Applying Continuous Improvement Techniques to Instructional Design Technology (IDT) for Greater Organizational Effectiveness

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Abstract

Organizations embracing the philosophy of continuous improvement require the use of every available avenue to perform consistently at higher levels. Annually, more organizations throughout the world utilize continuous improvement tools to become more effective and efficient in their production methods. Yet, year after year, companies spend billions of dollars on training programs, many of which fall short of their intended goals, creating both practical and legal issues for the business. With this in mind, this article looks at assimilating the models and methods from the discipline of instructional design and technology (IDT) with continuous improvement tools to improve the effectiveness of training for both individual and organizational development. Using IDT in this way enables the organization to better identify its learning needs. This blending of IDT and continuous improvement will produce a better, more effective educational program for the overall organization.

Introduction

Organization development (OD) requires a total system approach, using a mixture of endeavors to improve organizational effectiveness (Cummings & Worley, 2005; Jeffery, 2005). Often, training is one of these endeavors. Effective staff training and development improves the overall organization's effectiveness because training and development of individual employees enhances each individual's capacity to contribute to the development of the organization (Olaniyan, 2008). To this end, U.S. companies spent an estimated $52.8 billion in 2010 on training programs for employees with an estimated $1,202

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being spent per learner ("2010 Training industry report," 2010).

Despite the significant training expenditures, by many accounts, training is often an abject failure with many organizations unable to establish a positive link between training and desired change (Bunch, 2007). Indeed, some studies have found that mandatory corporate training programs may actually have the opposite impact of their intended effect (Dobbin 2011; Georgenson 1982; Kalev 2006; Vedantam 2008). Poor training has been cited as the root of quality control issues, customer dissatisfaction, low morale, and poor teamwork ("Ineffective training" 1998).

As Bunch (2007) noted, "Along with wasting immeasurable time and billions of dollars, failed interventions promote costly litigation and growing cynicism about the worth of organizational change efforts and contribute to the persistent undervaluing of the training profession." Moreover, with more and more courts recognizing an employer's duty to train in a variety of contexts, it is more important than ever for training programs to be effective (Cash, 2001; Okon, 2011; Peace-Wickham, 2010).

So what can organizations do to reverse the trend and make training programs effective instruments of organizational development and change? The answer may lie in combining continuous improvement principles with models and methods from the discipline of instructional design and technology (IDT). Blending the methods of IDT and the system tools of continuous improvement will result in more effective and legally defensible training and educational programs to facilitate both individual employee development and development of the organization as a whole.

Continuous Improvement and the Tools of Six Sigma

Continuous improvement has been a driving force behind the most competitive businesses for several decades. Once thought to be simply a set of tools for improving production quality and efficiency, Six Sigma, an underlying operating philosophy of continuous improvement, has expanded to a variety of business functions, including human resource management. Jeffery (2005) and Kleason (2007) advocated the use of Six Sigma methods as a means of improving organization performance. The literature has numerous applications of using process improvement techniques. For example, ReVelle (2003) gave an example of using process maps in improving safety in the workplace; Jeffery and Bratton-Jeffery (2004) applied Quality Function Deployment in the integration of training models; Maes and Jeffery (2005) suggested applying behavioral science protocols to Six Sigma; Chow, Bowman, and Wittenberg (2007) used benchmarking as a method of assessing compliance in training practices in medical device manufacturing; Chow, Finney, and Woodford (2008) integrated Six Sigma tools in the performance of job analysis.

One of the most widely used continuous improvement tools is the four-step quality model known as the PDCA cycle – Plan – Do – Check - Act. In the first step, Plan, businesses find a process to improve, define the problem with the process, and develop solutions. In step 2, Do, the business implements a solution identified in step 1 and tests the change. In step 3, Check, the business reviews the tested change, analyzes the results, and identifies what it has learned. In step 4, Act, the business takes action based on what it learned in step 3. Thus, if the change did not work, the cycle begins again. If the change worked, it is incorporated into wider changes and the cycle begins again (American Society for Quality).

