Just in Time Training: Current Methods and Best Practices

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Abstract

The article focuses on just-in-time training (JIT-T), or just-in-time learning, and the best practices for the delivery of JIT-T. Just-in-time training is a relatively new concept similar to just-in-time supply-chain management and just-in-time manufacturing which focus on a consumer pull-demand philosophy to reduce waste and to reduce cost. Best practices are the processes that all organizations would like to use in order to maximize efficiency and effectiveness while reducing waste. By using those two concepts as a guideline, the paper presents a definition of JIT-T and the current methods for JIT-T that contribute to effective delivery. Through the examination of effective JiT-T delivery, the paper develops a framework for the best practices used to implement JIT-T.

Keywords: best practices, current methods, delivery, effective, implementation, just-in-time learning, just-in-time training, JIT-T

Just-in-Time Training: Current Methods and Best Practices

Because of the similarities between manufacturing inventory supply and educational knowledge supply, just-in-time training or pull-demand education based upon the expertise of the learner could be designed and developed by an instructional designer to deliver training much like manufacturing processes were changed to deliver just-in-time or pull-demand inventory efficiently and at reduced cost to manufacturers in the late 1970's and early 1980's (Kester, Kirschner, van Merriënboer, & Baumer, 2001, pp. 373-391). An instructional design practitioner might think, when confronted about designing just-in-time training (JIT-T), that JIT-T is self-explanatory by virtue of the descriptive title. Given this conclusion that designer might be surprised as he or she begins to research the development of such a program that there are a variety of nuances that one must consider while the program evolves into its final form. Not only does JIT-T have conflicting definitions, but it also has many elements that contribute to effective delivery, not the least of which is the current knowledge and the discretion of the learner to choose what to learn.

Through an examination of the literature to determine current methods for delivering just-in-time training (JIT-T) and then and interpretation of the strategies, the author will determine what constitutes the best practices for JIT-T. In doing so the author will analyze the commonalities among the definitions and then elaborate on the universal points within those definitions in order to reach a consensus definition from the perspective of the learner. Then the author will examine who requires JIT-T, when JIT-T should be used, where and how JIT-T occurs, and what support mechanisms are required for JIT-T and concludes with why JIT-T is needed along with a summary of best practices.

Defining Just-in-Time Training

Many of the current definitions of JIT-T follow similar lines. Most state that JIT-T can happen anywhere, at any time, and can cover nearly any material. The following definition is one that does not specify they type of employee who seeks out JIT-T, it only seeks to define JIT-T from the perspective of an employee to accomplish the employer goals. Globerson & Korman (2001) write that:

> JIT-T means 'as needed' training rather than accumulating an inventory of know-how that is lost over time. JIT-T means not only at the appropriate time, but also just enough training and in just the right context. JIT-T may also be considered as a rediscovery of on-the-job training offered in a self-paced manner. (p.280)

The previous definition points out that the training is not mandated or supply-pushed by the employer, but is rather demand-pulled by the employee in an as needed manner. Additionally, Globerson and Korman, specify that the training is a finite by stressing that the training is *just enough*, and that the training is situational and pertinent. Lastly, by saying that the training is self-paced, Globerson and Korman give control of the learning to the learner.

Beckett, Agashae, & Oliver (2002) define JIT-T using long-time managerial employees, and state that "JiT (just-in-time training) can be defined as the negotiated provision, in managerial workplaces, of learner-generated immediate skill formation" (p.332). While this definition specifically refers to managerial workplaces it still has some key components of a universal definition which are *negotiated provision* and *learner-generated immediate skill*. Negotiated provision is referring to the bargaining that takes place between the employee and the employer over what the employee wants to learn and what the employer needs the employee to learn. When the Beckett, Agashae, & Oliver refer to learner-generated immediate skill they are

writing about what the learner wants to learn and how the learner wants to learn that skill. The theme of this definition once again gives control to the learner.

"JIT learning is often conceived as anywhere, anytime learning that is just enough, just for me, and just-in-time" (Brandenburg & Ellinger, 2003, p. 309). The preceding definition places limitations on the learning by using the word *just* much like Beckett, Agashae, & Oliver's definition used the words negotiated provision. All of these definitions also hinted at a place to learn that was not a classroom. The first one specifically invoked on-the job, while the second referenced a managerial workplace, and the third specified anywhere. None of the preceding definitions use the employers' perspective.

