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Development and Validation of the Commuting Safety Management Coordinator Module

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Abstract
The lack of commuting safety management at workplaces is a contributing factor to the increase in commuting accidents in Malaysia. Thus, this study aimed to develop and validate a Commuting Safety Management Coordinator module using the Design and Development Research (DDR) approach integrated with the Sidek Module Development Model (SMDM). The module, consisting of 11 units, was reviewed by 11 experts through a Focus Group Discussion (FGD) and achieved a content validity level of 87%, indicating strong content validity. The validated module supports organizations in enhancing commuting safety practices and warrants further research on module reliability and effectiveness.

Keywords: Commuting Safety Management Coordinator; Content Validation; Design and Development Research; Sidek Module Development Model

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1.0 Introduction

Commuting accidents, defined as accidents that occur while traveling to and from work, during authorized breaks, or while on work-related journeys, have become a growing concern in Malaysia. Over the past decade, reported commuting accidents increased by 39 percent, with data from 2023 revealing that these accidents accounted for 71 percent of all worker fatalities, totaling 750 deaths (Social Security Organization, 2023). This figure surpassed fatalities from industrial accidents and represented approximately 12 percent of total road deaths in the country (Royal Malaysia Police, 2023; Social Security Organization, 2023). The economic burden of commuting-related fatalities is equally alarming, with the projected financial cost amounting to RM2.7 billion in 2023, based on a valuation of RM3.6 million per road traffic death in Malaysia (Musa et al., 2023).

One of the key factors contributing to the rise in commuting accidents in Malaysia is the lack of commuting safety management at workplaces (Aziz & Yusof, 2015; Nordin, 2014). Through self-regulation, employers have a moral obligation to ensure the safety of their employees during commutes by implementing structured commuting safety management (CSM) practices (Nordin, 2014). In response to this critical gap, the present study was conducted to develop and validate a Commuting Safety Management Coordinator (CSMC) module, which aims to equip designated personnel with the knowledge required to support their organizations in planning, implementing, and continuously improving their CSM systems.

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2.0 Literature Review

The development and validation of training modules requires a structured, evidence-based approach to ensure both effectiveness and relevance. The Design and Development Research (DDR) framework is widely recognized for providing a systematic process, which comprises three main phases: needs analysis, design and development, and evaluation (Richey & Klein, 2014). DDR is built around three key phases: needs analysis, design and development, and evaluation. This iterative process allows continuous refinement of the training modules, aligning them with both theoretical principles and practical requirements.

To adapt this framework to the Malaysian training context, the Sidek Module Development Model (SMDM) has been employed for its comprehensive, culturally sensitive approach. The SMDM incorporates essential components, including goal setting, content selection, instructional strategies, media planning, and validation, making it particularly suitable for aligning with local educational norms and practices (Sidek & Jamaludin, 2005).

Compared to other module development approaches, SMDM offers a robust, unified model emphasizing the integration of Malaysian cultural values and educational expectations (Sidek & Jamaludin, 2005). Recent empirical studies have demonstrated that integrating DDR with SMDM produces modules that are pedagogically sound and applicable in practical contexts. Recent applications of DDR, combined with SMDM, have shown positive outcomes across various domains (Abdul Hamid et al., 2025; Md. Aris et al., 2024).

In this study, the DDR and SMDM framework is adopted as the conceptual foundation for the design and validation of the training module. As summarized in Table 1, the DDR phases are aligned with the corresponding components of SMDM, creating a coherent structure that links research design, module development, and evaluation.

