

The Genesis of Safety Awareness: Cognitive Disruption, Unlearning and Reflective Transition in OSH Training Readiness

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Abstract

This study examines the genesis of safety awareness among Occupational Safety and Health training participants, focusing on internal cognitive processes prior to the internalisation of formal learning. While existing research has emphasised behavioural outcomes and compliance-based indicators, limited attention has been given to how pre-existing assumptions are challenged and reshaped. Addressing this gap, the study adopts a qualitative interpretative phenomenological approach to explore how safety understanding emerges through cognitive disruption and reflective engagement. Data were generated through interviews, observations, and document analysis involving a purposive sample of 15 OSH practitioners with relevant industry experience and training exposure. The data were analysed using thematic analysis to identify patterns of cognitive transformation. The findings indicate that safety understanding begins not with knowledge accumulation but with cognitive disruption that destabilises existing mental models, followed by reflective unlearning and reconstruction of meaning. Participants experienced internal conflict and uncertainty that prompted reassessment of prior practices. These findings show that learning is initiated through the breakdown of assumptions rather than passive acquisition. The study contributes by positioning cognitive disruption and unlearning as key mechanisms in safety learning, with implications for designing training programmes that promote deeper and context sensitive safety practices.

Keywords: Cognitive Disruption, Unlearning, Reflective Learning, OSH Training, Safety Awareness

Introduction

The role of Occupational Safety and Health Coordinators (OSHC) in Malaysia has become increasingly important following recent developments in occupational safety regulations. As individuals responsible for coordinating workplace safety activities, OSHC enter training programmes with workplace experience, assumptions, and established routines that shape how safety concepts are interpreted and applied. Existing safety research has established that

training can improve knowledge, skills, behavioural performance, and transfer to the workplace, while safety-culture scholarship has clarified the interaction between psychological, behavioural, and situational influences on safety practice (Salas et al., 2020; Cooper, 2018). However, these outcome-oriented perspectives explain more about what changes after an intervention than how participants become cognitively ready to reconsider familiar but potentially unsafe practices before formal learning is internalised.

Workplace-learning research likewise shows that learners do not enter training as blank slates; prior experience, workplace affordances, and active cognitive processing shape the interpretation of new information (Billett, 2020; Mayer, 2020). Transformative-learning studies further establish that critical reflection can challenge taken-for-granted assumptions and support revised frames of reference (Mezirow, 2000; Taylor & Cranton, 2023). Unlearning scholarship, beginning with Hedberg (1981), explains why obsolete knowledge or routines may need to be relinquished before alternatives can be adopted. Nevertheless, these three bodies of literature are usually treated separately and do not adequately explain the linked, pre-behavioural sequence through which a safety-training participant first experiences cognitive disruption, then questions and releases an established assumption, and finally reconstructs the meaning of safe practice.

The specific theoretical gap, therefore, concerns the mechanism and sequence connecting cognitive disruption, reflective unlearning, and meaning reconstruction at the point of training readiness. It remains unclear how this transition is experienced by Malaysian OSHC participants whose safety assumptions have been shaped by local organisational routines, production pressures, and accumulated industry experience. Without this explanation, behavioural or compliance-based evaluations risk treating readiness as a pre-existing condition rather than an emergent cognitive transition. This study addresses that gap by exploring how safety awareness develops through the sequence of cognitive disruption, reflective unlearning, and meaning reconstruction among Malaysian OSHC participants. In doing so, it integrates insights from safety training, workplace learning, and transformative learning into a process-based account of the genesis of safety awareness.

Literature Review

Cognitive Disruption and Safety Learning

Contemporary learning theories suggest that meaningful learning often begins when individuals encounter situations that challenge existing assumptions and established ways of thinking. Such experiences create cognitive disruption, a condition in which previously accepted beliefs become insufficient for explaining new workplace realities. Rather than merely acquiring information, learners are encouraged to question familiar practices, critically examine previous experiences, and become more receptive to alternative perspectives (Illeris, 2020; Taylor & Cranton, 2023). Within occupational safety contexts, cognitive disruption is particularly important because workers frequently rely on routine practices and accumulated experience when making safety-related decisions.

In many workplace environments, safety knowledge develops through repeated exposure to operational routines and organisational norms. While such experiences contribute to competence and efficiency, they may also create strong mental models that influence how risks are perceived and interpreted. Over time, workers may develop a false sense of security

and become less sensitive to workplace hazards because previous actions have not resulted in negative consequences (Antonsen, 2021; Le Coze, 2022). Consequently, familiar practices may remain unquestioned even when they contain hidden risks or unsafe assumptions.

