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Kyoung Hwa Lee
Pennsylvania State University

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Critical Reflection in Workplace: Using Cultural-Historical Activity Theory (CHAT) to Theorize Factory Workers' Continuous Learning

Kyoung Hwa Lee

Ph.D. candidate in Adult Education, Penn State University

Abstract This study investigated workers' critical reflection on the shop floor through analyzing *The Toyota Way* (Liker, 2004) from the perspective of adult education using Cultural Historical Activity Theory (CHAT) as a theoretical framework.

Introduction

This study aimed to suggest the importance and possibility of workers' critical reflection on the shop floor through analyzing *The Toyota Way* (Liker, 2004) from the perspective of adult education. This book examines successful management methods that emphasize long-term support for workers' learning. The management philosophy resulted in making Toyota one of the most successful corporations in the world. The key idea of this study was to view critical reflection as an educational practice incorporated in the 14 management principles of *The Toyota Way*, although the principles focused not on education but management. Moreover, it is an educational method that can be understood analyzing using Cultural Historical Activity Theory (CHAT) as a theoretical framework.

Critical Reflection

The idea of critical reflection in adult education was largely initiated by Mezirow (1990), Welton (1995), Brookfield (1990) all prominent theorists in the field. Mezirow suggested critical reflection could be seen as an adult learning theory that explains transformation in peoples everyday life, largely based on the critical theory of Habermas (Brookfield, 2005). According to Habermas, critical theory is connected to "the human striving for emancipation with a version of ideology critique that is forced specially on patterns and structures of communication"(cited in Brookfield, 2005, p.1133). That is, critical theory aims to critically understand and challenge to continuous reproduction of social or political domination which has been formed in this society.

Through the emancipatory view, Mezirow argued that critical reflection "involves a critique of the presuppositions on which our beliefs have been built"(Mezirow, 1990, p.1). Namely, critical reflection is to occur through escaping from dominant perspectives – assumptions that are taken-for-granted and then to create new assumptions that are posed against old ones. The concept of critical reflection corresponds to adult educators' ultimate purpose; at least as that purposes are articulated by Mezirow and his followers. Critical reflection is a practice by which adults critically examine their own assumptions, thus reinterpreting their own political, social, and cultural life. In fact, numerous adult educators and theorists have emphasized that critical reflection inspires human beings to form their political, social, and cultural life, as 'a critical learning theory'. They have highlighted the importance of adult educators' role in exhorting people to critically examine the contemporary societal climate (Welton, 1995).

However few academic adult educators and theorists have focused on how adult learners' critical reflection is executed or what outcome is implemented through critical reflection. The difficulties of interpreting philosophy undergirding critical theory have limited its usefulness. However, in order to be useful, adult educators need to examine how to apply critical reflection to

the practice of adult education. Thus, this study focused on the critical reflection as an educational ‘method’, i.e. ‘how is it possible to implement critical reflection’ and then approached this question within the area of workplace learning. *The Toyota Way* is an excellent example for analyzing critical reflection because Toyota is a corporation that has applied workers’ personal learning, as well as learning in groups, to the shop floor for a long time. In this study, critical reflection was analyzed using Toyota’s management strategies that have encouraged workers learning on the shop floor.

The Toyota Way

The Toyota Way is a book that consists of 14 principles created by Liker with materials and data embedded in the management philosophy of Toyota Corporation. In the 1930s, Toyota Motor Corporation started by making simple trucks. In the early years, Toyota managements needed to improve their manufacturing management and to move beyond their primary product line.

However, after World WarII and into the 1950s the social and economic climate was very unfavorable to them. Nevertheless, Toyota management visited U.S. plants, including Ford Motor Corporation, with the plan to enter the U.S. market. In the plants, they quickly realized that there were no fundamental changes from the process of mass production since the 1930s. Especially, in Ford plants they saw lots of equipment making large amounts of products that were then stored as inventory, resulting in large amounts of material and product sitting in inventory (Liker, 2004, p.21). Toyota management recognized the ineffectiveness of Ford’s mass production system and began to realize the importance of ‘continuous flow’. Thus, they could establish the foundational philosophy of management that: “flexibility required marshaling the ingenuity of the workers to continually improve processes”(p.22). According to Liker, the success of Toyota stems from “a deeper business philosophy based on its understanding of people and human motivation” and more concretely based on “its ability to cultivate leadership, teams, and culture, to devise strategy, to build supplier relationships, and to maintain a learning organization”(p.6).

