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The Integrated Migrant worker Safety Training Evaluation Model: IMSTEM

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Abstract

This paper presents the development of the IMSTEM (Integrated Migrant worker Safety Training Evaluation Model), which aims to provide guidance on how to evaluate the transfer of safety training of migrant workers. Addressing the lack of rigorous safety training evaluation frameworks, the IMSTEM, using a mixed methods, multi-source approach, covers the deficiencies of previous models. The IMSTEM has its foundations in three main sources: a) the integration of safety training literature in relation to migrant workers; b) the theoretical framework of realist evaluation, which enables evaluators to understand what works for whom in which circumstances; and c) the integration of the training transfer and training effectiveness literatures. This paper offers an effective tool for safety training evaluation, which considers the longitudinal nature of training transfer. The IMSTEM consists of five phases starting from the pre-training phase to the second follow-up phase, thus considering all levels in Kirkpatrick's model (reactions, learning, transfer, and results of training). In order to increase the likelihood of the training achieving its intended outcomes, the IMSTEM suggests ways in which measurements of training transfer may be used both by professionals and organizations interested in maximising transfer of safety training for migrant workers.

Keywords: safety training; realist evaluation; migrant workers; training transfer; training effectiveness

The Integrated Migrant worker Safety Training Evaluation Model: IMSTEM

A recent literature review by Peiró, Nielsen, Latorre, Shepherd, and Vignoli (2020) called for a rigorous evaluation of safety training of migrant workers in construction, considering both the transfer and the outcomes of training. They highlight inadequacies in existing training provision as a key issue impacting migrant workers' safety. Furthermore, Vignoli, Nielsen, Guglielmi, Mariani, Patras, and Peiró (2021) presented the design for training migrant workers in construction and argued for a particular focus on training non-technical skills. The lack of rigorous safety training evaluation models, however, is not restricted to the construction sector.

A lack of theory-based evaluation models is a general issue in safety research (Ricci, Chiesi, Bisio, Panari, & Pelosi, 2016; Robson et al., 2012). Models have been developed for the evaluation of safety training that capture the transfer of training, e.g., whether knowledge and skills acquired during training are generalized into workplace behaviours and whether such changes in behaviours are maintained over time (Pedersen, Nielsen, & Kines, 2014; Vignoli, Punnett, & Depolo, 2014). We reviewed these models and identified three limitations. First, they do not build on the wider training transfer literature. Second, they do not identify the factors that should be evaluated. Third, they do not combine two crucial elements of training evaluation: training transfer (i.e., whether knowledge, attitudes, and skills lead to changed behaviours in the workplace that are maintained over time; Baldwin & Ford, 1988) and training effectiveness (i.e., whether training achieves its intended outcomes such as improvements in safety compliance and proactivity). With respect to migrant workers in particular, evaluation does not capture the characteristics specific to migrant workers (Peiró et al., 2020). Based on realist evaluation (Pawson & Tilley, 1997), we developed the Integrated Migrant worker Safety Training Evaluation Model (IMSTEM) that integrates the

training transfer and training effectiveness literatures to evaluate what works for whom in which circumstances when training migrant workers in safety. It is our hope that the IMSTEM can serve as inspiration and guidance on how to evaluate the effectiveness of safety training.

Evaluating safety training: Current approaches and limitations

Previous occupational safety and health training evaluations have primarily focused on outcomes in the form of knowledge, attitudes and beliefs, behaviours, and health (Ricci et al., 2016; Robson et al., 2012). Asari and Leman (2015) reviewed current approaches to evaluating safety training using the Kirkpatrick (1994) 4-level training evaluation model. They concluded that safety training is rarely systematically evaluated; safety training is most often only evaluated at the first level of the Kirkpatrick model (reactions to training). As a result, evaluation provides little knowledge on how to design future safety training (Asari & Leman, 2015).

Ford, Baldwin, and Prasad (2018) highlighted two ways in which training evaluation research needs to enhance our understanding of how we can optimize training outcomes. First, there is large body of research on training transfer, i.e., the extent to which knowledge, skills, and behaviours learned in training are generalized to the workplace and the extent to which learning is maintained and retained over time (Baldwin & Ford, 1988). Training transfer is important because it may inform the development of future training, improve working practices, improve social interactions and support at work, and help us develop more effective transfer tools (Volet, 2013). This literature has largely failed to connect the transfer of training to whether the intended outcomes of training are achieved (Ford et al., 2018) and has rarely been used in safety training (Ricci et al., 2016). Two exceptions are the studies of Freitas and Silva (2017) who interviewed trainers about training methods, and the individual

and work environmental factors influencing transfer, and Hussain, Pedro, Lee, Pham, and Park (2018) who applied training transfer to safety training of migrant workers. Both studies failed to link training transfer to training outcomes.

