Utility of action checklists as a consensus building tool

Yeon-Ha KIM[1], Etsuko YOSHIKAWA[2]*, Toru YOSHIKAWA[3],
Kazutaka KOGI[3] and Moon-Hee JUNG[1]

[1]Hanyang University, Republic of Korea
[2]Tokyo Ariake University of Medical and Health Sciences, Japan
[3]The Institute for Science of Labour, Japan

Abstract: The present study's objective was to determine the mechanisms for enhancing the utility of action checklists applied in participatory approach programs for workplace improvements, to identify the benefits of building consensus and to compare their applicability in Asian countries to find the most appropriate configuration for action checklists. Data were collected from eight trainees and 43 trainers with experience in Participatory Action-Oriented Training. Statistical analysis was performed in SPSS using the package PASW, version 19.0. The difference in the mean score for the degree of the utility of action checklists between countries was analyzed using ANOVA methods. Factor analysis was performed to validate the action checklists' utility. Pearson Correlation Coefficients were then calculated to determine the direction and strength of the relationship between these factors. Using responses obtained from trainees' in-depth interviews, we identified 33 key statements that were then classified into 11 thematic clusters. Five factors were extracted, namely "ease of application", "practical solutions", "group interaction", "multifaceted perspective" and "active involvement". The action checklist was useful for facilitating a participatory process among trainees and trainers for improving working conditions. Action checklists showed similar patterns of utility in various Asian countries; particularly when adjusted to local conditions.

Key words: Participatory Action-Oriented Training (PAOT), Action checklists, Factor analysis, Participatory approach, Consensus building tool

Introduction

Participatory approaches for improving safety and health at work have been adopted in many Asian countries as an integral part of occupational safety and health management systems[1, 2]. These participatory approaches have been widely applied within small enterprises, agricultural facilities, construction sites, and informal workplaces[3–8].

Typical examples include training programs applying WISE (Work Improvement in small Enterprises)[7], WIND (Work Improvement in Neighborhood Development)[8], and POSITIVE (Participation-Oriented Safety Improvement by Trade Union Initiatives)[9, 10] programs, which have enjoyed widespread use in many Asian countries[6]. These programs commonly make use of the Participatory Action-Oriented Training (PAOT) methodology[11]. Additionally, they commonly use participatory training tools such as photo sheets depicting examples of good practice, action checklists, and group work methods[7]. A number of successful participatory action-oriented workshops have

previously been carried out in collaboration with occupational safety and health teams using these same participatory training tools[11].

Recent reports from these workshops indicate that the use of practical training tools such as action checklists (ACL) can be instrumental in achieving successful outcomes in PAOT programs[12]. These tools have previously been employed in training managers and workers on both farms and construction sites[11]. In particular, ACLs guide users to propose practical improvements applicable in a range of specific local contexts[11–13].

These training tools are also useful in promoting simple, low-cost and practicable solutions for improving existing working conditions[4, 5, 9, 15]. Moreover, previous studies have shown that practical and easy-to-apply training tools are more effective when they are based on local good practice[7–9, 11, 15]. Locally designed tools can also be modified to promote the active involvement of trainees, capitalize on local wisdom and knowhow, and embed improvements to ensure their sustainability[7, 16]. It is therefore important to understand how training tools can play a dynamic role in facilitating the design and implementation of improvement actions for stimulating meaningful and practicable change in different workplace situations[3, 11–14].

Various ergonomic ACLs have been developed for improving practices in a diverse variety of work contexts while placing a common emphasis on action-oriented use, application of local good practice, and low-cost improvements[3–5, 16]. A more in-depth analysis is therefore needed to more clearly define what design principles can play a key role in assisting trainees to use action checklists to formulate locally appropriate solutions and provide guidance for improving working conditions. Studies aimed at identifying mechanisms for their utility could therefore potentially generate important insights regarding the roles of both trainers and trainees in the consensus building process.

The primary objective of the present study was to find the mechanisms for the utility of ACLs applied in participatory programs for workplace improvements. Additionally, we aimed to identify their patterns of use in building consensus by comparing the impact of their actual application in different Asian countries with the support of trainers in PAOT programs. Finally, we sought to identify the most appropriate avenues for the future development of locally adapted ACLs as a training tool for building consensus to promote and sustain improvements in a range of work settings.

Methods

Data were collected between January and March 2011 and collection methods included in-depth interviews and a written questionnaire.