To understand the difference between an employee perspective and the employer perspective, one must look at another just-in-time training definition that comes from the aftermath of Hurricane Katrina which destroyed much of the infrastructure of the states of Louisiana and Mississippi in 2005. According to Boerner (2015), in this case, the storm forced the relocation of much of the workforce and many businesses. The people who stayed did not have the training to repair their homes, to repair the roads, to repair the power grid, or to work in the shipbuilding industry. With industry and federal government funding, the local community colleges quickly developed programs to provide workforce training which they called just-in-time training. This just-in-time training has played a large role in the recovery of the local economy along the gulf coast of the United States. The development of those JIT-T programs could not have been done so quickly without the massive influx of money from outside sources (pp. 21-23). Although this definition appears to be employer driven, one could suppose that the learners needed training to attain a new job in order to replace the jobs that were lost. One crucial difference in this definition is that, unlike the other definitions, this industry driven JIT-T took

days or weeks rather than the learner driven JIT-T which takes minutes or hours. For the purpose of this paper, the focus will be on learner driven JIT-T rather than industry driven JIT-T.

Who Requires JIT-T

Because JIT-T is learner driven, learners of all kinds can benefit from JIT-T. However, not all types of learners elect to use JIT-T. It takes the right attitude, awareness on the part of the learner that he or she lacks the knowledge or skills to perform a task, a desire for specific information by the learner, knowing how to retrieve the information, having the ability and possibly the technology to access the required information.

For example, Beckett, Agashae, & Oliver (2002) used a case study to examine the implementation of JIT-T and they observed that, "Managers want to learn something using JiT, so they have an expresses intentionality about their state of ignorance. They want to achieve 'understanding', not mere skill-acquisition or technical expertise for its own sake" (p. 334). Through this observation Beckett, Agashae, & Oliver determined that the managers had to acknowledge that they needed help, the ability to recognize their ignorance, and the desire to do something about it. Beckett, Agashae, & Oliver also noted that without a reason for learning, there was no desire to learn on the part of the learner. In summary, an instructional designer could design, develop, and deliver a top notch program, but if the learner doesn't acknowledge, recognize, or desire help then the program is wasted.

Brandenburg & Ellinger (2003) note that "JIT learning is truly learner driven where the control shifts to learners, especially including groups of learners, who create their learning environment, select vehicles for learning, establish priorities and pace, and set expectations for outcomes" (p. 309). This means that organizations, through instructional designers and trainers,

must be prepared with a knowledge of the learners and their expectations in order to have the training available for the learners in the mode that is expected by the learners.

When to Use JIT-T

Globerson & Korman (2001) noted that memory retention played a large part in determining when JIT-T should be used and wrote, "The adoption of JIT-T does not mean that no general training is given, since in order to apply a certain module of know-how, the trainee needs to have a general knowledge of the subject matter" (p. 280). Know-how is the knowledge of how to perform a task. As shown by Globerson & Korman (2001) in Figure 1, the amount of know-how remaining decreases steadily over time after the initial training session. Because time causes the amount of knowledge to decrease, it is the responsibility of the organization to provide refresher modules and of the learner to know that he or she needs to access the refresher modules when there is a knowledge gap. It is also imperative that the learner remember enough of the general training to recognize the gap in knowledge and that there is a need for JIT-T.

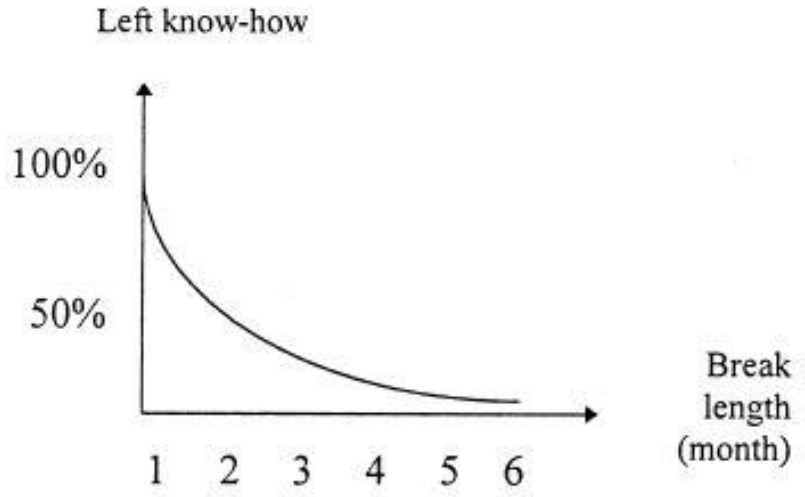

Fig. 1. The relationship between break length and the amount of remaining knowledge.