Second, the majority of training transfer research has been cross-sectional with little consideration of how trainees proactively shape their jobs based on their newly acquired skills and knowledge once they return to the workplace and thus has failed to consider the dynamic nature of how learning is transferred to the workplace and evolves over time (Blume, Ford, Surface, & Olenick, 2019). For example, if migrant workers meet resistance when attempting to apply newly learned skills and knowledge, they may be less persistent in applying this knowledge. If they are encouraged to apply skills this is likely to increase attempts to use such skills and knowledge (Blume et al., 2019) and further develop their safety behaviours. The use of cross-sectional study designs also presents a challenge in the migrant worker safety training literature. In the review by Peiró et al. (2020), ten out of 18 studies employed a cross-sectional design and three used pre-and post-training knowledge tests. Only five studies looked at the impact of training on workers after they had returned to the workplace. In the present paper, we present a new framework that addresses these calls; the Integrated Migrant worker Safety Training Evaluation Model (IMSTEM). The IMSTEM integrates the training transfer and effectiveness models and suggest ways in which measurements of training transfer may be used by professionals and organizations to optimize transfer to increase the likelihood of the training achieving its intended outcomes.

The IMSTEM

The IMSTEM extends the current literature on training transfer and effectiveness in three ways. First, most training transfer models have been developed from reviews of existing research (e.g., Baldwin & Ford, 1988), rather than being based on theoretical frameworks. In

the present model, we employ realist evaluation as our underpinning theoretical framework. We argue that realist evaluation offers a good underpinning theory for evaluating the transfer and effectiveness of training. The training transfer literature has distinguished between open skills and closed skills training (Yelon & Ford, 1999). Closed skills training focuses on teaching skills and knowledge where there is one correct way of completing a task, e.g., using a safety harness, whereas open skills training refers to training where there is more than one way of applying the skills and knowledge learned, e.g., identifying hazards and the correct way of addressing these hazards (Yelon & Ford, 1999). Complex interventions work through emergent and recursive causality (Rogers, 2008). We propose that open skills training can be seen as a complex intervention, in that there is no direct translation of skills into the work setting, but rather relies on individuals making decisions about how to change their behaviours in the workplace post-training (Yelon & Ford, 1999). The IMSTEM focuses on open skills training, as safety training in non-technical skills requires trainees to identify hazardous situations in the workplace and translate skills and knowledge learned during training to appropriate behaviours to alleviate safety risks (Yelon & Ford, 1999).

We propose there are two forms of mechanisms in safety training. First, the attendance and engagement in training itself, and the training content and training methods (e.g., classroom teaching, interactive group exercises, etc.), are likely to influence whether migrant workers acquire new skills and knowledge. Once migrant workers acquire skills and knowledge, the second mechanism is the extent to which these skills and knowledge are translated into actual safety behaviours in the workplace. There are also contextual factors at the individual and work environmental levels that may influence whether these mechanisms are triggered. These factors may be different for the two sets of mechanisms.

Second, we integrate three disparate training literatures. First, the training transfer literature has focused on identifying the factors that influence training transfer, e.g., the work

environment and individual characteristics, which may influence the extent to which training is transferred to the workplace, generalized to the work setting, and maintained over time (Baldwin & Ford, 1988). The literature has failed to consider the factors that may be of particular importance to training transfer among migrant workers. We rely on the safety training literature and in particular the literature review of Peiró et al. (2020) and Hussain et al. (2018) when identifying the individual and contextual work environment factors that may influence the extent to which migrant workers first attend and engage with training and later attempt to transfer learning to the work site.

As mentioned above, the training transfer and training evaluation literatures have been relatively disparate, and in the present paper, we present an integrated model. In doing so, we developed a five phase model that integrates the safety training of migrant workers' literature (Peiró et al., 2020), the training transfer literature (Baldwin & Ford, 1988; Blume et al., 2019) and the training effectiveness literature (Kirkpatrick, 1994). In the following, we present this model and at each phase propose measures that may capture each element. We were inspired by the three phases of the dynamic transfer model (Blume et al., 2019): 1) post-training knowledge and skills that the trainees intend to transfer; 2) initial transfer attempts; and 3) evaluation and integration of feedback from the initial transfer attempt. The model suggests that behavioural changes should be evaluated together with intent to transfer and suggests a self-regulatory process whereby trained workers try out new behaviours and, depending on their success; workers retain or modify their behaviours (Blume et al, 2019). Our model also addresses the call of Bell, Tannenbaum, Ford, Noe, and Kraiger (2017) who, in their review of 100 years of training research, called for future research on the importance of self-efficacy, the mechanisms of training design and the constraints of the work environment.

