How could you implement 'awakened need of change' for the applying ergonomics to work system in industrially developing countries?

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Abstract: This paper describes the different getting learning understanding of systemic organization knowledge conversation of a Pre-Macro-ergonomics intervention process for 'Awakened need of change', based on implementing PDSA Cycles of learning and its 'Meta-reflection' as an interactive research work.
The practical applications and implications of the process are drawn from the finding of the framing positive question toward knowing, relating, action, and organizing; 1) what is the successful of this kind of Pre-Macro-ergonomics Intervention right now? (Appreciative), 2) what do we need to change to make a better future? (Imagine), 3) who takes action and with what consequences? (Act)

Keywords: Pre-Macro-ergonomics Intervention Work, Awakened need of change, Meta-reflection, Industrially Developing Countries

1. Introduction

It was emphasized by Zeleny (2010) that pragmatic philosophical roots firmly established that knowledge is: 1) action oriented (i.e., all knowledge is consensual.), 2) socially established (i.e., knowledge is consensually social and without a social context there can be no knowledge.), and 3) relatively interpreted (i.e., although the "given" of sensory data and experience remains absolute, its classification and relation to other things is relative to a given context of experience and intended action.). However, it was Albert Einstein who cautioned our world that "Information is not knowledge". Einstein also asserted that "Knowledge is experience. Everything else is information" (Zeleny, 2010) .He noted that, "Knowledge is purposeful coordination of action. Achieving intended purpose is the sole proof or demonstration of knowledge. Its quality can be judged from the quality of the outcome (product), or even from the quality of the coordination (process)", (Zeleny, 2010, p.27). This concept of knowledge is significant when it is distinguished with information as well as data when we want a challenging ergonomics intervention work in industries of Industrially Developing Countries (IDCs) with the reflective practices (Helali, 2008; 2012).

Furthermore, Sanchez (1996) gives us some direction when he proposes that three levels of understanding describe three levels of different kinds of knowledge within an organization; *know-how* can be characterized as "practical understanding" or learning by doing, *know-why* as "theoretical understanding" or learning by studying, and *know-what* as "strategic understanding" or learning by using.

This introductory concept of "Knowledge" or "organization knowledge" helps us that "How we think affects what we do" for empowerment as a way of thinking for a kind of pre-macro-ergonomics intervention work in IDCs' industries.

Therefore, recently, the first author's study (2008) introduces developing an ergonomics intervention technique model to support the participatory ergonomics process for improving work system in organizations in an industrially developing country and his inquiry was "What can we do together to make a positive different here?" Finding one of the key factors for the main ergonomics intervention technique activities was "Awakened Need of Change". For this reason, Deming (1993) describes a system as a network of interdependent components that work together to try to accomplish the aim of the system. The system begins with an awakening ("an awakening to the crisis" as Deming described it). The aim of the awakening could be stressing the importance of the need to change. Without an awakening, the person can, at best, learn many important lessons; based on, Helali's study (2008) emphasized that different people were participated (293 participants) in the different Ergonomics Training Workshops (24 ETWs) from 1996 to 2002 from various industries in different places in Iranian industries, for example the 7 ETWs were conducted at group level for 32 engineers, occupational health specialists and safety engineers from Iran Khodro (Car) Company, from 2001 to 2002. This resulted in people learning many lessons as ergonomics awareness (as understanding without knowing) approach, but, deeply motivated intention occurs after the awakening (as understanding with knowing) approach about using the 'Future Workshop' (Jungk and Mullert,1987) at the organizational level (see also, different evidence based on the case studies and action research-type intervention in the Helali's study (2008).