Cognitive disruption challenges these assumptions by exposing learners to alternative interpretations of workplace reality. Through reflective questioning, case discussions, and exposure to authentic workplace incidents, participants become aware of discrepancies between their previous beliefs and emerging understandings. Such experiences generate cognitive tension that encourages deeper reflection and critical examination of workplace practices (Illeris, 2020). However, cognitive disruption alone does not guarantee meaningful learning. The discomfort and uncertainty generated during this process must be accompanied by opportunities for reflection and interpretation if transformation is to occur (Taylor & Cranton, 2023). Therefore, cognitive disruption should be viewed as the starting point of a broader learning process that supports deeper awareness and safety-related learning.

Reflective Unlearning of Existing Assumptions

Following cognitive disruption, learners often enter a process of reflective unlearning, where previously accepted assumptions and workplace practices are critically reassessed. The concept has roots in Hedberg's (1981) account of how established knowledge may need to be discarded when it no longer supports adaptation. In this study, unlearning refers to the deliberate process of questioning, revising, and abandoning beliefs or behaviours that are no longer appropriate within changing workplace contexts (Becker, 2010; Tsang, 2021). Unlike traditional learning perspectives that focus primarily on acquiring new knowledge, unlearning emphasises the importance of letting go of outdated understandings before meaningful change can occur.

Within occupational safety environments, workers frequently develop routines based on accumulated experience and organisational expectations. While such routines may improve operational efficiency, they may also contribute to the normalisation of unsafe practices. Over time, workers may become less likely to question familiar behaviours because those practices have become embedded within workplace culture and everyday operations (Billett, 2020; Illeris, 2020). Reflective unlearning therefore becomes essential in helping individuals critically examine these assumptions and recognise limitations in their existing understanding. Despite its importance, unlearning remains one of the most challenging aspects of workplace learning. Individuals often become attached to familiar routines because those practices have previously produced successful outcomes. Consequently, they may resist alternative approaches even when evidence suggests the need for change (Becker, 2010; Tsang, 2021). Organisational pressures such as production targets, workload demands, and peer influence may further reinforce existing behaviours, making behavioural change more difficult to achieve (Poell et al., 2021). Reflective unlearning therefore requires cognitive awareness, emotional readiness, and organisational support to facilitate meaningful transformation.

Meaning Reconstruction in Safety Awareness Development

Meaning reconstruction refers to the process through which learners integrate new insights and experiences into revised understandings of workplace reality. Following cognitive disruption and reflective unlearning, individuals begin to reinterpret their experiences and construct new perspectives that influence future judgement, decision-making, and workplace

behaviour (Mezirow, 2000; Kolb & Kolb, 2021). This process is particularly important in occupational safety learning because it enables participants to move beyond procedural compliance towards a more reflective and meaningful understanding of safety.

Transformative learning theory suggests that meaningful change occurs when individuals critically examine existing assumptions and reconstruct their understanding through reflection and experience (Mezirow, 2000; Taylor & Cranton, 2023). Rather than simply accepting information presented during training, learners actively engage in interpreting experiences, evaluating alternative viewpoints, and developing new perspectives that better align with workplace realities. Through this process, safety awareness becomes increasingly personalised and internally driven rather than externally imposed.

Within occupational safety contexts, meaning reconstruction may also contribute to changes in professional identity. Participants begin to view themselves not merely as followers of procedures but as individuals who play an active role in recognising hazards, managing risks, and promoting safer workplace practices. Such transformation reflects a shift from compliance-oriented thinking towards a more reflective and responsible orientation to safety (Kolb & Kolb, 2021; Le Coze, 2022). Consequently, safety becomes integrated into professional values and everyday workplace decision-making.

Reflective Safety Awareness as a Foundation for Behavioural Transformation

Reflective safety awareness has increasingly been recognised as a critical foundation for sustainable behavioural change within occupational safety environments. While traditional safety training frequently focuses on procedural compliance and knowledge acquisition, contemporary learning perspectives suggest that long-term behavioural transformation requires individuals to develop a deeper understanding of the meaning and consequences of their actions (Illeris, 2020; Billett, 2020). Reflective awareness enables workers to move beyond merely following rules towards understanding why safety practices are necessary and how workplace decisions may affect both personal and organisational wellbeing.