In the five phase model, we first describe the individual and work environmental contextual factors, which we propose influence whether migrant workers attend and engage

with training, together with the baseline of our proposed outcome measures. In the second phase, during training, we describe the mechanisms that may lead to transfer of training, attendance and engagement with training, and the content and delivery methods of training. The third phase is immediately at the end of training, and we propose which mechanisms may result in training outcomes and the contextual factors, both individual characteristics and in the work environment, that may trigger these mechanisms. We also propose a set of intermediate outcomes, i.e., the safety behaviours that training focused on, however, these depend on the training objectives and may therefore differ from training to training. In the fourth phase, we propose three months post-training the mechanisms that may lead to intended safety outcomes and the contextual factors, which may either facilitate or hinder mechanisms being triggered. Finally, in the fifth phase, we propose after six months to measure the outcomes of training. We propose a mixed methods approach to data collection. We rely primarily on quantitative measures of mechanisms, context and outcomes to ensure breadth and representativeness, however, supplement with observations of training, and qualitative data to ensure richness and in-depth understanding of the reasonings of trainers delivering training, migrant workers, and their supervisors.

Insert figure 1 around here

Phase 1: Pre-training

In order to understand the contextual factors, which may influence attendance and engagement with training, the training transfer literature suggests both individual and work environment contextual factors (Burke & Hutchins, 2007). In the following, we propose the

factors that may be particularly important for safety training of migrant workers. These factors may be captured through a short questionnaire distributed to trainees prior to training.

Context: Pre-training individual characteristics

Pre-training individual characteristics are those characteristics that individuals possess which may influence attendance at and engagement in training. Due to the cross-sectional nature of most training transfer research (Blume, Ford, Baldwin, & Huang, 2010), relatively limited attention has been paid to the factors that may influence engagement with training. We propose that a number of demographic factors may influence migrant workers' attendance and engagement with training. These factors include number of years and spells in the host country as an indicator of whether migrant workers are accustomed to the safety culture and regulations in the host country (Peiró et al., 2020). Personal resources that may influence attendance and engagement with training is training self-efficacy, i.e., the extent to which migrant workers are confident they can acquire new skills and knowledge during training (Colquitt, LePine, & Noe, 2000). Learning self-efficacy has been significantly related to motivation to learn (Chiaburu & Marinova, 2005), but unrelated to training transfer. This suggests that learning self-efficacy is an important prerequisite to training and should be measured pre-training. Guthrie and Schwoerer (1994) proposed a measure for learning self-efficacy. An example of an item from this measure is: "I am confident that I can succeed in training".

Context: Pre-training work environment factors

Training transfer models suggest that the wider contextual work environment plays a key role in training transfer (e.g., Baldwin & Ford, 1988; Burke & Hutchins, 2007). Pre-training contextual factors are also likely to influence attendance at and engagement with training itself. For example, supervisors may be more likely to encourage migrant workers

and prioritize time for trainees attending training if they exert safety leadership, i.e., put safety on the agenda and seek solutions to safety-related issues (Gurt, Schwennen, & Elke, 2011). A slight adaptation of the health leadership measure by Gurt et al. (2011) to focus explicitly on safety may capture safety leadership. An example of an item could be: "My supervisor includes me in decisions concerning safety issues".

Not only safety leadership may influence the extent to which migrant workers attend and engage with training. Safety climate has been found to be important for safety outcomes (Clarke, 2006, 2010). Migrant workers working in organizations that include safety issues in work practices and procedures are more likely to see the value of learning more about how to work safely and therefore attend and engage with training. A short safety climate measure that captures the policies and practices of working safety is the Jorgensen, Sokas, Nickels, Gao, and Gittleman (2017) safety climate measure. An example of an item is: "Safety remains a priority even when work runs behind schedule".

