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Investigating different methods of safety training for the construction industry

Submission date	Recruitment status	[X] Prospectively registered
03/12/2018	No longer recruiting	[X] Protocol
Registration date	**Overall study status**	[_] Statistical analysis plan
17/12/2018	Completed	[X] Results
Last Edited	**Condition category**	[_] Individual participant data
16/02/2021	Injury, Occupational Diseases, Poisoning	

Plain English summary of protocol

Background and study aims
This study aims to investigate virtual reality as a safety training method for the construction industry. It will also explore how training focused on human aspects in safety can increase safety knowledge and skills.

Who can participate?
Construction workers of both genders aged 20 and over, with at least 2 years of work experience.

What does the study involve?
This study involves four types of safety training processes. The participants will be randomly allocated to take part in one of the following types of safety training process: virtual reality, lecture-based, a combination of virtual reality safety training and training on human aspects in safety, a combination of lecture-based safety training with training on human aspects in safety. The participants will fill in questionnaires to investigate their attitudes and knowledge relating to safety before the training, immediately after the training and at 1 month after the training.

What are the possible benefits and risks of participating?
The possible benefits of the study include improved safety attitudes and safety knowledge among the participating workers. A possible side effect of virtual reality safety training is mild motion sickness.

Where is the study run from?
Finnish Institute of Occupational Health

When is the study starting and how long is it expected to run for?
January 2018 to January 2020

Who is funding the study?
The Finnish Work Environment Fund, the Finnish Institute of Occupational Health and the participating construction companies.

Who is the main contact?
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Additional identifiers

Protocol serial number
117306

Study information

Scientific Title
Interventional four-arm randomized controlled trial to assess the efficacy of a virtual reality safety training and human factor learning method

Acronym

MoSaC

Study objectives
Virtual reality safety training more effectively increases safety knowledge, perceived behavioural control and safety motivation than traditional lecture-based safety training with a short-term follow-up. We also expect the HF tool to have beneficial effects on safety learning.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Finnish Institute of Occupational Health ethics committee, 28/09/2018

Study design
Interventional four-arm randomized controlled trial

Primary study design
Interventional

Study type(s)
Prevention

Health condition(s) or problem(s) studied
Occupational safety and health

Interventions
We will obtain written informed consent from all the study participants and will inform them of the potential risks and benefits of participating in the trial through an information sheet. No personal-level study data concerning the participants will be shared with employers or any third party during or after the study.

The study consists of four intervention arms into which study participants are randomly assigned.

1. The first arm consists of immersive virtual safety training. Virtual safety training will last approximately 30 minutes and includes the following steps: technical guidance, brief introduction to movement in virtual reality and safety training in a VR-learning environment. The VR-learning environment guides study participants to identify work-related hazards, safety procedures and behavioral strategies to prevent accidents. Study participants will practice safety-related actions such as visual search for hazards, removing hazards, inspecting equipment and machinery for any defects and walking safely around or through the work zone.

2. The second arm consists of traditional lecture-based safety training. Lecture-based safety training will last approximately 30 minutes. Informational content will equivalent in content to the VR-training. The difference will be that active learning process in VR-learning environment is missing and lecture-based training method will be used.

3. The third arm combines immersive virtual reality safety training and a modified version of a previously developed human factors safety training. Study participants will be guided to use a systematic checklist (HF-tool) to identify the role of human factors in safety-related processes, accidents and incidents. Human factors training will last approximately 2.5 hours and includes following the steps: Introduction to the content of HF-tool and basic concepts of human factors

in safety, using HF-tool to analyze case-example of occupational accident. The human factors safety training guides study participants to identify background factors of accidents, analyze human contribution to safety and plan strategies to improve safety management.

4. The fourth arm combines lecture-based safety training with the HF-tool training.

We will use a validated questionnaire to assess the efficacy of intervention arms. Baseline data will be collected prior to the randomization into intervention arms. The first follow-up measure will be collected immediately after VR-safety training and lecture-based training. The second follow-up measure will be collected approximately 1 month after the baseline measurement. Data collection takes place at the workplaces and paper questionnaires are used

Intervention Type
Behavioural

Primary outcome(s)
1. Safety locus of control
2. Safety self-efficacy
3. Perceived control over safety issues
4. Safety knowledge
5. Safety-related outcome expectancies
All primary outcome measures will be assessed by questionnaire at baseline, immediately after the end of VR-safety training/lecture-based safety training, and approximately 1 month after the baseline measurement.

Key secondary outcome(s))
1. Safety motivation assessed using questionnaires and previously developed study scales at baseline, immediately after the end of VR-safety training/lecture-based safety training and approximately 1 month after the baseline measurement.
2. Safety performance assessed using the safety performance scale at baseline and approximately 1 month after the baseline measurement.

Completion date
30/01/2020

Eligibility

Key inclusion criteria
Current inclusion criteria as of 21/08/2019:
1. Aged 20 and over
2. At least 2 years of work experience
3. Native Finnish language competence
4. Currently employed in the construction sector

Previous inclusion criteria:
1. Aged between 20 and 50 years
2. At least 2 years of work experience
3. Native Finnish language competence
4. Currently employed in the construction sector

Participant type(s)

Other

Healthy volunteers allowed
No

Age group
Adult

Sex
All

Total final enrolment
120

Key exclusion criteria
Does not meet inclusion criteria

Date of first enrolment
01/01/2019

Date of final enrolment
30/06/2019

Locations

Countries of recruitment
Finland

Study participating centre
Finnish Institute of Occupational Health
Topeliuksenkatu 41 B
Helsinki
Finland
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Sponsor information

Organisation
The Finnish Work Environment Fund

ROR
https://ror.org/02v046k89

Funder(s)

Funder type
Other

Funder Name
Työsuojelurahasto

Alternative Name(s)
Finnish Work Environment Fund, Työsuojelurahasto Arbetarskyddsfonden, Työsuojelurahasto | Helsinki, TSRahasto

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
Finland

Funder Name
Finnish Institute of Occupational Health

Funder Name
STARA

Funder Name
YIT

Funder Name
SRV

Funder Name
NCC

Funder Name
Lujabetoni

Funder Name
Voimatel

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated and analyzed during the current study will not be available due to agreement with study participants.

IPD sharing plan summary
Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/12/2020	16/02/2021	Yes	No
Protocol article	protocol	01/08/2020	15/01/2021	Yes	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes