Combining a person-centered and ecological approach to develop, implement, evaluate and sustain workplace innovation in organizations: Intervention mapping

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Abstract

Workplace innovation (WPI) aims to strengthen both an organization's performance and the employees' quality of work life by improving the work environment in an organization. This contribution proposes the intervention mapping (IM) protocol to develop, implement, and evaluate and sustain WPI in an organization. IM combines person-centred and ecological (multilevel) views to involve individuals who function on diverse levels within an organization. The protocol applies theory-based change strategies to establish concrete and effective individual and environmental changes that are tailored to the local context of the organization.

Introduction

Workplace innovation (WPI) is a fairly recent notion that stands for implementing sustainable improvements in the work environment to benefit both organizational results and employee quality of work life (Pot, 2011). In this paper we introduce the systematic protocol of Intervention Mapping approach (IM: Bartholomew et al., 2016), that has been applied to improve health in communities and in organizations.

We think it is also quite suited to develop and implement a change programme to establish a lasting WPI.

Establishing lasting WPI is much needed in knowledge-centred economies to maintain the welfare and security of a gradually declining workforce due to an ageing population (Oeij, Dhondt, Kraan, Vergeer, & Pot, 2012). To increase labour productivity for example, WPI promotes employee skills and competencies. The ideal is to involve employees in reorganizing and designing the work environment. These ideas on WPI have been made publically available via several documents under the auspices of the European Commission (Dhondt & Totterdill, 2014). Some European countries have attempted to develop WPI programmes (Pot, 2011), but a sustainable implementation of workplace innovation still lags behind in many European organizations. The main reason is that attempted changes encounter many unforeseen obstacles and prove less effective than intended.

We believe that IM may help to prevent these obstacles as the protocol advocates a practical approach given that WPI research findings often do not provide concrete advice on how to implement changes (Oeij, De Looze, Have, Van Rhijn, & Kuijt-Evers, 2012). For example, employee well-being has often been related to firm performance or product innovation, but such an association does not tell us whether employee well-being is the cause or the consequence of firm performance or product innovation (Kesselring, Blasy, & Scopetta, August, 2014). This implies that research findings cannot provide hands-on solutions for WPI and the actual methods to accomplish them.

Moreover, the available methods for workplace and social innovation only provide a general description of the potential change processes (Pot & Koningsveld, 2009) and, typically, lack the detail necessary for practitioners to apply them directly in the local context. Importantly, the choice of appropriate change methods and their implementation is only possible as part of a thorough intervention development process. Such a process has to create a realistic and effective change programme to which all individuals involved are committed.