Pre-training outcomes

Organizations are performance-oriented rather than learning-oriented (Volet, 2013) and thus it is important to measure safety outcomes. When measuring the effectiveness of training, it is important to capture whether any changes in intended outcomes can be observed post-training. As it is often challenging to identify suitable control groups in organizational settings (Nielsen & Miraglia, 2017), internal reference evaluation can be used (Nielsen, Randall, & Christensen, 2010). In internal reference evaluation, the individual pre-training measures are used as a baseline and compared to measures post-training to detect any changes within the individual. Such evaluation takes place at multiple levels. To determine whether knowledge and skills are acquired post-training, trainees should complete pre-training tests about their existing knowledge and skills levels; this can be done at the

beginning of the first training day (for an example of an internal reference evaluation, see Vignoli et al., 2021). To determine whether training brings about the intended changes to safety behaviours, e.g., safety compliance and proactive safety behaviours, it is important to capture safety behaviours before training. Unlike learning, which should be captured immediately after training, changes in safety behaviours need to be captured after migrant workers have had the opportunity to practice these behaviours in the work site (Volet, 2013). As accident and injury rates are influenced by many contextual factors, we propose to measure safety compliance and proactivity as outcome measures. Suitable measures may be for safety compliance the measure by Neal and Griffin (2006) and safety proactivity by Parker, Williams, and Turner (2006), examples of such items are: "I use all the necessary safety equipment to do my job" and "I implement ideas for safety improvements myself", respectively.

In summary, prior to migrant worker safety training, short surveys should capture the contextual factors such as characteristics of the migrant workers and the work environmental factors that predict attendance and engagement with training. To test the effectiveness of training, outcome measures should also be measured at baseline. In the following, we discuss the training mechanisms and the contextual factors that should be collected during training.

Phase 2: During training

Mechanisms during training

Multiple mechanisms may be triggered during training and influence whether skills and knowledge acquired during training are transferred into changes in safety behaviours post-training. First, attendance at training, in particular where training runs over multiple sessions, is important to capture. We therefore propose that trainers delivering the training keep a log of attendees. If migrant workers do not attend all training sessions, they are less

likely to acquire the skills and knowledge trained and thus less likely to change their safety behaviours.

The training transfer literature has found multiple factors influencing training transfer. For instance, trainers' presentation and use of materials, their reactions to migrant workers' input and migrants' reactions to their trainer may influence learning and subsequently training transfer (Burke & Hutchins, 2007). In the safety literature, less attention has been paid to the role of trainers (Freitas & Silva, 2017). In the literature review by Peiró et al. (2020), migrant workers identified the importance of trainers understanding migrant workers' work situation and the particular pressures they face. An important part of training evaluation is therefore to observe what happens during training.

Bust, Gibb, and Pink (2008) called for research that explored how safety messages are transferred, the types of narratives they communicate, how they are intended to be communicated and the discourses they represent. To explore this, we propose observations of training sessions. Such observations will allow us to collect data on how migrant workers react to the trainer and to the material, how the trainers in return react to migrant workers' input, how trainers deliver the material and how migrant workers interact with each other. Haslam et al. (2005) found that participation was crucial to ensure workers assume responsibility and ownership, and creatively suggest solutions to problems. Therefore, we propose to observe whether trainees are forthcoming in sharing their experiences and suggesting solutions during training. To understand whether shared values and a collaborative climate developed within the group, it is important to observe how migrant workers interact with each other (Bust et al., 2008). The observations capture whether trainers delivered the material in the way it was intended and how trainees react to the material.

Observations, however, do not capture how trainers feel about the material. Freitas and Silva (2017) interviewed trainers about their perceptions of best practices for training transfer, factors that influence transfer, and trainers' sense of responsibility for training transfer. We therefore also propose to conduct short reflective interviews with trainers after each training session. How migrant workers engage with training material is particularly important as previous research has found that materials not in trainees' native tongue may be difficult to understand (Peiró et al., 2020). A particular challenge in developing training materials is the fact that in many countries, migrant workers are from many different cultures and speak many different languages so translating into the native tongue may prove challenging (Eurostat, 2019). Even when training materials are translated into trainees' native tongue it may be difficult if translations are poorly conducted (Peiró et al., 2020). Trainers should be interviewed about how useful they found the exercises of the training, be it teaching materials or group work and what could be done differently. Trainers should be asked to keep a record of how many attended and whether the number helped learning and facilitated meaningful interaction. Baldwin, Ford, and Blume (2017) argued that it is important to understand what strategies trainers use to make training stick and we propose to explicate these strategies through interviews.

In summary, we propose that evaluators observe training sessions and interview trainers to understand how trainees interact with trainers and training material and capture the reflections of trainers. Such information is invaluable to understand whether trainees learn the material and thus optimises the chance of training transfer. In the following, we discuss which measures to include post-training.

Phase 3: Post-training

Immediately post-training, we propose to test whether learning has taken place. This can be done by pre- and post-knowledge tests (Evia, 2011; Forst et al., 2013). We propose to measure contextual factors which may trigger outcomes and a baseline of intermediate outcomes, i.e., the changes in behaviours related to non-technical skills (Mariani, Vignoli, Chiesa, Violante, & Guglielmi, 2019).