Interviews

In-depth interviews were conducted with eight trainees based at three companies who had professional experience using ACLs to facilitate PAOT workshops in Japan. The eight trainees, aged 40–60, comprised managers or employees working at a cosmetics manufacturer, a care center for the disabled and a construction labor union. Twelve open-ended questions were administered to identify patterns of real-world use and to characterize their experiences using the ACL – with particular emphasis on actions taken to improve workplace conditions. These questions were as follows: "what kind of action checklist is used?", "how many workers have used it?", "is it used in group discussions?", "did it help to find improvement points?", "did it increase knowledge?", "is it easy for making improvement actions?", "does it strengthen cooperation?", "is it easy to use?", "did you find the most appropriate improvement solution?", "will you continually use it?", and "does it lead to higher productivity?". An interpreter and an assistant interviewer accompanied the researcher when visiting the workplaces. Interviews were conducted in English, and, where applicable, translated into Japanese by an interpreter. They were taken in written notes. At each company, approximately 2 h were set aside for each in-depth interview. This was followed by a 1 h worksite visit to observe workplace practices at each location.

A further round of in-depth interviews was conducted on three Korean and Japanese expert trainers in the occupational health field who made use of the ACLs as part of their professional practice. These expert trainers included an International Labor Organization (ILO) specialist, a university professor and a lecturer in the field. These interviews were focused around five main open-ended questions concerning practical ways to make use of ACLs in training situations. The interview questions were as follows: 1) "do you find it easy to build consensus among trainers in using it?"; 2) "do you have a trick to make trainees to pay attention to its use?"; 3) "what is your key for finding the good points?"; 4) "does the workplace where you acted as a trainer have high productivity?"; 5) "how do you train the trainees to have a broad outlook for improvements?". The interviews were conducted either face-to-face or by telephone in Korean and English for

the Korean and Japanese participants, respectively. These interviews lasted approximately 30 min to 1 h for each participant and interviewers took voice recordings and written notes.

Questionnaire

Fifty trainers in Korea, Japan, Vietnam, Thailand, Cambodia, and Russia with experience in PAOT in workplace setting were asked to complete questionnaires designed to obtain the views of experienced trainers on the utility of ACLs in participatory training. Forty participants subsequently responded to the questionnaire by e-mail. The questions administered were designed with reference to the responses given during the in-depth interviews with trainees. Key statements were generated using the Colaizzi phenomenological method[18] and the structured interviews comprised 20 questions with responses given on a 5-point Likert scale. The reliability of the data collection method used was shown to be high, with a Cronbach's alpha coefficient of 0.91. Our sample of 40 trainers included 19 participants from Japan (47.5%), 13 from Korea (32.5%) and 8 (20.0%) from other countries (6 Vietnamese, 1 Cambodian, 1 Thai and 1 Russian). The mean age of the trainers was 44.6 ± 12.1 yr and the majority had professional experience in the occupational health field.

Statistical analysis

Transcription analysis was performed using Colaizzi's phenomenological method[18]. Extracts of key statements obtained using in-depth interviews were then arranged into groups according to their meaning. These were then classified into thematic clusters.

We analyzed the results of the questionnaire in SPSS using the package PASW, version 19.0. The difference in the mean score for the degree of utility of the ACLs between countries was analyzed using ANOVA. To confirm the validity of our tests for the utility of the ACLs, factor analysis was conducted by applying Varimax rotation. Five factors were then extracted with an Eigen value of 1.1, and these were then relabeled to indicate the particular dimensions of the ACLs' utility which they represented. We then calculated Pearson Correlation Coefficients to determine the direction and strength of the relationship between these factors.

Finally, we examined the role of ACLs in facilitating consensus building with regards to immediate workplace improvements by analyzing and reviewing the interactions between positive responses in different thematic areas. The thematic clusters used to classify the key statements

in the in-depth interviews paralleled those obtained from the questionnaire.

Ethical considerations

Participants were provided with an overview of the study in print, and provided written consent before participating in interviews. At the time questionnaires were administered, participants also received written information on privacy protection and the use of their personal information. And this questionnaire is also anonymous questionnaire studies that return of a completed questionnaire indicated continuing consent for their participation in the study. This study was conducted in accordance with the Ethical Guidelines for Epidemiological Studies, published jointly by the Ministry Education, Culture, Sport, Science and Technology and the Ministry of Health, Labour and Welfare of Japan.

Results

Aspects of the utility of ACLs based on the statements of trainees

A total of 33 key statements were extracted from in-depth interviews with trainees, as shown in Table 1. These statements were then grouped into 11 thematic clusters, which covered the following areas: "utilizing the ACL as an action-oriented took for proposing improvement actions", "ease of use", "highlighting the importance of continuous use", "adjustment to work site conditions", "presenting simple and low-cost solutions", "increasing knowledge", "utilizing the ACL as a positive training tool", "sharing practical experience in group work", "increasing productivity", "identifying necessary improvement actions", and "strengthening collaboration".