Table 1. Integration of DDR phases with SMDM components

DDR Phase	DDR Component	SMDM Component
Phase 1: Needs Analysis	Problem Identification & Contextual Analysis	1. Aim of Module Setting 2. Theory, Rationale, Philosophy, Concept Identification 3. Research Needs
Phase 2: Design and Development	Design of Intervention & Prototype Development	4. Goal Setting 5. Content Selection 6. Strategy Selection 7. Logistics Selection 8. Media Selection 9. Module Combination Process 10. Completed Draft Module
Phase 3: Evaluation	Evaluation of Intervention Effectiveness	11. Pilot Study 12. Validity & Reliability Testing 13. Effectiveness Evaluation

(Source: Richey & Klein, 2014; Sidek & Jamaludin, 2005)

3.0 Methodology

The following subsections outline Phases 1 and 2, followed by a detailed discussion of the module validation methodology applied in Phase 3. It is important to note that pilot testing, reliability analysis, and effectiveness evaluation in Phase 3 are beyond the scope of this study.

3.1 Phase 1: Needs Analysis

The primary objective of developing this module is to implement targeted interventions that improve CSM practices within organizations. The conceptual basis is based on the Plan–Do–Check–Act (PDCA) framework, drawing on previous academic research regarding Occupational Safety and Health (OSH) management practices (International Organization for Standardization, 2018; Manu et al., 2018; Nordlöf et al., 2017; Rodrigues et al., 2020; Simukonda et al., 2020). In addition, the development process references relevant management system standards and guidelines on road safety established by the International Organization for Standardization (ISO), specifically ISO 39001 (International Organization for Standardization, 2012) and ISO 39002 (International Organization for Standardization, 2020).

A preliminary survey was carried out to determine the module's needs in Phase 1. A validated questionnaire on CSM practices, evaluated by five experts, was administered to a convenience sample of 30 respondents serving in OSH roles within their respective organizations. The CSM section included 28 items grouped under seven domains: policy, planning, risk assessment, organizing, implementation, measuring and reviewing performance, and continual improvement. The respondents were asked to indicate, using a binary scale ("Yes" or "No"), whether each specific practice was currently implemented in their organizations. The data was analyzed using descriptive statistics, and the results were reported as average percentages based on the number of “Yes” responses to the 28 questions.

3.2 Phase 2: Module Development

Phase 2 involved the structured design and development of the Commuting Safety Management Coordinator (CSMC) module. The module was developed based on the elements of CSM practices. These elements formed the foundation for the module’s content and structure. The process began with setting clear goals, followed by developing specific learning objectives to guide the module's direction and expected outcomes. The content was carefully selected to focus on three main areas: the factors and consequences of commuting

accidents affecting employees and organizations, the seven core domains of CSM practices, and the formulation of organizational commitment and action plans.

Instructional methodologies were designed to reflect adult learning principles and to ensure relevance to workplace settings. These included a combination of presentations, role-playing exercises, practical activities, classroom-based sessions, and assignment submissions. Media and logistical arrangements were planned to support effective delivery and encourage active participation. To ensure a coherent and integrated learning experience, the module content was systematically organized into 11-unit components. Throughout the development process, a series of workshops was conducted among the researchers to discuss, refine, and finalize the module content and structure.

3.3 Phase 3: Module Validation

Module validation in Phase 3 employed a hybrid strategy combining quantitative and qualitative approaches. The quantitative component involved assessing content validity levels using the method proposed by Sidek & Jamaludin (2005). The qualitative component was conducted through a Focus Group Discussion (FGD) to facilitate collaborative review and refinement of the module (Krueger & Casey, 2014).

Fifteen experts in road safety and commuting safety management were invited to participate in an FGD session. Eleven experts attended and agreed to participate in the FGD. The first author served as the session moderator. After introductory remarks from each expert, the moderator presented the complete draft module. Each expert was then asked to evaluate the module individually using a 10-point Likert scale, where 1 indicated "strongly disagree" and 10 indicated "strongly agree". A Quick Response (QR) code linked to a Microsoft Form was provided to facilitate the assessment process.

Each unit of the module was evaluated based on its relevance to the topic, clarity of the learning objectives, appropriateness of the content, suitability of the delivery methods, and estimated duration. The overall module was assessed for comprehensiveness, alignment with best practices, logical structure, relevance to the target audience, and its potential effectiveness in improving commuting safety management practices. These elements were adopted and adapted from previous studies (Haynes et al., 1995; Polit & Beck, 2006; Sidek & Jamaludin, 2005). The content validity level was calculated using the formula recommended by Sidek & Jamaludin (2005), in which the total score given by all experts is divided by the maximum possible score and multiplied by 100. According to this method, a module is considered to have high content validity when it achieves a score of 70 percent or higher.