Mechanisms post-training

As it is people's thoughts and reasoning that drive behaviours (Pawson, 2013), it is important to understand the thoughts that may drive migrant workers' future transfer attempts to translate skills and knowledge into actual safety behaviours in the workplace. An important first mechanism thus becomes whether migrant workers intend to transfer knowledge and skills acquired during training and translate these into changes to safety behaviours in the workplace. Most research on training transfer has focused on motivation to transfer (e.g., Ford et al., 2018), however, *intent to transfer* may be more important (Al-Eisa, Furayyan, Alhemloud, 2009; Cheng & Hampson 2008). Migrant workers may be motivated to transfer but anticipated obstacles to transfer may dampen their intentions thus hampering transfer attempts. Intent to transfer among migrant workers may be particularly important as these workers often experience conflicting demands between safety and meeting performance targets (Choudhry & Fang, 2008; Menzel & Gutierrez, 2010). Motivation or intent to transfer has been found to predict behavioural changes (Huang, Ford, & Ryan, 2016) and may thus be an important precursor to migrant workers attempting new safety behaviours. Most research has focused on motivation to transfer pre-training, however, the content and methods of training are likely to influence intent and should thus be measured post-training (Massenberg, Schulte, & Kauffeld, 2017). Yelon, Sheppard, Sleight, and Ford (2004) developed a measure of intention to transfer which can be tailored to capture the intention to transfer safety

knowledge into safety behaviours. An example of a tailored item could be: “I believe what I learned on the training can help me work more safely”.

Context post-training: Individual characteristics

The training transfer literature has found that self-efficacy, the extent to which trainees believe they can successfully overcome obstacles at work, has been important for skills and knowledge being translated into behavioural changes (Burke & Hutchins, 2007). Huang et al. (2017) found that post-training self-efficacy predicted initial attempts to transfer and thus safety self-efficacy may be an important contextual factor for triggering future transfer attempts. An example of a safety-self-efficacy scale that could be useful is the measure develop by Katz-Navon, Naveh, and Stern (2007) and an example of an item is: “I am confident in my ability to prevent safety hazards in my gang”.

Context post-training: Work environmental factors

The training transfer literature points to factors that may moderate training transfer. The meta-analysis by Blume et al. (2010) pointed to three work environment factors: transfer climate, support and organizational constraints. Transfer climate is operationalized as safety climate and measured at baseline in phase 1. Migrant workers often suffer a poor relationship with their supervisors and experience pressures to engage in unsafe work behaviours (Dutta, 2017). The supervisor support measure by Holton, Bates, and Ruona (2000) could be used to capture this construct. An example of an item is: “My supervisor meets with me to discuss ways to apply training on the job.”

Workers need to collectively engage in safe work practices and therefore peer support for training transfer may be important. Often migrant workers work in close-knit units (Al-Bayati, Abudayyeh, Fredericks, & Butt, 2017) and thus peer support is crucial. The peer

support measure by Holton et al. (2000) could be used to capture this construct. An example of an item is: "My colleagues encourage me to use the skills I have learned in training".

Workload is a known organizational constraint in the safety literature that prevents migrant workers from focusing on safety; migrant workers in particular experience demands to prioritize performance over safety (Choudhry & Fang, 2008; Menzel & Gutierrez, 2010). It is likely that work demands predict transfer attempts to change safety behaviours. We propose using an adapted version of the HSE Indicator tool (Edwards, Webster, Van Laar, & Easton, 2008) asking specifically about whether demands prevent migrant workers from working safely. A tailored item could look like this: "I have to neglect some aspects of safety because I have too much to do". The examination of workload is an important addition to the training transfer literature as Blume et al. (2010) found only two studies have focused on constraints.

Post-training intermediate outcomes

Managing safety issues is not only reliant on technical skills (Yule, Flin, Paterson-Brown, & Maran, 2006) but also so-called non-technical skills (Flin, O'Connor, & Crichton, 2008). These skills have been defined as the "cognitive, social and personal resource skills that complement technical skills and contribute to safe and efficient task performance" (Flin et al., 2008, p.1). To understand non-technical skills important for ensuring safety among migrant workers, Vignoli et al. (2021) identified five critical skills: teamworking (a shared approach to working safely); situational awareness (the ability to identify hazardous situations); communication (communicating about hazards); decision making (deciding how to approach and manage hazardous situations); and the management of fatigue and stress (acknowledging how being tired and stressed may influence safety behaviours). These skills should be measured immediately after training so that we have a baseline measure for

assessing changes over time. We propose the measure by Mariani et al. (2019) could be used. Example items of the five scales are: “I care about my colleagues' safety” (teamwork), “I foresee possible future hazards while I'm working” (situational awareness), “When required, I make quick decisions to ensure safe working” (decision-making), “I raise concerns about unsafe work practices” (communication), and “I recognise the causes of mental fatigue that pose a risk to working safely” (management of stress and fatigue).

