The Relationship Between Emotional Competence and Mathematics Achievement in Primary Education: Effects of Group Work Intervention

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Mentimeter Icebreaker

What is the first emotion that comes to mind when you think about mathematics?

LINK

Introduction

- Students face academic stress and anxiety
- Emotional intelligence supports academic potential
- Limited integration of EI in mathematics education
- Mathematics anxiety interferes with performance
- Classroom climate influences emotional outcomes

Emotional Intelligence in Education

01

ABILITY TO RECOGNIZE, UNDERSTAND AND REGULATE EMOTIONS

02

DIFFERENT THEORETICAL MODELS (ABILITY VS. COMPETENCE)

03

IMPORTANT FOR REASONING AND DECISION-MAKING

04

EMPIRICAL SUPPORT IN EDUCATIONAL CONTEXTS

05

STILL INSUFFICIENTLY INTEGRATED IN TEACHER EDUCATION

Mathematics Anxiety

- Feelings of fear, tension and apprehension
- Negatively affects achievement and attitudes
- Reduces working memory capacity
- Develops within classroom context
- Influenced by teaching practices and climate

Why Collaborative Learning?

Collaborative learning promotes interaction and engagement

Supports deeper conceptual understanding

Encourages development of emotional competences

Success depends on motivation and teacher awareness

Aim: examine impact of group work on emotional development and achievement

Research Aim and Questions

- **Aim:**
  - Examine differences in emotional intelligence before and after intervention
  - Examine association between emotional intelligence and mathematics achievement
- **Research Questions:**
  1. *Are there differences in the level of emotional intelligence of sixth-grade students before and after the intervention (a change in teaching methods through more frequent use of group work)?*
  2. *Do students who participated in the experimental program show a higher level of emotional intelligence after the intervention compared to students from the control group?*
  3. *Is the level of emotional intelligence of sixth-grade students positively associated with their academic achievement in mathematics?*

Instruments

- **UEK-D – Emotional Competence Questionnaire for Children**
  - *3 emotional competence dimensions:*
    1. *perception and understanding of emotions (5 items)*
    2. *expression and regulation of emotions (5 items)*
    3. *and management of emotions (5 items)*
  - *5 items: attitudes toward group work*
  - *Likert scale (1–5)*
- **Mathematics Skills Assessment Test**
  - *15 tasks*
  - *mathematical knowledge and logical reasoning*
- **Written assessment from the Triangle unit**
- **Written assessment from the Quadrilaterals unit**

Research Design: Two Phases

Phase 1 – Triangles

- 6.a → Experimental group (ESA)

- 6.b → Control group (KSB)

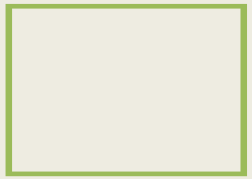
- Group work + project task

- Mathematics Skills Test and

UEK – D (pre – test)

- Written assessment Triangle

+ UEK – D post - test



Phase 2 – Quadrilaterals

- 6.b → Experimental group (ESB)

- 6.a → Control group (KSA)

- Group work + project task

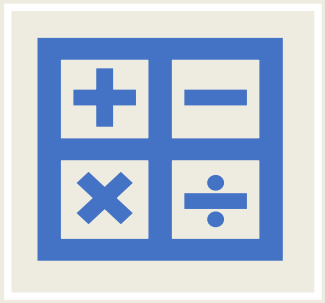
- written assessment

Quadrilaterals + UEK-D

Participants, Ethics and Reliability

6.a (n = 14), 6.b (n = 18)
Two instructional units: Triangles (15 lessons), Quadrilaterals (12 lessons)
Anonymous data collection
Pre-test reliability: $\alpha = 0.328$
UEK-D reliability: $\alpha = 0.844, 0.797, 0.823$

Results – Phase 1 (Baseline)



Mathematics skills pre-test

ESA: M = 10.50 (SD = 1.87)

KSB: M = 10.94 (SD = 1.92)

No significant difference (U = 101.5; p = 0.344)

UEK-D (pre-test)

High reliability (α = 0.844)

Significant difference only in “Expression and regulation of emotions” (p = 0.016)

Other components: no significant differences

Results – Phase 1 (Post-test Comparison)