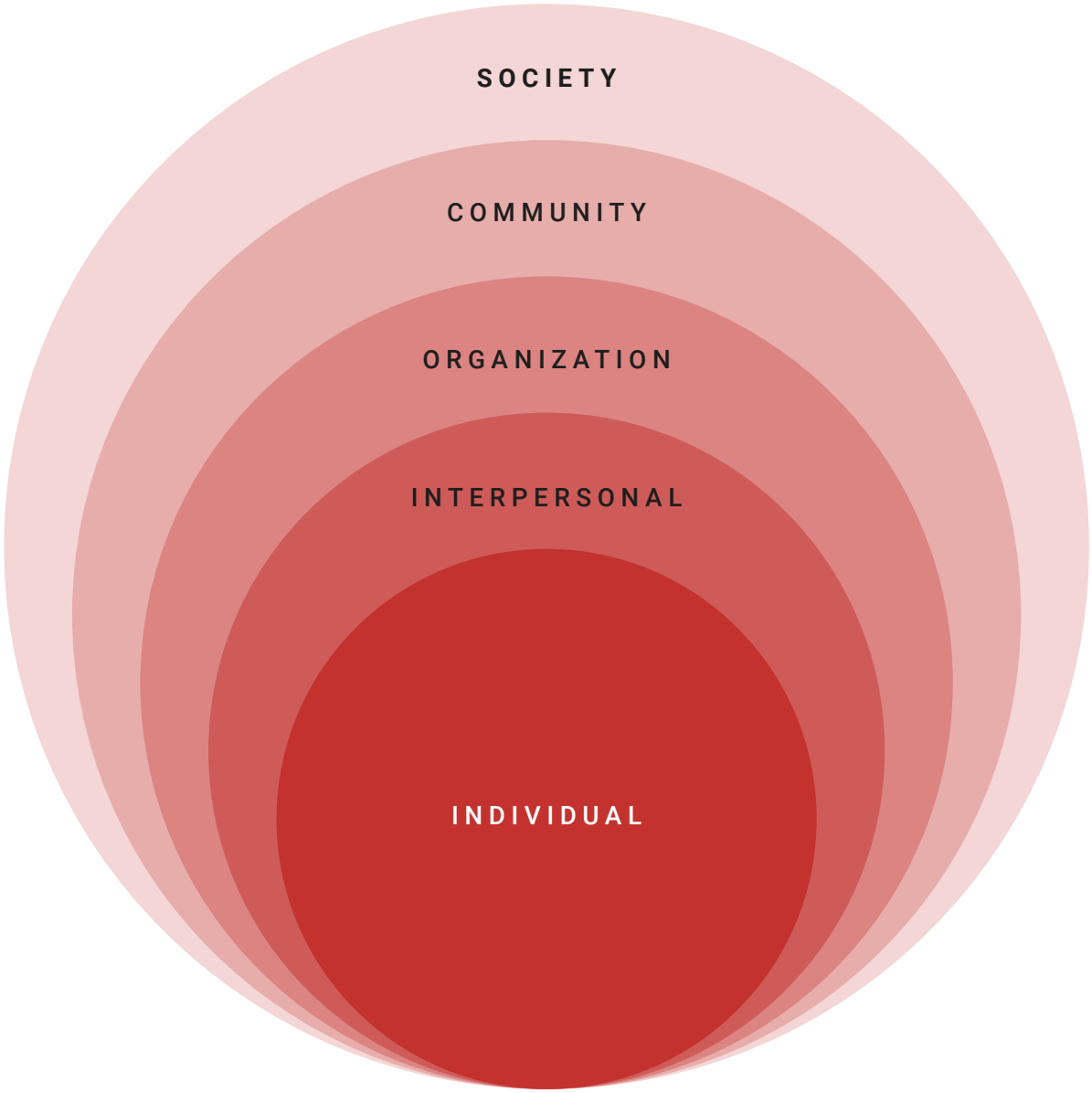
In this respect, the IM approach is a promising protocol to successfully develop, design, implement, evaluate, and sustain workplace innovation in an organization (Bartholomew et al., 2016).

IM: individual and environmental change

The IM protocol emerged in the 1990s from a general discontent with the reliance on fragmented scientific knowledge that often resulted in ineffective health interventions (Bartholomew, Parcel, & Kok, 1998). To date, IM has been applied successfully to develop and implement interventions to minimize health risks such as HIV, smoking, and to promote healthy behaviour through physical fitness programmes and more balanced nutrition (Wisenthal & Krupa, 2014). IM interventionists are often health and social psychologists who are well-versed in translating theoretical methods of behavioural change into concrete, practical applications that are tailored to the context.

IM views individuals as embedded in an ecological environment (van Doorn, Kok, & Ruiter, 2015) and IM interventionists realize that intervention plans may change and that the development process must remain flexible and allow for iterative loops to update earlier design decisions. See Figure 1 for a representation of IM's view on individuals as embedded in ecological levels.

Figure 1. Schematic representation of the ecological view and the positions of individuals (Adapted from Kok, Gottlieb, Commers, & Smerecnik, 2008).



Note: The individual employee may be viewed as embedded in an environment with a number of interconnected organizational levels and even ecological levels that extend beyond the organization. Individual and organizational changes required to establish WPI are accomplished by involving and targeting individuals who function on these diverse and connected ecological levels.