In the Six Sigma method of continuous improvement, the PDCA cycle is expanded to five steps and is known as the DMAIC cycle – Define, Measure, Analyze, Improve, and Control. Each step in the DMAIC cycle has a variety of "tools" to facilitate evaluation and improvement. A number of those tools have been seen as effective instruments in designing training and educational programs. For example, Chow, Finney, and Woodford (2010) recommended the application of a number of Six Sigma tools to the employee training and development functions, including cause-and-effect analysis, statistically-based experimental design, quality function deployment, matrix management, benchmarking, and mistake proofing. Witkin and Altschuld (1995) recommended the application of Ishikawa's fishbone diagram in the cause analysis during a needs assessment study. Burgar (1994) suggested the application of Quality Function Deployment (QFD) when designing courses in higher education. Bier and Cornesky (2001) proposed the use of QFD in designing and developing curriculum as aa avenue of meeting the customer needs.
If the tools of continuous improvement are so readily applicable in other disciplines. Is there any reason not to adapt and utilize tools and methods from other disciplines in the quest for continuous improvement? Looking further, can other tools and methods be adapted and incorporated within the Six Sigma construct to help in the improvement of training and employee development? One promising method is instructional design and technology (IDT).

Instructional design and technology, sometimes referred to as instructional design and development, offers an assortment of strategies, models, and methods for designing and developing instructional materials for the classroom and/or training room. Incorporating these tools of IDT into continuous improvement seems a logical step for improving the training and educational process for any organization striving for excellence.

Recent Use of IDT

Instructional Design and Technology is a rapidly growing field concentrated in instructional strategies and learning theories. Gustafson and Branch (2007, p. 11) described instructional design as a "systematic process that is employed to develop education and training programs in a consistent and reliable fashion."

Gustafson and Branch (2007) mention several aspects of instructional design that leads one to relate it favorably to continuous improvement. First, instructional design is typically a team activity. They suggest that ID projects are best suited for team resolution because of their size, complexity, and potentially large scope. The team concept has long been an integral part of continuous improvement. For example, many open source communities building various Linux distributions seek to release new and improved software according to a frequent release cycle (usually around 6 months). This requires a collaborative and iterative community-based process of identifying, correcting, and evaluating issues in the software on a continuous basis. In addition, continuous improvement and open source models are becoming important considerations in contemplating future educational models (Seely-Brown, & Adler, 2008).

A second aspect of instructional design is the assumption that outcomes can be reliably measured. Reliable and valid measurement is the second stage of the DMAIC cycle, thus affording the practitioner the opportunity to measure outcomes and adequately assess the impact of interventions and changes made to the instructional process. The time difference between implementation and feedback is often an issue when measuring the effectiveness of results; however, some open learning models promote more immediate feedback systems, as discussed by Seely-Brown (2005), and may be considered for future research in this area.

To further the case for blending continuous improvement and IDT, it may help to look at the positioning of IDT in relation to the performance improvement initiative. Six Sigma is a process employed in the Human Performance Improvement (HPI) field (also known as Performance Systems Technology), which is a field dedicated specifically to anything that improves performance issues relating to organizational or business objectives. When a performance gap is discovered HPI attributes the cause for the deficiency to one or more of four drivers: Skills/Knowledge, Environment, Motivation, or Incentives (Willmore, 2004). IDT is seen by some practitioners as linking directly into the Skills/Knowledge deficit area, making an IDT practitioner a type of specialist in Human Performance Technology.

Combining IDT Models with Quality Improvement Tools

Instructional design models are useful to practitioners because they help "conceptualize representations of reality" (Gustafson & Branch, 2002, p. 1). ID models are not rigorously tested or scrutinized for widespread or universal application. Their validity lies in their application by practitioners who find them useful.

For example, the "ADDIE" model is the generic model representing the basic functions of the systemic design model. The ADDIE model utilizes the following: analysis of learners and needs, design of the instructional strategy and instructional methodology, development of the instructional content, implementation of the instructional intervention, and evaluation of the learning outcomes and instructional effectiveness. The core elements of this instructional development model are enhanced when the PDCA cycle of continuous improvement is incorporated. Learning needs are determined from the results of gap analyses and needs assessments; solutions for closing these performance gaps as well as meeting the learning needs come from a cyclical evaluation. Figure 1 depicts each of the elements of the instructional design model encircled by the PDCA.

