

Participatory methods effective for ergonomic workplace improvement

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Abstract

Recent experiences in using participatory methods for ergonomic workplace improvement are reviewed to know how these methods can be effective in different settings. The review covered participatory programmes for managers and workers in small enterprises, home workers, construction workers and farmers in Asian countries. To meet diversifying ergonomic needs, participatory steps reviewed are found to usually follow a good-practice approach easily adjustable according to local needs. These steps are found to usually focus on low-cost improvements. They can thus lead to concrete results particularly by addressing multiple technical areas together. Typical areas include materials handling, workstation design, physical environment and work organization. Further, the review confirms that the participatory methods are always modified according to each local situation. This is done by developing a group-work toolkit comprising action checklists and illustrated manuals and by building a support network of trained trainers. It is suggested that participatory methods taking a good-practice approach by multi-area low-cost improvements through the group use of locally adjusted toolkits are effective for improving small-scale workplaces including those in developing countries.

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1. Introduction

Participatory methods are increasingly utilized in improving ergonomic aspects of work and workplaces. The merits of these methods are widely recognized as a means of promoting initiative of local people and achieving workable solutions (Vink et al., 1995, 1998; Zalk, 2001; Khai et al., 2005). A notable merit is that they contribute to improving various forms of workplaces in their diverse conditions (Noro and Imada, 1991; Nagamachi, 1995; Kawakami and Kogi, 2001; De Jong and Vink, 2002; Koningsveld et al., 2005).

It is of particular interest that participatory methods are extensively used in workplace improvement including risk management processes in both industrially developed and developing countries (Shahnavaz, 2000; Kogi, 1998, 2002; Hignett et al., 2005). Various modified methods are used for facilitating work redesign in these different situations. These methods place a particular emphasis on creating initiative of local people through participatory solving

of workplace problems (Eklund, 2000; Hägg, 2003; Khai et al., 2005). It is important to know how these methods can be effectively applied for improving working conditions in small enterprises despite many constraints (Gustavsen and Oscarsson, 1991; Engeström, 2000; Kawakami and Kogi, 2001).

The advantages of participatory methods have been discussed particularly in relation to participatory ergonomics. Wilson and Haines (1997) define participatory ergonomics as the involvement of people in planning and controlling a significant amount of their own work activities, with sufficient knowledge and power to influence both processes and outcomes in order to achieve desirable goals. This definition is equally relevant to the spread use of participatory methods in workplace improvement. Various reports on the safety and health risk reduction processes at different workplaces confirm this relevance (Khai et al., 2005).

Experiences in our inter-country networking of participatory approaches in workplace improvement in Asian countries likewise indicate the importance of an adequate set of action-oriented participatory methods. Many

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concrete workplace improvements are reported in small enterprises, construction sites, agricultural farms and working homes (Kawakami and Kogi, 2005).

These recent experiences in our networking activities are examined to know types of participatory methods effective in different settings as discussed by Noro and Imada (1991) and Haines et al. (2002). The answers to the following questions are sought:

- (1) What kind of approach is taken commonly by the participatory methods to meet ergonomic needs in diversified work settings?
- (2) To what extent do types of workplace improvements achieved by these methods vary from each other in different work settings?
- (3) Through which support measures can we better facilitate participatory action by local people?

Attention is drawn to the locally adjusted nature of improvement steps taken. Attention is also drawn to the roles of action-oriented tools and key persons in meeting local needs. Practical hints for spreading workplace improvement programmes in small enterprises and agriculture particularly in developing countries may be presented.

2. Materials

Recent experiences in participatory methods effective for ergonomic workplace improvement in different work settings are reviewed. The experiences gained in our Asian inter-country network (<http://www.win-asia.org>) are examined to know the types of support useful for spreading practical improvements in small-scale workplaces in diversified situations.

Most experiences reviewed cover programmes for relatively underserved workplaces including small- and medium-sized enterprises, construction sites, home workplaces and agricultural farms. Participatory approaches in workplace improvement have evolved since the mid-1980s and developed in the form of action-oriented training of local people who plan and implement immediate improvements in their own workplaces.

