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# Gamified physical education to improve fitness and learning interest among vocational high school students in rural China

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| **Submission date**<br>07/05/2026 | **Recruitment status**<br>No longer recruiting | [_] Prospectively registered<br>[_] Protocol |
| **Registration date**<br>07/05/2026 | **Overall study status**<br>Completed | [_] Statistical analysis plan<br>[_] Results |
| **Last Edited**<br>07/05/2026 | **Condition category**<br>Other | [_] Individual participant data<br>[X] Record updated in last year |

## Plain English summary of protocol

Background and study aims
Many adolescents in vocational schools have limited opportunities and motivation to take part in regular physical activity. This study tests whether making physical education lessons more game-like, supportive, and team-based can improve students' physical fitness and interest in physical education.

Who can participate?
Students enrolled in Grade 10 or Grade 11 classes (aged 15 to 18 years) at participating county-level vocational high schools in rural China.

What does the study involve?
The study takes place in three county-level vocational high schools in rural China. Twelve intact classes are included. Classes are randomly assigned to either a gamified physical education programme or usual physical education. The gamified programme lasts 12 weeks and is delivered during regular school PE lessons. It uses low-cost methods such as team challenges, effort-based points, mastery badges, and anonymized team progress boards. These activities are designed to encourage effort, cooperation, confidence, and a sense of belonging, while reducing pressure from public individual ranking.

The main outcome is students' sport-related physical fitness, measured using a composite score based on sprint speed, endurance running, standing long jump, and sit-and-reach. The study also measures students' interest in physical education and their feelings of autonomy, competence, and relatedness during PE lessons. The study compares changes between the gamified PE classes and usual PE classes over 12 weeks.

What are the possible benefits and risks of participating?
Possible benefits of participation include improved physical fitness, increased interest in physical education, enhanced teamwork experience, and greater confidence during physical activity. The study may also help schools identify low-cost approaches to improving student engagement in physical education.

Possible risks are minimal and mainly related to ordinary physical education participation, such as temporary fatigue, muscle soreness, or minor sports injuries. All activities are conducted within routine school physical education settings under teacher supervision.

Where is the study run from?
Changchun University of Architecture and Civil Engineering, China.

When is the study starting and how long is it expected to run for?
September 2025 to January 2026.

Who is funding the study?
Investigator initiated and funded.

Who is the main contact?
Dr Dingyi Hou, dding421@gmail.com

# Contact information

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Public, Scientific, Principal investigator


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# Additional identifiers

### Chinese Clinical Trial Registry (ChiCTR)
PID315354

# Study information

### Scientific Title
A multi-site cluster randomized controlled trial of a need-supportive gamified physical education intervention for improving sport-related physical fitness and physical education learning interest among vocational adolescents in rural China

### Acronym
Gamified PE

### Study objectives
The aim of this study is to evaluate whether a 12-week need-supportive gamified physical education intervention improves sport-related physical fitness and physical education learning interest among vocational high school adolescents in rural China, compared with usual physical education practice. The study also examines whether changes in autonomy, competence, and relatedness explain intervention effects, and whether effects differ by gender or family affluence.

### Ethics approval required
Ethics approval required

### Ethics approval(s)
Approved 04/05/2025, The Ethics Committee of the School of Health Industry, Changchun University of Architecture and Civil Engineering (Changchun University of Architecture and Engineering, No. 1519, Huoju Road, Shuangde Subdistrict, Changchun High-Tech Industrial Development Zone, Changchun City, Jilin Province, 130015, China; +86 15500101233; jkcyxy@126.com), ref: 2025-JJXY-EC-001

### Primary study design
Interventional

### Allocation
Randomized controlled trial

### Masking
Blinded (masking used)

### Control
Active

### Assignment
Parallel

## Purpose
Prevention

## Study type(s)

## Health condition(s) or problem(s) studied
Physical inactivity, low sport-related physical fitness, and reduced engagement in physical education among vocational high school adolescents in rural China.