Utility of ACLs

The questionnaire responses obtained from the 40 trainers indicated that they generally acknowledged that the ACLs had a high utility. The degree of the utility of ACLs, as determined by the trainers, was compared between countries; as shown in Table 2. There were no significant differences found in the perceived utility of ACLs between the three groups of participants. Responses were firmly positive with total score of 90.35 (±7.58) across all items and an average score of 4.52 for each individual item. The total of the utility scores based on responses to the 20 questions were slightly lower for Korea (89.74 ± 12.92) and other countries (88.95 ± 10.13) when compared with those from Japan (91.17 ± 11.77). These differences were

Table 1. Key statements expressing features enhancing the utility of the ACL taken from interviews with trainees

	Thematic clusters	Meaning statements
A	Utilizing the ACL as an action-oriented training tool for proposing improvement actions	1. We found good points and points for improvement
		2. It assists us in identify points for improvement
		3. It made us to act naturally to improve
B	Ease of use	4. It is easy to understand the meanings of the illustrations
		5. We only need to check 'Yes', 'No' or 'Priority' without having to provide a full description
		6. It is so simple that you can use it even if you are new to the job
C	Highlighting the importance of continuous use	7. We want to continue to share good points and points for improvement
		8. We will use it continually otherwise we will forget it
		9. It is there to protect us from accidents in the workplace
D	Adjustment to work site conditions	10. We left a blank in the ACL for workers to add new ones in case it is needed in their section
		11. A doorsill is needed for the disabled children but it has to be removed for elderly users
		12. The updated ACL is important because conditions on the work site change frequently
E	Presenting simple and low-cost solutions	13. We proposed an idea to assemble a low-cost toluene ventilation system
		14. We decided to fabricate a doorsill with wood for disabled children
		15. We learned how important the unused machinery cover was
F	Increasing knowledge	16. We can now identify points for improvement
		17. We were aware of improvements even when they were incremental
		18. We realized how important the unused machinery cover was
G	Utilizing the ACL as a positive training tool	19. Inspectors come once a year and they just send us the results by mail
		20. Inspectors always point out the bad points but we wanted them to provide us with encouragement
		21. Inspectors are like policeman with regards to laws and regulations
H	Sharing practical experience in group work	22. We exchanged our opinions in groups
		23. We shared examples of good practice during group work with another department
		24. We wanted to share our successes with others
I	Increasing productivity	25. We don't know whether it is linked to expand production
		26. It is unclear how this activity is profitable
		27. The construction site changes so often that it is impossible to measure productivity
J	Identifying necessary improvement actions	28. We assembled a new toluene ventilation system.
		29. We made the doorsill for disabled children to aid their cognitive development
		30. We used the machinery cover and to ensure users' safety
K	Strengthening collaboration	31. Our coworkers already had strong relationships but it made us stronger
		32. The results depend on whether the manager has an interest in the ACL
		33. The way the ACL is used is more important than its role in strengthening collaboration

not significant, however. The lowest mean values from Japan (3.89 ± 0.93) and Korea (4.00 ± 1.08) was found on the item "creating links with management goals". The lowest mean values for the other countries (4.12 ± 0.35) were for the item "generating practical solutions" and "working in groups". Japanese respondents gave a slightly lower mean score for the item "easy to use" (4.15 ± 0.60) when compared with other items. In Korea, responses to the items "promoting active involvement" (4.07 ± 0.64)

and "broadening the scope" (4.15 ± 0.98) gave slightly lower mean values than for other countries. Among all the items included in the survey, the highest mean score across all countries was for "highlighting the importance of adjusting to local conditions" (4.87 ± 0.40).

Factors relating to the utility of ACLs

We conducted a factor analysis to identify the factors underlying the utility of ACLs (Table 3). Our analysis

Table 2. Agreement on the degree of the utility of the ACL by country (n=40)

