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Methodology of Outcome and Reaction-Type Questionnaires

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Introduction

The selection of outcome and reaction-type questionnaires is a fundamental aspect of the RECOMMIT project's evaluation framework. This article details the methodological approach used to develop and adapt assessment tools for measuring the impact of training interventions on detainees, prison staff, and trainers. The selection process involved choosing culturally valid outcome scales, reaction-type assessments, and observational measures to evaluate skills attainment, social perceptions, and the effectiveness of virtual reality (VR)-based training. The study underscores the importance of cross-cultural adaptation, longitudinal assessment, and mixed-methods evaluation to ensure meaningful insights into the project's outcomes.

The RECOMMIT project is designed to facilitate detainees' reintegration into society through structured interpersonal communication skills (ICS) training, immersive VR technology, and prison staff training. A robust evaluation strategy is essential to assess the effectiveness of these interventions.

The methodology for selecting outcome and reaction-type questionnaires was informed by best practices in educational and psychological measurement. These tools were designed to measure cognitive, affective, and behavioural changes among trainees while ensuring cross-cultural validity across partner institutions. This article presents the process of identifying, adapting, and implementing these measures to ensure a comprehensive and reliable evaluation of the project's impact.

Selection of Outcome and Reaction-Type Questionnaires and Observational Measures

A multi-tiered evaluation framework was developed to cover different levels of impact. This framework included:

- Reaction-type and learning-level assessments to measure participants' immediate responses to training.
- Outcome measures assessing detainees' progress in social identity, interpersonal skills, and well-being.
- Technology Acceptance Measures (TAM) to evaluate user experience with VR-based learning.

- Observational tools to supplement self-reported data.

Methodology for Questionnaire Selection

The RECOMMIT project seeks to facilitate the rehabilitation and social reintegration of detainees by enhancing their interpersonal communication skills through structured training and immersive virtual reality experiences. To evaluate the project's effectiveness, a systematic methodology for selecting outcome and reaction-type questionnaires was developed. The selection process followed a structured approach, ensuring that the tools used could accurately measure behavioural, cognitive, and attitudinal changes while accounting for cross-cultural differences across different partner institutions. The questionnaire development process was based on the project objectives, findings from a comprehensive literature review, and insights gained through a Delphi exercise. These inputs were synthesized into a learning objectives matrix, which categorized the key learning outcomes into three domains: knowledge, skills, and attitudes. This matrix served as the foundation for the design of the questionnaires, ensuring that each instrument was aligned with the specific learning goals of the training program.

The process began with an in-depth review of existing validated instruments in the fields of education, psychology, and correctional rehabilitation. The primary objective was to ensure that the selected questionnaires aligned with the project's key impact areas, which included skill acquisition, personal development, attitudinal shifts, and the effectiveness of virtual reality as a training tool. Questionnaires were adapted based on cultural relevance, clarity, and ease of understanding, ensuring that they could be reliably administered across different national contexts. Special attention was given to the wording of questions to minimize ambiguity and to allow for accurate interpretation by participants from diverse backgrounds.

The detainee assessment component included both outcome-based and reaction-type questionnaires, administered at multiple time points: pre-training, mid-training, post-training, and a follow-up assessment after two months. These tools were designed to measure changes in self-perception, self-efficacy, well-being, interpersonal communication skills, and social attitudes. The detainee questionnaire incorporated self-report measures on values, personal confidence, and communication efficacy, allowing researchers to track the progression of skills

and attitudinal changes over time. Weekly reaction-type assessments were also included to capture cognitive and emotional responses to training content, ensuring a dynamic evaluation of how detainees engaged with the material. Each of these instruments was directly mapped to the learning objectives matrix, ensuring that they measured changes in detainees' knowledge (e.g., understanding of communication techniques), skills (e.g., application of active listening and conflict resolution strategies), and attitudes (e.g., changes in self-perception and social integration readiness).

