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Exploring potential methods to evaluate impact and outcomes of construction safety and health research

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Project Summary

Evaluating the impact of construction safety and health research findings and interventions is an ongoing research to practice (r2p) challenge due to the complex and fragmented nature of the industry. While evaluation approaches such as tracking the number of units sold, auditing project records, and observing use of an intervention on jobsites may work within a small market, with one employer, or with one manufacturer, these approaches would be too resourcet o e m p l

Washington University in St. Louis' Dissemination and Implementation Research Core

The Dissemination and Implementation Research Core (DIRC) at Washington University in St. Louis is a core within the Institute for Clinical and Translational Science (ICTS) that provides methodological expertise to D&I researchers within the Washington University community (i.e., faculty and their collaborators). For this project, DIRC helped CPWR determine if ongoing panels are an appropriate mechanism of data collection to assess outcomes and impact of r2p activities, and how such panels could be structured to serve as a surveillance system to assist in tracking the impact of r2p dissemination and implementation efforts.

Methods

DIRC researchers conducted a literature review on the use of the Delphi Method in construction research and a concept mapping study was conducted in coordination with CPWR researchers. The methods for these two pieces of this project are described briefly below. The reports can be found at <https://www.cpwr.com/research/research-practice-library>. The findings from these two studies were used to address a need identified by CPWR to find new and effective ways to measure the use of construction safety and research findings and interventions and evaluate their impact. These studies were used to determine if evaluation panels are the appropriate approach, to inform how Delphi Panels could be structured to evaluate impact, and to identify other actions to consider to supplement the work of such panels.

Delphi Panel Literature Review

The Delphi Method is a systematic procedure that is employed to achieve a reliable consensus among a selected panel of experts. This project's purpose was to review relevant papers and research on Delphi Panels and their potential use in assessing whether construction safety and health research findings are being used (e.g., research to practice) by target audiences of workers and contractors, including their managerial staff, to reduce injuries and illnesses. A secondary objective of this review was to understand the parameters of panel selection, composition, and analysis. A trained research assistant under the direction of DIRC faculty members conducted this review.

research on safety and health in construction. Additional papers published since the review were identified using the same method as Amenyaw et al. The literature review can be found at <https://www.cpwr.com/sites/default/files/publications/SS2018-Delphi-Panels-Narrative-Review.pdf>.

Concept Mapping

Concept mapping is a participatory approach to organizing ideas using a mixed methods (i.e., combining qualitative and quantitative data) approach (Kane & Trochim, 2007; Rosas & Kane, 2012). This methodology engages diverse stakeholders in a multistep process to generate ideas, organize them into distinct categories, and rate the ideas according to a set of criteria, for example how feasible or important is each idea (Rosas & Kane, 2012). Once participants organize the ideas into different groupings, these related concepts are clustered visually (concept maps) and statistically (Rosas & Kane, 2012). This project's purpose was to provide insights into researchers' and practitioners' perspectives on the best ways to find out whether evidence-based safer tools, work practices, and other resources are being used on construction jobsites.

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Delphi Panel Literature Review

Based on the literature review, the Delphi Panel approach is considered appropriate for evaluating whether safety and health research findings and interventions are being used. There were more than 50 studies identified that used the approach in various segments of construction research. Thus, we can conclude that the methodology is considered acceptable to stakeholders (i.e., potential expert panelists) even though few of these studies were specifically in construction safety research. Also, because of its widespread use we can conclude that the methodology is rigorous enough to meet the standards of researchers. Further, there was enough literature to synthesize a literature review published in a peer-reviewed journal (Ameyaw et al., 2016), which indicates that there is enough interest behind the methodology in the field. Last, the method is considered promising because there was sufficient consensus on parameters such as panel composition from

perspectives. For the proposed Evaluation Panels, it is recommended that criteria for selecting panel members be established at the beginning of the project, and then experts are identified who meet the desired criteria. Criteria to define an expert should include knowledge of the industry, the task the intervention is designed for, and direct knowledge of practices on job sites.

Panel size

The literature review indicates that the size of Delphi Panels can range from 10 participants into the hundreds and that satisfactory results have been found with small, homogeneous panels with between 10 and 12 members. While existing construction research literature is inconclusive regarding the ideal size of a Delphi Panel, Hollowell and Gambatese have advocated for a minimum panel size of between 8 and 12 individuals. Based on the fact that the proposed Evaluation Panels would be homogeneous groups and Hollowell and Gabatese's experiences in the construction industry, we recommend that each panel range in size from 8 to 12 participants.

considered in light of this recommendation; for example, more rounds may be needed when panels are more diverse.

Additional Considerations for Future Work

Beyond the knowledge gained from the literature review, there are additional considerations for the formation and use of evaluation panels.

Number of panels

The literature review did not yield information on the use of sequential Delphi Panels to investigate separate ideas. It seems feasible to use this approach to investigate multiple questions, although considerations should be made for the time, financial, and staffing resources involved. It is recommended that CPWR begin with two pilot panels and synthesize results to determine the value of this approach for evaluation. If they are found to be valuable and, if there are resources available and a need, additional panels can be established.

Focus of the panels

There should be an intentional organization to the sequence and focus of the panels. CPWR should prioritize the specific interventions to evaluate. During a pilot phase, it is recommended that the first pilot panel seek to understand an intervention that has broad application in the industry, and the second pilot panel could be used to understand how to measure another intervention that has a narrower group of end-users.

Recruiting panel members

- x **Responsiveness:** How many follow-up prompts (emails or calls) did it take to yield an adequate response?
- x **Feasibility:** Were the number of rounds initially planned successfully completed?
- x **Acceptability:** If using qualitative data collection methods, questions can be asked about whether they liked the

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