Clinical Trial Protocol
Iranian Registry of Clinical Trials

08 Nov 2026

The effectiveness of interactive educational games on concept understanding, mathematical problem solving, and overt anxiety

Protocol summary

Study aim
Determining the effectiveness of interactive educational games on concept understanding, mathematical problem solving, and students' overt anxiety

Design
This study is a randomized, double-blind, parallel-group clinical trial conducted in Phase 2 on 30 male students (15 in each group). The sample allocation is done by simple random method using the RAND function in Excel software; first, each participant receives an identification code and is divided into two groups of 15 based on a random number.

Settings and conduct
This research will use a field experimental research method and an extensive pre-test and post-test design. The research will be conducted in a boys' elementary school in Izeh city. All participants, clinical caregivers, and evaluators who interpret the data will be kept confidential and all information will be kept anonymous.

Participants/Inclusion and exclusion criteria
Inclusion Criteria: Aged between 7 and 13 years. Enrolled in primary school. The child and their parents/legal guardians provide full informed consent to participate in the study. Exclusion Criteria: Presence of a physical illness that may interfere with the treatment process. Current use of psychiatric medications.

Intervention groups
Intervention group: Sabzipour and Fathi's interactive educational game intervention (1403) is implemented in groups in 12 45-minute sessions, two sessions per week. Control group: Does not receive any intervention.

Main outcome variables
Understanding the concept; solving math problems; overt anxiety.

General information

Reason for update

Acronym

IRCT registration information
IRCT registration number: **IRCT20260817070698N1**
Registration date: **2026-08-22, 1405/05/31**
Registration timing: **prospective**

Last update: **2026-08-22, 1405/05/31**
Update count: **0**

Registration date
2026-08-22, 1405/05/31

Registrant information

Name
Mostafa Kordi

Name of organization / entity

Country
Iran (Islamic Republic of)

Phone
+98 905 253 3364

Email address
mostafakordi19989@gmail.com

Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2026-09-11, 1405/06/20

Expected recruitment end date
2026-09-21, 1405/06/30

Actual recruitment start date
empty

Actual recruitment end date
empty

Trial completion date
empty

Scientific title
The effectiveness of interactive educational games on concept understanding, mathematical problem solving, and overt anxiety

Public title
The effectiveness of interactive educational games on concept understanding, mathematical problem solving, and overt anxiety

Purpose
Education/Guidance

Inclusion/Exclusion criteria

Inclusion criteria:
Aged between 7 and 13 years. Enrolled in primary school. The child and their parents/legal guardians provide full informed consent to participate in the study.

Exclusion criteria:
Presence of a physical illness that may interfere with the treatment process. Current use of psychiatric medications.

Age
From **7 years** old to **13 years** old

Gender
Male

Phase
N/A

Groups that have been masked

- Care provider
- Outcome assessor
- Data analyser

Sample size
Target sample size: **30**

Randomization (investigator's opinion)
Randomized

Randomization description
In this study, simple randomization method is used to assign male elementary school students in Izeh to two experimental and control groups. The randomization unit in this study is male elementary school students who are eligible to enter the study. First, a complete list of volunteer students who have been selected based on the study entry criteria is prepared. Then, each student is assigned a unique numerical identification code. These codes are entered into the Random Number Generator software and a random number is generated for each student. After generating these numbers, the students are sorted in ascending order based on the value of the random number. Then, the individuals are assigned to two groups; sequentially, the first 15 on the list are assigned to the experimental group and the next 15 to the control group. With this method, the order in which the students enter the study and the researcher knows them will not play any role in determining the group. To conceal allocation, the person responsible for entering data and performing the randomization process in the software will be independent of the interactive educational game intervention administrators and the research evaluators and will not have access to information about the implementation of the intervention or changes in student allocation. Also, student identification codes will be kept confidential and separate from their other personal information. Therefore, it will not be possible to predict the assigned group for each student before the randomization process.

Blinding (investigator's opinion)
Double blinded

Blinding description
In order to control bias and improve the internal validity of the study, this study was designed as a blinded evaluator and blinded analyst; in this way, the outcome evaluator and data analyst will be kept unaware of the allocation of male elementary school students to the experimental and control groups. Given the nature of the intervention, namely the implementation of an interactive educational game, blinding the students and the intervention administrator is not possible; because the students in the experimental group directly participate in the educational game activities. In this process, the outcome evaluator will collect and record data related to mathematical concept understanding, mathematical problem solving, and overt anxiety at all stages of the pretest, posttest, and possible follow-up, without knowing the students' assigned group, in order to reduce the possibility of bias in measuring and recording the results. Also, all questionnaires and assessment forms with anonymous codes, such as “Group 1” and “Group 2,” will be provided to the statistical analyst, and the true nature of the groups will not be revealed until the statistical analyses are completed. All steps of randomization and assignment of students to experimental and control groups will be performed by an individual independent of the educational game facilitator and the research evaluators. Decoding of assignment codes will also be done only after the final completion of the statistical analyses. In this way, the possibility of the evaluator and analyst’s knowledge of the students’ groupings affecting the research results is minimized.

Placebo
Not used

Assignment
Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee
Behbahan Islamic Azad University Ethics Committee

Street address
Shahid Bayani St., Amir Kabir Blvd.

