*), while reengineering uses dramatic and discontinuous improvement. [28] Unfortunately, this comparison uses an incomplete definition of *kaizen*. *Kaizen* according to Imai [29] can be defined in terms of four characteristics:

1. Improvement combines both innovation and maintenance. Innovation involves figuring out completely new ways of doing something or new things to do. Maintenance involves following standard methods.
2. Improvement usually happens in small steps. But the continuous accumulation of improvements can lead to radical breakthroughs.
3. Improvement should involve everyone.
4. *Kaizen* is based on the assumption that if a process is good, good results follow.

Both approaches are capable of dealing with radical change. Innovation is part of both methods. However, Quality Management incorporates both innovation and *kaizen*, and therefore encompasses a broader range of possible applications.

#### **Analysis of Reengineering in the Context of Quality Management Theory**

In this section, reengineering is discussed within the context of the assumptions of Quality Management theory.

### *Assumption 1: Create a win-win environment*

#### *Potential agreement:*

It is important to understand the needs and wants of customers. The customer alone is responsible for defining product or service value. A customer focus creates opportunities for all stakeholders to win in the long run.

#### *Potential disagreements:*

(1) According to reengineering, "tradition counts for nothing." [30] Organizational values and beliefs provide a model for behavior and security for stakeholders. In Quality Management, tradition can be important to the creation of a win-win environment. Dismissal of these traditions may create fear and mistrust among all stakeholders.

(2) Reengineering states, "Many companies that begin reengineering don't succeed at it. Nonetheless, reengineering is not a high-risk endeavor." [31] Prediction of this risk requires theory. Lacking a theoretical basis, reengineering cannot predict the degree of risk to the various stakeholders of an organization. This may create a win-lose situation.

### *Assumption 2: Foster cooperation*

#### *Potential agreement:*

People have to learn that they belong to a team; they fail or succeed together. [32]

#### *Potential disagreements:*

(1) According to reengineering, "Companies need people who can figure out what the job takes and do it, people who can create the slot that fits them. Moreover, the slot will keep changing." [33] Despite its superficial appeal, this type of thinking can create unmanageable and destructively competitive chaos. Despite the intuitive appeal of best efforts and high spirits, organizations require systems to determine who, what, where, when, and how people should do things in a cooperative environment. In Quality Management these systems are called: Policy management, cross functional management, and daily management.

(2) Reengineering states: "It is the process owner's reputation, bonus, and career that are on the line when his or her process is undergoing reengineering." [34] This type of thinking can create destructive competition for scarce resources. A process owner may try to optimize his reengineered process, not the entire organization. Quality Management promotes cooperation to optimize the organization's interdependent system of stakeholders.

### *Assumption 3: Manage with a long-term process-and-results orientation*

#### *Potential agreements:*

(1) Quality Management and reengineering both emphasizes the importance of a process point of view.

(2) Reengineering argues that: "Executives fulfill their duties by ensuring that processes are designed in such a way that workers can do the job required and are motivated by the company's management system." [35] This agrees with Quality Management theory in the sense that people can do only as well as the process allows.



(3) Both reengineering and Quality Management claim that a vision and a mission are critical for success. They are necessary to accomplish long-term plans and goals of the organization.

(4) Roberts (1994) states that it does not make sense to measure the performance of someone by numbers, while other problems that might impact this performance are neglected. This example supports the Quality Management notion that performance can be only as good as the process permits and that some process measurements are unknown and unknowable.

*Potential disagreements:*

(1) Checks and controls are non value-added steps. Their elimination is an economic decision. Reengineering provides no method to make this decision. This is potentially dangerous because it may lead to necessary inspections being neglected or superfluous inspections being overemphasized. Quality Management uses the "kp rule" [36] as a decision criterion on when to eliminate inspection.

The "kp" rule minimizes the total cost of incoming material and final product. It works between any two points in a process. Simply stated, the "kp" rule is an inspect all-or-none rule. Its logical foundation has statistical evidence of quality as its base. There is a difference between inspecting and routinely monitoring products, services, processes, or people. The kp rule facilitates the collection of data such that variation can be continually reduced [37].

(2) Reengineering assumes that all "value created through a process" and "worker performance" are measurable. Quality Management believes that many important dimensions of business performance are unknown and unknowable.

(3) Reengineering promotes the idea that: "All that is needed is the will to succeed and the courage to begin." [38] Quality Management claims that theory and knowledge are the key to understanding a process. Without theory, there is no knowledge and no transformation. A manager can not have a process point of view without a theory of how the process should function.

*Assumption 4: Create a balance of intrinsic and extrinsic motivation*

*Potential agreements*

(1) The reengineering literature notes that "Managers change from supervisors to coaches. Executives change from scorekeepers to leaders." [39] The new managers should mentor people. Quality Management strongly emphasizes the need to mentor people; to give people the opportunity to learn and to improve skills. Both approaches foster intrinsic motivation.