Research on workplace learning indicates that behavioural transformation is more likely to occur when individuals engage in reflective evaluation of their experiences and assumptions (Mezirow, 2000; Taylor & Cranton, 2023). Through reflection, workers become more capable of recognising inconsistencies between existing practices and desired safety outcomes. This process encourages the development of self-awareness, critical judgement, and personal accountability, all of which are essential for supporting safer workplace behaviour.

Furthermore, reflective safety awareness contributes to the development of professional responsibility and safety ownership. Individuals who actively reflect upon workplace risks are more likely to anticipate hazards, question unsafe practices, and participate in safety-related decision-making processes (Le Coze, 2022; Salas et al., 2020). Rather than relying solely on organisational enforcement mechanisms, workers become active contributors to workplace safety through informed judgement and responsible action.

Consequently, reflective safety awareness may be viewed as an important intermediary process linking cognitive disruption, reflective unlearning, and meaning reconstruction to behavioural transformation. By fostering deeper engagement with workplace realities,

reflective awareness enables individuals to develop more adaptive, context-sensitive, and sustainable approaches towards occupational safety. This perspective provides an important conceptual foundation for understanding how safety learning evolves beyond compliance and contributes to meaningful changes in workplace practice.

Methodology

Research Design and Rationale

This study adopts a qualitative interpretative phenomenological approach to explore participants lived experiences in developing safety awareness within the Occupational Safety and Health training context. The selection of this approach is grounded in its capacity to capture how individuals interpret and make sense of their experiences, particularly when those experiences involve complex cognitive and emotional processes. In safety learning, participants do not simply receive information but actively engage in interpreting, questioning, and reconstructing their understanding through interaction with training content and prior workplace practices.

A qualitative design is therefore considered appropriate as the processes of cognitive disruption, internal conflict, and reflective transformation are inherently subjective and cannot be adequately captured through quantitative measures. These processes involve shifts in perception, moments of uncertainty, and reflective engagement that require in depth exploration. By focusing on participants lived experiences, this study seeks to provide a process-oriented understanding of how safety awareness begins to develop, rather than limiting the analysis to observable behavioural outcomes.

Sampling and Participant Selection

The study employed a purposive sampling strategy involving 15 Occupational Safety and Health Coordinators (OSHC) in Malaysia who had recently completed structured OSHC training, selected based on strict inclusion criteria, including relevant industry experience, completion of formal training, and representation across multiple sectors such as construction, manufacturing, and services. Participants were drawn from varied operational contexts, including high rise construction, infrastructure projects, production line operations, and service-based environments, to reflect the diversity of real workplace settings.

Rather than aiming for statistical representation, the study focused on selecting information-rich participants capable of providing meaningful and contextually grounded insights. The sample size is consistent with interpretative phenomenological research, where emphasis is placed on depth rather than breadth, and data collection continued until thematic saturation was achieved, with saturation observed from the twelfth interview onwards, where no new conceptual themes emerged, and confirmed after the fifteenth interview, indicating that the dataset was sufficiently rich to support rigorous qualitative analysis.

Table 1

Profile of Research Participants

Participant Code	Industry Sector	Work Context	Years Experience	of	Training Stage
P1	Construction	High rise building	10		Completed
P2	Services	Facility management	5		Completed
P3	Construction	Infrastructure project	12		Completed
P4	Manufacturing	Production line	8		Completed
P5	Services	Logistics operations	4		Completed
P6	Construction	Offshore support	15		Completed
P7	Manufacturing	Assembly operations	7		Completed
P8	Services	Technical services	5		Completed
P9	Construction	Civil engineering works	11		Completed
P10	Manufacturing	Plant operations	6		Completed
P11	Services	Maintenance services	6		Completed
P12	Construction	Structural works	13		Completed
P13	Manufacturing	Quality control	9		Completed
P14	Services	Operational support	6		Completed
P15	Manufacturing	Equipment handling	7		Completed

The participant profiles reflect a diverse and non-linear distribution across sectors and work contexts, representing the natural variation found in real training environments.