Unlike safety proactivity and compliance, our outcome measures, we do not measure these intermediate outcomes pre-training as trainees are not expected to have engaged in these behaviours pre-training but should acquire these through training. Safety proactivity and compliance, however, are global safety behaviours (Clarke, 2006, 2010) and thus we measure those at baseline, pre-training.

In summary, we propose that intent to transfer is an important mechanism for training transfer to occur, however, as contextual factors within the individual and the workplace may hamper future transfer attempts these factors should be measured post-training. We also propose that whether important non-technical skills have been acquired through training should be captured at this stage. In the following, we discuss training transfer and the factors which may influence training transfer.

Phase 4: 1st follow-up

Although there are no fixed recommendations for when to follow-up, the average time found in the meta-analysis by Blume et al. (2010) is 14 weeks. The dynamic training transfer model advocates the continued measurement of training transfer processes (Blume et al., 2019), therefore we propose two follow-ups; the first at 12 weeks after training has been completed and the second a further 12 weeks after that. Twelve weeks should give migrant

workers an opportunity to practice a range of safety behaviours and an additional six months sufficient for behaviours to consolidate.

1st follow-up mechanisms

We propose that two mechanisms may be of particular importance post-training. First, we propose that maintaining safety knowledge may be important. Ahonen et al. (2013) found that migrant workers who participated in training maintained hazard awareness as they continued to use training material. We therefore propose a single item to assess whether migrant workers have consulted training material post-training. Another important mechanism is evidently actual transfer attempts, i.e., the extent to which migrant workers transfer what they have learned to their daily job and make changes to their safety behaviours. Trainees are active participants with agency to navigate the transfer process and they have a choice in the extent to which they transfer knowledge and skills (Blume et al., 2019). It is thus important to understand how training transfer evolves over time (Blume et al., 2019). Migrant workers' evaluations of initial attempts will determine whether further attempts are made and whether safety behaviour changes (Blume et al., 2019) and it is thus important to capture their initial attempts to transfer. We propose that the scale by Grohmann and Kauffeld (2013) could be used to capture transfer. An example of an item is: "In my everyday work, I often use the knowledge I gained in the training."

Context: 1st follow-up: Individual characteristics

We propose that intent to transfer may still be an important factor influencing attempts to transfer. If migrant workers have experienced resistance to their transfer attempts in the 12 weeks post-training, their intent to transfer in the following 12 weeks may dwindle.

Context: 1st follow-up: Work environment factors

One important contextual factor post-training that may trigger transfer attempts is opportunities to use skills and knowledge acquired during training in the workplace. If migrant workers do not find themselves in situations that allow them to try out new safety behaviours or they do not have the necessary equipment to work safely, they are unlikely to attempt new safety behaviours. Opportunities to use skills and knowledge may encourage migrant workers to continue to apply learning and they may also develop their capabilities further as they have the chance to adapt skills, knowledge and behaviours to the reality they face in the workplace (Ford et al., 2018). In their meta-analysis, Roediger and Butler (2011) found that active repetition facilitated training transfer; the more trainees use skills learned the more likely they are to be consolidated. Focusing specifically on safety communication training, Dingsdag, Biggs, and Sheahan (2008) emphasized the importance of trainees having the opportunity to practice and perfect communications skills. We propose that a tailored version of the Holton, Bates, Seyler, and Carvalho (1997) opportunities measure could be tailored to capture the accessibility of resources and conditions to work safely. An example of an item could be: “I have been given the tasks necessary to apply the skills and knowledge about safety I learned on the training”.

We propose that support continues to be crucial to training transfer and thus we propose to repeat the peer support using the measure by Holton et al. (2000). The training transfer literature has found that supportive supervisor behaviours are particularly important after training (Lancaster, Milia, & Cameron, 2013). Schindler and Burkholder (2016) conceptualized transfer supervisor support as mentoring, coaching, social support and task support. Supervisors who follow up on training and discuss how skills and knowledge can be applied in the work setting are likely to encourage migrant workers to attempt to transfer training (Ford et al., 2018).