Item	Japan (19) M	Japan (19) SD	Korea (13) M	Korea (13) SD	Others (8)* M	Others (8)* SD	Total (40) M	Total (40) SD	F	P
1. Proposing improvement actions	4.84	0.37	4.69	0.48	4.50	0.53	4.72	0.45	1.72	0.19
2. Training people	4.84	0.37	4.69	0.48	4.62	0.51	4.75	0.43	0.96	0.39
3. Finding necessary improvement in multiple aspects of work	4.68	0.67	4.53	0.66	4.37	0.51	4.57	0.63	0.94	0.39
4. Emphasizing low-cost solutions	4.84	0.68	4.53	0.77	4.87	0.35	4.75	0.66	0.49	0.61
5. Ease of use	4.15	0.60	4.53	0.66	4.25	0.70	4.30	0.64	0.17	0.84
6. Assisting in finding points for Encouraging improvements using trainee's own methods	4.52	0.51	4.38	0.65	4.25	0.46	4.42	0.54	0.97	0 .38
7. Generating practical solutions	4.47	0.69	4.46	0.66	4.12	0.35	4.40	0.63	0.48	0.61
8. Promoting active involvement	4.21	0.63	4.07	0.64	4.37	0.74	4.20	0.64	0.51	0.60
9. Working in groups	4.57	0.50	4.53	0.66	4.12	0.35	4.47	0.55	2.35	0.10
10. Providing opportunities to share experiences	4.42	0.69	4.53	0.66	4.25	0.46	4.42	0.63	0.49	0.61
11. Highlighting the importance of adjusting to local conditions	4.94	0.22	4.84	0.37	4.75	0.70	4.87	0.40	0.70	0.49
12. Presenting ways of implementing simple improvements	4.52	0.84	4.30	0.75	4.37	0.51	4.42	0.74	0.34	0.71
13. Using the ACL as an action-oriented training tool	4.78	0.41	4.76	0.43	4.87	0.35	4.80	0.40	0.17	0.84
14. Basing actions on local good practice	4.73	0.56	4.30	0.75	4.25	0.46	4.50	0.64	2.71	0.08
15. Promoting learning by doing	4.42	0.76	4.69	0.63	4.75	0.46	4.57	0.67	0.95	0.39
16. Broadening the scope	4.52	0.61	4.15	0.98	4.37	0.51	4.37	0.74	0.97	0.38
17. Encouraging an exchange of experience	4.36	0.68	4.38	0.65	4.37	0.51	4.37	0.62	0.00	0.99
18. Creating links with management goals	3.89	0.93	4.00	1.08	4.25	0.46	4.00	0.90	0.42	0.66
19. Applicability for use in future activities	4.84	0.37	4.69	0.48	4.75	0.46	4.77	0.42	0.48	0.61
20. Recommendation for use in future Training	4.63	0.68	4.69	0.48	4.50	0.75	4.62	0.62	0.22	0.80
Total	91.17	11.77	89.74	12.92	88.95	10.13	90.35	7.58	0.28	0.75

* Others; Vietnam, Cambodia, Thailand, Russia

Table 3. Factor loadings for five factors identified using factor analysis

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
01. Proposing improvement action	**0.67**	0.33	0.22	0.31	−0.22
05. Ease of use	**0.52**	0.20	0.09	-0.19	0.27
11. Highlighting the importance of adjusting to local conditions	**0.75**	0.29	0.03	-0.13	0.15
13. Using the ACL as an action-oriented training tool	**0.76**	0.14	−0.01	0.23	−0.02
19. Applicability for use in future activities	**0.71**	0.12	0.29	0.06	0.31
20. Recommendation for use in future training	**0.75**	−0.03	0.10	0.30	0.17
04. Emphasizing low-cost solutions	0.46	**0.71**	0.10	−0.25	0.24
07. Generating practical solutions	0.16	**0.49**	0.20	0.37	0.45
12. Present ways of implementing simple improvements	0.16	**0.84**	0.06	0.29	0.21
14. Basing actions on local good practice	0.30	**0.77**	0.28	0.14	0.02
16. Broadening the scope	0.04	**0.80**	0.33	0.19	0.11
02. Training people	0.40	0.48	**0.51**	0.25	−0.38
09. Working in groups	0.10	0.17	**0.77**	0.10	0.02
10. Providing opportunities to share experiences	−0.03	0.15	**0.60**	0.43	0.18
17. Encourage an exchange of experience	0.14	0.06	**0.77**	0.19	0.11
18. Creating links with management goals	0.10	0.27	**0.72**	−0.21	0.26
03. Finding necessary improvement in multiple aspects of work	0.17	0.24	0.19	**0.83**	−0.02
06. Encouraging improvements using trainee's own methods	0.27	0.34	0.44	**0.49**	0.12
08. Promoting active involvement	0.10	0.27	0.24	0.26	**0.74**
15. Promoting learning by doing	0.39	0.10	0.15	−0.20	**0.73**
Eigen value	8.05	2.25	1.74	1.41	1.10
Cumulative %	19.03	37.06	52.58	62.90	72.84

Table 4. Correlations between the five factors identified

	Factor 1	Factor 2	Factor 3	Factor 4
Factor 2	0.54**			
Factor 3	0.40**	0.56**		
Factor 4	0.47**	0.58**	0.57**	
Factor 5	0.47*	0.52**	0.41**	0.30

*$p<0.05$, **$p<0.01$ F_1=ease of application; F_2=formulating practical solutions; F_3=group interaction; F_4=multifaceted perspective; F_5=active involvement

showed that all five factors identified were valid. The 20 survey items were meaningfully categorized into these five factors — which were found to account for 72.84% of the variance. The factor loadings were similarly high for each of the five factors with values between 0.49 and 0.84. Six items were categorized within Factor 1 and five were categorized within Factor 2 and Factor 3. Two of the survey items were categorized within both Factor 4 and Factor 5. It was notable that each of the five factors comprised items with high factor loadings. The highest factor loadings were 0.75 for Factor 1, 0.84 for Factor 2, 0.77 for Factor 3, 0.83 for Factor 4 and 0.74 for Factor 5.

