INTERACTIVE AND MULTIMEDIA TOOLS NEGATIVE EFFECTS ON PRESCHOOL-AGED CHILDREN

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Abstract: This thesis aims to identify in clear and measurable terms the potential negative consequences of interactive and multimedia tools on preschool-aged children. The study focuses on indicators such as language delay, attention and hyperactivity symptoms, social problems, sleep disturbances, and reduced physical activity. The objective is to determine the associations between screen use and content characteristics and negative outcomes, and the role of moderators — parental involvement, content quality, and family socioeconomic status.

Key words: preschool education, screen time, negative effects, language delay, attention disorder, sleep disturbance

Introduction

- Problem overview

- As screens and interactive devices become more prevalent in children's lives, evidence about their negative effects is growing. While many studies highlight benefits, under certain conditions and with prolonged use negative outcomes may occur.

- Relevance of the study

- Clear limits on risky screen time and practical recommendations to reduce it are needed for educational and public health decision-making.

Literature review

- Main findings

- Prolonged screen time can contribute to delays in language development, and passive video viewing may negatively affect receptive and expressive vocabulary levels.

- Meta-analytic evidence indicates that increased screen time is associated with worse attention and greater hyperactivity symptoms.

- Reduced sleep quality and delayed sleep onset are linked to screen use before bedtime.

- Decreased physical activity and increased risk of overweight/obesity rise with greater screen time.

- Gaps and conflicting findings

- Content quality and co-viewing with parents can enhance positive outcomes, so judging effects solely by screen time may be misleading.

Research questions and hypotheses

- Main questions

- What negative outcomes do more than 2 hours of daily screen use cause in preschool-aged children?

- Does interactive educational content reduce negative outcomes?

- Does parental involvement act as a moderator that reduces negative effects?

- Hypotheses

- H1 Average daily screen time above 2 hours will be associated with language delays and lower receptive/expressive vocabulary levels.

- H2 Daily screen time above 2 hours will lead to increased attention and hyperactivity symptoms (measured by Conners or SDQ).

- H3 Screen use during the pre-bedtime hours will worsen sleep onset and sleep duration.

- H4 Low content quality and use without parental involvement will exacerbate negative outcomes.

Methodology

- Study design

- Quasi-experimental design or longitudinal observation over 12 months. Pretest-posttest with control and experimental groups.

- Sample

- Ages 3–5 years.

- Sample size approximately 160 children (80 experimental, 80 control) — based on estimated effect size d = 0.4, power 80% and alpha = 0.05. For longitudinal observation a sample of 200 children is recommended to account for attrition.

- Variable definitions

- Independent variables: screen time (hours/day), content type (educational/interactive, passive video, games), level of parental involvement.

Primary outcomes

- Language measures (MacArthur-Bates CDI or an adapted local test), attention and hyperactivity (Conners Early Childhood or SDQ), sleep parameters (Pediatric Sleep Questionnaire or sleep diary), physical activity (parent reports or pedometer/actigraphy), social behavior (CBCL or SDQ subscales).

Instruments and measures

- Language assessment: MacArthur-Bates CDI or locally validated vocabulary tests.

- Attention and behavior: SDQ and Conners short form.

- Sleep: sleep diary and PSQ. Actigraphy for a small subsample if needed.

- Screen monitoring: 7-day screen diary + device logs (if available) + content coding form.

- Demographic and SES questionnaire.

Procedure

- Ethics approval and written parental consent.

- Baseline measurements (pretest).

- During the 12-week intervention or observation period monitor screen use and content. In the experimental group content-limited use with pedagogical guidance; control group continues usual conditions.

- Posttest and 6- and 12-month follow-ups.

Statistical analyses

- Descriptive statistics and between-group comparisons (t-test, Mann-Whitney if required).

- ANOVA/ANCOVA to examine group differences controlling for pretest scores.

- Multivariable regression models assessing the effect of screen time and content while controlling for SES and parental education.

- Moderation and mediation analyses (with parental involvement as a moderator).

- Mixed-effects models for longitudinal data.

Expected results

- More than 2 hours of screen time per day will negatively affect language measures and attention-related outcomes.

- Passive video viewing will be more detrimental to language and social communication measures, while interactive formats will be somewhat less harmful.

- Pre-bedtime screen use will delay sleep onset and reduce total sleep duration.

- Parental involvement and high-quality educational content will attenuate negative effects.

Discussion

- If hypotheses are confirmed, the results will indicate the need to limit screen time, control content quality, and promote parental pedagogical involvement.

- Clear guidelines for policy and preschool practice could be developed.

- If some hypotheses are rejected, further analysis of the role of content quality and usage context will be necessary

Conclusion

- For parents: limit daily screen time for 3–5-year-olds to 1–2 hours, avoid screen use within 1 hour before bedtime, co-view high-quality educational content, and provide interactive support.

- For educators: use screens in preschools only for explicit pedagogical purposes and for limited durations.

- For policymakers: develop locally appropriate screen time recommendations and run parent awareness campaigns.

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