Asking only migrant workers does, however, only give us part of the picture (Ford et al., 2018). It is well-known that workers and supervisors do not always agree on the way things are (Tafvelin, von Thiele Schwarz, & Hasson, 2017) and trainees tend to overestimate their transfer (Ford et al., 2018), compared to their supervisor (Chiaburu, Sawyer, & Thoroughgood, 2010). It is therefore also important to ask supervisors about the strategies they employ to hold migrant workers accountable and how they motivate them to transfer skills and knowledge learned during training (Ford et al., 2018). Accordingly, we propose also to ask supervisors to complete the questionnaire about supervisor support to understand how supervisors perceive they support migrant workers' transfer and whether there is congruence between migrant workers' and supervisors' perceptions of support (Tafvelin et al., 2017). A short survey measure, however, does not capture the richness of the supervisor-migrant worker interaction, and we propose to also interview supervisors using critical incident technique (Flanagan, 1954) to capture specific situations in which supervisors have encouraged training transfer.

1st follow-up intermediate outcomes

To identify whether improvements can be detected in the intermediate outcomes in the 12 weeks post-training, we propose to measure the intermediate outcomes at this time point too.

In summary, the continued use of training materials and actual attempts to transfer skills and knowledge to the workplace setting may be important mechanisms that bring about changes in outcomes. Whether migrant workers engage in transfer attempts depend on whether they face situations at work where they can try out new behaviours and are supported by peers and supervisors in doing so. We propose also to explore a different perspective on supervisor support, namely asking supervisors themselves how they support trained migrant

workers in their attempt to engage in changed safety behaviours. We propose to again survey migrant workers on their non-technical skills.

Phase 5: 2nd follow-up

In the fifth and final phase, it is important to evaluate whether changes to intermediate (non-technical skills) and distal outcomes (safety behaviours, safety proactivity and compliance) can be identified. First, however, it is important to gain additional insights into how migrant workers have experienced the training process.

2nd follow-up measurements

There are three aspects to opportunity to use knowledge and skills; breath (number of trained tasks), activity level (number of times performed), and type of task performed (simple vs. complex) (see Blume et al., 2019). We need to understand the choices trainees make post-training to discard, maintain, apply, or modify learning and skills in their work context and whether trainees seek out new situations (Ford et al., 2018). The elements are difficult to capture in detail in a survey and we need qualitative interviews to understand the thoughts and reasoning of migrant workers in transferring training content to the workplace (Ford et al., 2018). Using critical incident technique (Flanagan, 1954) to interview trained workers can help identify situations in which migrant workers have used training and understand how they applied training. It can provide invaluable information about which particular elements of training helped them work more safely, what the results were of training attempts and importantly what were the hindering and the facilitating factors in the work environment that shaped the outcomes of training transfer.

To understand the extent to which workers have continued to use training material and transferred training we propose to ask the same questions regarding accessing training material and engaging in transfer behaviours in the questionnaire.

2nd follow-up: Evaluating training effectiveness

To determine whether training achieved its intended outcomes, baseline measures must be repeated post-training. Thus follow-up includes completion of safety behaviours such as safety proactivity and compliance measures collected at baseline and the non-technical skills and behaviours measures collected at phases 3 and 4. Analyses of before and after safety proactivity and compliance will help us understand whether migrant workers have changed their behaviours. These outcome measures can be combined with survey measures that function as mediators (e.g., transfer attempts) and moderators (e.g., supervisor support and opportunity to use) that may be contextual factors influencing whether mechanisms are triggered or not (Nielsen & Miraglia, 2007). Measuring the development of non-technical skills and behaviours enables us to conduct survival analyses and analyse how contextual factors influence whether migrants engage in fewer or more attempts to transfer depending on the feedback from the environment. Finally, our observations and interview data provide a rich source of information on the mechanisms and contextual factors that may explain our outcomes.

In summary, in this last phase, we propose that proximal and distal outcomes should be captured and supplemented by interviews to gain a rich, in-depth understanding of why migrant workers have changed their behaviours – or not.

Discussion

In the present paper, we propose a theory-based model for evaluating the transfer of safety training aimed at migrant workers. We argue that whether training, if transferred, leads to intended safety outcomes depends on a variety of factors: How receptive the work environment has been to practice skills, knowledge, and behaviours learned; how trainees have been supported in using those skills; and whether attempts to use skills, knowledge, and

behaviours have been successful. Pre- and post-analyses of training outcomes do not offer much insight into why any changes happened – or not. It is important to analyse the mechanisms and contextual factors measured at previous stages to determine their impact. For example, was a successful training outcome influenced by the level of support or was this potential relationship thwarted by a hindering context where trainees had little opportunity to practice their learned skills?