Participation of individuals

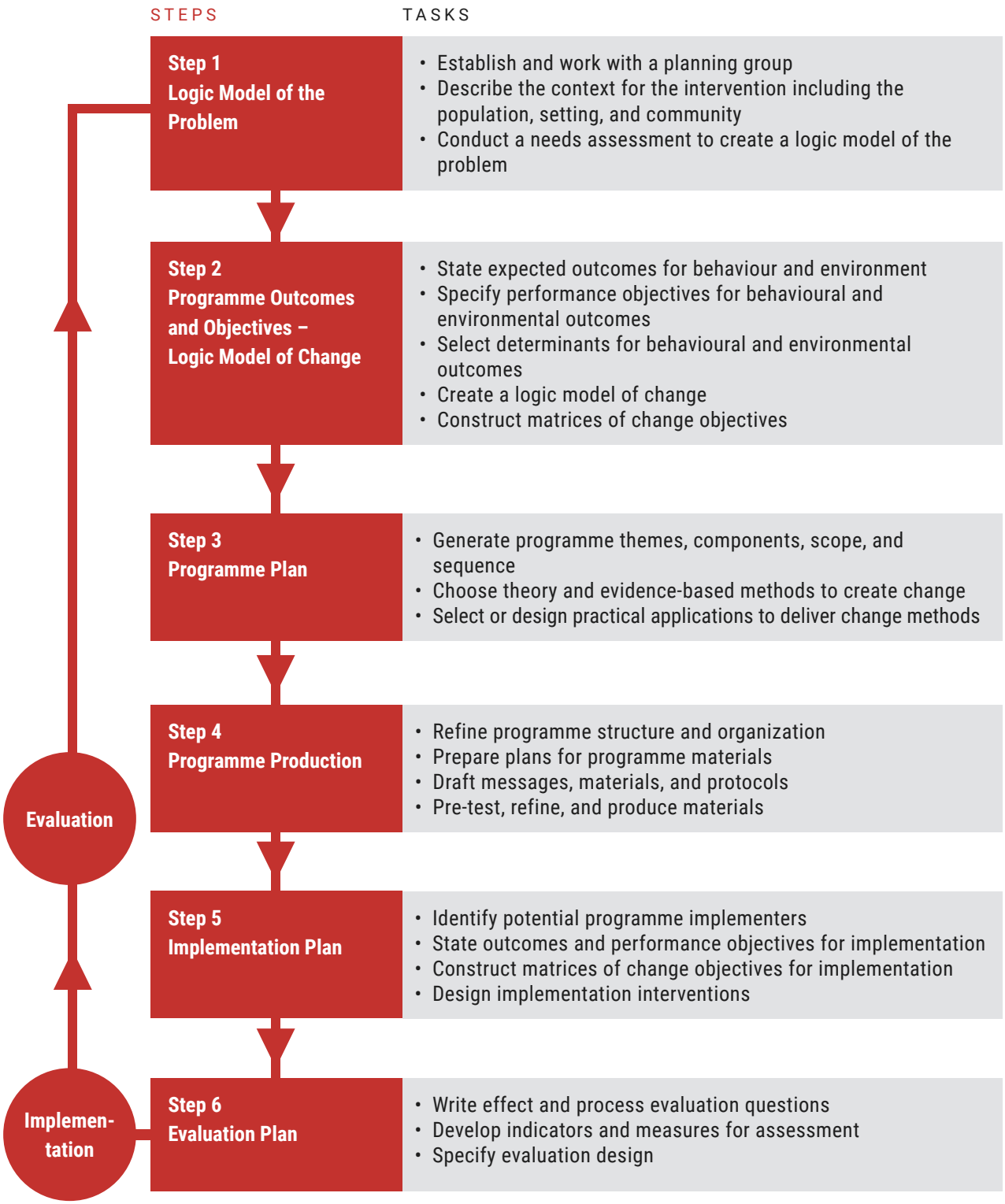
An IM change programme to accomplish WPI involves both employees and management in developing the intervention, and also targets these various stakeholders during the actual change process. Interventionists establish participation in programme development by inviting representatives from diverse ecological levels to participate in the planning group. These levels may reside inside but also outside the organization. Representatives from within the organization may be employees on the work floor but also individuals from Human Resources (HR) and upper management. Individuals from outside the firm may be representatives of labour unions and local government. This approach ensures that all participating stakeholders can integrate their knowledge, experience, and creativity. It also ensures a realistic view on the expected scope of the solution in the local setting, and warrants commitment to the change programme at all environmental levels (Kok et al., 2008).

Individuals embedded in the above-mentioned environmental levels may also be the targets of the change programme. Indeed, to establish sustainable WPI, an IM change programme will target employees on the work floor. However, any change on a lower environmental level requires support from higher levels (van Doorn, Massar, & Kok, 2018). Such support may entail motivating the employees as well as supporting them in realizing potential alterations of procedures or even infrastructures. A complete intervention programme will describe in detail the (testable) change strategies to accomplish both individual and environmental changes in the organization.

