JIT in Higher Education

Dr. A.K.Gupta

Dept. of Mech. Engg., DCR University of Science and Technology, Murthal, Sonepat, Haryana, India

Abstract

JIT concepts have successfully been implemented in manufacturing organizations. The major emphasis of JIT system is on reducing inventory. However, JIT is not just for reducing the inventory. Weiters while justifying JIT in service industries illustrated that JIT system is not only for reducing the inventory. Most service organizations will not find physical inventory reductions as a major source of financial justification, there are other significant attributes of JIT that offer benefits to these organizations. It eliminates waste, promotes fast changeovers, streamlines the operations, establishes close supplier relations and adjusts quickly to the changes in demand so that products and services can be provided quickly, at less cost and in more variety. The system-wide approach of JIT has greater role to play in services than in manufacturing. Productivity of our service sector becomes even more critical as it gains a larger segment of our economy. This paper is an attempt to study the relevance of JIT principles and processes in higher education.

Keywords

Education, Manufacturing Management, Service, JIT

I. Introduction

Colleges and universities are complex service organizations with many stake holders ranging from society at large to governments, parents, students, faculty and staff. Under increasing cost containment pressures higher education administrative units have to do more with less and process improvement becomes an overriding priority. Education system is much like manufacturing, in the sense that both employ the processes that add value to the basic inputs used to create the final product or service. JIT focuses on the process and not the product. It can therefore be applied to any group of processes whether manufacturing or service. The basic philosophy behind JIT is to continuously seek the ways to make processes more efficient. This goal is approached by waste elimination. Waste is defined as anything that does not add value. There can be identified so many activities in any process that do not add any value and they are termed as waste and eliminating them from the processes will lead to improvement in processes. Thus one of the key requirements of JIT is the constant and continuous improvement of processes. The education sector has got a remarkable capacity to improve productivity. As regards education sector, the greatest productivity gains will come from defining the value added activities and eliminating those that do not add any value. This paper reviews the relevant literature and explores the integration of JIT techniques and practices into higher educational services. Based on this, some research directions are identified.

II. JIT System

The basic idea of JIT was originally developed and formalized into a management system by Toyota Motor Company of Japan. Since then JIT concepts are being applied in a variety of industries across the globe. Survey and case studies of industries of United States, the United Kingdom, Germany, Italy, Korea, Hong Kong and India [2, 4, 9, 10] have shown growing acceptance of JIT. The literature in the field contains the following common descriptive definitions of JIT.

1. American Production and Inventory Control Society (APICS) defined JIT as a philosophy of manufacturing based on a management plan that identifies and then eliminates all waste and emphasizes continuous improvement in plant productivity [18].
2. JIT is not a series of techniques rather, it is a manufacturing philosophy that requires the support, commitment and participation of human resources at all levels of organization [3].
3. JIT is a philosophy that defines the way the work should be done. It is concerned with creating the right environment for effective operation. They further stated that JIT is best defined as an approach to achieve excellence in a manufacturing company [16].
4. JIT is a philosophy that extends throughout the entire organization and one which emphasizes a proactive approach to the management of operations [22].

All these definitions describe JIT as a management philosophy of managing the operations in a better way which leads to improvement in quality, productivity, and cost savings etc.

III. Literature Review

The relevant literature is being reviewed. There is reasonable consensus among researchers that JIT is a useful and beneficial approach to reduce the manufacturing costs while simultaneously improving the quality of a product [24]. Numerous organizations have reported time and cost savings due to JIT practices [18].

Wright & Mechling [31], reported on the research to empirically determine which operations management problems are the most important to small service organizations. The results indicated that ‘determining how utilize resources most effectively’, ‘monitoring and measuring quality of services’, ‘predicting future events, conditions, customer demand, price/cost levels’, etc are important operational issues for service organizations. However, the results also indicated that facility location and layout, waiting line systems, and distribution requirements planning were for the most unimportant to the respondent service organizations.

Reichheld and Sasser [27], conceptualized the concept of zero defections to services. According to them, service companies must understand what their manufacturing counterparts learned in the 1980s—that quality does not improve unless it is measured. Service companies have their own kind of scrap heap; customers who will not come back. That scrap heap too has a cost. So the concept of zero defections- keeping every customer the company can profitably serve will increase the company’s profits. Customers can tell you exactly what parts of the business you must improve. Zero defections culture can be developed by training the workforce and using defections as a primary performance measure. Everyone in the organization must understand that zero defections is the goal. It is important to make all employees understand the lifetime value of a customer. Managers should use defections as a vehicle for continuously improving the quality and value of the services. The winners will be those who lead the way in managing towards zero defections.