Data Collection Procedures

Data were generated through a combination of semi structured interviews, observations, and document analysis to ensure triangulation and depth of understanding. Semi structured interviews served as the primary data source, allowing participants to express their experiences in their own words while enabling the researcher to explore key areas in greater depth. The interview guide was developed based on the research objectives and refined through expert validation prior to data collection. Specifically, the guide was reviewed by two senior Occupational Safety and Health academics and an experienced industry practitioner to ensure clarity, relevance, and alignment with the study objectives. A pilot test was also conducted to refine the sequencing and wording of the questions.

The interviews ranged from 42 to 75 minutes depending on the richness of participants narratives and were conducted either face to face in a private setting or via digital platforms based on participant availability. This flexible approach enabled participants to share their experiences more openly and naturally. Observations were conducted during training sessions to capture participants engagement, interaction, and behavioural responses within the learning environment, providing insight into how cognitive and reflective processes unfolded in real time. Document analysis was also undertaken on relevant training materials to further contextualise participants experiences. The integration of these data sources enhanced the credibility of the findings through methodological triangulation.

Data Analysis Strategy

The data were analysed using thematic analysis following the framework proposed by Braun and Clarke, which involves a systematic and iterative six-stage process. The analysis began with familiarisation through repeated reading of interview transcripts and observation notes,

followed by initial coding, where meaningful segments of data were identified and manually coded using a highlighter-based approach on printed transcripts before being organised into structured categories. Subsequently, codes were grouped into potential themes by identifying patterns across the dataset, and these themes were then reviewed and refined to ensure coherence and alignment with the data. The themes were further defined and clearly named to capture the essence of participants' experiences, before being integrated into an analytical narrative supported by verbatim quotations. This structured approach ensured that the analysis remained systematic, transparent, and firmly grounded in participants lived experiences.

Trustworthiness and Reflexivity

To ensure rigour and trustworthiness, several strategies were implemented throughout the research process. Credibility was enhanced through prolonged engagement with the data and the use of verbatim quotations to accurately represent participants' voices, while transferability was supported through detailed contextual descriptions that enable readers to assess the applicability of the findings to similar settings. Dependability was strengthened through systematic documentation of research procedures, creating a clear audit trail that promotes transparency and consistency throughout the study. Confirmability was ensured by maintaining a systematic analytical process and minimising researcher bias through continuous reflection and reflexive practice. A reflexive journal was maintained throughout the study to document assumptions, decisions, and analytical reflections.

Reflexivity was particularly important given the researcher's professional background in Occupational Safety and Health, which provided valuable contextual insight while requiring careful management to minimise potential bias. Through continuous self-reflection and grounding interpretations in participants' narratives, the researcher ensured that the findings remained faithful to the data and accurately reflected participants lived experiences.

Findings

Cognitive Disruption and Internal Conflict

At the initial stage, participants demonstrated strong confidence in their understanding of safety, often equating procedural compliance with actual competence. However, exposure to structured training content disrupted this sense of certainty and encouraged participants to question their previous workplace practices.

Participant 2 (P2) stated:

"I thought I already knew everything about safety because I followed all the SOPs but when they explained the risks I realised I did not actually understand and it made me feel like I have been doing things wrongly all this time."

Participant 7 (P7) similarly explained:

"At first I was confident but during the training I started to doubt myself like maybe what I have been doing before was not safe at all."

Participant 5 (P5) added:

"When the trainer showed accident images that closely resembled my workplace situation, I felt a physical shiver. I had always thought it was fine to work that way, but in reality, I was unknowingly exposing myself to potential disaster."

These findings suggest that participants experienced cognitive disruption when previously accepted workplace practices were challenged by new information and learning experiences. Feelings of uncertainty, self-doubt, and reflection encouraged participants to reassess their existing assumptions and understanding of safety.

Reflective Unlearning of Prior Practices

Following the phase of disruption, participants began to critically reassess long-standing workplace habits and routines. This process involved recognising unsafe practices and consciously attempting to move away from behaviours that had previously been accepted as normal.

Participant 4 (P4) stated:

"I had to rethink everything. We used to do things a certain way because that is how it has always been done but once I saw the gap I had to consciously stop myself from falling back into those old routines."

Participant 9 (P9) explained:

"I feel uncomfortable because I realised I have been normalising unsafe practices for a long time."

Participant 15 (P15) added:

"It is difficult to abandon old habits because others around me are still doing the same thing. However, once I became aware of the risks, I felt guilty if I ignored them. I had to consciously force myself to adopt a safer approach."