UEK-D reliability (post-test):

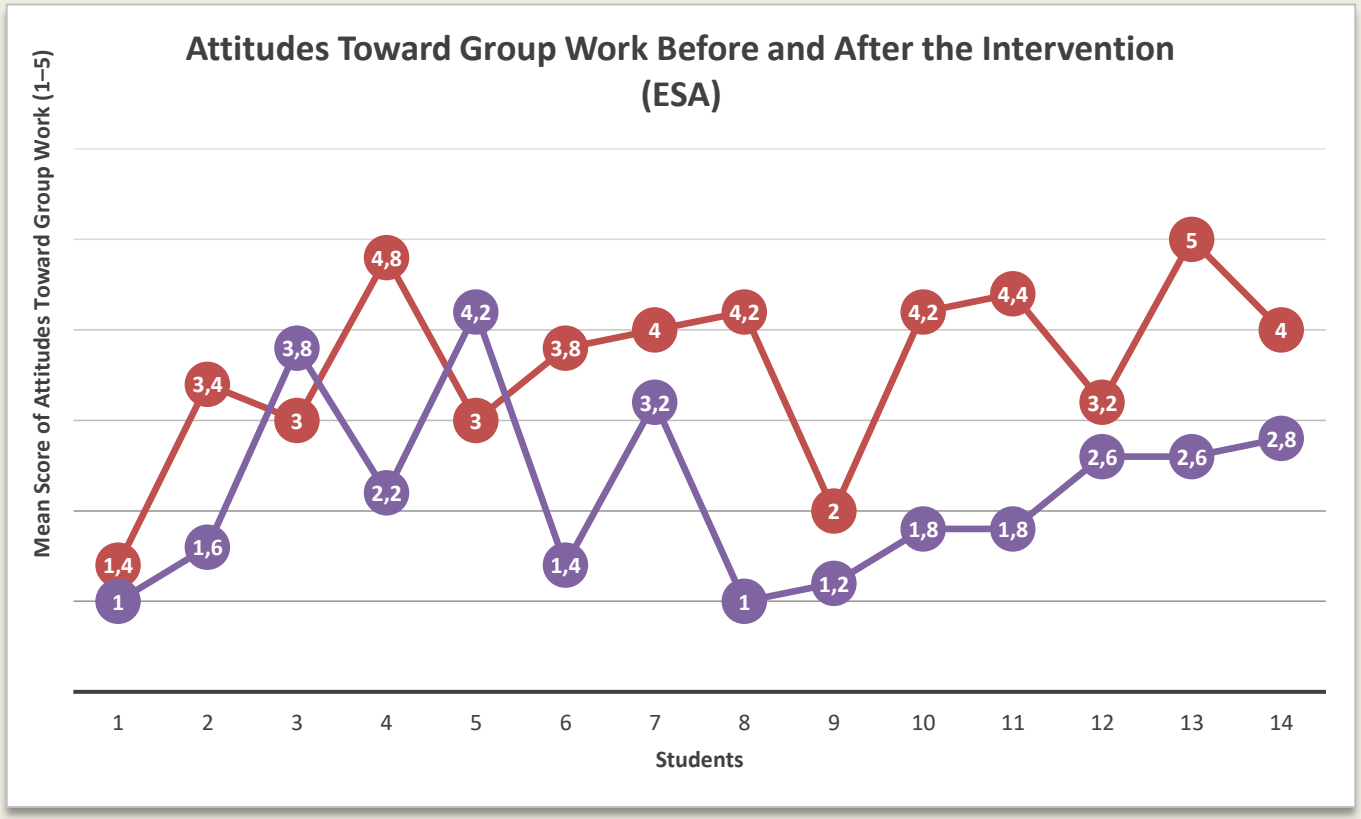
- $\alpha = 0.797$

Between-group comparison (ESA vs. KSB):

- *No significant differences in:*
  - Perception & understanding (p = 0.606)
  - Regulation & management (p = 0.528)
- ***Significant difference in:***
  - **Attitudes toward group work** (U = 31.50; p < 0.001)→ **Control group higher** (M = 3.84 vs. 2.23)

Changes Within ESA Group (Pre–Post)