2. Method of Systemic Intervention as the PDSA Cycles of Learning

It should be mentioned that action is the application of new learning (theory of Macro-ergonomics knowledge). For this reason, Macro-ergonomics is a socio-technical systems approach to work system design (Hendrick, 2002). However, the notion of open system theory has played an important role in the study of organizations; for example, the socio-technical theory is heavily influenced by the systems theory. It is usually also referred to as Macro-ergonomics (Hendrick and Kleiner, 2002). Action, however, must be managed by different learning levels. This can be accomplished through a Plan-Do-Study-Act (PDSA) cycle (Deming 1993); i.e., the PDSA cycle describes a method of continuous improvement. First, the problem is identified and a subsequent solution is found (Plan). Then the solution is applied with the hope that it eliminates the problem (Do). After this, the result of the activities is investigated (Study). The last phase is to establish the result in the organization to see if the result is satisfactory, and give feedback to other interested parties (Act). This cycle is a flow diagram for learning, as well as for improvement of a product or of a process. Additionally, learning must be continual. The only way to continue the transformation is to obtain feedback and to reflect (Oden, 1999), and then to repeat the loop to different purpose learnings (Figure 1) with a "Meta-Reflection" (i.e., 'this is thinking again about our reflection-on-practice. It is stepping back and checking out what we thought and said earlier. It is further removed from the action than "reflection-on-practice" (Ghaye and Lillyman, 2000, p. 48).

Therefore, based on the design of this kind of work by the first author, a study has been implemented in one of Iranian industries in 2010 by the second author as a successful interactive research work (Abdollahpour, 2011).

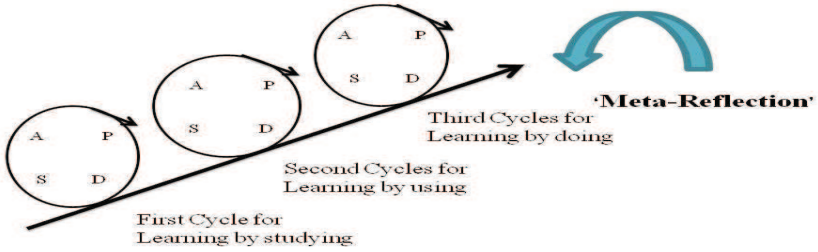

Figure 1: PDSA Cycles of Learning, (adapted from Helali, 2008, p. 27) and a 'Meta-reflection'

3. Getting a phase method Pre-Macroergonomics for 'Awakened Need of Change'

This should be in an 'appreciative way', i.e., research with company and the participation of people, not only on people or techniques and tools. For this reason, this could be 'empowerment through reflection', i.e., "empowerment as a process", "Empowerment as a discourse", "empowerment as a way of thinking", and also "collective empowerment" (See, Ghaye and Lillyman, 2012) for the awakened need of change (Figure 2). Thus, they can be characterized based on the different getting learning based on the concepts of "organization knowledge". Example:

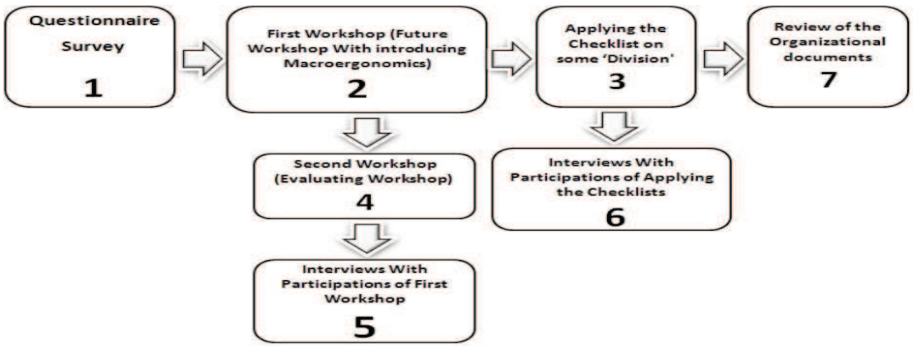

Figure2: A Phase Method of Pre-Macro-ergonomics Intervention Process for Awakened Need of Change Improving 'Working Condition System' (Health, Safety, and Ergonomics)

A Case study: This phase method of Figure 2 was implemented by the authors at a power plant manufacturing when the study aim was to create macroergonomics awareness in the company in order to emphasize the importance of improving "Working conditions Systems" (Health, Safety, and Ergonomics) with a macroergonomics approach. The research question of the study was to the first author that "How should a pre-macro-ergonomics intervention work process with Macro-ergonomics approach be delivered to the Company (also to the second author) that they can easily learn "why and how" to apply the ergonomic to work system at the organizational level and further of here successfully?