These findings indicate that reflective unlearning required conscious effort and critical self-reflection. Participants described feelings of discomfort and internal conflict as they attempted to disengage from familiar workplace behaviours and adopt safer practices.

Meaning Reconstruction and Realignment of Identity

Following the phase of unlearning, participants began to reconstruct their understanding of safety through reflection and learning experiences. This process enabled them to develop a broader and more meaningful interpretation of workplace safety.

Participant 12 (P12) explained:

"During the practical session it finally clicked. I stopped seeing safety as a checklist for the auditor and started seeing it as my duty to protect my team's lives."

Participant 13 (P13) stated:

"Now I do not just follow instructions I try to understand the situation and think about the risks."

Participant 1 (P1) added:

“Previously I just followed what others said, but now I feel responsible to think independently and make safer decisions.”

These findings demonstrate that participants gradually reconstructed their understanding of safety beyond procedural compliance. Safety was increasingly viewed as a personal responsibility that influenced judgement, decision-making, and workplace behaviour.

Discussion

The Psychology of Cognitive Disruption in Safety Learning

The findings demonstrate that safety learning is initiated not through knowledge acquisition but through cognitive disruption that destabilises participants' pre-existing assumptions. This challenges conventional training approaches that assume learning begins with information delivery. Instead, meaningful learning occurs when participants experience a breakdown of certainty that prompts critical reflection. This aligns with the concept of disorienting dilemmas proposed by Jack Mezirow (2000), where transformation begins when existing frames of reference are challenged. However, this study extends the theory by showing that disruption in the OSH context is not only cognitive but also emotional, involving fear, discomfort, and self-doubt. These findings also challenge the traditional information processing model, as discussed by Richard E. Mayer (2020), by suggesting that prior knowledge must first be destabilised before new understanding can be meaningfully constructed.

Unlearning and the Challenge to the “Blank Slate” Assumption

This study challenges the assumption that participants enter training as neutral learners. Instead, participants bring deeply embedded mental models shaped by workplace routines, which often create a false sense of competence. This supports the concept of unlearning, as highlighted by Hedberg (1981) and further developed by Klaus G. Becker (2010), where outdated knowledge must be actively discarded before new understanding can emerge. The findings indicate that unlearning is cognitively demanding and emotionally challenging, requiring conscious effort to override habitual practices. Additionally, the presence of social tension suggests that unlearning is not purely individual but influenced by collective workplace norms, requiring individuals to negotiate between conformity and reflective awareness.

From Procedural Compliance to Reflective Safety Identity

The findings reveal a shift from procedural compliance towards the development of a reflective safety identity. Initially, participants viewed safety as a checklist driven by external requirements, but through disruption and unlearning, they began to internalise safety as a personal responsibility. This reflects a deeper process of identity reconstruction, where individuals transition from passive followers to active interpreters of safety. This finding aligns with contemporary workplace learning perspectives and challenges behaviourist approaches, as discussed by Dominic Cooper (2018) and Eduardo Salas et al. (2020), which prioritise observable compliance over internal meaning making. The study argues that sustainable safety outcomes depend on this deeper level of internalisation.

Practical Implications for OSH Training in Malaysia

The findings suggest that current OSH training approaches, which emphasise procedural instruction, may be insufficient for facilitating meaningful transformation. Training programmes should therefore incorporate disruption-based strategies such as scenario simulations, case-based discussions, and reflective questioning. A practical shift could involve reducing lecture-based delivery and increasing reflective and experiential learning activities to at least 50% of the training structure. Additionally, structured reflection and peer interaction should be integrated to support deeper meaning making. At a broader level, institutions such as Jabatan Keselamatan dan Kesihatan Pekerjaan can integrate these principles into national training frameworks to enhance the effectiveness of safety education, moving beyond compliance driven models towards more adaptive and context sensitive practices.

Conclusion

This study concludes that the development of safety awareness is not initiated through the acquisition of knowledge but through the disruption of existing assumptions followed by the processes of reflective unlearning and meaning reconstruction, highlighting that learning is a dynamic process involving internal conflict, emotional engagement, and reflective reinterpretation of prior experiences rather than a linear progression of knowledge accumulation. From a broader perspective, the study contributes to the field of occupational safety and health by emphasising the importance of cognitive and reflective dimensions in training design, suggesting that effective safety training should move beyond compliance-based approaches and incorporate strategies that actively challenge participants' assumptions, thereby supporting the development of more adaptive, reflective, and context sensitive safety practices.

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