IM Development Steps

Once the decision is made to implement WPI, the six steps of the protocol are followed in programme development. See Table 1 for an overview. The required activities per programme development step imply that the interventionists are proactive in preventing the effects of the intended changes from being hampered by local environmental influences. Note, in addition, that every development step needs to be well-documented, so that design decisions are detailed and transparent. Such a rigorous documentation also facilitates the common practice in IM to return to previous development steps to verify or even update earlier design decisions to accommodate recent insights.

Table 1
Intervention Mapping Steps in Terms of Required Activities and Products (adapted from Bartholomew et al., 2016).



Note: The arrows signify the linear and iterative nature of the design process.

Step 1. Create the logic model of the problem.

First, the assembled planning group identifies the main issues or problems in the organization that must be solved to make sustainable WPI possible. The group identifies the context in which the intervention will take place, and distinguish individual and environmental factors that contribute to the problems. Established theories may be used but are complemented by local data gathering via talks and interviews with employees on several levels within the organization. The goal is to create a so-called logic model of the problem that describes in detail all factors that contribute to the problem. The model intends to be realistic and interventionists include only those factors that can be changed. For example, one factor may be that employees on the work floor do not talk about what WPI may mean for them and the organization. Part of the change programme may entail stimulating employees in voicing their opinion on WPI.

The logic model of the problem is complemented and refined by an overview of the available resources such as approval of the intervention and financial support by management. Such a basis is essential to warrant the development of a realistic and effective change programme. During IM's Step 1, it should become apparent which parts of the general philosophy of WPI can be fulfilled and which parts may not be attainable. For example, the analysis may reveal that the need for improving quality of work life is substantial but that limited financial resources and other senior management support may not allow large-sale changes of the organization's infrastructure.
The final logic model incorporates only changeable factors for a realistic framing of the problem.

Step 2. Formulate programme outcomes and change objectives per ecological level.

In Step 2, the factors contributing to the identified problem(s) are now used to define two concrete types of objectives. Performance objectives specify the required employee performance (e.g., employees voice their opinion) and change objectives detail what must be changed (e.g., employees gain and express confidence to voice their opinion) to reach the formulated performance objective. Change objectives may also pertain

to environmental changes. Below we show that, to be effective, these changes also require targeting individuals at higher levels within the organization.

IM's person-centred, ecological view prescribes that a change objective is reached by changing the so-called determinants of behaviour. Examples are beliefs, attitudes, perceived norms, self-efficacy, but also knowledge and skills (Kok, Gottlieb, et al., 2015). Self-efficacy (confidence in one's performance ability) is, in our example, the determinant that is targeted to promote voicing behaviour of employees on the work floor. Such a change is ineffective if it is not supported by individuals who function at higher levels in the organization, such as supervisors and senior management.

During the second development step, the interventionists create matrices of change objectives. Each matrix is a tabulated overview per ecological level of performance objectives (rows) and determinants (columns) that must be targeted to accomplish the change objective (cells). Change objectives are used to create concrete and tailored change applications in Step 3. Note that the present example (Table 2) is necessarily simple. It is not uncommon to target a number of determinants and change objectives for a single performance objective, such as self-efficacy in combination with skills and outcome expectations (Kok, Gottlieb, et al., 2015). A matrix typically specifies a number of distinct performance objectives.

Change objectives pertaining to employees on the work floor cannot be realized in isolation and require support from individuals on alternate environmental levels. This means that these individuals become part of the change plan and that a separate matrix is created to specify performance objectives, determinants and change objectives for supervisors, as well as for upper management. This may even extend to individuals outside the organization. The change programme by the end of Step 2 describes which change objectives (targeting individuals on several levels) must be reached to fulfil the intended programme outcomes (WPI).