City
Behbahan

Province
Khouzestan

Postal code
6361713198

Approval date
2026-07-21, 1405/04/30

Ethics committee reference number

IR.IAU.BEHBAHAN.REC.1405.191

Health conditions studied

1

Description of health condition studied
Academic and anxiety problems in students
ICD-10 code
ICD-10 code description

Primary outcomes

1

Description
Understanding the concept
Timepoint
Before performing the intervention and two weeks after completion of the intervention
Method of measurement
Tabrizi Mathematical Learning Abilities Questionnaire (2010)

2

Description
Math problem solving
Timepoint
Before performing the intervention and two weeks after completion of the intervention
Method of measurement
Hassani Mathematical Problem Solving Skills Questionnaire (2018)

3

Description
Overt anxiety
Timepoint
Before performing the intervention and two weeks after completion of the intervention
Method of measurement
Abolghasemi et al.'s Test Anxiety Questionnaire (1996)

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group: The interactive educational game intervention of Sabzipour and Fathi (1403) will be implemented in 12 45-minute sessions, two sessions per week in a group setting. The sessions for teaching mathematical concepts based on interactive games will be implemented based on the content of the elementary school mathematics textbook and designed by the researcher. This intervention will be implemented in 12 45-minute sessions, one session per week in a group setting for the students in the experimental group. In each session, the desired mathematical concept is first taught, then the students practice it through games and practical activities, and at the end, their learning will be reviewed with practice and a short evaluation. The educational themes of the sessions include: **Teaching counting and classifying shapes through the "Count and Color" game, strengthening counting and comparing numbers with the "Count and Compare" game, teaching order and symmetry with the "Sort" game, strengthening counting to 10 and relating numbers with finger displays in the "Numbers and Finger" game, developing problem-solving skills and recognizing numerical symbols through the "Surprising Table", teaching the concept of addition and its symbolic representation with the "Add" game, strengthening understanding of the concepts of greater, smaller, and equal with the "Compare Numbers" game, deepening the concept of addition and decomposition of numbers with the "Build Addition" game, strengthening the ability to recognize the largest number and familiarity with two-digit numbers in the "Biggest" game, teaching and consolidating the concept of subtraction through the "Subtract" game, strengthening the ability to sort numbers with the "Sort" game, and finally teaching place value and decomposition of numbers into tens and ones with the "Decompose" game. The main emphasis of this intervention is on active and enjoyable learning, student participation, repetition and practice, immediate feedback, use of concrete situations, and strengthening problem-solving skills and understanding of basic mathematical concepts through play.
Category
Behavior

2

Description
Control group: They do not receive any intervention or treatment.
Category
N/A

Recruitment centers

1

Recruitment center
Name of recruitment center
Shahid Fattah Qureshundi Boys' Primary School
Full name of responsible person
Mostafa Kordi
Street address
No. 11, Saadi Alley, Toheed 2 St., Qaleh Tol
City
Baghmalek
Province
Khouzestan
Postal code
6396148341
Phone
+98 905 253 3364

Email
mostafakordi19989@gmail.com

Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Islamic Azad University
Full name of responsible person
Behrang Mohammad Salehi
Street address
Daneshjo Square, Zagros Blvd.
City
Izeh
Province
Khouzestan
Postal code
6391693627
Phone
+98 996 477 0611
Email
bsalehi@iau.ac.ir
Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
Islamic Azad University
Proportion provided by this source
100
Public or private sector
Public
Domestic or foreign origin
Domestic
Category of foreign source of funding
empty
Country of origin
Type of organization providing the funding
Academic

Person responsible for general inquiries

Contact
Name of organization / entity
Islamic Azad University
Full name of responsible person
Mostafa Kordi
Position
Master's student
Latest degree
Bachelor
Other areas of specialty/work
Psychology
Street address
No. 11, Saadi Alley, Toheed 2 St., Qaleh Tol
City
Baghmalek
Province
Khouzestan
Postal code
6396148341
Phone
+98 905 253 3364
Fax
Email
mostafakordi19989@gmail.com

Person responsible for scientific inquiries

Contact
Name of organization / entity
Islamic Azad University
Full name of responsible person
Mostafa Kordi
Position
Master's student
Latest degree
Bachelor
Other areas of specialty/work
Psychology
Street address
No. 11, Saadi Alley, Toheed 2 St., Qaleh Tol
City
Baghmalek
Province
Khouzestan
Postal code
6396148341
Phone
+98 905 253 3364
Fax
Email
mostafakordi19989@gmail.com

Person responsible for updating data

Contact
Name of organization / entity
Islamic Azad University
Full name of responsible person
Mostafa Kordi
Position
Master's student
Latest degree
Bachelor
Other areas of specialty/work
Psychology
Street address
No. 11, Saadi Alley, Toheed 2 St., Qaleh Tol
City
Baghmalek
Province
Khouzestan
Postal code
6396148341
Phone
+98 905 253 3364
Fax
Email
mostafakordi19989@gmail.com

Sharing plan

Deidentified Individual Participant Data Set (IPD)
No - There is not a plan to make this available

Justification/reason for indecision/not sharing IPD
Participant data is completely confidential and I do not intend to publish it.

Study Protocol
Undecided - It is not yet known if there will be a plan to make this available

Statistical Analysis Plan
No - There is not a plan to make this available

Informed Consent Form
Undecided - It is not yet known if there will be a plan to make this available

Clinical Study Report
No - There is not a plan to make this available

Analytic Code
No - There is not a plan to make this available

Data Dictionary
No - There is not a plan to make this available