The Intervention Design and Analysis Scorecard: A Planning Tool for Participatory Design of Integrated Health and Safety Interventions in the Workplace

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Objective: As part of a Research-to-Practice Toolkit development effort by the Center for the Promotion of Health in the New England Workplace, to develop and test a structured participatory approach for engaging front-line employees in the design of integrated health protection and promotion interventions. **Methods:** On the basis of a participatory ergonomics framework, the Intervention Design and Analysis Scorecard (IDEAS) provides a stepwise approach for developing intervention proposals, including root cause analysis and setting evaluation criteria such as scope, obstacles, and cost/benefit tradeoffs. The IDEAS was tested at four diverse worksites with trained facilitators. **Results:** Employees were able to develop and gain management support for integrated interventions at each worksite. **Conclusions:** The IDEAS can be used effectively by front-line employees to plan integrated interventions in a program dedicated to continuous improvement of employee health protection/promotion and Total Worker Health.

The Center for the Promotion of Health in the New England Workplace[1] (CPH-NEW) is a Total Worker Health (TWH) Center of Research Excellence dedicated to conducting translational research on integrated workplace health promotion and occupational safety and health interventions at the programmatic level.[2] A primary focus of the CPH-NEW research effort has been to develop a way to fully engage front-line employees and managerial/supervisory personnel in the collaborative, iterative design of workplace interventions. The benefits of this engagement over "top-down" approaches include as follows:

- Identification of workplace health promotion and occupational safety and health issues that are most salient to front-line employees.
- Identification of a wider range of intervention possibilities. Employees are usually much more aware than health and safety professionals or upper management of the complex interactions between how their work is organized and the physical design factors in their workplace.[3,4] Also, employees are able to factor lifestyle and other behavioral influences into solution activities that go beyond the immediate workplace, in keeping with the TWH concept.
- Better identification of potential barriers and facilitators to interventions.
- Enhanced buy-in to problem definition and intervention design from all parties, resulting in greater sustainability.
- Establish a supportive organizational culture and dynamics for a self-correcting and sustainable program.

The CPH-NEW initially developed and field-tested an approach to intervention planning modeled after best practices in participatory ergonomics (PE) programs.[5–8] In conventional PE programs, small "design teams" of front-line employees develop ergonomic interventions, usually with the help of a program facilitator. Throughout the design process, a "steering committee" of management and supervisory personnel acts as a sounding board and provides company-level knowledge to help select the best interventions developed through the participatory design process. The CPH-NEW's novel approach expanded the PE process to encompass integrated health protection and health promotion interventions. This new participatory ergonomics and health promotion ("PE×HP") programmatic approach[9] supports continuous improvement of employee protection and promotion as a way to achieve TWH.

THE INTERVENTION DESIGN AND ANALYSIS SCORECARD TOOL

The Intervention Design and Analysis Scorecard (IDEAS) Tool is part of a larger suite of Research-to-Practice (R2P) tools developed by the CPH-NEW to support PE×HP programs. Its current, seven-step format was developed through iterative design during field testing. As its name implies, the key feature of the IDEAS Tool is the use of a stepwise, scorecard approach to develop, evaluate, rank, and select the most practical and effective intervention ideas and solutions. Bringing this structured process to the consideration of an intervention's costs, barriers, resources, scope of impact, and benefits makes it possible to develop an internal justification (ie, business case) for an intervention that is specific to the context of the organization. This results in intervention proposals that the program steering committee and upper management are more likely to support, in part because of the greater alignment of interventions with organizational goals.[10]

The IDEAS Tool is closely modeled after an intervention planning process developed for use by professional macroergonomists as described in a case study by Robertson and Courtney[11] that was based on previous work of Robertson and Rahimi.[12] Nevertheless, the IDEAS Tool can be used by masters-level professionals without extensive backgrounds in ergonomic, occupational safety and health, or health promotion. Use of the IDEAS Tool fulfills four key scientific and programmatic needs: (1) to address the multiple contributing root causes of health/safety issues/concerns, (2) to provide balanced interventions integrating both health protection and health promotion principles and approaches, and involving combinations

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This work was supported by Grant No. U19-OH008857 from the National Institute for Occupational Safety and Health (NIOSH) at the Centers for Disease Control and Prevention. The contents of this article are solely the responsibility of the authors and do not necessarily represent the official views of NIOSH.

The authors declare no conflicts of interest.

Supplemental digital contents are available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site (www.joem.org).