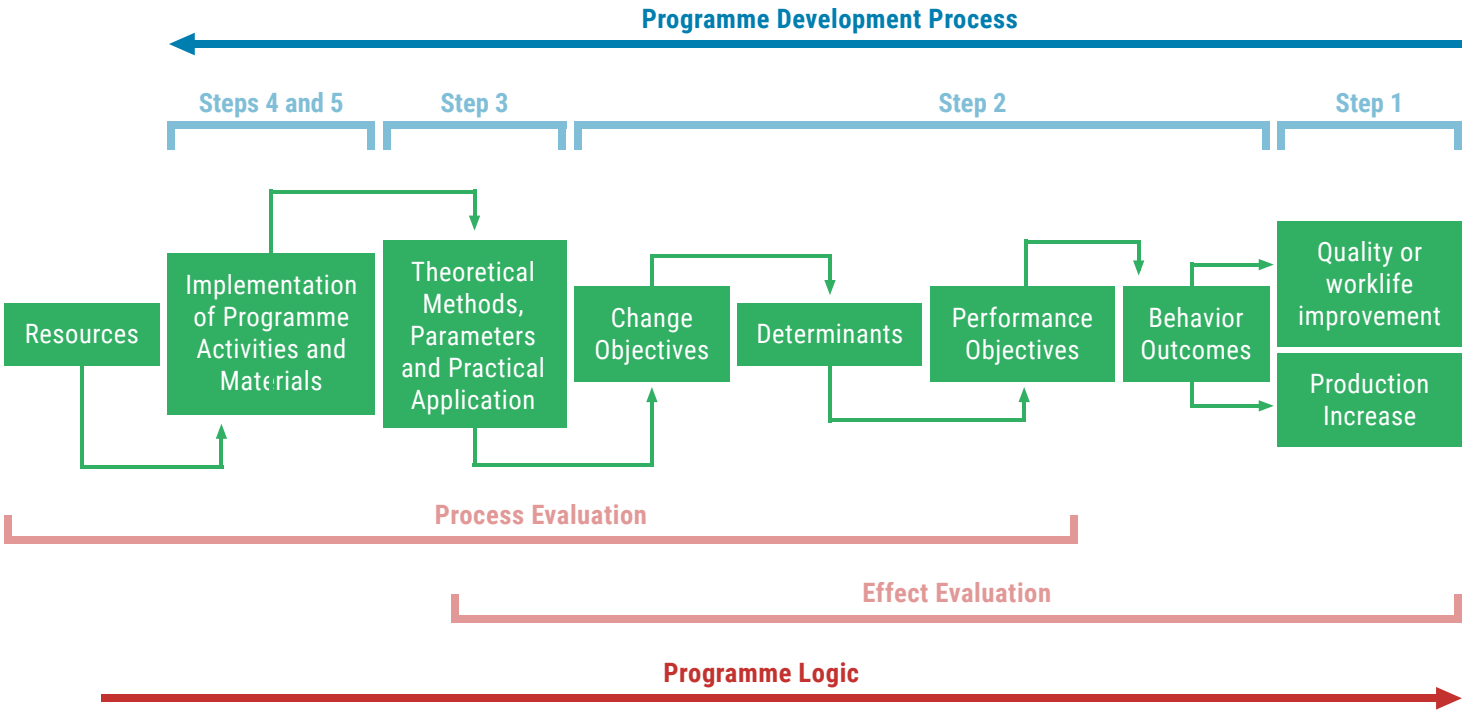
The intervention plan is represented by the logic model of change (see Figure 2 for details).

Table 2
Example of a Matrix of Change Objectives.

General behavioural outcome at the employee level	Determinants of behavioural change		
	Determinant 1: self-efficacy	Determinant 2	etc.
Performance objective 1: Employees voice their opinion on WPI	Change objective 1.1: Employees express their confidence in voicing their opinion	Change objective 2.1	etc.
Performance objective 2	Change objective 1.2	Change objective 2.2	etc.
etc.	etc.	etc.	etc.

Note: The matrix follows the example provided in the text and, for the sake of clarity, shows only one combination of performance objective and determinant to form a change objective at the employee (work floor) level. Typically, the change programme (Step 2) specifies more than one performance objective and also more than one determinant. Hence, a table (per ecological level) may have several rows and columns. A row in a table has more than one cell that each specifies a change objective. At this phase of the intervention development, the change objectives (cells) can be made very concrete without specifying in detail what the objectives will accomplish. However, the IM protocol precludes that programme designers mistakenly adopt these change objectives as being change applications. Change applications will be specified later and need to be based on theoretical change methods that have empirical support.

Figure 2. The Intervention Logic Model (Adapted from Bartholomew et al., 2016)



Note: The Intervention Logic Model shows the logic of programme development from right to left along the protocol steps from general outcomes, through performance and change objectives (via determinants) to selecting change methods, translating them into change applications, designing materials and planning how to implement them. The protocol requires programme planners to start at the right side and work through every single development step to prevent omissions that often hamper the effect of interventions in organizations. Following the model from left to right reveals the change logic of the programme from implementing materials toward behavioural and programme outcomes.