The reviewed programmes include the following:

- (a) action training courses in the Philippines, Thailand and Vietnam applying the work improvement in small enterprises (WISE) methodology developed by the ILO (Thurman et al., 1988; Batino, 1997; International Labour Office (ILO), 2004);
- (b) similar action-oriented training for risk reduction in small- and medium-sized enterprises and construction sites in Japan, Laos, Malaysia, Mongolia, the Philippines and Vietnam (Hiba, 1998; Ito et al., 2001);
- (c) training workshops for farmers applying work improvement in neighbourhood development (WIND)

methods in Thailand, the Philippines and Vietnam (Khai et al., 2005);

- (d) participatory action training for home workers using work improvement for home workers (WISH) methods similar to WISE methods (Kawakami and Kogi, 2005); and
- (e) action training of trade union members through national trade union centres by applying participation-oriented safety improvement by trade union initiative (POSITIVE) methods developed for technical cooperation activities by the Japan International Labour Foundation and conducted in Bangladesh, China, Mongolia, Nepal, Pakistan, the Philippines, Thailand and Vietnam (Kawakami et al., 2004).

Since these programmes are organized as serial short-term action training courses or workshops, the review include the training packages developed, networks of trainers as well as related follow-up activities. First, the approach commonly taken by these programmes is compared. Then, types of improvements achieved by these programmes are discussed. Finally, the networking arrangements for these programmes are examined.

3. Results and discussion

3.1. The approach commonly taken in responding to diversifying needs

The first question concerns the approach commonly taken by participatory methods applied in different settings. It is of interest that the participatory methods used in the reviewed programmes have gradually developed since the 1980s learning from the experiences gained in applying the WISE methodology. We may confirm that the WISE programmes have spread to many countries in the course of the 1990s with significant influences on the other action training programmes. This is obviously because the basic principles of the methodology building on local good practices have been widely accepted by the other programmes.

The different target groups, the main steps used and special features of these programmes reviewed are shown in Table 1. All the programmes apply short-term training focusing on good examples locally achieved and technical sessions for learning basic principles of ergonomics and occupational hygiene on the basis of good practices demonstrated by these examples. As a rule, extensive follow-up activities led by trainers are undertaken in all the programmes.

It should be noted that participatory methods are undertaken for some different reasons. For example, WISE methods emphasize the advantages of small enterprises in taking immediate measures through workplace-level agreements, and thus rely on group work of managers in applying basic ergonomics principles. Similar methods are used in various industrial workplaces and construction sites

Table 1
The target groups and the main participatory steps used in the programmes reviewed

Target groups	Main participatory steps	Special features
Small enterprises (WISE)	4–10 day course consisting of a checklist exercise, sessions on practicable improvements and group work on implementation	Emphasis on advantages of small enterprises; focus on local good examples and basic ergonomics
Small enterprises and construction sites (for risk reduction)	2–5 day workshop with a checklist exercise, sessions on practical risk-reducing measures and plans (sessions may be held at intervals)	Involving managers and workers; training materials adjusted to local risks; group work on typical cases
Farmers (WIND)	1–2 day workshop including household visits and serial group discussions on practicable improvements and action proposals	Emphasis on improving both working and living conditions; learning good examples done at low cost
Home workers (WISH)	Usually 1-day workshop including home visits and group discussions on good examples and action plans	Collaboration of contractors and home workers; focus on low-cost improvements
Trade unions (POSITIVE)	3–4 day course consisting of a factory visit, sessions on good examples and basic principles, group work on immediate actions	Highlighting roles of unions; learning local examples; group work on action plans

by means of training materials adapted to their local needs and necessary risk-reducing measures. It is striking that the focus on local good practices plays an important role in learning readily applicable improvements. This wide applicability of participatory methods confirms the previous reports on their use for reducing musculoskeletal risks at work (Koda et al., 1997; Rosenberg et al., 2001; Kogi et al., 2003) and for improving flexible shift systems (Kogi and DiMartino, 1995; Jeppesen, 2003). Among the reviewed programmes, participatory methods are often initiated to improve the workplace design or work environment in dealing with problems related to work stress or low productivity.