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DOI: 10.1097/JOM.0000000000000036

of behavioral changes and training initiatives as well as changes to work organization and the workplace, (3) to propose a range of intervention options for the steering committee to consider for any specific health/safety issue, and (4) to develop intervention proposals aligned with business decision-making practices and strategic goals that consider return-on-investment metrics.[13]

Regarding return-on-investment metrics, these are not limited to estimating a return-on-investment in purely financial terms, and are instead consistent with best practices when organizations consider any new initiative.[14,15] Employees are asked to consider a wide range of measures associated with each of their intervention ideas, for example, the number of employees who are likely to benefit from this intervention (scope) and potential obstacles/barriers to implementing this intervention. Thus, the IDEAS Tool supports prioritization and systematic comparisons of competing intervention ideas through a structured, scorecard approach.[14,16] Once a design team has successfully completed at least one complete intervention planning cycle, it has acquired skills that also will support collaboration on interventions that are initiated by the steering committee.

METHODS

The CPH-NEW field-tested the IDEAS Tool within PE×HP programs over a 2-year period at four diverse worksites. Employee design teams were formed with a representative group of between 5 and 10 front-line employees. As part of their orientation and training provided by the PE×HP program facilitator, employee perceptions of workplace health and safety problem areas and concerns gathered through surveys and focus groups were shared with the design team members. Members of the design team then prioritized these problems and concerns to focus their initial intervention design efforts. Once a focus area was identified, the program facilitator guided the employee design team through the intervention planning process using the IDEAS Tool. As detailed later, the process began with identifying the multiple contributing and underlying root causes of the problem, and ended by generating a set of intervention proposals that were submitted to the program steering committee.

Steps in the IDEAS Planning Process

The seven planning steps of the IDEAS Tool planning process, and the respective roles of the design team and steering committee, are depicted in a flow diagram (see Figure, Supplemental Digital Content 1, http://links.lww.com/JOM/A134). Solid-lined boxes show Steps 1 to 5A in which the design team independently identifies a workplace issue/concern and then initiates and completes the intervention planning process. Steps 5B to 7 show the independent steering committee activities, in which sets of intervention proposals from the design team are received, reviewed, and then either approved and implemented or rejected. The roles of the steering committee are to provide the design team with constructive feedback about the proposals and any needed resources for refining, implementing, and evaluating interventions. Each of the IDEAS Tool steps has an accompanying worksheet that is designed to assist the program facilitator and the design team or steering committee in the intervention planning process for that step (see IDEAS Worksheets, Supplemental Digital Content 2, http://links.lww.com/JOM/A135). Some worksheets are filled out with reference to a hypothetical job in health care to demonstrate their use. The activities associated with each step are as follows:

Step 1: Once the design team has selected a focus problem or issue, the design team engages in a systems analysis process. This process begins by breaking the problem/issue down into *subissues*, and then continues by identifying the multiple *contributing factors* associated with each subissue. As in the example, it is important to identify subissues from the domains of workplace design, work organization, and health behaviors. Completing Step 1 is an iterative process; extra worksheets are used as needed until the team is satisfied that all or most contributing factors have been identified.

Step 2: The design team develops an initial set of *intervention alternatives* that will address each subissue identified in Step 1. Each alternative includes a proposed set of *activities*, with measurable objectives that address the major *health and safety goal/objective.* A balanced set of activities is sought for each intervention involving ergonomic workplace changes as well as behavior or lifestyle changes. The design team uses brainstorming to generate as many activities as possible until it is agreed that the most important contributing factors identified in Step 1 have been addressed.

Step 3: Before evaluating each intervention, the design team creates a mutually agreed upon set of selection criteria to help prioritize proposals identified in Step 2; these will eventually be used to evaluate each set of intervention activities in Step 4. Criteria address four broad categories: (1) scope of project in regard to numbers of employees impacted, (2) benefits/effectiveness, (3) obstacles/barriers, and (4) resources/costs. These criteria will allow the design team to consider important trade-offs among the various sets of activities being considered for an intervention alternative.

Step 4: The design team uses the selection criteria to review and compare the intervention activities under consideration (separate Step 4 worksheets for each intervention proposal). The goal is to combine the most viable activities into three intervention alternatives for further development and eventual presentation to the program steering committee. Having at least three viable alternatives allows the steering committee flexibility, including the formation of a new subset of activities that the design team had not considered, and this increases the likelihood that an intervention in some form will be supported.

Step 5A: The *design team* rates the set of proposed interventions on a scorecard, assigning "low," "medium," or "high" to each selection criterion developed in Step 3, after an overall prioritization of alternatives and possible notes to the steering committee. Worksheet 5A, along with Worksheets 1 to 4 as background, is shared with the steering committee when the intervention alternatives are presented.