Some conceptual article and case studies [1, 7, 8, 13] have shown...
that JIT is eminently suited to non-manufacturing situations as well as
such as in service and administrative work situations. Various
researchers [15, 17, 19] are of the view that service industries can
improve their operations by using techniques and tools similar to
the ones used in manufacturing environments.
Researchers [5, 15, 25] realized that the challenges in service
organizations are not necessary of the same nature as manufacturing
organizations. Services cannot be treated as merely goods with
some odd characteristics. As a matter of fact, the characteristics
of most service firms differ widely from those of manufacturing.
The main features of a service, which distinguishes it from a
product are; intangibility, heterogeneity, and inseparability of
production and consumption [123]. However, some concepts and
tools developed in the manufacturing domain can be altered to
fit and benefit service organizations. Behara and Chase [6] have
adapted the concept of Quality Function Deployment (QFD) for
service firms. Statistical process control [4], just in time [17],
and quality circles [19], all originated in manufacturing and then
were adopted by Service Operations management to fit service
organizations [15].
Levitt [20], suggested a production-line approach to service.
Services are thought in humanistic terms and manufacturing in
technocratic terms. That is why manufacturing industries are
forward looking and efficient while the service industries and
customer service are, by comparison primitive and inefficient.
Once service in the field receives the same attention as products
in the factory, a lot of new opportunities become possible. The
solution is to take a manufacturing approach to this activity i.e.
the approach that substitutes technology and systems for people.
Highly automated and controlled conditions are to be generated
in providing services like an assembly line of a car manufacturing
company.
Chase [12], proposed a new way of viewing service operations and
showed a classification scheme for service systems and suggested
a framework for developing a production policy for the service
system. Given the fact that activities in many service systems are
sequentially identical to the activities in manufacturing systems, it
can be intuitively asserted that service operations can effectively
use production techniques to improve their output and, hence,
profitability.

IV. Higher Education Production System
Before applying JIT to education service sector, it is important to
look at how the educational system differs from manufacturing
systems. Prior studies and analyses [11, 26, 28], have indicated the
main features of a service, which distinguishes it, from a product.
These features include:

A. Inseparability of Production and Consumption
This involves the simultaneous production and consumption,
which characterizes many services. Simultaneous production
and consumption also eliminates many opportunities for quality
control intervention. Unlike manufacturing, where the product
can be inspected before delivery, services must rely on a sequence
of measures in order to ensure the consistency of output. This
emphasizes the importance of process control in services even
more so than in manufacturing, since services at times do not
deal with a physical product to inspect.

B. The Customer is a Participant in the Service Process
Customer is always involved in service production process. Degree
of customer involvement may vary. By categorizing services on
a continuum ranging from low to high contact; it can be better
appreciated the trade off between flexibility and efficiency of
operations [11]. Generally high contact process technology is more
flexible to accommodate the unique needs of diverse customers.
When the flexibility is high, efficiency is often low because the
conversion process can not be standardized. At the low contact
end of the continuum, the process technology can be less flexible,
because customers are absent during the conversion process,
and consequently the operations can be oriented more towards
standardization and efficiency.

C. Intangibility
Because services are performances, ideas or concepts, rather than
tangible objects, they often cannot be seen, felt, etc., in the same
manner in which goods can be sensed. When buying a product,
the consumer may be able to see, feel and test its performance
before purchase. With services, the consumer must often rely
on the reputation of the service firm. These less measurable
considerations have the potential to greatly influence consumers’
perceptions and expectations of quality.

D. Perishability
This refers to the concept that a service cannot be saved or
inventoried. The inability to store services is a critical feature
of most service operations. Vacant hotel rooms, empty airline
seats and unfilled appointment times for a doctor are all examples
of opportunity losses. Perishability leads to the problem of
synchronization supply and demand, potentially causing customers
wait or not to be served at all.

E. Heterogeneity
Heterogeneity of services in consequences of explicit and
implicit service elements relying on individual preferences and
perceptions.

F. Labour Intensiveness
Service operations are labour intensive. These features emphasize the essential uniqueness of service
management and dispel the common belief that manufacturing
management principles can be applied to services without
recognition of the uniqueness of the service delivery system.
A higher educational service system also possesses all these
features.
The purpose of this paper is to study the integration of JIT elements
into these unique features of educational system so that JIT
becomes relevant to education service system.

V. Justifying JIT In Higher Education
Educational system design is similar to that of manufacturing
because both produce a product whether that product is a good or
service. The JIT concepts and techniques are equally applicable to
both manufacturing and educational operations because they are
process rather than product oriented. The following elements of
JIT seem equally applicable to higher educational settings.
A. A Focus on Quality
JIT wants the existence of total quality management principles. Quality is not just an attribute of product or service but it is a mind set. It defines the corporate culture and provides strategic advantage in terms of long gains in market share and return on investment. Employees must perform their tasks correctly the first time which requires proper training and education of employees so that they learn the way of performing their duties. The use of quality circle concept can be helpful in higher education system.

B. Customer Focus
Under JIT system, customer needs govern all activities. Higher Educational system is a complex system in this regard with many stake holders like society, government, parents, students, faculty and staff etc. In a competitive environment, the customer defines the quality. If you do not satisfy your customer, someone else will.