An additional prominent trend is to use participatory methods for improving the workplace conditions for safety and health management systems as reported previously (Kogi, 2002). This is also seen among some of the reviewed programmes in Japan and Vietnam. In these programmes, 1–2 day workshops applying the WISE methodology are used to implement immediate improvements as part of risk-reducing procedures.

Extensive follow-up activities have been undertaken particularly in the case of WISE and WIND programmes. These activities include networking of trained trainers and case studies of improvement processes by local people. Typical examples of the training and follow-up activities are given below.

Example 1: the Philippine WISE project: The project was undertaken during 1994–97 and onward by the labour inspectorates with the support of the ILO and employers' and workers' organizations. During the 1994–97 period, 36 intensive courses were held in four regions of the Philippines involving 900 small enterprise managers. Each course consisted of a checklist exercise at a factory, technical sessions in a few evenings on basic ergonomics principles presented by utilizing local good examples, voluntary group work in small groups for several days and final presentations on implemented improvements.

Awareness courses for managers and workers were also held. These courses were held by WISE trainers selected from inspectors and trained by train-trainers workshops. Since 1998, additional 100 intensive courses were held for 2475 managers. Until 2005, over 9000 improvements were reported from the trained managers mainly in materials handling, workstation design and physical environment. Case studies of individual enterprises showed that usually a few to several low-cost improvements were done per enterprise, and that managers agreed that the methods used were effective for improving both productivity and working conditions.

Example 2: WIND activities in Cantho Province, Vietnam: Serial 1-day workshops were held in many districts since the late 1990s by the initiative of the Health Department of the province. Health personnel and the staff of the Centre for Occupational Health and Environment acted as core trainers who trained farmer facilitators through these workshops. Each workshop comprised household visits combined with the use of an action checklist, group discussions on local examples of low-cost improvements and on individual plans and final presentations of the plans. The trained farmers acted as facilitators for organizing group work of neighbour farmers for planning and implementing similar improvements. The facilitators reported improvements done using report forms. During the 2000–05, over 200,000 improvements were recorded in living conditions, working conditions and welfare. Case studies and follow-up visits showed that usually several improvements were done in each participating household, and that these improvements were achieved at low cost.

Example 3: POSITIVE activities in Nepal: Four-day courses were held at national and regional levels by the Nepal Trade Union Congress since 2000. Core trainers trained in these courses conducted industrial and factory-level seminars of 2–4 days. Each seminar consisted of a checklist exercise in a factory visit, sessions on local good

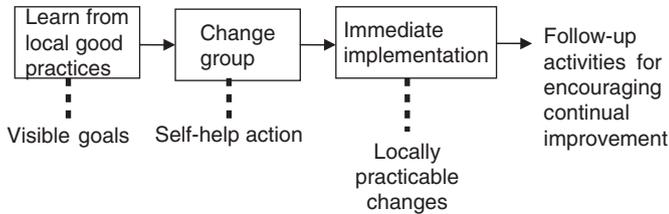


Fig. 1. Core participatory steps commonly used in the reviewed programmes for workplace improvement.

examples and basic improvement principles, group work on roles of trade unions and on immediate action plans. The seminars covered materials handling, workstations, machine safety, physical environment and welfare facilities. The participants of the seminars later presented reports of improvements done at their workplaces. During the 2000–04 period, 75 4-day seminars and 66 1-day seminars were held by local trainers trained in the 4-day courses. The improvements reported from the participants were examined at annual conferences of core and advanced trainers held since 2001. Case studies were undertaken to assess the skills of the trainers corresponding to the status as core trainers, advanced trainers and local trainers. These studies showed the importance of supporting the trainers at different levels by a full set of training materials.

It is confirmed that the participatory steps taken by WISE, WIND and other reviewed programmes undertake serial group work by forming change groups of local people. Apparently, the tasks of the change groups are to learn from local good practices and plan and implement similarly practicable changes. The fundamental steps may thus be summarized as shown in Fig. 1.

In line with the core steps, the WISE training programmes in different countries commonly consist of checklist exercises, group discussion of local good examples and group work on locally practicable changes. It should be noted that the participatory methods are used in a stepwise manner corresponding adequately to each of these steps. Technical sessions are usually organized to include the presentation of basic improvement principles by a trainer utilizing corresponding local good examples as well as group discussions on immediate improvements. The repetition of group discussion sessions seems useful for helping the participants learn local good practices and propose practicable improvements.

