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A scoping review protocol on utilization and evaluation of VR-based Interventions for the training of child endangerment assessment

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Piloting of the study selection process.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 17 September 2024 and was last updated on 17 September 2024.

INTRODUCTION

Review question / Objective The scoping review deals with the topic of assessing home environments with regard to potential child welfare risks using VR technologies. Four questions are at the center of the review. 1) What findings and interventions are already known and in use to educate and train students and professionals in the assessment of child welfare risks? 2) How and with the help of which tools have these interventions been developed and evaluated? 3) What effects does the use of such VR-based interventions have on the development of competencies and the subjective perception of the participants themselves compared to conventional training and further education measures? 4) To what extent have VR-based interventions already been used to support decision-making in the assessment of situations

that jeopardize the welfare of children? The objective of this scoping review is to generate a comprehensive insight into the possibilities and shortcomings of VR-based methods for training social work students and professionals.

Population: all students of social work as well as persons who have to make professional assessments of child welfare in the context of their work.

Concept: VR-based interventions to assess or interact with situations that may represent or simulate child endangerment.

Context: Training and further education of experts and professionals as well as studying and teaching in the field of social work with a focus on child welfare assessment.

Background Child endangerment in the home environment, manifested by physical or psychological injury, under-care, or neglect by parents or other guardians, poses a risk to children and their well-being that should not be underestimated. Threats of this kind are also a major problem for society in terms of public health, as the consequences of child abuse and neglect can still be felt in adulthood. (1) Such experiences in childhood are by no means a rarity and therefore require more intensive consideration. (2) Experts in social work, police, child education, and health care are trained in recognizing, recording, and reporting signs that may indicate a child's welfare is at risk. Assessing the welfare of the child can be very challenging. On the one hand, false positive reports must be avoided to spare parents and children unfounded stress, but on the other hand, false negative reports can also lead to children having to endure a longer period of suffering and more protracted consequences. There are various assessment tools for this purpose, but they all have their disadvantages and limitations. (3, 4) It can be seen that the subjective assessment of sometimes very complex situations can lead to different evaluations, making it difficult to arrive at uniform and clear interpretations of threats to the child's welfare. (5)

This, combined with weaknesses in the training and further education of professional staff to identify child abuse and neglect (6), leads to uncertainty on the part of the assessors and to misinterpreted situations.

Rationale Virtual reality applications have been used for years and are increasingly being used in various industries and areas of the labor market to facilitate or improve work (7) or to train groups of people. (8) The assessment of child welfare risks is not exempt from this either. In addition to VR-based interventions, various other digital applications are being tested and used in this area to achieve improvements in the fields of prevention, medical education, diagnostics, treatment, screening, and forensics. (9) However, it appears that the area of assessing child welfare threats and the training to be able to implement such assessments adequately, appropriately, and reliably have not yet been systematically recorded. Due to the different professional groups that are involved in the assessment of child welfare conditions and due to the fragmentation of the assessment situations, be they in the home environment, in child-rearing facilities, or medical care, it seems sensible to provide an overview of studies dealing with VR-based interventions for training purposes to assess child welfare. By conducting the scoping review we want to address

the lack of best practice examples for the development and evaluation of such interventions. This includes the presentation of fitting tools for development and evaluation respectively, the identification of suitable test environments, and the determination of ethical questions and conflicts. Further utilization options may also be explored, such as (AI-based) decision support systems.

METHODS

Strategy of data synthesis For this scoping review, we plan on scrutinizing the databases PubMed, SCOPUS, ProQuest, WOS, and EBSCO (EBSCOhost Research Databases including APA PsycArticles, APA PsycInfo, CINAHL, eBooks collection, HBS select case study collection, MEDLINE, OpenDissertations and APA PsycTests). As for the words chosen for our search term, we already gathered suiting terms in German and English and classified those to form groups. Group 1 consists of words relating to children (Child, Children, Minor). Group 2 consists of words relating to the endangerment of children (Neglect, Endangerment, Violence, Maltreatment, Abuse, Adverse childhood experience, ACE). Group 3 consists of words relating to training (Training, Exercise, Practice, Teaching, Learning, Education). And group 4 consists of words relating to VR-systems and adjacent digital interventions (Virtual Reality, Augmented reality, Child avatar, Digital twin). If applicable, truncations will be incorporated.

The following search term can be viewed as an example. Adjustments will be made if the database calls for them.

(Kinder OR child OR children OR minderjährig* OR minor) AND (vernachlässigung OR neglect OR gefährdung OR endanger* OR gefährden OR gewalt OR violence OR misshandlung OR maltreatment OR abuse OR "adverse childhood experience" OR ACE) AND (training OR übung OR exercise OR practice OR üben OR lehre OR lernen OR teaching OR learning OR unterricht* OR education) AND ("virtuelle realität" OR "virtual reality" OR "augmentierte realität" OR "augmented reality" OR "child avatar" OR "digital twin" OR "digitaler zwilling").