(2) According to reengineering proponents, "The people who directly support the business process should be given a central role in analyzing and redesigning the process." [40] This is a part of empowering people in the Quality Management sense as well; it creates intrinsic motivation.

*Potential disagreements*

(1) Hammer and Champy (1993) maintain that: "People's roles change from controlled to empowered." "People who make their own rules" [41] are needed. This should be achieved by giving people authority, then they will be willing to take risks and work harder to make

things happen. Reengineering does not provide a method to empower people. It merely says that employees should have more latitude. People should no longer be trained, but rather educated. [42] In Quality Management, empowerment increases joy in work and pride in the outcome for all employees. In this context, the method is to provide individuals or teams the opportunity to: (a) learn about a system through training and development, (b) define and document the best practice methods which make up the system, (c) improve and innovate the best practice methods which make up the system, (d) utilize latitude when making decisions within the context of a best practice method, and (e) trust superiors to react positively to the latitude taken by employees making decisions within the context of a best practice method.

(2) Reengineering claims that: "An employee's performance in a reengineered job this year does not guarantee anything about his or her performance in the years to come." "... Substantial rewards for outstanding performance take the form of bonuses, not pay increases." "...Contribution and performance are the primary bases for compensation" [43] reengineering does not incorporate an awareness of the effects of the system on the performance of employees (common variation) into compensation decisions. It does not consider the effects of such views on intrinsic motivation and empowerment. Quality Management aims to balance intrinsic and extrinsic motivation and drive out fear.

(3) Reengineering tries to "identify and annihilate assumptions." [44] The rise and fall of educational panaceas. This should help to stimulate thinking about new ways of doing work. This is in conflict with Quality Management because it lacks understanding for people's need for security and the unknown and unknowable losses that are incurred from insecurity. Quality Management promotes joy in work and pride in the outcome, emphasizing on a balanced mix of intrinsic and extrinsic motivation.

### **Reengineering, Quality Management, and Educational Institutions**

Educational institutions that seek to improve through reengineering may experience severe difficulty. Potential problems derive from the disagreements between reengineering and Quality Management, as discussed in the prior section. These issues are now discussed with respect to educational institutions.

First, reengineering can be a high risk endeavor. If it fails, it may result in large costs to stakeholders such as teachers and students in areas such as morale and joy in learning. Second, all components of "value created through a process" and "worker performance" are not measurable. In fact, the most important outcomes in the educational system are unknown and unknowable; the benefits of a committed teacher or a joyous learner, for example, versus the costs of a frustrated teacher or a discouraged learner. Third, the belief that "all that is needed is the will to succeed and the courage to begin" is simply not true. Real and sustained improvement in the educational system requires a theory of education and a theory of improvement that are woven together. Quality Management is such a theory. Fourth, empowered administrators, teachers, cafeteria workers, maintenance people, to name but a few, are needed to transform an educational institution, People are not empowered, however, by administrators merely saying they are. They are empowered by leaders who adopt management practices that empower people. Fifth, identifying and annihilating assumptions can be extremely frightening to many stakeholders of the educational system. In the name of progress, many people's basic foundations concerning employment and educational security may be severely damaged with resulting loss in productivity and increased costs.

## CONCLUSION

It is important for those interested in improving educational institutions to bear in mind that, like some educational panaceas, new ideas in management may be introduced, touted and widely embraced despite the absence of thoughtful debate and careful empirical testing. Bailey [45] has argued that such panaceas move through a predictable life-cycle as follows:

- Idea: a new idea is born, researched, and reported.
- Cult: a small group of true believers nurtures, evangelizes and refines the idea.
- Popular acclaim: the idea spreads and is labeled a panacea; a community of "recognized experts" suddenly appears.
- Disenchantment: there is nothing new to be said and failures begin to surface.
- Repudiation: a tidal wave of negative comments surfaces, but a new theory awaits in the cult stage.
- Float: some zealots remain loyal and the idea is periodically resurrected in modified forms.

Many components of reengineering are not new or innovative; they already exist in Quality Management theory. However, some components of reengineering are potentially dangerous if not used within the context of Quality Management. Hopefully, this paper will stimulate debate regarding the relative merits of reengineering and Quality Management, especially in the field of education.

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37. Let  $p$  = the average fraction defective in incoming lots of parts (for example, a day's receipt of material). Let  $k_1$  = the cost to inspect one part, and let  $k_2$  = the cost to dismantle, repair, reassemble, and test an assembly that fails because a defective part was put into the production line. If  $k_1/k_2$  is greater than  $p$ , then 0% inspection. If  $k_1/k_2$  is less than  $p$ , then 100% inspection. If  $k_1/k_2 = p$ , then either 0% or 100% inspection, depending on history.
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