In the existing safety training literature, migrant workers are seen as passive recipients of training (Peiró et al., 2020), however, once these workers return to their workplace, they have to be proactive in changing their behaviours and seek out situations in which they can practice learned behaviours. In particular, with regards to safety, migrant workers often have to balance safety and time pressures (Choudhry & Fang, 2008; Menzel & Gutierrez, 2010) and suffer cultural and language barriers (Peiró et al., 2020). To date, there has been little research on how to evaluate whether transfer of training happens. Transfer of training is crucial to understanding the mechanisms of training, e.g., is the training content inadequate for migrant workers to gain the sufficient knowledge to work safely at the worksite, or are the methods of learning inappropriate such that migrant workers do not learn or are they simply not encouraged to apply learning and skills once they return to the worksite? These questions are important to answer to design future training or to develop supportive interventions, e.g., supervisor training to motivate supervisors to encourage safe behaviours or organizational interventions aimed at introducing a safety climate supported by effective safety practices and procedures.

Strengths and limitations

The main strengths of the present framework are the integration of the safety training literature, in particular in relation to migrant workers, the theoretical framework of realist

evaluation, and the integration of the training transfer and training effectiveness literatures. An additional strength is the proposed mixed methods, multi-source approach. In the present paper, we only present this IMSTEM framework. A limitation of the paper is that we do not validate this. We call for researchers to test the model to assess its validity and ability to detect the factors that influence training effectiveness.

Our proposed framework, however, does suffer from a number of limitations. First, in the present model, we restrict our conclusions to open skills training. We suggest that safety training is akin to complex interventions as such training requires independent decision making and translation of skills into the complex work setting. Blume et al. (2010) found in their meta-analysis that transfer factors were more closely related to open skills training. A possible explanation is that such training presents more challenges for workers to proactively make decisions on how to translate skills and knowledge into behavioural changes (Volet, 2013), for example, training on safety awareness, i.e. identifying safety hazards requires independent decision making.

Second, we acknowledge that completing surveys may be challenging for low-skilled migrant workers with limited language abilities. We suggest that it may be useful to perform telephone interviews or visit the worksites and be available for workers when completing questionnaires to encourage workers to complete the questionnaires. Where migrant workers are in a particular language group, e.g., Hispanic workers, as is often the case in the US (Peiró et al., 2020), translating questionnaires may be an option.

Third, it could be argued that many of the measures we include could have been measured at more times than we suggest here, however, we argue it is important to keep the surveys as short as possible to ensure workers do not feel overburdened and drop out.

Fourth, we suggested two follow-up times to capture the dynamic training transfer as recommended by Blume et al. (2017). To the best of our knowledge, there are no formal recommendations or follow-up times. We considered three and six months follow-ups to be appropriate as this is likely to be sufficient time for trainees to try out a range of safety behaviours at the workplace and to adjust these depending on the feedback they receive from the environment. The longitudinal studies included in the literature review by Peiró and colleagues (2020) used three (Ahonen et al., 2013; Forst et al., 2013) or six months follow-ups (Harrington et al., 2013; Williams, Ochsner, Marshall, Kimmel, & Martino, 2010). Furthermore, the meta-analysis on training transfer found the average follow-up time was 14 weeks (Blume et al. 2010).

Fifth, in its entirety, the IMSTEM is time-consuming and require high-level research expertise, e.g. performing interventions using critical incident technique.

Finally, we have not specified in detail, which safety behaviours trainees should apply. In one place, we suggest safety proactivity and compliance, however, which safety behaviours are measured depends on the objectives of the training."

Conclusion

Given the need to evaluate the effectiveness of safety training programmes and the absence of rigorous methods for that purpose in relation to migrant safety training, this paper offers an effective tool for safety training evaluation: the IMSTEM. We propose the IMSTEM may serve as guidance on how to evaluate the effectiveness of safety training for migrant workers. The main contributions of the IMSTEM model are threefold: First, the IMSTEM model is based on a comprehensive review of the separate literatures and integrates previous training transfer and training effectiveness models, building on their strengths and overcoming their individual deficiencies. Second, its five-phase structure allows evaluators to

determine, which factors to measure at which point thus moving beyond the cross-sectional nature of the existing evaluation of migrant worker training. Collating this information can help evaluators and organisations to refine existing training and support the development of future training to ensure training achieves it intended outcomes. Third, the model provides concrete guidance as to which measures to collect and how to analyse data once collected to understand the factors that influence training outcomes. The IMSTEM may be successful in evaluating safety training programmes and transfer among migrant workers in the construction sector but it can be adapted to other safety training programmes among other collectives of workers.

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Figure 1: IMSTEM