D2.1 Summary Report of Systematic Reviews and Meta-Analyses

Synthesis of Current Knowledge on AT Applications

a- STEP COST Action CA19104

Working Group 2: Collaborative Evaluation

Executive Summary

Working Group 2 has completed six comprehensive systematic reviews examining the effectiveness, appropriateness, feasibility, and sustainability of Assistive Technologies (ATs) for people with Autism Spectrum Disorder (ASD) and/or Intellectual Disabilities (ID). This report synthesizes the key findings across these reviews.

1. Overview of Systematic Reviews

1.1 Review Portfolio

The working group conducted systematic reviews in six critical areas: Mobile Applications as AT for Preschool Children with ASD/ID; Digital Games in Educational Curriculum for Children with ASD/ID; AT for Workplace Inclusion of Adults with ID; AT for Conceptual Skills Enhancement and Social Inclusion; Tech to Connect: Social Skills Through AT; and AT for Promoting Practical Skills in ASD/ID.

1.2 Methodology

Our methodology incorporated comprehensive scientific database searches focusing on key terms including Inclusion, Empowerment, Assistive Technology, Autism, and Intellectual Disability. Each review included rigorous quality assessment of included studies and synthesized findings across multiple contexts.

2. Key Findings

2.1 Technology Effectiveness by Type

Mobile Applications and Tablets

These technologies have proven highly effective in supporting communication skills, particularly when implemented as speech generating devices. Their high portability and accessibility make them particularly valuable in various settings.

Digital Games

Educational gaming applications have demonstrated significant success in improving social skills, enhancing imitation abilities, and developing mathematical comprehension. These tools have shown particular effectiveness in school settings, where they increase learning engagement and motivation.

Smartphones and Video Modeling

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The compact size of smartphones has helped reduce stigma while supporting vocational skill acquisition. These devices have proven particularly effective in enhancing workplace communication and improving independent work performance.

Social Robots

Social robotics technology has shown notable success in supporting emotional development and enhancing social interaction. These tools have been particularly effective in creating engaging learning environments.

Wearable Devices

Wearable technology has demonstrated success in improving user autonomy and enhancing self-regulation capabilities. These devices have proven valuable in supporting independent functioning across various settings.

Computer-Assisted Instruction

This technology category has shown particular strength in improving literacy and numeracy skills. The structured learning environment provided by these tools has proven especially beneficial for skill development.

Virtual Reality and Interactive Software

These advanced technologies have shown success in enhancing daily living skills, improving communication abilities, and supporting social interaction. Their immersive nature has proven particularly effective in promoting learning independence.

2.2 Study Quality Assessment

The reviews revealed moderate to high quality evidence across studies, though sample sizes were typically limited to fewer than 10 participants. The field shows continued growth in research volume, though inclusion is often positioned as a secondary rather than primary outcome.

3. Implementation Considerations

3.1 Strengths

Implementation success has been particularly noted in cases where portable and compact designs helped reduce stigma. The versatility of applications across different skills has proven valuable, as has the creation of safe learning environments. Technologies have shown particular strength in supporting emotional and behavioral regulation while enhancing self-awareness capabilities.

3.2 Limitations

Implementation challenges primarily center around small sample sizes in most studies and limited focus on severe ASD and ID cases. Long-term follow-up has been insufficient in many cases, and skill maintenance has shown variability across different contexts.

4. Future Research Priorities

4.1 Population Focus

Research expansion should prioritize inclusion of more severe ASD/ID cases and broader age range coverage. Sample sizes need significant increase, and studies should extend to individuals with physical impairments.

4.2 Methodology Improvements

Future research requires longer follow-up phases and more robust evaluation of skill maintenance. Studies should assess transferability across settings and develop standardized outcome measures.

4.3 Design Considerations

User involvement in the design process requires significant expansion. Device lifespan considerations should be prioritized, along with stigma reduction through design and adaptation for early learners.

4.4 Stakeholder Involvement

Research should increase emphasis on parental involvement and enhance teacher training. Practitioner support should be expanded, and end-user feedback should be more thoroughly incorporated.

5. Recommendations

5.1 Research Design

Future studies should prioritize larger sample sizes and standardized outcome measures. Long-term follow-up should become standard practice, with increased focus on evidence-based practices.

5.2 Implementation

Implementation strategies should ensure comprehensive stakeholder involvement and consider sustainability factors. Transferability issues require careful attention, supported by adequate training programs.

5.3 Technology Development

Development should prioritize user-centered design approaches and careful consideration of device lifespan. Stigma concerns require focused attention, and accessibility should remain a primary consideration.

6. Conclusions

These systematic reviews demonstrate significant potential for various AT types to support individuals with ASD/ID across different contexts. While current evidence supports their effectiveness, the field requires larger studies with extended follow-up periods. Future development must prioritize user involvement, sustainability, and practical implementation considerations.

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7. Next Steps

Moving forward, the field must address identified research gaps and develop comprehensive implementation guidelines. Assessment frameworks require development, best practices need establishment, and inclusion metrics must be clearly defined.

Report prepared based on systematic review findings.

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