C. Continuous Improvement
In the race for quality there is no finish line. JIT is not a one-time effort. It embodies the ethics of continuous improvement, which needs to be supported by all levels of staff in the team. JIT seeks organization wide involvement in work improvement projects. Suggestion schemes are therefore strongly encouraged and supported.

D. Process Improvement
Every organization is a network of processes. Enable the people who work in them to understand that work in relation to customer needs. Process improvements can be done through problem solving teams and process simplification.

E. Mindset
Previously, JIT began and ended on production floor. Now JIT reach in all directions. JIT has found applications in administration, paperwork operations, mail order operations, materials management, staff management [ 8, 21, 14, 30, 23 ] etc.

F. MIS
Process improvement teams are taught to track meticulously every fault, complaint, break down, accident or shortage that comes their way. Every process generates data to improve it. A variety of statistical tools-tools in quality control are deployed in what the Japanese call Kaizen (continuous improvement) methods of process control.

G. Eliminate Rework
JIT attacks waste. Waste is defined as anything that do not add value. Waste can be eliminated by simplification, standardization, and get it right the first time approach. Doing mistakes, doing useless work, and in extra steps that do not add any value can equal 20 percent of all cost. Educational service systems can have even greater problems. According to author [28] Service organizations spend 35 percent or more of their operating costs doing things wrong and the doing them again.

H. Teamwork
JIT promotes teamwork culture. Teamwork is different from committees. Teams are self directed work groups with their own required competencies. Unlike committees, teams bring together most or all the people who work in a process to work on its improvement. JIT wants all people to share responsibility for the processes they work in and believes in superiority of collaborative work that achieves team learning.

I. Empowering People
According to one researcher [28] 85 percent of all problems are traceable in the process itself, just 15 percent are due to the people. People want to do right and better things. They want pride in their work. The task of the administration is to remove the system barriers that prevent people from doing so. JIT empowers people by trusting all employees and giving them appropriate authority. Driving out the fear from workplace and stop attacking people will improve their efficiency and effectiveness which will lead to improvement in productivity.

J. Training and Recognition
Training help people learn corporate vision of quality, to have skills of teamwork and problem solving and to be closer to customers. JIT firms invest heavily in training needs of people and believes in team oriented recognition, honors and celebration.

K. Vision
As customer is part of the educational production system, the customer is very well aware of not only the tangible aspects of service but also of the service delivery system. Customers often notice variance in the system and this may affect the perceived level of quality. One must use simple language so that everyone understands and is focused on the right thing to do. The more each employee knows and understands the system as a whole, the less variance in the service delivery there will be.

L. Leadership
JIT do not want leaders who are powerful figures in sole command of vertical authority structures, instead they want leaders who are vision givers, listeners, team-workers, committed to quality and customer needs and enablers of people driven improvement.

M. Technology
IN JIT environment, work is being done in highly automated controlled conditions like the assembly line of a car manufacturing plant. As in any higher educational service system, there are more people and fewer machines there are chances of more variations in delivery function. So advances in technology must be used to support the employees’ activities and replace wherever possible with machines.

N. Layout
Higher educational systems must strive to remove communication barriers and facilitate effective communication by proper layouts. Effective communication means must be developed. Bottlenecks during service delivery can be devastating to the quality and success of the system.

VI. Concluding Remarks and Directions for Future Work
It has been attempted to justify JIT concepts in higher educational settings. The implementation of JIT principles and processes in the class room may be difficult. Manufacturing processes are far more predictable and controllable than the learning process. Higher educational sector use the different words than industry. Some concepts like teamwork approach to problem solving may be unfamiliar in higher educational environments. It may require new attitudes and skills in both faculty and students. In other words,
a radical change in organizational culture is required to build the learning environments where fear is eliminated and responsibility shared. However, the service areas of the institution – facilities, billing, registration, security, etc. – all have counterparts in industry and should easily lend themselves the beginning point for JIT. Measurements of student achievement, curriculum and instruction may yield more wide variable results than measurements on an assembly line. However, one can research on the implementation aspects of JIT principles and techniques in higher educational setting.

References

Dr A.K.Gupta received his B.Tech. degree in mechanical engineering from NIT, Kurukshetra, India in 1990, the M. B.A. degree from Indira Gandhi National Open University, New Delhi, India in 1998 and the Ph.D. degree in mechanical engineering from Maharishi Dayanand University Rohtak, India in 2006. He started his career as graduate engineer trainee with Jindal Strips Limited; Hissar in 1991. From 1991 to 1996, he was lecturer at Vaish Technical Institute, Rohtak. At present, he is working as associate professor in department of mechanical Engineering with DCR University of science & technology, Murthal (Sonepat) Haryana, India. His specialization area is industrial engineering and operations management. His research interests include JIT, TPM, and other related topics. He has published many research papers in international/national conferences/seminars journals.