The factors defined in our analysis were labelled to indicate which dimensions of the ACLs' utility they corresponded to. Factor 1 was defined as "easy application", Factor 2 as "formulating practical solutions", Factor 3 as "group interaction", Factor 4 as "multifaceted perspective" and Factor 5 as "active involvement". These factors clearly conformed to both the design principle of the ACLs employed and their real-world patterns of use.

The Pearson Correlation Coefficients showing the relationship between the factors identified in our analysis are shown in Table 4. While we did not find any statistically significant correlation between Factors 4 and 5, we found statistically significant ($p<0.01$) correlations between Factor 1 and Factor 2, 3, 4 and 5, between Factor 2 and Factors 3, 4 and 5, and between Factor 3 and Factors 4 and 5 with coefficients in the range of 0.40–0.58. These results suggest that the relationships between these five factors were not fully independent.

By referring to the results of the factor analysis, we were then able to classify the 11 thematic clusters used to group trainees' responses into five corresponding categories (Table 5). These categories were considered to indicate the degree to which trainees agreed that the ACL is an "easy-to-use training tool adjusted to local conditions", and that its application "broadens the scope to present simple improvements", "encourages an exchange of

experiences to link with management goals", "encompasses multiple aspects of work" and "promotes active involvement".

These five thematic areas identified in the interviews with expert trainers closely corresponded with the factors found in our factor analysis. While the thematic area "easy-to-use training tool adjusted to local conditions" corresponded with Factor 1 (defined as "easy application"), "broadens the scope to present simple improvements" matched Factor 2 ("formulating practical solutions"), "encourages an exchange of experiences to link with management goals" Factor 3 ("group interaction"), "encompasses multiple aspects of work" Factor 4 ("multifaceted perspective") and "promotes active involvement" Factor 5 ("active involvement").

Key statements identified by expert trainers

The twenty eight key statements identified from the questionnaire responses given by the expert trainers are shown in Table 6. These were grouped into five themes which comprised "agreement with the utility of the ACL", "ideas to promote active involvement", "methods for finding examples of good practice", and "advice for linking with management goals". The trainers agreed that ACLs could aid in enhancing consensus building among trainees. They also highlighted the importance of developing skills to promote active involvement and encouraging trainees to find their own examples of good practice based on their experience using ACLs. Finally, the expert trainers also responded with advice for linking their use with management goals and for broadening the scope of their use.

Discussion

The PAOT methodology emphasizes building on local good practices, applying low-cost improvements and the use of action-oriented training tools as a continuous, iterative process[2, 3, 8, 9, 11]. These practical and easily-adaptable training tools for application in PAOT workshops can therefore play a role in involving trainees in proposing, implementing and sustaining improvement actions in the workplace. It also emphasizes capitalizing on local wisdom and knowhow when designing practical improvements for better workplace conditions when used as part of action-oriented, stepwise training activities[3–7, 16]. An ACL can play a key role as a training tool for trainees to identify practical solutions (Fig. 1). There is also immense value in informing occupational safety and health professionals, researchers and policymakers alike on the effec-

Table 5. Relations between the five factors based on the questionnaire results and the 11 thematic clusters for grouping trainees' statements

Factors	Theme category	Thematic areas
F_1: Ease of application	Easy-to-use training tool adjusted to local conditions	A: Utilizing the ACL as an action-oriented training tool for proposing improvement actions B: Easy-to-use C: Necessity of continuous use D: Adjusting to work site conditions
F_2: Practical solutions	Broadens the scope to present simple improvements	E: Presenting simple and low-cost solutions F: Increasing knowledge
F_3: Group interaction	Encourages an exchange of experiences to link with management goals	G: Use of the ACL as a positive training tool H: Sharing practical experience in group work I: Increasing productivity
F_4: Multifaceted perspective	Encompasses multiple aspects of work	J: Identifying necessary improvement actions
F_5: Active involvement	Promotes active involvement	K: Strengthening collaboration

Table 6. Overarching themes extracted from key statements obtained from expert trainers