After the experts completed their individual assessments, the moderator presented a summary of the findings to the group. This served as the basis for further discussion during the FGD, allowing experts to provide additional feedback and suggest refinements to enhance clarity, applicability, and instructional quality, even for items that had already achieved high validity scores.

4.0 Findings

4.1 Needs Analysis

Based on the preliminary survey of 30 organizations, the average implementation score of CSM practices is 15%, indicating a generally low level of adoption across the sample. Among the seven assessed domains, the implementation domain recorded a slightly higher score compared to the others. These findings highlight the absence of a formal framework for managing commuting risks and, more importantly, the lack of a designated person to lead such efforts. Accordingly, the development of the CSMC module is both timely and necessary.

4.2 CSMC Module

The development process in Phase 2 resulted in a structured and comprehensive CSMC module consisting of eleven units. Each unit was designed to address specific aspects of commuting safety management, beginning with foundational knowledge and progressing toward practical implementation and organizational improvement. The module covers key areas, including commuting accident factors, the PDCA cycle, policy formulation, planning, risk assessment, organizing roles and resources, implementing good practices, performance measurement, continual improvement, and action planning. Each unit includes clearly defined learning objectives, relevant content, and appropriate delivery methods tailored to adult learners in workplace settings.

The instructional design integrates various methodologies, including presentation slides, group activities, role-play, individual presentations, and assignment submissions. Unit durations range from 30 minutes to 5 hours, depending on the complexity of the topic, totaling 18 hours. The final unit emphasizes commitment and action planning. Overall, the module structure reflects a logical progression from awareness to action, ensuring that learners gain both theoretical understanding and practical skills. Table 2 presents the complete list of the instructional units included in the CSMC module.

Table 2. Overview of module units, topics, learning objectives, methods of delivery, and duration

Unit	Topics	Learning Objectives	Contents	Methods of Delivery	Duration
1	Commuting accidents, their factors, and impact	• Describe the magnitude and factors contributing to road crashes. • Describe the definition and scope of commuting accidents. • Identify common contributing factors.	• Introduction to road safety • Definition of commuting accident • Statistics on commuting accidents	• Presentation slides	60 minutes