(Globerson & Korman, 2001, p. 280)

Where JIT-T Occurs

JIT-T does not happen in the classroom as a planned event. See table 1. "The JIT environment is not an alternate means for the acquisition of skills, fundamental knowledge, and attitudes depicted in the left-hand column. Rather, its fundamental applications are focused on real-time creation of knowledge and solutions that cannot be separated from a job function" (Brandenburg & Ellinger, 2003, p. 310). One of the places that JIT-T could take place is the workplace because in the workplace there are several different avenues that the learner can take for the acquisition of knowledge. Min Kyu Kim (2011) defines the workplace as,

> a potential learning space that is not separate from the performance space and embraces all kinds of learning efforts…including formal versus informal learning, which tends to be intentional but not classroom-based…and planned versus incidental learning, which is not intentional but occurs during work-related activities, such as talking with a senior worker… Furthermore…the workplace may be seen as a composition of multiple communities of practice (CoPs), in that workers belonging to multiple CoPs either learn from or betray the others. (p. 37)

The instructional designer could potentially take advantage of the different aspects of the workplace to design JIT-T and encourage through a systems approach the use of JIT-T. What this means is that the instructional designer can use "careful crafting of the situation to the outcomes, whilst encouraging the reflexivity of ends and means in the light of the confident exercise of that skill" (Beckett, Agashae, & Oliver, 2002, p. 334). In other words, the instructional designer should play a large part in designing JIT-T to ensure that it occurs in a positive fashion that will reinforce the transfer of knowledge. Because of the nature of JIT-T, in that the learner seeks out the knowledge, there is a danger that learning could occur through

channels not designed or developed with the organizations best interests in mind. This learning might result in situations that create liability for the company, damage infrastructure, or possibly even result in a fatality.

TABLE 1: Attributes of Two Learning Environments

Current Learning Environment	Just-in-Time Learning Environment
Training	Learning
Formal	Informal and incidental
Course based	Real-time problem based
Specific time and location	Access anytime, anywhere
Structured process	Unstructured process
Reaction to needs	Anticipatory to needs
Applications for existing knowledge	Creation of new knowledge
Content driven	Learner driven
Learning and work distinct	Learning and work merged
Cognitive and behaviorist learning principles	Constructivist and organic learning principles
Use of explicit knowledge	Exploiting tacit knowledge
Technology of integration	Technology of collaboration
Static standards	Dynamic standards
Stated objectives	Stated strategy
Customized to content and objectives	Personalized to learner
Social component of learning when required	Social component of learning integrated
Technology use negotiated	Technology use integrated into enterprise system

(Brandenburg & Ellinger, 2003, p. 310)

How JIT-T Happens

Social factors

In order for the JIT-T program to become a success, the instructional designer must know the audience. Beckett, Agashae & Oliver (2002) observed that "Managers initially may have felt intimidated by the technology, yet may have felt they could not admit it due to their organizational status. As a result, they did not access employee-level 'public' training offerings. . . . [However, once the program was in place and had gained acceptance from the learners, a]

natural competitiveness became a positive influence on program access and subsequent success" (pp. 337-338).

Learning theories

Situated learning might apply to JIT-T because JIT-T might happen just before or during situated learning. For example, one might ask a member of the CoP how to perform a task (JIT-T) while performing the same task (situated learning). Because "learning from a situated perspective occurs through the learner's participation in the practices of a community, practices that are mutually constituted by the members of the community" (Driscoll, 2011, p. 38).

Cognitive Information processing theory may also play a part in JIT-T. When a learner accesses information multiple times, that act becomes a feedback loop or control process called rehearsal. Atkinson and Shiffrin noted that rehearsal enabled short term memory to become long-term memory. (Goldstein, 2015, p.122). For example, when a learner accesses a knowledge management system (KMS) to find a specific procedure (JIT-T), eventually this rehearsal should result in the transfer of learning.

Constructivism might apply as well to JIT-T. "[To synthesize knowledge] learners must test their personal understandings against those of others, usually peers and teachers." (Driscoll, 2011, p. 41). The testing of understanding describes how one might interact in a community of practice when constructing a personal understanding of a complex subject and communities of practice naturally facilitate JIT-T experiences.