We may confirm that the common strategy of the participatory methods in effectively meeting diversifying needs is to build on local good practices. The strategy in this way can provide practical information about good examples and help people organize effective planning and implementation of necessary improvements.

3.2. Merits of focusing on locally practicable improvements in multiple areas

The second question is about the variations in the types of improvements achieved through the participatory

methods reviewed. In answering this question, it is useful to know the focus on low-cost improvements adopted by all the reviewed programmes. Experiences in these programmes show that this focus is more effective when the methods incorporate low-cost improvements achievable in multiple technical areas. In general, technical areas addressed include materials storage and handling, workstation design, physical environment, welfare facilities and work organization. In the case of the Philippine WISE project, about 2000 improvements planned in the initial 2-year period covered all these technical areas, and 83% were implemented during a short course period of about 10 days. The implementation rates were high in all the technical areas. Similarly, these multiple technical areas are simultaneously covered by the numerous low-cost improvements implemented in other programmes. In the case of WIND and WISH programmes, living conditions related to these technical areas are also covered.

It appears therefore important to use participatory methods in the manner to help local people address multiple technical areas. The various training tools used in the reviewed methods usually incorporate (a) local examples showing good practices in a wide range of different technical areas, (b) action checklists covering these areas, (c) illustrated guides about improvements in all these areas and (d) trainers' manuals. The relations between the features of participatory methods and corresponding action tools are shown in Table 2.

By dealing with the multiple technical areas, users of the tools are guided to look at locally workable options and undertake priority improvements selected from these several options. The common types of workplace changes listed in Table 3 are generally useful in the participatory programmes.

The effective application of the participatory methods thus depends on their composite structure matching the process of building on local good practices. We can confirm that the action toolkits for facilitating the stepwise use of the methods are best utilized when the incorporated good examples, action checklists and guides refer to low-cost improvements practicable in multiple areas in local conditions. This direct attention to multiple areas may help local people develop and upgrade a set of action-oriented training tools.

3.3. Networking of training local trainers for disseminating participatory methods

The third question concerns the support measures for facilitating local participatory actions. As such support measures, various efforts are being made in the programmes reviewed as reported previously (Kawakami and Kogi, 2001). This is because it is necessary to “tailor” the participatory methods according to particular local needs identified in each work situation. While the general structure of these methods is in conformity with the participatory steps described above, the training schedules

Table 2

Main participatory methods and corresponding action tools for making the planning and implementation of workplace improvement locally adjusted

Primary purposes	Procedures (tools)	References (for use of method)
Learn local practices (know practicable options)	Present good examples (photos or videos)	(Thurman et al., 1988; Kogi, 1995; Batino, 1997; International Labour Office (ILO), 2004)
↓	↓	
Present available options (select immediate solutions)	List many low-cost ideas (action checklists)	(International Labour Organization (ILO), 1996; Kogi, 1998; Kawakami and Kogi, 2001)
↓	↓	
Facilitate group work (use local skills)	Aim at immediate action (improvement guides)	(Noro and Imada, 1991; Zalk, 2001; Khai et al., 2005)
↓	↓	
Facilitate continual action (encourage local initiative)	Support joint follow-up (trainers' manuals)	(Ito et al., 2001; Kogi, 2002; Kawakami and Kogi, 2005)

Table 3

Types of workplace changes frequently implemented through participatory methods and the number of planned and implemented improvements in the Philippine WISE project during 1994–96

Technical areas (basic improvement rules)	Types of changes commonly aimed at	Philippine WISE project	
		Planned	Implemented ^a
Materials handling (fewer handling actions)	Organized storage, mobile devices, efficient lifting	409	364 (89%)
Workstation design (efficient, easier work)	Work height, easy reach, fixtures, coding	167	134 (80%)
Physical environment (safe comfortable space)	Lighting, isolating hazard sources, guards, comfortable climate	1024	838 (82%)
Welfare facilities (restful conditions)	Sanitary facilities, resting corners	239	196 (82%)
Work organization (effective teamwork)	Autonomy, work-rest schedules, job rotation	185	150 (81%)
Other daily life aspects (stable daily life)	Nutrition, childcare, community cooperation	Others 46 Total 2070	43 (93%) 1725 (83%)

^aImprovements implemented within the course period of two weeks and success rates.

and the toolkits are extensively modified reflecting the identified needs.