		• Explain the impact of commuting accidents on workers and organizations.	• Contributing factors and impact of commuting accidents		
2	Commuting Safety Management (CSM)	• Describe the Plan-Do-Check-Act (PDCA) cycle and its relevance to commuting safety. • Recognize the key elements of ISO 39001:2012 and ISO 39002:2020. • Explain how PDCA supports CSM.	• Overview of ISO 39001:2012 • Overview of ISO 39002: 2020 • Application of PDCA in CSM	• Presentation slides	30 minutes
3	CSM: Policy	• Describe leadership commitment in promoting commuting safety. • Explain the importance of a documented commuting safety policy. • Identify effective communication strategies for policy awareness.	• Leadership commitment • Commuting safety policy • Policy communication and awareness	• Presentation slides • Activity 1: Commuting Safety Policy • Group Presentation	60 minutes
4	CSM: Risk Assessment	• Describe commuting profiles for risk management. • Describe the steps in Hazard Identification, Risk Assessment, and Risk Control (HIRARC) for commuting safety. • Identify route hazards and countermeasures.	• Commuting profiling • Risks and opportunities within the scope of CSM • Introduction to HIRARC • Introduction to Route Hazard Mapping	• Presentation slides • Activity 2: HIRARC • Activity 3: Route Hazard Mapping • Group presentation	180 minutes
5	CSM: Planning	• Identify ways to set objectives and targets for commuting safety. • Describe how to formulate a commuting safety strategy.	• Setting objectives and targets • Formulation of commuting safety strategy	• Presentation slides	30 minutes
6	CSM: Organizing	• Define roles and responsibilities in commuting safety. • Describe how resources are allocated for CSM. • Identify internal and external communication channels.	• Roles and responsibilities • Resource allocation • Internal and external communication	• Presentation slides • Activity 4: CSM Planning & Organizing • Group Presentation	120 minutes
7	CSM: Implementation	• List examples of basic and further good practices in commuting safety. • Describe how good practices can be implemented in workplace settings.	• Basic good practices • Further good practices	• Presentation slides • Activity 5: Family Safety Reminder	90 minutes
8	CSM: Measuring and reviewing performance	• Describe methods for collecting and analyzing commuting accident data. • Explain the purpose and process of internal audits.	• Commuting accident data collection, investigation, and analysis • Internal audits	• Presentation slides	60 minutes
9	CSM: Continual improvement	• Describe how organizations identify and respond to findings related to commuting safety. • Explain the importance of timely and effective corrective or preventive actions in reducing commuting-related safety risks.	• Continual improvement in CSM	• Presentation slides • Activity 6: Role Play – Commuting Safety Management Meeting	120 minutes
10	Benefits and best practices of CSM	• List organizational benefits of implementing CSM. • Describe examples of best practices from various industries.	• Benefits of CSM implementation • Best practices examples in industry	• Presentation slides	30 minutes
11	Commitment and action planning	• Describe the role of the CSM Coordinator in supporting their employer's efforts to improve commuting safety management. • Assess current commuting safety practices within the organization. • Develop an action plan to address identified gaps.	• Role of Commuting Safety Management Coordinator • Commuting Safety Management Practices Questionnaire (CosMaP-Q)	• Presentation slides • Activity 7: Gaps and Action Plan • Individual presentation • Assignment submission	300 minutes

4.3 Content Validation

The validation results for the module demonstrate high content validity, with all eleven units achieving scores above the threshold of

70%. Specifically, the overall content validity scores for each unit ranged from 83.8% to 90.2%, as presented in Table 3. Additional assessments on the overall module also indicate high content validity, which yielded an overall score of 88%, as illustrated in Fig. 1, with the highest rating in module comprehensiveness (91.8%), followed by effectiveness in establishing commuting safety management (CSM) coordinators (88.2%) and enhancing CSM practices (87.3%). The module also demonstrated strong alignment with best practices (87.3%), suitability for the target audience (87.3%), and logical structure (86.4%). When combined, the course's overall content validation score is 87.1%, confirming its pedagogical soundness and relevance to the target audience.

Despite the high content validity levels, further insights were obtained through expert discussions during the FGD. The experts recommended diversifying delivery methods to improve learner engagement and suggested reviewing time allocations for specific learning objectives. They also proposed incorporating interactive learning tools to enhance the delivery experience and recommended the inclusion of practical activities related to the development of commuting safety policies. Additional suggestions focused on effective accident investigation and reporting for commuting accidents, as well as on integrating elements aligned with Environmental, Social, and Governance (ESG) goals.

Table 3. Content validity index for each unit of the CSMC Module

Elements	Unit 1 (%)	Unit 2 (%)	Unit 3 (%)	Unit 4 (%)	Unit 5 (%)	Unit 6 (%)	Unit 7 (%)	Unit 8 (%)	Unit 9 (%)	Unit 10 (%)	Unit 11 (%)
Topic	90.0	90.0	88.2	87.3	91.8	85.5	90.9	90.0	90.9	89.1	90.9
Learning objectives	87.3	89.1	85.5	86.4	85.5	84.5	89.1	86.4	88.2	89.1	90.9
Learning content	88.2	89.1	84.5	85.5	90.0	83.6	90.9	85.5	87.3	87.3	89.1
Delivery methods	77.3	83.6	80.9	86.4	90.0	82.7	90.0	86.4	89.1	88.2	90.9
Durations	83.6	89.1	86.4	73.6	91.8	76.4	89.1	85.5	87.3	85.5	89.1
Overall	85.3	88.2	85.1	83.8	89.8	82.5	90.0	86.7	88.5	87.8	90.2