The data of the case study came of the several steps as Figure 2 with the different samples of participants. A detail of this unique exercise became documented as a case study (a manuscript draft paper, Abdollapour and Helali, 2014). Further of here, for the expanding and internalization of this kind of research work culture is focused on Iranian industries now when the second author seen and understood benefit of this kind of the research work as a continuous interaction research work.

Thus, the pre-systemic process can be characterized based on the different getting

learning understanding when there are the different concepts of "learning" based on the research model Figure 1 on "organization knowledge" and its Meta-Reflection as follows:

3.1 Getting Learning by Studying ('Know-why')

The first cycle is 'know-why' as theoretical understanding or learning by studying for the awakened need of change. For this reason, we need three different questionnaires survey to managers, HSE (Health, Safety, and Environment) department personnel and operational staff that it will be used to gather basic information about the improving working condition system status of each company from three views of organizational levels. This could show us one kind of empowerment as a way of thinking on each company when we use example Chavalitsakulchai's questionnaire that it was designed in 1991 and we can apply and analyze statistically it to propose where company is standing for improving working condition system.

3.2 Getting Learning by Using ('Know-what')

The second cycle is 'know-what' as strategic understanding or learning by using for the awakened need of change. For this reason, there are three kinds of the strategic understanding for building ergonomics intervention techniques that were noted by the Helali's study in 2012. However, there are two different research questions here 1) How can vision and ideas be developed for applying ergonomics to work system in each company with a middle-out macro-ergonomics intervention, and 2) What are new checkpoints of work organizations. This could show us one kind of empowerment as a process. For this reason, we can use Future Workshop (FW) based on the Jungk and Mullert (1987) model. Before that, it has been used and tested as an ergonomics tool in the IDC since 1996 by Helali's study (2008). Here the focus is on the second learning cycles (Figure 1) that all middle-mangers of each company must be participated in FW. Because of turnover the change of top managers is high in the IDC's industries. However, the middle-managers have more support role implementing each positive plan and planning. For this reason, Hendrick and Kleiner (2002) noted that Middle-out, an analysis of subsystems and work process can be assessed both up and down the hierarchy from intermediate levels, and changes are made to ensure a harmonized work system design.

3.3 Getting Learning by Doing ('Know-how')

The third cycle is 'know-how' as practical understanding or learning by doing, for the awakened need of change. For this reason, there are different doing of ergonomics intervention techniques in Helali's (2008) study that he has shown how step by step an ergonomics intervention technique and its developing could be formed and studied in an IDC. In this process, one of the main contributions of the participatory ergonomics process was, using the ergonomic checkpoints (ILO, 1996/ new version 2010). For this reason, the using ILO's book which is based on an action learning or participant engagement by doing helps participants to see integrating Health, Safety, and Ergonomics at the workplace as well as one kind of job enrichment based on ergonomics principles and finding new checkpoints (Helali, 2008; 2009). However, in the pre-macro-ergonomics intervention, the action-checklist of the ergonomic checkpoints helps to organizations that the participants discuss and use it in some divisions till they see and take a whole picture of Health, Safety, and Ergonomics problems in the workplace (For example, see also Helali, 2009) as one kind of collective empowerment.