As shown in Table 4, the participatory methods are often modified in an effort to meet the local needs of people. These modifications are intended to overcome the difficulties in applying the training packages developed for general purposes. They are usually done jointly by the programme organizers, core trainers and local trainers. Short-term programmes and awareness workshops can be organized by relying on training materials indicating local good practices. Photographs showing these practices are extensively used. Industry-specific modules are further developed incorporating industry-based good practices and materials. Action checklists redesigned by mentioning locally prevalent low-cost ideas play a vital role in adapting the methods to each local situation.

The inter-country networking of partner institutions using the reviewed methods has contributed significantly to

the development and dissemination of the participatory training packages. Since the late 1990s, several Asian regional and subregional meetings have been held for exchanging experiences in WISE, WIND and POSITIVE activities. In a number of occasions, core trainers skilled in these methods in Bangladesh, Japan, Pakistan, the Philippines, Thailand and Vietnam attended training activities in other countries. Thus, training toolkits incorporating newly developed training methods in the form of PowerPoint presentation files, local examples, action checklists, illustrated guides and trainers' manuals have been exchanged among these institutions. Examples of these toolkits are displayed in the websites of the Work Improvement Net-Asia (<http://www.win-asia.org>; <http://www.wingtoshc.org>).

Local networks of core and local trainers are also found effective for facilitating training activities in a structured way. Usually, core trainers are trained through the efforts

Table 4
Various efforts to modify the participatory methods so as to meet the local needs of participants

Local needs/difficulties	Modified methods and support	Effects
WISE: In addition to comprehensive methods, shorter course periods are often preferred WISE: Industry-specific examples, checklists and manuals are requested	Shorter courses and 1-day awareness workshops are held depending on local needs A number of industry-specific modules are developed for mining, construction, garments, chemical and other industries and for health care	More employers and workers attend training events and simplified toolkits are in wider use Increased coverage of participatory approaches and a new perspective for industry-specific modules
WISE: Insufficient budget for training courses	Stepwise workshops instead of comprehensive courses with relatively low training fees	Sustainable training activities and extension to micro-enterprises
WIND: Women farmers in rural districts too shy to join WIND: Audiovisual aids are not always available at village level WISH: Home-based workers not willing to attend long programmes POSITIVE: Workers need permission from employers to attend courses	Selecting temples in the community as training sites Photo-sheets designed to show local good examples for use in sessions in technical areas Developing a 1-day training programme held in respective communities A 1-day module developed and implemented at weekends followed by follow-up meetings	Equal numbers of female and male farmers attend training workshops Short training courses by WIND trainers in rural districts Home-based workers attending community level training More workers attend the courses with intensive follow-up activities

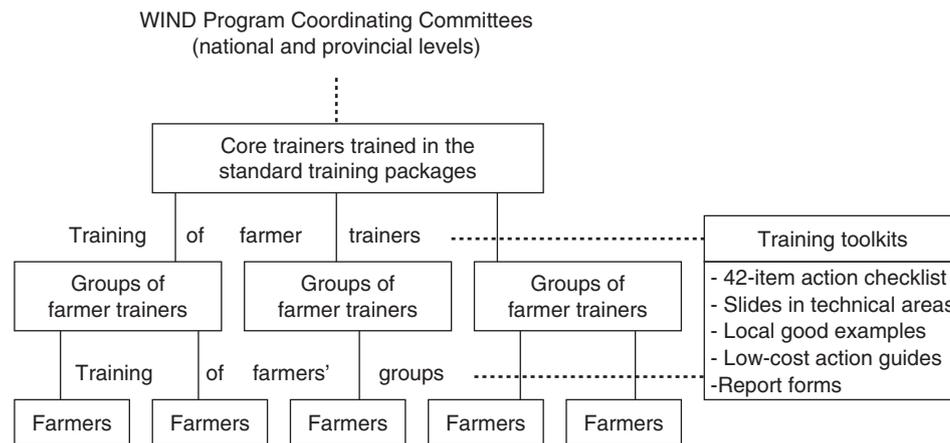


Fig. 2. The training network of WIND core and farmer trainers in Vietnam for training groups of farmers by means of training toolkits at two levels.