Step 3. Programme plan: designing theory-based and tailored change applications.

Step 3 creates concrete change applications to target the behavioural determinants and to reach the change objectives as specified earlier. Concrete change applications are tailored to the local ecological context and are based on theoretical change methods that are selected from the literature. The interventionists selects theoretical change methods based on their support in the literature as well as based (from experience) on how effective they are expected to be in the current change programme. See Table 3 for the outcomes of the development process of Step 3 in our example.

For instance, as shown in Table 3, to motivate employees to become more confident in voicing their ideas on WPI, interventionists may decide to apply a social cognitive theory (Bandura, 2004) based change method, namely, "modelling" to improve employee self-efficacy to voice their opinion. The resulting change application may involve presenting a video of a model employee who is confident and successful in voicing her ideas to her colleagues and supervisor. Such an application must be embedded in the ecological context and this requires that interventionists identify barriers (i.e. parameters) that potentially hamper the effect of the change application, and turn these barriers into effective facilitators.

Barriers and facilitators of change application effectiveness.

A potential barrier, to improving employee self-efficacy in voicing their opinion, could be that the actors in the video who voice their opinions on WPI are not taken seriously as representing typical colleagues. Therefore, an important facilitating factor on the employee level could be that the video shows actors and ideas that are recognized as representing the local context (Bandura, 2004).

Another potential barrier may be that employees will not gain confidence in voicing their opinions if they are not supported by their supervisor. Supervisors may thus be involved as essential facilitators of the change applications targeted at the employee level. However, it is necessary to ensure that these supervisors are able to play a facilitating role. In other words, supervisors are also targets for behavioural change. Interventionists may have anticipated this from the start or have to return to Step 1 to alter the logic model and then identify change objectives for the supervisors in

Table 3
Intervention Mapping Procedure and Required Contents (per Column) in Step 3 of the Protocol to Translate Change Objectives into Theory-based and Tailored and Effective Change Applications (Adapted from Kok, Gurabardhi, Gottlieb, & Zijlstra, 2015).

Determinant and change objective	Theoretical change method	Parameters: barriers and facilitators	Change application
Outcome expectations: Upper management is informed about and will endorse the need for WPI and believes that its implementation and management can be done effectively and has benefits in the long run.	Sense making via persuasive communication (Elaboration Likelihood Model): Guiding individuals toward the adoption of an idea, attitude, or action by using arguments or other means.	Central processing of arguments about health statistics and causal theories on organization benefits. Messages need to be relevant and not too different from the beliefs of the manager, and are repeated to promote continuous change.	A number of presentations by interventionists and health promotion organizations with information on the importance of WPI and the advantage of the IM protocol to implement and maintain it effectively. Show, explain and discuss past and potential IM success.
Beliefs: Supervisors are convinced that feedback provision helps employees to form and maintain confidence in voicing their opinion on WPI.	Belief selection (Theory of Planned Behaviour): Using messages designed to strengthen positive beliefs, weaken negative beliefs, and introduce new beliefs.	Requires investigation of the current beliefs of the supervisors. Resulting action plans must have reachable goals and time schedules, and must be tailored to the target group.	Managers exchange their beliefs and discuss under supervision how feedback can be given. The goal is to come to a concrete action plan to: Train feedback provision, implement, and evaluate.
Self-Efficacy: Employees express confidence in voicing their opinion on WPI.	Modelling (Social cognitive theory): Providing an appropriate model and being reinforced for the desired action.	The employee must identify with the models, must be able and is reinforced to apply the portrayed behaviour effectively in her personal job context.	Employees watch a video in which model employees successfully voice their opinion on WPI and receive appropriate feedback from supervisor and colleagues. The portrayed situation contains recognizable individuals and situations and emphasizes the commitment of supervisor and senior management.

Note: Rows specify the organizational level.

Step 2 and match them with fitting determinants. Interventionists subsequently work through Step 3 and select appropriate theoretical change methods, and translate them into tailored change applications (Kok, Gottlieb, Panne, & Smerecnik, 2012).