Step 5B: The *steering committee* reviews the intervention alternatives proposed by the design team, provides feedback on reratings as necessary, and then selects which intervention, or new set of activities, to implement, and then communicates with the design team. Several exchanges with design team members may be needed to clarify any differences between ratings. These exchanges can be more fruitful in person.

Step 6: Once an intervention is selected, the steering committee develops a schedule of activities for successful implementation of the intervention, with consideration of the selection criteria. Step 6 is mostly a checklist of factors to consider for successful implementation because organizations will typically have their own planning and scheduling tools.

Step 7: The last step involves monitoring and evaluating the implemented intervention, and making modifications if needed. Collection of process and outcome measures is crucial, and it is likely that some adaptation of the intervention will be needed. An iterative cycle for refining interventions is considered essential to any continuous improvement process, and this process promotes organizational learning on how to protect and promote employee health and safety in the face of changing demands and the evolution of the workplace.[8]

A complete set of the IDEAS Tool (fillable) worksheets and quick reference guides to assist with their use, along with assessment tools and other support materials in the R2P Toolkit for PE×HP programs, are available on the CPH-NEW Web site.[1]

RESULTS

A sampling of the interventions that were both proposed and implemented is provided here as evidence that use of the IDEAS Tool by the employee design team resulted in integrated health protection/promotion interventions that were supported by management.

At a small realty and property management firm (worksite size 160), a comprehensive set of interventions focused on a host of operational issues that unnecessarily contributed to high workload, frustration, and stress, largely because of communication breakdowns among renters, front-office staff, and workers. An example intervention was developing training materials for renters on the proper operation of apartment appliances and how to correctly report maintenance issues. A second intervention focused on discomfort and overheating caused by the bulky company uniforms.

At a nonprofit site of office workers (worksite size 350), a PE program was put in place primarily to address musculoskeletal discomfort. Actions included setting ergonomics policy that included guidelines and standards in the areas of workstation assessment, hazard identification, and ergonomic controls; the assignment, training, and deployment of internal ergonomic "champions" to provide individual consultation to office employees with a focus on maximizing computer workstation ergonomic fit even in the face of limited workstation resources; ergonomics education for all employees; roles for employee involvement in office renovations/moves; and roles for management support and endorsement.

At a state government agency of office workers (worksite size 260), training-focused ergonomic interventions occurred as part of a PE program: workstation ergonomics training for all staff, ergonomics information selected and disseminated by the design team via a weekly newsletter, a workstation self-adjustment guide, and ergonomic training provided for newly purchased office equipment.

At a state prison site (worksite size 289), design team meetings were suspended for a long period because of layoffs associated with labor negotiations. Nevertheless, a health fair was organized on the basis of health/safety issue/concern areas identified and prioritized by the design team. Experts were brought in to provide information and educational materials about sleep disorders and how best to adjust to shift work, healthy eating and weight loss, preventive measures in a new state health care plan that many correction officers were confused about, stretching exercises presented by a physical therapist who had experience working with correction officer injuries and rehabilitation, and support options offered by the Employee Assistance Program. Correction officers were systematically relieved throughout the prison so that they all could attend.

DISCUSSION

On the basis of the results of the field testing reported on here, front-line employees were able to use the IDEAS Tool with the help of a PE×HP program facilitator to generate intervention proposals that upper management could support. In addition, the interventions that resulted were aligned with the host organization's goals and integrated so that employee health protection and promotion were both benefited.

One factor that in some cases prevented the IDEAS Tool from being used most effectively was the lack of regular meetings of the design team because of scheduling issues or staff shortages. This impeded progress in intervention planning, resulting in frustration within both the design team and the steering committee. Progress was also slowed in some instances because of the lack of communication between the design team and steering committee regarding available resources, and the role of the design team when interventions were implemented. Although these limitations can be addressed through additional training, the CPH-NEW continues to explore new ways to expedite intervention planning through improvements in the IDEAS Tool itself.

CONCLUSIONS

The IDEAS Tool offers a number of strategic benefits to the host organizations. Use of the IDEAS Tool allows the TWH model to be realized within an integrated health protection and health promotion PE×HP program, and for this to occur without a large up-front commitment of resources for a set of top-down initiatives that are usually found in conventional programs. Furthermore, this "grassroot" intervention planning approach incorporated company-specific employee demographics, physical infrastructure, workplace culture, organizational practices, leadership style, regional norms, and so forth that are known to impact intervention effectiveness. The IDEAS Tool also allowed for adoption of outside models and approaches (R2P) when these were determined within the IDEAS planning process to be a good fit for the organization.

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