Theme	Key statements
Agreement with the utility of the ACL	1. It is simple and easy to reach consensus in making actions 2. It encourages trainees to find both the good points and for improvement 3. Continuous use is important – so be patient and don't expect immediate results! 4. Trainees are not familiar with the discussion surrounding the use of the ACL
Ideas to promote active involvement	5. There should be fewer than 40 checklist items 6. Trainees should be acknowledged and encouraged 7. Ensure that responses to trainees are polite and respectful 8. Trainers must be reminded that this is a trainee-centered tool 9. Trainers must have a passion to facilitate 10. Facilitating skills development through activities such as games and role-play scenarios is important. 11. Classrooms should be rearranged to optimize the atmosphere and improve delivery of training 12. Although this is a participatory program it is not always easy to achieve full involvement of the trainees 13. Trainees should be reminded not to rely on the ACL but to exchange opinions with others
Methods for finding examples of good practice	14. The positive aspects should be identified first 15. Trainers have to change workers' perspectives on their own working conditions 16. It is important to identify key people locally to find examples of local good practice 17. Don't try to aim for perfection at all times 18. There are already many good points 19. Show many examples of good practice to the trainees 20. Visit the workplace before implementing the ACL
Advice for linking training with management goals	21. Government support is needed 22. There is no objective data for measuring productivity increases 23. A cost-benefit analysis is needed 24. There is a lack of understanding of the programs objectives on the part of the manager 25. Motivation and work satisfaction contribute to high productivity
Methods for broadening the scope	26. Follow-up activity is important 27. Trainees already know examples of good practice when exchanging ideas 28. This is a step-by-step process – so don't rush things!

tive use of ACLs for building consensus and improving working environments in a range of settings. The practical insights regarding the use of ACLs identified by this study may be of use in addressing this question.
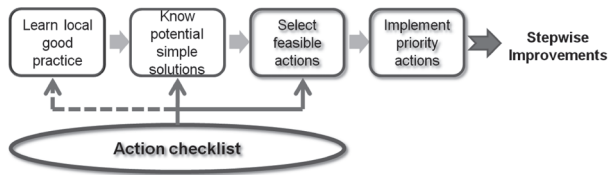
Fig. 1. Steps taken in PAOT programs in relation to the use of an action checklist.

A previous study has described the features common to all PAOT ACLs, which included 1) direct reference to checkpoints that could be used directly as an action-oriented training tool, 2) presenting ways of making simple improvements reflecting basic ergonomic principles, and 3) designing action items based on good practices to suggest locally feasible actions[7, 9]. The present study revealed five factors which could form a basis upon which of the utility of ACLs could be measured. First, each ACL is, on a fundamental level, a simple and training tool adjusted to local conditions. Precious work by Kogi has highlighted that it is an action-oriented training tool for assisting trainees in finding points for improvement[19]. Meanwhile, Kawakami has also emphasized that photo sheets with examples of good practice can provide clear guidance for trainees regarding workplace procedures and management priorities[17]. In other words, by implementing direct improvement actions, each trainee is encouraged to improve working conditions, and, where necessary, make updates to the ACL as part of a continuous, stepwise process[11, 20]. The key statements identified as part of our study included "the action checklist help identify points to be improved", "it is easy to understand the meanings of the illustrations" and "we left a blank items in the ACL for workers to add new ones in case it is needed in their section". These statements were representative of the 'easy application' theme – as shown using factor analysis. The priority implicit within this theme is to propose improvement actions. By updating and adjusting its content to specific needs at different work sites, ACLs may be used in a continuous fashion to create momentum for progress and further improvement[21, 22]. As a general point, recognition of the importance of locally adjusted action-oriented training tool tends to contribute to the total utility of ACLs. Our results confirmed that this held true in a range of in Asian settings (4.87 ± 0.40). This result also implies that the easy application of ACLs varies by country and is dependent on local socioeconomic factors as well as occupational safety and health policy on the national level and the effectiveness of workplace risk management. However, this

also appears to confirm our hypothesis that ACLs when adapted to local conditions, can be similarly effective in promoting consensus building across a number of Asian countries despite differences with regards to social and economic conditions and overall inequities in occupational safety and health.

ACLs can also be instrumental in broadening the scope and presenting simple workplace improvements in an easy-to-understand way. Previous studies in this area have focused on low-cost solutions based on the local good practice[7–11, 15, 16]. Their results have shown that ACLs also present avenues for practical improvement in a broad range of technical areas[11, 13, 20–22]. The key statements identified by the present study also included "we proposed an idea to assemble a low-cost toluene ventilation system" and "we learned how important the unused machinery cover was". These statements corresponded with the "practical solutions" factor which emphasized finding simple, low-cost solutions and increasing trainees' knowledge.