For example (see Table 3), it may be necessary that supervisors are stimulated to select the suited belief (determinant) that employees can be motivated to voice their opinion if they receive suitable feedback (Reasoned Action Approach: Fishbein & Ajzen, 2010). The theoretical change method belief selection may be translated in a change application that involves a supervised group discussion. The discussion should lead to a concrete plan to acquire the skills (determinant) to motivate employees to voice their ideas, and to give them motivating feedback (supervisor performance objective) on their WPI opinions (Dysvik & Kuvaas, 2012).

Moreover, support from senior management is a strong facilitator of all change applications on the lower ecological levels. However, the absence of this support may also bar the anticipated effects of change applications. By being part of the intervention planning group as well as a target in the change programme, top management should already be stimulated to endorse the need for workplace innovation and to promote a positive organizational climate (Dysvik & Kuvaas, 2012). From the start, interventionists should also target the organization's human resource department and upper management and inform and update them about WPI and how its implementation and sustainable management can be done (cost-) effectively with lasting employee and organizational benefits. For example, the theoretical change method sense making may entail persuasive communication (Elaboration Likelihood Model: Petty, Barden, & Wheeler, 2009) to alter outcome expectations (determinant) (see Table 3). The change method sense making is facilitated by repetition. The change application includes a number of presentations and updates by a planning group member (for instance, a management representative) to provide information on the required changes to realize WPI in the local environment (facilitator) and to highlight the advantages of the IM protocol to develop, implement, evaluate and sustain it effectively (Kok et al., 2008). The suggested change application could further be facilitated by involving, from the start, local government, and union representatives and labour inspectorates to provide additional credibility to the benefits of WPI.

Steps 4 and 5. Programme production and implementation.

The change programme plan is now turned into a product plan that specifies the strategies and activities that need to be organized to create deliverable programme materials. The end product of Step 4 comprises a number of refined documents that specify the materials to be used and all the individuals that will be involved in developing these materials (Bartholomew et al., 2016). These products are fully reviewed by the planning group and all members must agree that they are ready to plan the programmes's actual implementation in Step 5. The interventionists subsequently develop concrete logistic plans to implement the product plan in an organized manner. The interventionists select the programme implementers and train them in applying the logic, strategies and materials of the change programme.

Step 6. Evaluation plans development.

Plans are made for programme evaluation as an integral part of the Intervention Mapping process. IM distinguishes the evaluation of the development process including determining the quality of the programme implementation plan, from evaluating the effects of the actual implementation (Bartholomew et al., 2016).

Process evaluation planning is part of the entire change design process and is meant to identify and correct the potential weaknesses and flaws in the design (Biron & Karanika-Murray, 2014). The documentation of the design process and the design decisions are critically reviewed. If decisions are viewed as unsuitable they can still be updated and this may urge the interventionists to return to and check earlier planning products. Also, these concurrent process checks and improvements are documented.

Change programme implementation effects can be proximal or distal. Proximal effects may entail, for example, whether targeting a determinant (self-efficacy) has the expected and immediate increase in motivation to voice one's opinion. This can be reliably measured by a planned query of employees and implementers before and after the implementation (Kok, Zijlstra, & Ruiter, 2014). To capture the distal effect of the change programme on productivity and well-being, summative evaluations are planned on a yearly basis as part of the workplace innovation maintenance process.

Discussion

Intervention Mapping is analogous to route mapping in which a route planner determines where she is now and plans the way to find a destination (van Doorn & Blokland, 2014). Similar to a mapped route, IM planners create visual information aids such as tables and diagrams that function as landmarks on their route. But, the route mapping analogy does not fully describe what the IM development process entails. Unlike a road map, the route toward programme completion must be created during the IM development process and it is common to return to former positions and partly rerun the process. That is why IM landmarks or even large parts of the development landscape must often be adapted by renewed insights during the developmental process (Bartholomew et al., 2016).

The usefulness of the IM protocol to plan sustainable WPI can be more fully understood by realizing that IM allows for the integration of scientific and practical knowledge to create the best possible understanding of the local need for WPI. IM prescribes an intervention developmental process that starts with assembling a multidisciplinary planning group, proceeds with prescribed development steps that include iterative checks of design decisions, and anticipates programme implementation and the evaluation of its effects (Bartholomew et al., 2016). The protocol has been used to evaluate earlier intervention programmes and has shown that change applications are often based on intuition, do not account for potential environmental barriers and are not tailored to what the environment needs (Schaafsma, Stoffelen, Kok, & Curfs, 2013). Therefore, the IM framework can help interventionists to avoid pitfalls that are still common in many interventions and which are listed and explained in the final discussion section.