## Interventions
This is a multi-site, two-arm, parallel-group cluster randomized controlled trial conducted in three public county-level vocational high schools in rural China. Randomisation is conducted at the intact class level within each participating school to either the gamified physical education intervention or the usual practice. An independent researcher generates the allocation sequence using a computer-based random number generator. Classes are randomly assigned in a 1:1 ratio to either the gamified physical education intervention or usual physical education. Allocation concealment is implemented using sequentially numbered opaque sealed envelopes after baseline assessment.

The intervention consists of a 12-week “Gamified Season” delivered during regular physical education lessons, comprising 24 lessons of approximately 45 minutes each. The intervention is designed as a low-cost, need-supportive pedagogical redesign grounded in Self-Determination Theory. It uses four core components: an effort-based points-and-levels system rewarding persistence and individual improvement; skill-specific mastery badges with predefined performance criteria; stable student teams, referred to as “guilds”, of approximately 5–7 students; and anonymized team-based leaderboards emphasizing collective progress rather than individual ranking.

The intervention is implemented using printed scorecards and badge sheets, without reliance on digital platforms or expensive equipment. Teachers delivering the intervention receive standardized training covering need-supportive teaching, gamification rules, informational feedback, inclusion safeguards, and fidelity logging.

Control classes continue their usual physical education curriculum, typically involving standard teacher-led instruction and drill-based practice, without gamification materials or additional training.

## Intervention Type
Behavioural

## Primary outcome(s)
1. Composite Fitness Score measured using the mean score of four age- and sex-standardized physical fitness components based on the Chinese National Student Physical Fitness Standard: 50-m sprint, 800-m run for girls or 1000-m run for boys, standing long jump, and sit-and-reach. Each component is converted to a standardized 0–100 score, and the composite score is calculated as the mean of the four component scores. at baseline before randomization and post-intervention at week 12

## Key secondary outcome(s)

1. Physical education learning interest measured using the Vocational School Physical Education Interest Scale, including sports engagement, positive interest, negative interest, and autonomous learning, rated on a 5-point Likert scale, at baseline before randomization and post-intervention at week 12

2. Basic psychological need satisfaction in physical education measured using the Self-Determination Theory-based subscales assessing autonomy, competence, and relatedness in physical education, with four items per subscale rated on a 5-point Likert scale, at baseline, mid-intervention at week 6, and post-intervention at week 12

3. Equity-related subgroup differences in Composite Fitness Score measured using a subgroup analyses of intervention effects on Composite Fitness Score by gender and family affluence, with family affluence assessed using the Family Affluence Scale, at baseline and post-intervention at week 12

### Completion date
31/01/2026

## Eligibility

### Key inclusion criteria
1. Students enrolled in Grade 10 or Grade 11 classes at participating county-level vocational high schools in rural China
2. Classes with no scheduling conflict with regular physical education lessons
3. Classes taught by full-time certified physical education teachers
4. Students able to participate in regular school-based physical education activities
5. Students providing written informed consent, with additional parental or guardian consent for minors where required

### Healthy volunteers allowed
Yes

### Age group
Mixed

### Lower age limit
15 Years

### Upper age limit
18 Years

### Sex
All

### Total final enrolment
492

### Key exclusion criteria
1. Grade 12 students, because of internships or examination-related scheduling constraints
2. Students with medical conditions, injuries, or other contraindications to moderate-to-vigorous

physical activity or maximal fitness testing, according to school regulations
3. Students who transferred into participating classes after baseline assessment and therefore had no baseline measurements
4. Classes without regular physical education provision or without a full-time certified physical education teacher

**Date of first enrolment**
01/09/2025

**Date of final enrolment**
01/10/2025

# Locations

**Countries of recruitment**
China

**Study participating centre**
**Three county-level vocational high schools**
Changzhi, Shanxi Province
Changzhi
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046000

# Sponsor information

**Organisation**
Changchun University of Architecture and Civil Engineering

# Funder(s)

**Funder type**

**Funder Name**
Investigator initiated and funded

# Results and Publications

**Individual participant data (IPD) sharing plan**

## IPD sharing plan summary

Not expected to be made available