For prison staff, a post-training questionnaire was developed to assess the perceived usefulness, relevance, and applicability of the training. This questionnaire focused on measuring whether prison staff felt better equipped to support detainees in their reintegration journey, whether they found the training methods and materials effective, and whether they experienced improvements in their own interpersonal skills. A key aspect of this evaluation was to assess whether training for prison staff translated into practical behavioural changes that could positively impact the detainees' rehabilitation process. The structure of this assessment was also aligned with the learning objectives matrix, ensuring that key competencies related to knowledge (e.g., understanding rehabilitation principles), skills (e.g., application of communication strategies in prison settings), and attitudes (e.g., changes in perceptions toward detainee reintegration) were effectively measured.

To evaluate the use of virtual reality in training, the Technology Acceptance Model (TAM) was used alongside a VR Simulator Sickness Questionnaire. The TAM questionnaire measured perceived ease of use, usefulness, and engagement with the VR-based training system, while the sickness questionnaire was administered both before and after VR exposure to track any adverse physical effects such as dizziness, nausea, or discomfort. These measures were crucial in determining the feasibility and effectiveness of VR as an educational tool within correctional settings. The VR assessment was particularly relevant in the skills domain of the learning objectives matrix, as it aimed to determine whether participants could effectively engage with technology-based training and apply the learned skills in real-world scenarios.

In addition to these assessments, reaction-type questionnaires were developed for dissemination activities to capture the wider project impact on external stakeholders, including policymakers, prison administrators, and community members. These assessments aimed to measure awareness of the project's goals, perceptions of detainee rehabilitation, and

willingness to support reintegration efforts. The collected data would provide insights into the broader social impact of the project beyond direct participants.

To ensure validity and reliability, all questionnaires underwent a rigorous validation process, including pilot testing within partner institutions. The pilot phase allowed for adjustments to be made based on participant feedback, ensuring that questions were clear, culturally appropriate, and effectively measured the intended constructs. Where necessary, translation and back-translation techniques were employed to preserve the accuracy of meaning across different languages. The final set of questionnaires was compiled into a comprehensive evaluation framework that included outcome, reaction-type, learning-based, observational, skills-based, and cognitive assessments. This approach allowed for a holistic evaluation of the project's impact, ensuring that both short-term learning outcomes and long-term behavioural changes were captured.

By integrating multiple forms of assessment and ensuring cultural adaptability, the methodology for questionnaire selection in the RECOMMIT project provides a scientifically robust approach to evaluating rehabilitation programs in correctional settings. The combination of longitudinal assessments, cross-cultural validation, and mixed-method evaluation techniques ensures that the findings contribute to both academic research and practical policy recommendations for detainee reintegration initiatives. The use of the learning objectives matrix as a guiding framework ensures that the evaluation is directly aligned with the educational objectives of the project, allowing for a structured and targeted assessment of knowledge acquisition, skill development, and attitudinal change.

Learning Objectives Matrix

Domain	Definition	Detainees	Prison Staff	VR Training
Knowledge	Understanding concepts related to communication, values, self-awareness, and reintegration strategies.	Understanding values, rights, and effective communication.	Understanding detainee reintegration principles and effective communication strategies.	Understanding the role of VR in communication skill-building and reintegration training.

Skills	Application of interpersonal communication techniques, active listening, conflict resolution, and VR-based learning.	Practicing assertiveness, active listening, and disclosure management.	Applying communication techniques in prison settings and improving detainee engagement.	Navigating VR-based training modules and practicing communication scenarios in virtual settings.
Attitudes	Changes in self-perception, confidence, willingness to engage in social interactions, and openness to reintegration.	Developing self-efficacy, resilience, and readiness for reintegration.	Enhancing empathy, reducing biases, and fostering positive attitudes toward detainee rehabilitation.	Increasing engagement with digital tools, reducing anxiety toward VR, and improving perceived effectiveness of immersive learning.

Cross-Cultural Adaptation

Ensuring cross-cultural validity in the assessment of learning outcomes and behavioural changes was a critical component of the RECOMMIT project. Given the multinational implementation of the training program, the selection and adaptation of questionnaires required careful consideration to maintain the accuracy, relevance, and comparability of responses across different linguistic and cultural contexts. The process of cross-cultural adaptation followed a structured approach that included translation and back-translation, cultural relevance validation, and pilot testing within each partner country.

The first step in the adaptation process involved translation and back-translation of all questionnaires to ensure conceptual equivalence in different languages. Subject-matter experts, from the project consortium and associated partners, worked collaboratively to ensure that the terminology used in the assessments was both linguistically accurate and aligned with the specific legal, educational, and correctional system terminologies of each participating country. Back-translation was used as a quality control measure to detect any inconsistencies or shifts in meaning that could affect data comparability. Special attention was given to

culturally specific terms related to reintegration, communication styles, and interpersonal skills, ensuring that the wording remained neutral and accessible to diverse detainee populations.

To enhance cultural relevance, feedback was collected from experts, including researchers, psychologists, prison staff, and trainers with experience in detainee rehabilitation. This iterative process helped identify culturally sensitive concepts and refine questionnaire items to reflect the diverse socio-economic and legal frameworks within which the training program was implemented. The experts panel also provided insights into potential response biases that could arise due to differences in social desirability, authority perception, or self-reporting tendencies among detainees and prison staff in different countries.

Following the expert review, pilot testing was carried out within each institution to assess the clarity, comprehensibility, and engagement of the target groups with the questionnaires. Small sample groups of detainees and prison staff were asked to complete the assessments while researchers observed and recorded any misunderstandings, difficulties in interpretation, or reluctance in responding to specific items before the project implementation phase. Feedback collected led to minor modifications in question phrasing, response formats, and cultural references, ensuring that all items were linguistically and contextually appropriate.

Additionally, efforts were made to ensure inclusivity and accessibility within the cross-cultural adaptation process. Given the varying educational backgrounds of detainees, the questionnaires were designed to use clear and simple language, avoiding complex sentence structures or academic jargon. In cases where literacy levels were a concern, assisted administration of the questionnaires was introduced, allowing facilitators to explain questions verbally while maintaining neutrality in their interactions to minimize interviewer bias.

To maintain the comparability of data across different cultural settings, statistical tests for measurement equivalence were conducted during data analysis. This included tests for internal consistency (Cronbach's alpha), construct validity, and inter-item correlations across different language versions of the assessments. Any significant discrepancies were analysed to determine whether they were due to cultural differences in perception or variations in the effectiveness of training interventions.

The cross-cultural adaptation process ensured that all evaluation tools used in the RECOMMIT project maintained linguistic integrity, cultural appropriateness, and methodological

robustness. This approach enhanced the reliability of collected data and ensured that the findings could be meaningfully compared across countries, allowing for evidence-based recommendations on the scalability and effectiveness of detainee reintegration programs at a European level.

Technology Acceptance Model

The TAM questionnaire used in the RECOMMIT project was designed to assess detainees' and prison staff's perceptions of VR as an educational tool. The questionnaire aimed to measure usability, perceived effectiveness, engagement, and physical comfort during VR-based training sessions. The assessment was conducted immediately after participants' interaction with the VR system to capture their firsthand experiences and reactions.

The first component of the questionnaire focused on user experience and engagement with VR technology. Participants were asked to rate their agreement with statements regarding the enjoyment, pleasantness, and fun associated with using VR. Responses provided insights into whether the immersive nature of VR made learning more engaging and whether participants found the experience interesting and worthwhile. Given the novelty of VR in correctional education, this section helped determine its potential as a motivational tool for training detainees.

The second component assessed ease of use and system usability. Participants evaluated whether the VR system was intuitive, whether they could complete training tasks with ease, and whether they were able to navigate the system effectively. Questions related to skill acquisition and interaction with the technology were included to determine how quickly users adapted to the VR environment. This section was crucial in understanding whether detainees, regardless of their prior experience with technology, could successfully engage with VR-based learning.

Another critical section of the questionnaire measured perceived usefulness, focusing on whether VR enhanced participants' understanding of reintegration concepts and interpersonal communication skills. Participants were asked whether the VR system helped them understand training concepts faster, whether it improved their learning outcomes compared to traditional

methods, and whether they believed VR was an effective tool for personal development. The responses provided evidence on whether VR-based learning added value beyond conventional in-person training.

The questionnaire also included a section on intended future use of VR technology. Participants were asked whether they would be willing to engage in VR training again, whether they viewed VR as a beneficial learning tool, and whether they intended to use VR in other educational settings if available. This section helped gauge long-term acceptance and the potential for scaling VR training in correctional facilities.

To complement the TAM assessment, the VR Simulator Sickness Questionnaire was administered both before and after VR exposure to measure participants' physical comfort levels. Symptoms such as dizziness, nausea, headaches, difficulty concentrating, and blurred vision were assessed to determine whether participants experienced any discomfort that might impact their perception of VR. The sickness questionnaire provided essential feedback on whether the duration or intensity of VR exposure should be adjusted to ensure inclusivity and accessibility for all users.

Overall, the TAM questionnaire results provided valuable insights into how detainees and prison staff perceived VR technology in a training context. By analyzing ease of use, engagement levels, perceived learning benefits, and physical comfort, the RECOMMIT project was able to assess the feasibility of VR as a scalable learning tool. The findings contribute to broader discussions on innovative digital education in prison settings, highlighting the potential of immersive technologies to enhance skill development and rehabilitation outcomes.

Evaluation Framework

The evaluation framework of the RECOMMIT project is a structured and multi-layered system designed to systematically assess, validate, and measure the impact of training interventions on detainees, prison staff, and trainers. Beyond the use of questionnaires, the framework incorporates multiple evaluation tools, complementary methodologies, and structured processes to ensure a comprehensive, reliable, and replicable assessment of learning outcomes and behavioural changes. This framework serves as a quality assurance mechanism for

RECOMMIT and establishes a scalable model that can be adopted or adapted in other rehabilitation and vocational training programs.

At the core of this framework is the integration of both qualitative and quantitative evaluation tools. The reaction-type and outcome-based questionnaires serve as primary data collection instruments, capturing self-reported experiences, learning progress, and attitudinal changes over time. However, these tools are complemented by observational measures, facilitator assessments, and technology-driven analytics, ensuring that findings are not solely based on self-perceptions but also triangulated with external observations and behavioural data. This multi-source approach enhances data reliability and provides a richer, more nuanced understanding of participants' engagement and progress.

The framework is structured around a phased evaluation process, which follows a pre-defined set of steps to ensure consistency, validity, and adaptability. The first step involves the pre-training baseline assessment, where detainees and prison staff complete initial surveys and engage in introductory focus group discussions. This phase establishes a control measure for later comparisons, ensuring that progress can be tracked over time. The second phase includes ongoing monitoring and formative evaluation, where weekly reaction-type assessments, facilitator observations, and VR interaction data are collected to provide real-time feedback on engagement levels, training effectiveness, and potential areas for improvement. The third phase is the post-training evaluation, where outcome-based questionnaires, debriefing interviews, and performance-based assessments are conducted to capture the immediate impact of training interventions. The final phase involves longitudinal follow-up assessments, conducted two months after training completion, to measure the sustainability of learning outcomes and behavioural changes over time. This long-term data collection is essential for understanding the lasting impact of RECOMMIT's training methodologies and for making evidence-based recommendations for future programs.

Beyond direct surveys and self-assessments, the evaluation framework incorporates technology-driven validation tools. In the case of VR-based training, interaction analytics and user progression tracking are employed to assess how detainees engage with digital learning environments. These tools allow for an objective analysis of learning behavior, skill acquisition, and areas where participants may struggle or disengage. Additionally, video-recorded sessions

of interpersonal skills exercises provide further observational data that can be analysed to assess non-verbal communication, confidence levels, and practical application of learned skills. One of the defining features of this evaluation framework is its cross-cultural adaptability and scalability. By incorporating translation, back-translation, expert validation, and pilot testing, the framework has been designed to be replicated and adapted in different correctional and educational settings across various linguistic and cultural backgrounds. The use of standardized assessment tools, coupled with local adaptations for cultural relevance, ensures that the methodology can be applied beyond the RECOMMIT project. Furthermore, by integrating multiple assessment tools, the framework provides a flexible model that can be customized depending on the target population, training objectives, and available resources in future projects.

In terms of its broader impact, the evaluation framework serves as a best-practice model for assessing the effectiveness of rehabilitation and reintegration programs. Its structured approach ensures that training effectiveness is measured not only in terms of knowledge acquisition but also in terms of skill development, attitudinal change, and long-term behavioural transformation. By demonstrating the viability of VR-enhanced learning, the framework also contributes to discussions on digital innovation in correctional education and provides empirical evidence to support policy recommendations on the adoption of immersive learning technologies in rehabilitation programs.

Conclusion

The methodology for selecting outcome and reaction-type questionnaires in the RECOMMIT project was developed with a focus on scientific rigor, cross-cultural adaptability, and comprehensive impact measurement. Through a structured selection process, incorporating expert review, pilot testing, and alignment with the learning objectives matrix, the project ensured that the assessment tools effectively captured cognitive, behavioural, and attitudinal changes in detainees, prison staff, and trainers. The combination of reaction-type assessments, longitudinal outcome evaluations, and technology acceptance measures provided a multi-dimensional framework for evaluating the effectiveness of training interventions.

By employing multiple time-point assessments (pre-training, mid-training, post-training, and follow-up evaluations), the methodology allowed for the tracking of progress over time, ensuring that improvements in interpersonal communication skills, self-efficacy, and reintegration readiness were measured beyond the immediate training period. The inclusion of weekly reaction-type assessments further strengthened the methodology by capturing short-term cognitive and emotional responses, allowing for adaptive improvements in content delivery.

One of the strengths of this methodology is its comprehensive and multi-layered approach, which combines self-reported questionnaires with observational measures and technology-driven analytics. This integration ensures that findings are triangulated, reducing the reliance on self-reported data alone and providing a more objective analysis of learning outcomes. Another significant strength is its cross-cultural adaptability, achieved through translation, back-translation, and expert validation, ensuring linguistic and conceptual equivalence across diverse correctional environments. Additionally, the Technology Acceptance Model questionnaire and the VR Simulator Sickness Questionnaire provided valuable insights into the feasibility of immersive learning tools, allowing for a deeper understanding of how technology can enhance training experiences in correctional settings.

Despite these strengths, the methodology also presented challenges and limitations. One key weakness was the potential for response bias in self-reported questionnaires, particularly in prison environments where participants may provide socially desirable answers rather than their true perceptions. Additionally, while the multi-tiered evaluation approach allowed for longitudinal tracking, maintaining participant engagement for follow-up assessments over extended periods posed logistical challenges, particularly given the fluid nature of detainee populations. Furthermore, the variation in digital literacy levels among detainees impacted the uniformity of engagement with VR-based training, highlighting the need for additional support mechanisms for those with limited prior exposure to digital learning tools.

To address these challenges and enhance the effectiveness of future evaluations, several recommendations can be made. First, blended assessment approaches should be expanded by incorporating more facilitator-driven observational tools, ensuring that participant progress is not solely reliant on self-reported measures. Second, further refinements in cross-cultural adaptation strategies should be explored, including focus group discussions with detainees and

prison staff prior to questionnaire finalization to preemptively identify potential misunderstandings in question phrasing. Third, in future implementations, integrating automated digital tracking tools (e.g., engagement metrics in VR systems) could provide objective real-time data to complement questionnaire-based evaluations. Finally, given the importance of longitudinal follow-ups, strategies such as shorter and more frequent digital check-ins post-training could help sustain participant engagement and mitigate attrition in follow-up assessments.

The systematic methodology outlined in this article offers a replicable and scalable model for evaluating similar training interventions in correctional and vocational education settings. The structured alignment with learning objectives, incorporation of multiple assessment tools, and emphasis on long-term impact measurement ensure that the findings contribute both to academic research on rehabilitation education and policy recommendations for future initiatives. By demonstrating the feasibility of a scientifically rigorous and adaptable questionnaire selection process, the RECOMMIT project establishes a best-practice model for assessing educational interventions aimed at fostering social reintegration and skill development among detainees.

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