4. Discussion and Conclusion

The practical applications and implications of the Pre-Macro-ergonomics intervention based on Figure 1 and 2 are drawn from the finding of the framing positive question. It is mentioned that the appreciative reflection is a new form of reflection and it has shown four basic types of appreciative intent toward, knowing, relating, action, and organizing (Ghaye, 2008; Helali, 2012). This is one kind of appreciative work system or an appreciative pre-systemic macro-ergonomics work when the purpose could be empowerment through reflection on the awakened need of change for applying ergonomics to work system and, its Meta-Reflection as "maximizing strategy" (recognizing when an amplification of the 'success' is necessary; including, appreciative inquiry and root cause of success). This can be discussed and concluded as follows:

10.1Knowing: What is the successful of this kind of Pre-Macro-ergonomics Intervention right now? (Appreciative)

Some inquiries and concepts in an action pathway ergonomics intervention journey in the Helali' study (2008; 2012) and this paper for knowing are significant now: "What will the awakened need of change be we want more of here?" (i.e., Appreciative innovating) and "How can we amplify this? As well as how does the future unfold an appreciation of the positive present?" (i.e., reflection learning and action), or "How will we go further here?" (i.e., leading through appreciative) For this reason, this noted (Helali, 2012) that appreciative inquiry and appreciative intelligence are considering something that is looking towards a better future, not necessarily what is wrong.

10.2Relating: What do we need to change to make a better future? (Imagine)

Based on the Work System Sub-Systems (Kleiner, 2008) study, Figure 3 can be a conceptual model of "Awakened Need of Change" for an Appreciative Work System. This is also indicated as the key characteristic of the socio-technical system components identified by Kleiner (2008).

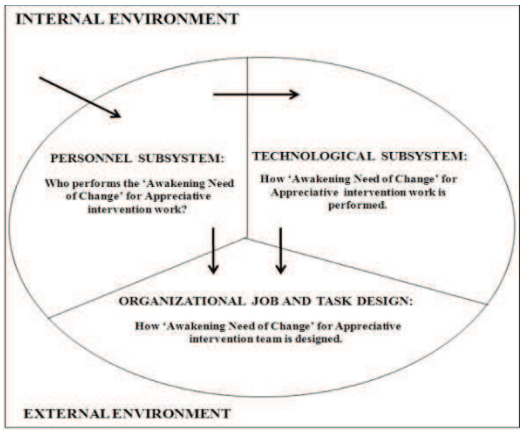

Figure3: Basic conceptual model of an 'Awakening Need of Change' for the Appreciative Work System, (adapted resource: Kleiner, 2008, p.70 and Helali, 2012, p. 2734)

10.3Action: How do we do this? (Design)

This is toward a kind of ergonomics intervention-type action research or reflection-learning and action (Helali, 2012; 2008; Ghaye, 2008), for this reason, totally, it is mentioned that Participatory and Appreciative Action Research (PAAR) are the third kind of action research about: 1) using the power of the positive question, 2) amplifying the

core positive question not 'problem solving'; 3) leading by valuing, not evaluating; 4) 'Appreciative Intelligence' (multiple intelligence); i.e., the ability to see the mighty oak in the acorn, and look at all successful things; 5) 're-framing' (i.e., how one can amplify those things that will help a better future emerging from positive present) by choice not one and best way for doing, or seeing how the future unfolds the present (Ghaye, 2008). However, this can be with focus on the following sub-research questions that it can be formulated as "What are your workplace stories", "journeys", "cultures" and "ballets (i.e. dances)" about applying ergonomics to work system and how you want to amplify it?

10.4Organizing: Who takes action and with what consequences? (Act)

In the appreciative way, the role of people/participants are to engage in the appreciate path to ask and reply to the reflective questions and also what can they learn from each other and services end-users' experience? This requires the applying ergonomics to work systems in IDCs in an appreciative way completely (Helali, 2012).

This kind of interactive research work can be useful as a proposal to co-workers for expanding "Practice-led and also Practice Based Research" in IDCs' universities.

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