- **Changes Within ESA Group (Wilcoxon, N = 14)**
  - *Perception & understanding → Z = −1.858; p = 0.063*
  - *Regulation & management → Z = −1.292; p = 0.197*
  - ***Group work → Z = −2.643; p = 0.008***



Results – Phase 2 (ESB Group)

- Experimental group: 6.b (N = 18)
  - *UEK-D reliability: α = 0.823*
- **Wilcoxon signed-rank test (pre–post):**
  - *Perception & understanding → p = 1.000*
  - *Regulation & management → p = 0.863*
  - *Group work → p = 0.695*

  → No statistically significant changes

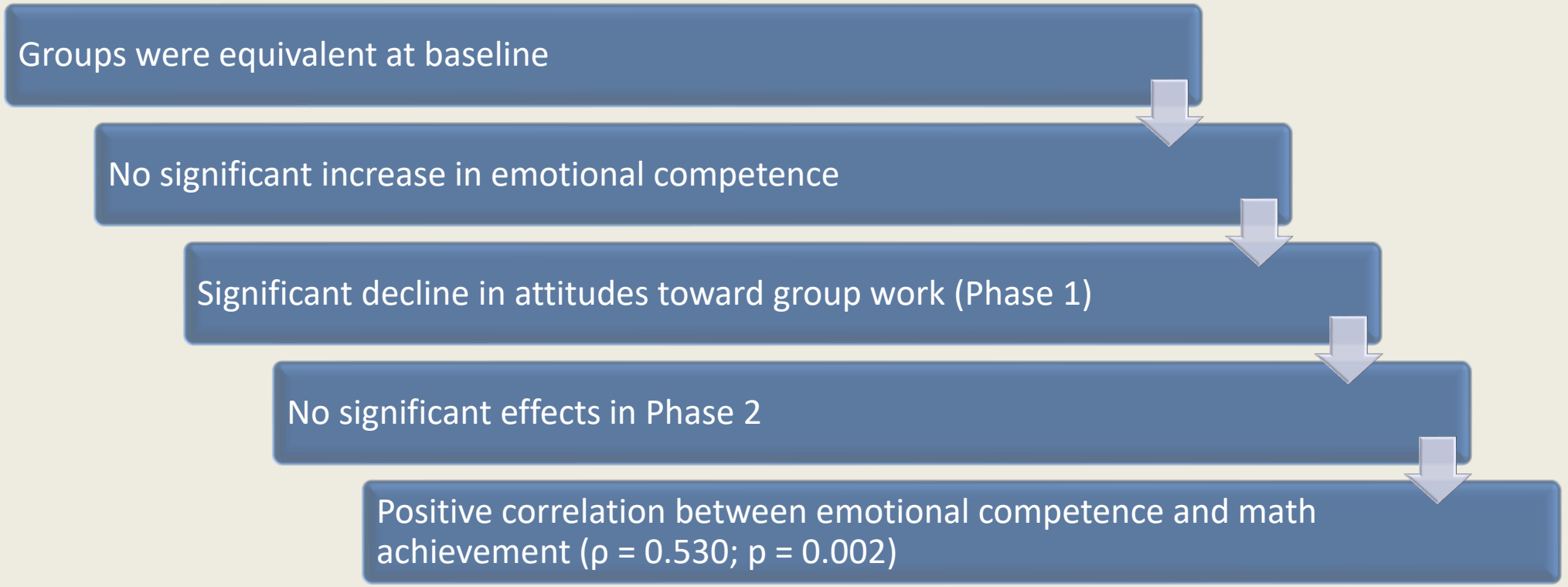
Emotional Competence and Mathematics Achievement

Spearman correlation analysis

- ρ = 0.530
- p = 0.002
- n = 32

→ Moderate, positive, statistically significant correlation

Discussion and Key Findings



Limitations

SHORT DURATION OF THE INTERVENTION

SMALL SAMPLE (TWO CLASSES, ONE SCHOOL)

GROUP WORK MAY NOT SUIT ALL STUDENTS

INSTRUMENTS MAY NOT CAPTURE SHORT-TERM CHANGES

Thank you for your attention.

I welcome your questions and comments.

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