Liker suggested four high level categories – Philosophy, Process, People/Partners, and Problem solving – to understand the 14 principles (p.6). These elements were merged into ‘Lean Production’, which is the representative product system in Toyota. Lean Production is “shortening lead time by eliminating waste in each step of a process leads to best quality and lowest cost, while improving safety and morale”(p.25). Lean Production has been the dominant manufacturing trend, along with Six Sigma, for the last 10 years and has become the object of benchmarking from other companies. However, Toyota management has emphasized not only such techniques under Toyota Product System but also “a company’s management commitment to continuously invest in its people and promote a culture of continuous improvement”(p.10). This is connected to Hansei-Kaizen (reflection-improvement), which is their central management element. Hansei is really deeper than reflection and is about aware of one’s own weaknesses and feeling deeply sorry, as a traditional Japanese cultural view (p.258). Kaizen is continuous improvement and is the process of making incremental improvements (p.24).

The two representative elements – Lean Production and Hansei-Kaizen – are linked directly to two principles among the 14 principles: Principle 2: ‘Create continuous process flow to bring problems to the surface’, and Principle 14: ‘Become a Learning organization through relentless reflection (Hansei) and continuous improvement (Kaizen)’. And also these principles could be regarded as principles that emphasized the importance of workers learning on the shop floor. Thus, this study dealt with chiefly these two principles to analyze workers learning as critical reflection with CHAT.

Analyzing Critical Reflection in The Toyota Way with CHAT

Cultural Historical Activity Theory was developed through three generations: the first generation was initiated by Vygotsky. He developed the idea of ‘mediation’ as a cultural tool into human actions (Engeström, 2001, p.133) in order to explain that the individual could not exist without society and vice versa. Through evolving this idea, he overcame the dichotomy between individual and societal structures and thus, in great detail he could suggest the idea that object lies in equal position to subject (p.133). The second generation was developed by Leont’ev. He explicated “the concept of activity by explaining the role of mediating cultural tools within broader social dimensions of practice” (Park, 2008, p.31). A third generation approach, largely conceived by Engeström developed the notion of expansive learning and then showed “how practice undergoes the type of change that defines the learning process” (p.32). This study used the third generation to analyze workers’ learning as critical reflection in *The Toyota Way*.

According to Engeström, there are at least two activity systems (Engeström, 2001, p.136) and “the subject forms the object through the mediation of the instruments against the backdrop of the rules, division of labor, and the community and, in turn, the object forms the subject”(Lord & Schied, 2007, p.6). Between elements of the activity systems, there are contradictions that drive the learning outcome. When focusing on workers learning in *The Toyota Way*, there are two activity systems based on principle 2 and principle 14: (a) ‘creating continuous process flow’, and (b) ‘becoming a learning organization’. In the two activity systems, the subject is the same, factory workers, and although each activity system has its own motive and object, there are several interactions and contradictions between various elements of both of them.

To begin with, the object of activity (a) is ‘eliminating waste’. The purpose of principle 2 is to create ‘one-piece flow’ in order to decrease waste on the shop floor. In the Lean Production, the core task of workers is to produce the best quality, lowest cost, and shortest delivery time through creating continuous flow (Liker, 2004, p.88). The factory workers as the subject in this activity system could have eliminating waste as the object through other elements (see below).

First, they have several rules: (1) they have to lower the ‘level’ of inventory problems, (2) they have to identify inefficiencies that demand immediate solution, and (3) they have to create ‘one-piece flow’ by constantly cutting wasted effort and time that is not adding value (pp.88-9). Second, these rules are applied to other staffs in corporation i.e. the division of labor, which includes horizontal, as well as vertical power relationship (Lord & Schied, 2007, p.15): the division of labor in this activity system includes engineers. They have to measure the flow of actual product for creating value-added productivity on the shop floor as well as office tasks. The suppliers are another factor in the division of labor and are a part of the product flow. The one-piece flow is started by obtaining raw materials and then they flow immediately to supplier plants and fill the order with components. For continuing the flow, the suppliers could never be excluded from the activity system.

Third, the community in this activity system is autoworkers from other plants and corporations. Each corporation has its own philosophy and culture for successful management. Fourth, the mediating instruments for eliminating waste in this system are ‘Lean Production’, ‘one-piece flow’, and ‘Takt time’ (which is used to “set the pace of production and alert workers whenever they are getting ahead or behind”(Liker, 2004, p.94)). These are special instruments to support Toyota management philosophy. Factory workers, engineers, and managements are all trying to use these instruments in order to achieve the objective of ‘eliminating waste’.