of the programme organizers in the country. These core trainers take part in the development of training packages and then train regional and local trainers. An example of such training networks in a new WIND programme for farmers in Vietnam is shown in Fig. 2. The programme is coordinated by national and provincial committees with the support of labour officials and farmers' and women's unions. Farmers are trained by farmer trainers who are trained by core trainers and act as facilitators for guiding other farmers in implementing improvements. Dozens of core trainers have been trained through training-of-trainers courses, and many farmer trainers are now active in at least four provinces of Vietnam.

The local networks as indicated by Fig. 2 have a two-fold effect. First, these networks secure the training of core and local trainers. The structured nets of trainers can facilitate the effective use of participatory training methods developed at international and national levels. Secondly, the local networks of trainers are used to develop locally adjusted training toolkits. This is well indicated by the

examples in Table 4. Almost all the training programmes reviewed have training toolkits in the local language except in the Philippines where English versions can be extensively used. Each toolkit contains a set of action-oriented training tools including local examples, action checklists and illustrated guides. WIND toolkits are available in English, Thai and Vietnamese, and POSITIVE toolkits are available in eight languages. The processes of developing locally adjusted modules involve presenting local good examples, redesigning action checklists and offering leaflets and modules incorporating photographs of these examples.

An additional important effect of the networking is the development of the link between these methods and risk management. We note that the WISE methods are increasingly used as part of workplace risk management as they help build on existing good practices. These links seem useful as workplace risks should be managed in the form of the Plan-Do-Check-Act (PDCA) cycle within the modern occupational safety and health management systems. This PDCA cycle means a participatory process

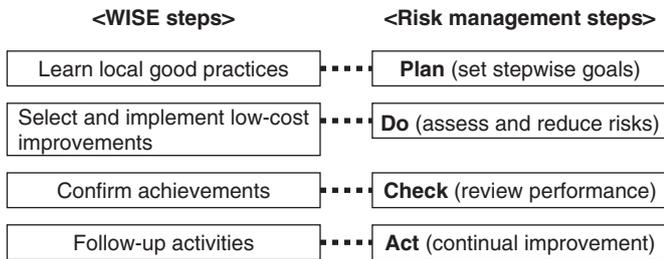


Fig. 3. WISE steps corresponding to a Plan-Do-Check-Act cycle for risk management.

of risk assessment and control followed by the review of existing risks at the initiative of local people. As shown in Fig. 3, the typical participatory steps of workplace improvement, as in the case of WISE steps, may be seen as representing an onsite risk management process. The participatory methods used are thus expected to promote the progress in workplace risk management. It is possible to upgrade both workplace improvement methods and risk management procedures in a coordinated manner.

It is therefore suggested that direct support through trainers using locally adjusted toolkits can facilitate the effective use of participatory methods. The direct support for participatory programmes will continue to be useful in bridging gaps seen in small enterprises, agriculture and the informal sector and in industrially developing countries. Resource constraints exist in all these countries in meeting ergonomics-related needs of diversifying work settings. It is necessary to strengthen support measures for participatory methods that can respond to these needs. Effective measures in this direction may include the development and use of web-based databases of low-cost ergonomic improvements. It is also necessary to disseminate participatory training toolkits that are adjustable according to each local situation.

4. Conclusions

The reviewed participatory methods used in workplace improvement programmes confirm the importance of building on local good practices in responding to diversified local needs. In adjusting the participatory steps to each local situation, it is important to help each local change group learn from local positive achievements. It is advisable to focus simultaneously on locally practicable improvements in multiple technical areas. It is further advised to utilize locally adapted participatory toolkits with the support of a network of trainers.

There is a strong need to adapt these participatory methods to different work settings in different countries as seen in various attempts. Direct support should be strengthened for developing training modules that can build on local good practices in a flexible manner. The support provided can link the workplace improvement methods with risk management procedures. Inter-country networking of positive experiences can accelerate ergo-

nomie improvements in various work settings particularly in industrially developing countries.

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