Within the PDCA cycle, each of the instructional design elements include a recurring cycle of creating a plan for the design stage, implementing the plan for the design stage, evaluating the results of

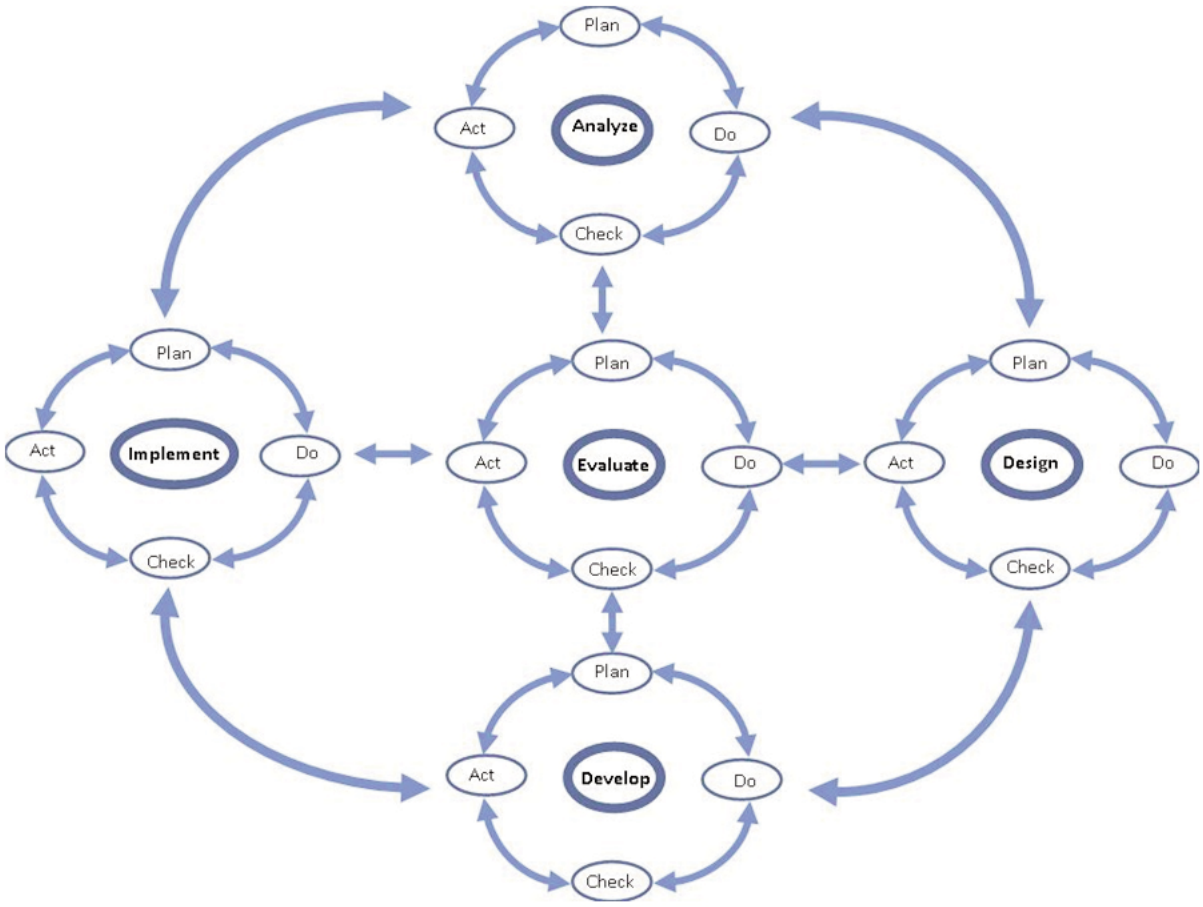

Figure 1. Core elements of instructional development, adapted using continuous improvement cycle.

the implementation of the plan for the stage, and taking any necessary actions as a result of the findings in the evaluation. This cycle can repeat itself throughout the entire process, which allows for the continuous improvement aspect to occur throughout the entire instructional development model. As each stage is completed in the ADDIE model, an evaluation is made and actions can be taken to make further improvements/corrections to continuously improve the instruction/training.

Instructional Strategies

The strategies of instruction include many different methods of providing instruction and learning to the intended learners and include both passive learning methods (where the learner is an observer of the learning activities) and active learning methods (where the learner is directly involved in the learning activities). Passive learning methods include the basic instructor lecture method, as well as more technology-based methods such as video and audio presentations, and computer-based instruction or training. Active learning can include any activity where the learner takes an active role in the learning activity, such as an interactive computer program, classroom role playing activities, or activities that simulate real world activities (Chow, Howard, & Lambe, 2009).