A preliminary search showed, that the incorporation of certain abbreviations (such as VR for virtual reality or AR for augmented reality) may lead to an increase in studies that do not focus on virtual reality but on other unrelated topics that share the same abbreviation. We therefore refrain from incorporating those into our search term.

As for restrictions we plan on searching for publication published between 2014 and 2024. They need to be published in English or German

and they need to offer an abstract. The search term will be applied to the title, abstract, and keywords (including author keywords and MeSH Terms). Adjustments will be made depending on the database's search properties. We refrain from applying the search term to the full text.

Eligibility criteria Study eligibility will be measured in three categories that can be assigned to the PCC scheme.

Participants/Population: Studies need to focus on professional personnel who work to sustain child welfare. This includes university-based students (i.e. social care workers) as well as working staff in different professions such as medical care, police, or education of children. We do not include studies that focus on children or parents.

Concept: Studies need to incorporate an intervention in the form of a VR-based system, an AR-based system, a digital twin, or a child avatar (adjacent technologies might be incorporated as well if applicable). Those systems need to be used for training or educational purposes of the aforementioned population. Studies that focus on other interventions (such as non-digital ones) or incorporate these technologies for reasons other than the assessment of child welfare will be excluded.

Context: Studies need to focus on the education, teaching, or some other kind of training of the aforementioned population.

We do not include studies that are aimed to investigate interventions to train or enable children to identify issues in child welfare for themselves or others as well as studies that concentrate on nonprofessional populations such as parents.

Source of evidence screening and selection

The article retrieval will be done by one researcher, exporting data from the databases used and converting and combining study information in one singular document, followed by a duplicate check and exclusion. Title and abstract screening will be done in duplicates. Both researchers will perform the screening while marking studies for inclusion or exclusion with an option for an uncertain decision. After deciding on 10% of the studies both researchers will discuss their findings and decisions to ascertain any discrepancies in their respective screening and rating behavior. In succession to this, adjustments to the screening process will be implemented if deemed necessary. Disagreements regarding inclusion or exclusion will be discussed at the end. If no agreement can be found a third researcher will decide on inclusion or

exclusion while being blinded to the decisions made before.

After conducting the title and abstract screening, two researchers will examine at least 5 random full-texts of the dataset. The insight gathered during this step will be used to create a suitable extraction table. This will be based on the discussion and consensus of those two researchers. Full-text retrieval will be performed by at least one researcher. The full-text review will be done by two researchers sharing the workload. After scrutinizing 10% of the studies the extraction table will be checked for inconsistencies. If any can be identified reasons will be discussed and the extraction approach will be revised if necessary. This process might be repeated if deemed suitable. The extraction table can be adjusted (i.e.: adding additional columns for further information). This approach has to be discussed with the other researcher in advance. If in the end no agreement can be found, a third researcher will decide on inclusion or exclusion while being blinded to the decisions made before.

Data management Data management will be done in Microsoft Excel. The databases that will be used do not allow for uniform data exports. If possible data will be exported as an .cls or .xlsx file. If these options are not presented, alternative formats such as .ris will be used. In some cases, databases only allow the abstract to be exported to a .txt file. A homegrown Python script for converting.txt files into .ris files will be used in those cases. The data will be combined in a single Excel sheet incorporating at least the following information: StudyID (assigned by the researchers), Database, Authors, Titles, Abstract, Year of publication, Journal Information, and DOI.

Additional information may be added if suitable. The Excel file will be worked on simultaneously. As for the full-text extraction form, an additional Excel sheet will be created containing information assigned to columns based on the initial 5 full-text screenings. Irrespective of this procedure, at least the following information is recorded: StudyID, Authors, Title, Country of data collection, year of data collection, Operationalized outcomes, Study design, Study methods, Population, Setting, n=, Intervention/Technology used, Funding, Results.

Reporting results / Analysis of the evidence Due to our insights based on a preliminary search, a narrative presentation of results seems to be fitting. We expect the studies to be heterogeneous in methodologies used involving quantitative and qualitative research. To address this heterogeneity a narrative analysis and reporting will be incorporated.

Presentation of the results The presentation of the results will be done in the form of a table. Alongside this, the derivation of a framework will be considered based on the findings made.

Language restriction The language will be limited to English and German.

Country(ies) involved Germany.

Keywords Child abuse; child endangerment; child maltreatment; child neglect; virtual reality; VR; education of professionals.

Dissemination plans This scoping review is intended to be published as a journal article and will form the basis for the Aid4Children project.

Contributions of each author

Author 1 - Jan-Oliver Kutza - Developing the search strategy and executing it, conducting title/abstract and full-text screening, evaluating and reporting the results, generating the manuscript, and addressing review comments.

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