Lessons learned from IM to avoid common pitfalls in the development and implementation of WPI

The IM protocol is the refined product of more than a decade of experience in intervention design, implementation and evaluation. The protocol is also meant to avoid a number of problems and pitfalls that have tended to hamper or even preclude the effectiveness of many organizational interventions in the past (Bartholomew et al., 2016) and may also weaken the effectiveness of WPI development and implementation.

These factors are compiled into the following recommendations that assume that interventionists take the time to become well-versed in applying the IM protocol to establish WPI:

- **An intervention objective solves an identified problem.** The IM protocol prevents interventionists from starting too early with specifying specific change applications. Interventions that fail to perform a proper analysis of the problem are often unable to produce a causal model that defines the problem and its potential solution. For example, practitioners may mistakenly think that simply informing employees that they should voice their opinions will lead to WPI. Instead, interventionists must be able to perform a proper investigation to chart the problem as it occurs in the context of the entire organization, and create WPI within the boundaries of the commitment and (financial) support by the client.
- **Change programme is both theory-based and practice-oriented.** The IM protocol requires interventionists to become well-versed in selecting theoretical change methods. IM is not meant to create new theories, but intends to apply existing theories, but only if they fulfil three requirements (Bartholomew et al., 2016). First, theories should provide well-described behavioural change methods that clearly indicate cause and effect of the behavioural change. Second, the method should have strong support from scientific research. And third, the planning group should be convinced that the change method is appropriate to be translated into a tailored and effective change application that contributes to establishing WPI.
- **Programme development requires both involvement and commitment of the involved individuals.** From the start, IM involves the basic target groups, organizational management, and perhaps even governmental and union representatives. These groups are represented in the planning group and their involvement and commitment defines the scope of the political and financial support to the programme to establish WPI within the context of the organization. Past interventions that failed to establish full support and commitment often experienced difficulties during programme finalization and implementation. This even applies to the actual implementers of the programme. In fact, the change programme will be ineffective if these implementers lack the proper training and commitment. It is essential that programme planners guard the entire process from training these individuals to the period in which they actually implement the change programme (Durlak, 1998).

- **Change programmes target individuals.** IM prescribes that any change objective starts with individuals who may function on diverse levels within the environment. This also applies when establishing WPI in the local context requires alterations of the infrastructure. These changes start with the beliefs and intentions of those individuals (for example upper management or even union representatives) that can realize the support to establish such a change. IM makes this possible as it combines person-oriented with ecological viewpoints and regards individuals as embedded in an environment that consists of interrelated levels.
- **Intervention programmes identify barriers to change applications.** Many interventions only target employees on the work floor and thus fail to identify potential (environmental) barriers. Instead, the IM protocol specifies that change plans target diverse interrelated levels and that change applications may be affected by environmental influences from the same but also from alternate ecological levels. Individuals on higher levels (e.g., upper management) may act as facilitators of a behavioural change on the work floor but also to support necessary environmental changes such as workplace redesign.
- **Interventionists fully document the development process.** IM requires programme planners to document the entire planning process. These required documents provide a detailed and active history of the development process, make it possible to return and evaluate and, possibly, adapt earlier design decisions. These documents also provide the criteria for evaluating the change programme's proximal and distal effects. The documentation should distinguish what will be changed from how it is changed (Schaalma & Kok, 2009).
- **Interventionists must plan the evaluation of both the programme development process and of the programme's effect.** The two types of evaluation provide invaluable information and are required to gain a complete overview of the effectiveness of an intervention programme. Evaluations should bring clarity as to why an intervention to establish WPI is or is not effective (Coffeng et al., 2012).

To conclude, Intervention Mapping is a promising protocol to develop, implement, evaluate and sustain effective WPI. The approach establishes individual and environmental changes via the behavioural change of individuals that function on diverse interconnected levels within an ecological environment. Experienced interventionists instigate and supervise the development process according to protocol. They form a participatory planning group, perform a problem assessment

and resource analysis, and plan, implement and evaluate evidence and theory-based change applications tailored to the organizational context (van Doorn et al., 2015; van Doorn et al., 2018).

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