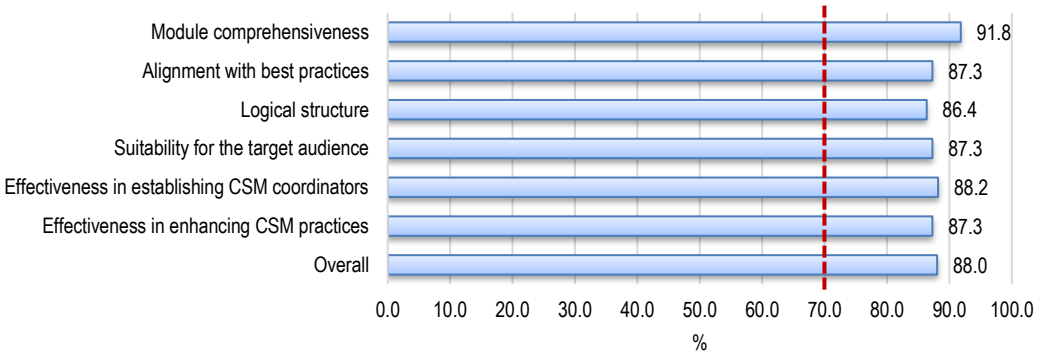

Fig. 1: Additional content validity assessments of the overall module

5.0 Discussion

The findings from the needs analysis revealed that CSM practices were poorly implemented across organizations, consistent with previous studies (Aziz & Yusof, 2015; Nordin, 2014). All seven domains consistently demonstrated low levels of practice, indicating that CSM concepts are not yet systematically embedded within organizational OSH frameworks. Although the implementation domain achieved slightly higher scores than the others, this may be attributed to the reactive measures implemented by organizations in response to accidents, rather than the outcome of a structured approach to commuting safety.

These findings support the need for a structured module to enhance CSM practices by establishing designated coordinators who can assist their organizations in planning, implementing, and continuously improving their commuting safety management systems. This role is similar to that of OSH coordinators in OSH management, who play a critical role in risk management, safety culture development, and the continuous improvement of the system (Møller et al., 2021).

The use of the integrated DDR and SMDM methodologies provided a robust framework for creating the CSMC module. These models emphasize systematic planning, iterative refinement, and empirical validation, which are critical in ensuring the quality and applicability of instructional materials. The validation results demonstrated strong content validity, with scores consistently exceeding the recommended threshold of 70% across all instructional elements and units. This suggests that the module is well-structured, relevant, and capable of achieving its intended learning outcomes, consistent with findings from recent studies that employed both DDR and SMDM methodologies (Abdul Hamid et al., 2025; Md. Aris et al., 2024).

Expert feedback gathered during the FGD also played a vital role in refining the module. The consensus reached among the eleven experts not only validated the content but also contributed to improvements in delivery methods and time allocation. This participatory approach emphasizes the importance of stakeholder involvement in module development, which has been shown to improve the overall

quality, relevance, and impact of instructional materials (Nyumba et al., 2018).

6.0 Conclusion & Recommendations

This study developed and validated the CSMC module using the combined DDR and SMDM approaches. The findings contribute theoretically by extending the application of DDR and SMDM beyond educational contexts into the field of organizational development. From a practical standpoint, the CSMC module provides structured guidance for organizations to improve CSM practices through the establishment of dedicated coordinator roles.

Nevertheless, the study is limited in scope as it did not include reliability testing to assess internal consistency, nor did it evaluate the module's practical effectiveness through implementation or outcome-based measures. To address these limitations and strengthen the module's impact, future research should incorporate reliability analysis, conduct case-control studies to measure effectiveness, and pilot the module across diverse industries.

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Paper Contribution to Related Field of Study

This manuscript contributes to transport and travel environment studies by providing a structured and validated training framework designed to enhance CSM practices within organizational contexts.

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