Instructional design models

While many instructional design models may be adequate for designing JIT-T, some models might work better than others. For example, because JIT-T is a learner demand-pull function, the instructional designer may not capture all of the methods that the learners want JIT-

T. In this case, the Layers of Necessity model may be appropriate because the instructional designer may need to act quickly to provide a simple process within a limited time frame, thus choosing an instructional design layer matched with needed training type (Tessmer, 1990, p. 79).

Another model which may fit with the needs of JIT-T is the Morrison, Ross, and Kemps model of instructional design which is flexible and provides the instructional designer with a method that can be started at any point (Baturay, 2008, p. 476). In contrast, the rapid prototype model may also apply if it is determined that the learner is demand-pulling JIT-T through an alternate means that was not previously planned. When using the rapid prototype model of instructional design, the learner is given the opportunity to interact with and provide feedback to the designer on the instructional method of delivery so that the designer can make immediate refinements. This rapid prototype model would probably work best with e-learning products (Nixon & Lee, 2001).

Support Mechanisms for JIT-T

The culture of an organization is important to the success of JIT-T. If the culture does not encourage learners to participate then the learners have no reason to do so. This was initially the case at PanCanadian Petroleum where "The corporate culture reinforced that it was acceptable for managers to be incompetent in this area" (Beckett, Agashae, & Oliver, 2002, p. 338). Without organizational support an instructional designer may have difficulty finding success.

Additionally, "technology-enhanced learning environments make the components of workplace learning not divergent but convergent as a whole learning system" (Min Kyu Kim, 2011, p. 37). Technology-enhanced learning environments (TELEs) can have a positive impact on an organizations' learners. The parts of a TELE are the Electronic Performance Support System (EPSS), the Knowledge Management System (KMS), the Communities of Practice

(CoP), and the e-learning system. The KMS are codified bits of knowledge that could be accessed through a website or database. Examples of KMS artifacts might be directives on how to perform a task or a WIKI citing best practices. The CoP is a group of practitioners where experts and novices exchange ideas through formal and informal channels. The e-learning system might include computer based training learning modules which lead the learner through a subject. The EPSS provides access to all of the other parts of the system allowing the learners to access the KMS or e-learning artifacts, and to ask the CoP for help (Min Kyu Kim, 2011, pp. 38-40).

Globerson & Korman (2001) analyzed the cost of JIT-T and determined that "the use of JIT-T is justified only when the setup cost is low enough to allow more frequent training sessions since different individuals may require the know-how at different times" (p. 282). For example, as opposed to traditional training as provided in a classroom, JIT-T might be delivered through the internet with a one-time set up cost and perhaps regular maintenance costs in order to ensure that the JIT-T modules are current. As such the learners could access the information whenever needed much like many people access YouTube or Google from their mobile phones today.

Discussion and Conclusion

Just-in-time training is more than an easy to access computer based training program. Ideally, best practices for just-in-time training should be designed not as the primary means of training, but rather to reinforce training that has already happened or to disseminate concepts that are already familiar to the employees. JIT-T should be developed as a system to be accessible at any time by any employee who needs it using artifacts that could be or have been recycled from the primary training sessions. Along these lines, JIT-T should contain burst of information that can be used quickly in minutes or hours rather than in days. It should have a variety of means to

reach the employees such as communities of practice, knowledge management systems, or e-learning modules perhaps using an electronic performance support system.

Another best practice is to ensure organizational support. The expectations of the culture of the organization must be clearly communicated to the learners. As part of this communication, the instructional designer could start to change learner attitudes and ultimately the culture of the organization. It is important that a supportive organizational commitment be in place or the many tools of the instructional designer to facilitate just-in-time training design, development, and delivery might not be effective.

While just-in-time training could be viewed as facilitated from an organizational perspective it has been and will always be the learner's choice to engage in it. Perhaps the most important best practice is to know the JIT-T audience. JIT-T is happening all around the world at this moment. Millions of people are looking at You Tube, typing questions into Google, scanning a company wiki, reading texts, listening to pod casts and generally using technology to answer a question or to learn something new. Those learners may be working and getting paid to learn or they might be at home and trying to advance their knowledge about a problem that they intend to tackle tomorrow. They might be at an organizational meeting in the workplace or at community of practice meeting in the local library. They might be on a ship in the middle of the Atlantic Ocean, or monitoring a forest fire from a helicopter. Just-in-time training can happen any time, any place, using many different methods. It would be best if the instructional designer remembered that and was prepared for it through a thorough analysis of the audience and what they desire.

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