Whether the participant is engaged in either active or passive learning, bridging must take place. Bridging is the use of discipline-specific information or topics in the presentation of a non-discipline concept in order for the learner to better make the connection to the new information from a familiar context. In his adaptation of quality tools to the improvement of safety practices, ReVelle (2003) provides the reader with a set of definitions specific to safety process analysis. This list is similar to many used in the traditional process analysis application, though it is geared specifically to areas related to safety. In providing these definitions, ReVelle bridges one knowledge base, quality process improvement, to another, safety. Bridging is necessary whenever tools, concepts, or ideas are taken from one "discipline" to another, so that the reader is made aware of the underlying concepts.

IDT Applications in Quality Practice

A review of the literature suggests that quality improvement methods have been applied in areas of education and instructional design, including training development and needs assessment. Bringing the tools of quality improvement with improving education and instruction is not new. Many have integrated these concepts in one way or another. For example, Murgatroyd (1991; 1993) suggested that Total Quality Management principles be employed in schools (and the education system), while Stimson (2003) recommended using ISO criteria in efforts to better the public school systems. Chow, Woodford, and Maes (2008) suggested the use of continuous improvement methodologies in the assessment of business school accreditation.

The next logical step would be to introduce instructional design methods and models as ways of improving both training and education as part of the continuous improvement process. Summers (2011) identifies training and education as one of the four primary areas of leadership focus that impacts lasting improvement.

An important element of training is the verification or validation that the training actually brought about sustainable improvement in per-

formance. Assessment of training effectiveness becomes a critical part of the training system. Just as there is no one tool to improve every process, there is no one instructional design model that will work in every scenario. Each application is situation-dependent.

In general terms, the concept of utilizing instructional design in the analysis, design, development, implementation and evaluation of training programs seems a reasonable approach to continuously improving the training process of any organization. Having a thorough understanding of both the learners' needs as well as the most effective methods of eliminating the gap to those needs will allow the organization to actually design and develop effective training from the start, a sharp contrast with what occurs in too many training activities. Instead of subject matter experts (SMEs) creating what they think are appropriate training materials and methods, the actual training can be driven by the learners' needs as well as assessments.

The real effectiveness of the training intervention can be determined through evaluation (Dick, Carey, & Carey, 2009). These measured results should signal if the training has been effective – regarding cost as well as intended results - and whether it should be continued. More directly, traditional continuous improvement tools and methods may be applied to the evaluation process, producing an improved method of assessment.

An Example of a Specific IDT Application

The collaborative problem-solving model described by Nelson (1999) offers great potential in improving heuristic style problems requiring a complex system of knowledge and skills to successfully complete a task. This type of instructional model would be appropriate in training quality and manufacturing engineers to conduct cause and effect analysis, as the task requires their understanding of the nuances of the process and product in order to completely identify all potential causes of the problem. It could also be used in the case management training of litigation paralegals in the law firm setting (Coyne & Furi-Perry 2009) and teaching team membership to family medicine residents (Eubank 2011). Practitioners have also suggested its use in the development of employment policies and employment training (Woodford, Maes, & Shearer 2006).

With the collaborative problem-solving model, the instructor takes on more of a role of facilitator than that of dispenser of information. In this role, the dynamics of the classroom change, allows learners to take a more active role in the learning. They rely on the instructor for direction instead of information. As a result, the learners take ownership of the information.

This learning environment also is suitable for working with smaller groups for extended periods of time, which in turn can help the instructor to solidify the learning through continuous support and immediate feedback. Thus, in organizations seeking greater effectiveness, the efficiency of the IDT models and methods offers much promise.

Conclusion

Companies or organizations, focusing on continuous improvement, should consider incorporating the models and methods of IDT into their reper-

toire of quality improvement applications. These models and methods can provide a next step into the improvement of organizational training program development.

In order to assure top quality training for the employees of any organization, a move beyond the standard practice of having SMEs design, develop, conduct, facilitate and evaluate training needs to take place. Most organizations cannot survive long-term without the continual improvement of all aspects of the organization, which must include the training and development of employees.

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