Furthermore, ACLs promote an exchange of experiences to link workplace improvements with management goals. By facilitating group discussions, ACLs encourage of the articulation of different viewpoints, allowing participants to reach a consensus in a timely manner and to identify priority actions[2, 19]. This is important given that low productivity and poor quality of work are often the result of hazardous workplace conditions and a lack of effective organization. Previous work has also shown that productivity is enhanced when conditions in the work place are improved[13]. One key statement identified in the present study, which encapsulated the "group interaction" factor, was "during group work with other department, we shared good examples". However, given the relatively high rate of agreement with the statement "we don't know whether it is linked to expand production", it was unclear whether encouraging exchanges of experience through group discussion could be directly linked to high productivity.

ACLs also cover multiple aspects of the trainees' work, and could therefore be of value in encouraging them to evaluate their own working conditions in multiple technical areas to identify effective action points and appropriate solutions for workplace improvement[2]. In our study, the key statement in this area was "we made the doorsill for disabled children to aid their cognitive development"; which represents the "multifaceted perspective" factor. Finally, ACLs promote active workplace involvement and in previous studies checklists and so on have been designed to achieve participation from both employers and employ-

ees alike[5, 13, 16]. Our results therefore suggest that "ideas to promote active involvement" is the most important of the themes identified from the ACL for promoting workers' involvement. Moreover, the use of ACLs encourages an exchange of experiences[11].

Another key statement identified was "the results depend on whether the manager has an interest in the ACL". This statement fell under the "active involvement" factor, and emphasizes the fact that ACLs should be designed with both employers and employees in mind as both play an instrumental role in facilitating improvement actions. ACLs are also useful in providing a structure for group work and encouraging workers to exchange examples of good practice[6, 20]. This may imply that the "group interaction" factor is pivotal for promoting trainees' active involvement. To ensure this, trainers should have knowledge in the relevant technical area, experience in implementing low-cost solutions and the ability to engage trainees and secure their active involvement[23].

The present study pinpointed a number of positive messages regarding the real-world utility of ACLs, in addition to lessons for their future development as a training tool for stimulating improvements in workplace environments. Despite this, utility scores for key statements relating to linking with management goals and promoting active involvement were found to be relatively low – particularly in Korea and Japan. However, we were not able to assess how management goals could be incorporated into the use of ACLs; particularly in settings where processes are already in place to measure their utility. This could indicate that practical applicability of the "group interaction" factor may be less flexible and that its outcomes may be determined by the social and economic context, occupational safety and health policies on the company level and the goals of management at the work site. One possible cause of this may be the burden for both employees and employers in implementing ACLs, as is especially the case in Japan and Korea. Trainers are also faced with a lack of awareness on the part of employers regarding the benefits of improved working conditions. This issue could potentially be resolved, however, by presenting objective evidence, such as cost-benefit analyses, to convince both employer and employee that the use of ACLs has a positive impact on productivity. If this is not practically feasible in a given setting, however, efforts should be made to identify relevant case studies, and if necessary, carry out a cost-benefit analysis on-site. Given that employers play a decisive role in facilitating improvement actions, efforts to increase awareness of the benefits of ACLs are most likely

to provide impetus for improving working conditions. This suggests that simplifying their use and reducing their burden on employers may facilitate greater involvement on the part of the employee if employers consider such programs a constructive use of working hours.

This study showed no statistically significant differences in mean scores for the utility of the ACLs between countries. The degree of utility of the ACLs, as measured using the survey responses, was found to be high across the majority of survey items and across different Asian countries. These results may imply, therefore, that ACLs may be an effective tool for consensus building regardless of the setting.

The present study has some limitations, however. First, we were able to recruit only eight trainees for the in-depth-interviews – thereby reducing the reliability of our results. Additionally, there were other important factors which we could not adjust for such as job category. Finally, our analysis was limited to the positive aspects of ACLs and did not cover any of the negative aspects which may hinder their real-world utility.

Conclusion

Our results revealed that both trainees and trainers made effective use of ACLs in their participatory training activities as an effective means of facilitating the participatory process and improving both working conditions and the workplace environment.

The ACLs presented in this study are likely to be most effective in real-world practice when they are adapted to local conditions and make reference to local knowhow and examples of good practice. Our factor analysis of the questionnaire responses identified five factors relating to the utility of the ACL. These factors indicated that "ease of application", "practical solutions", "group interaction", a "multifaceted perspective" and "active involvement" are instrumental for the successful application of these ACLs in real-world contexts.

The present study shows that ACLs based on practical improvements can be applied in local settings in multiple aspects of work, and that they are particularly useful for enhancing participatory training programs. Situation-specific design and effective use of ACLs is essential for building active interest in implementing immediate improvements in a wide range of workplace scenarios.