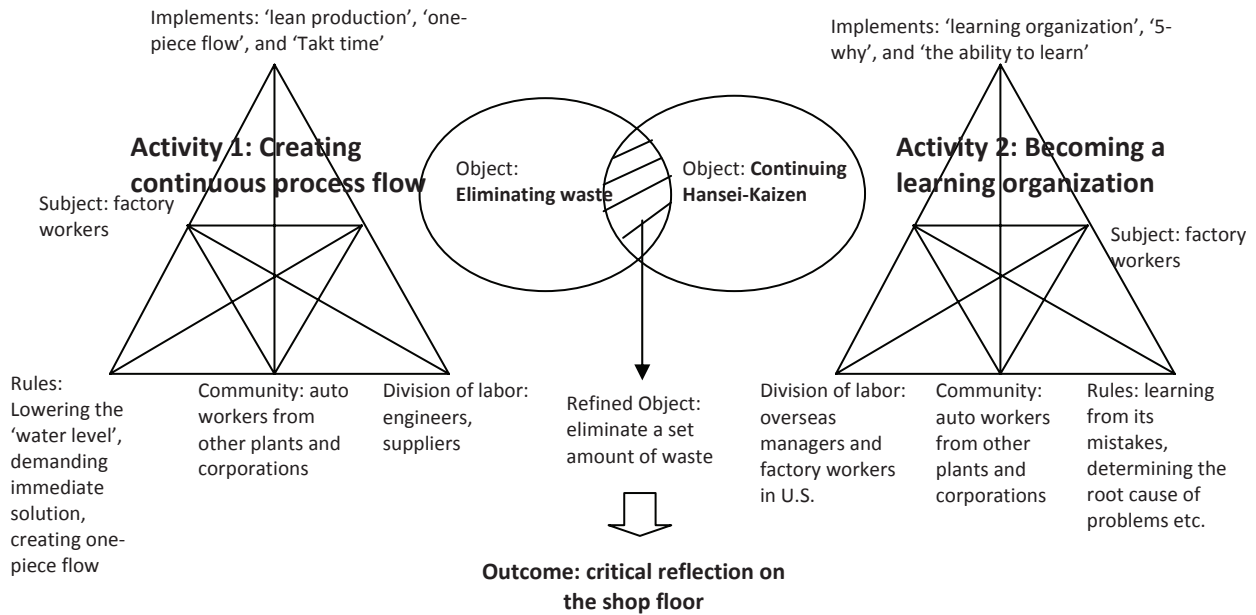
Next, the object of activity (b) is ‘doing continuously Hansei-Kaizen’. The purpose of principle 14 is to lead continuously workers’ Hansei-Kaizen (reflection-improvement). The

Hansei view of feeling worried and admitting shame is a traditional Japanese view. It is really much deeper than reflection and really being honest about one's own weakness (p.258); "without Hansei it is impossible to have Kaizen"(p.257). The Kaizen as Japanese term for continuous improvement is the process of making incremental improvements, no matter how small (p.24). It is "an attitude of self-reflection and even self-criticism, a burning desire to improve"(p.252). The factory workers as the subject in this activity system could be transformed by Hansei-Kaizen as the object through other elements in this activity system (see below).

First, in this system they have rules – learning from mistakes, determining the root cause of problems, providing effective countermeasures, empowering people to implement those measures, and having a process for transforming the new knowledge to the right people etc (p.251). Second, they are sharing these rules with others. The division of labor includes overseas managers and factory workers in U.S. who are not familiar with Hansei-Kaizen as a part of Japanese culture. Third, community of this activity system is autoworkers from other plants and corporations because each corporation has its own philosophy and culture for successful management. Fourth, the mediating instruments for doing Hansei-Kaizen are 'learning organization' which does not only adopt and develop new business or technical skills but also learns the new skills and knowledge as second level of learning, and '5-why' a process by which one determines the root cause, and 'the ability to learn' including adaption, innovation, and flexibility (pp.250-3). There are also different instruments for implementing Hansei-Kaizen, so workers in U.S. plants as well as in Japan learn to acquire Hansi-Kaizen.

However, there might be workers' contradictions in the process of implementing the two principles (the two objects) because workers are required to engage in thinking and problem solving on the shop floor and to employ Hansei-Kaizen, which is embedded in Japanese culture. In the activity system (a), it is not easy for workers to adapt to continuous system on the shop floor because there are few connections between their tasks and the system employed in the Ford system. The workers had to move away from the Ford system and employ Toyota's Thinking Production System. In addition, in the activity system (b), there were some contradictions between U.S. workers and Hansei-Kaizen. It is not easy to allow for workers to do continuously self-reflection (Hansei-Kaizen). In activity system, such contradictions arise when different interpretations, understandings, or meaning exist in one of context (Lord & Schied, 2007, p.7).

However, according to Engeström "the role of contradictions within an activity system is what drives the learning outcomes" (cited in Lord & Schied, 2007, p.7) with different histories and positions that are implied in several elements-division of labor, rules, etc (Engeström, 2001, p.136). Thus, this study could discover the learning outcome from various contradictions in two different activity systems with different histories and positions are constructed by the backdrop of the rules, divisions of labor, implements, and the community. The learning outcome stemmed from two different activity systems in this study was the 'critical reflection on the shop floor'.



Conclusion

This paper suggests that CHAT can provide a means to analyze workers' critical reflection at work. The approach has the potential to show how critical reflection occurs in everyday environment. While this is a hypothetical case, it does suggest the possibilities for using CHAT to understand how critical reflection occurs on the shop floor.

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