References

1) International Labour Office (2001) Guideline on occupational safety and health management systems ILO-OSH2001, International Labour Office, Geneva.

2) Kawakami T, Kogi K (2001) Action-oriented support for occupational safety and health programs in some developing countries in Asia. Int J Occup Saf Ergon **7**, 421–34. [Medline]

3) Kogi K, Phoon W, Thurman J (1988) Low-cost ways of improving working conditions: 100 examples from Asia. International Labour Office, Geneva.

4) International Labour Office (1996) Ergonomic Checkpoints: Practical and Easy-to-implement Solutions for Improving Safety, Health and Working Conditions, International Labour Office, Geneva.

5) Thurman JE, Louzine AE, Kogi K (1988) Higher productivity and a better place to work—Practical ideas for owners and managers of small and medium-sized industrial enterprises Action manual. International Labour Office, Geneva.

6) Kawakami T (2006) Networking grassroots efforts to improve safety and health in informal economy workplaces in Asia. Ind Health **44**, 42–7. [Medline] [CrossRef]

7) International Labour Office (2002) WISE (Work Improvements in Small Enterprises) Trainers' Package, ILO Regional Office for Asia and the Pacific, Bangkok.

8) Kawakami T, Van VN, Theu NV, Khai TT, Kogi K (2008) Participatory support to farmers in improving safety and health at work: building WIND farmer volunteer networks in Viet Nam. Ind Health **46**, 455–62. [Medline] [CrossRef]

9) Kawakami T, Kogi K, Toyama N, Yoshikawa T (2004) Participatory approaches to improving safety and health under trade union initiative—experiences of POSITIVE training program in Asia. Ind Health **42**, 196–206. [Medline] [CrossRef]

10) Japan International Labour Foundation (2005) Report of the international forum on "trade union and occupational safety and health" JILAF, Tokyo.

11) Khai TT, Kawakami T, Kogi K (2011) Participatory Action-Oriented Training. ILO DWT for East and South-East Asia and the Pacific, Hanoi.

12) Kazutaka K (2012) Roles of Participatory Action-oriented Programs in Promoting Safety and Health at Work. Saf Health Work **3**, 155–65. [Medline] [CrossRef]

13) Tsutsumi A, Nagami M, Yoshikawa T, Kogi K, Kawakami N (2009) Participatory intervention for workplace improvements on mental health and job performance among blue-collar workers: a cluster randomized controlled trial. J Occup Environ Med **51**, 554–63. [Medline] [CrossRef]

14) Kogi K (1996) Participatory action training for workplace improvements in small enterprises in developing countries. Environ Sci **4**, 123–33.

15) Kogi K (1997) Low-cost ergonomic solutions in small-scale industries in developing countries. Asian-Pacific Newsl Occup Health Saf **4**, 68–70.

16) International Labour Office Ergonomic Checkpoints Practical easy-to-implement solutions for improving safety, health and working conditions 2nd ed. http://www.ilo.org/wcmsp5/groups/public/—dgreports/—dcomm/—publ/documents/publication/wcms_120133.pdf. Accessed August 31, 2014.

17) Kawakami T (2007) Participatory approaches to improving safety, health and working conditions in informal economy workplaces. Experiences of Cambodia, Thailand and Viet Nam, Senior Specialist in Occupational Safety and Health, ILO Sub regional Office for East Asia, Bangkok.

18) Colaizzi P (1978) Psychological research as the phenomenologist views it. In R. S. Valle & M. King (Eds.) Existential Foundations of Psychology (chapter 3). Oxford University Press, New York.

19) Kogi K (2007) Action-oriented use of ergonomic checkpoints for healthy work design in different settings. J Hum Ergol (Tokyo) **36**, 37–43. [Medline]

20) Kobayashi Y, Kaneyoshi A, Yokota A, Kawakami N (2008) Effects of a worker participatory program for improving work environments on job stressors and mental health among workers: a controlled trial. J Occup Health **50**, 455–70. [Medline] [CrossRef]

21) Lee JE, Kim SL, Jung HS, Koo JW, Woo KH, Kim MT (2009) Participatory action oriented training for hospital nurses (PAOTHN) program to prevent musculoskeletal disorders. J Occup Health **51**, 370–6. [Medline] [CrossRef]

22) Koda S, Nakagiri S, Yasuda N, Toyota M, Ohara H (1997) A follow-up study of preventive effects on low back pain at worksites by providing a participatory occupational safety and health program. Ind Health **35**, 243–8. [Medline] [CrossRef]

23) Chaikittiporn C, Kawakami T, Kogi K (2001) Support measures to improve night and shift work conditions in Thailand: a case study in a glass factory. J Hum Ergol (Tokyo) **30**, 185–9. [Medline]