Clinical Trial Protocol
Iranian Registry of Clinical Trials

22 Nov 2026

Investigating the Effect of Using Artificial Intelligence in the Flipped Classroom Method on Academic Engagement, Learning Outcomes, and Critical Thinking Disposition in Nursing Students of Fatemeh school of Nursing and Midwifery

Protocol summary

Study aim
Determining the Effect of Using Artificial Intelligence in the Flipped Classroom Method on Academic Engagement, Learning Outcomes, and Critical Thinking Disposition in Nursing Students of Fatemeh school of Nursing and Midwifery

Design
Intervention design with random assignment to two control and experimental groups with a sample size of 54 students.

Settings and conduct
The project will be conducted at the Faculty of Nursing and Midwifery of Hazrat Fatemeh University of Medical Sciences. The project is an interventional type with pre-test-post-test.

Participants/Inclusion and exclusion criteria
Study entry criteria: First-semester nursing student who has taken the Fundamentals of Nursing Skills course, is willing to participate in the study, is between 18 and 30 years old, and has access to a smartphone or laptop with internet access. • In case of non-cooperation to continue participating in the study or absence from more than one training session, incomplete completion of the questionnaires by 20% of the main questions, previous history of taking the Fundamentals of Nursing Skills unit, and history of taking wound and dressing courses based on self-report, the participant will be excluded from the study process.

Intervention groups
Participants will be randomly assigned to two experimental and control groups. Training in both groups will be followed by 4 flipped classroom training sessions, with the intervention group receiving training in the use of artificial intelligence tools before presenting the educational content.

Main outcome variables
Academic Engagement, Learning Outcomes, and Critical Thinking Disposition

General information

Reason for update
Acronym
IRCT registration information
IRCT registration number: **IRCT20190727044347N9**
Registration date: **2025-12-05, 1404/09/14**
Registration timing: **prospective**

Last update: **2025-12-05, 1404/09/14**
Update count: **0**

Registration date
2025-12-05, 1404/09/14

Registrant information
Name
Fatemeh Shirazi
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Iran (Islamic Republic of)
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Recruitment status
Recruitment complete
Funding source

Expected recruitment start date
2025-12-06, 1404/09/15
Expected recruitment end date
2026-01-21, 1404/11/01
Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Investigating the Effect of Using Artificial Intelligence in the Flipped Classroom Method on Academic Engagement, Learning Outcomes, and Critical Thinking Disposition in Nursing Students of Fatemeh school of Nursing and Midwifery

Public title

Effect of Using Artificial Intelligence in the Flipped Classroom Method on Academic Engagement, Learning Outcomes, and Critical Thinking Disposition in Nursing Students of Fatemeh school of Nursing and Midwifery

Purpose

Education/Guidance

Inclusion/Exclusion criteria

Inclusion criteria:

First-semester nursing student who has taken the Fundamentals of Nursing Skills course Willingness to participate in the study Age 18 to 30 years Access to a smartphone or laptop Access to the internet

Exclusion criteria:

Failure to cooperate in continuing to participate in the study or being absent from more than one session of training Incomplete completion of questionnaires by 20% of the main questions Previous history of taking the course History of taking wound and dressing courses based on self-report

Age

From **18 years** old to **30 years** old

Gender

Both

Phase

N/A

Groups that have been masked

No information

Sample size

Target sample size: **54**

Randomization (investigator's opinion)

Randomized

Randomization description

After selecting individuals eligible to participate in the study based on the inclusion criteria, the statistician will use Random Allocation software to randomize the participants into 9 blocks, each block with a size of 6 people, into two experimental and control groups.

Blinding (investigator's opinion)

Not blinded

Blinding description

Placebo

Not used

Assignment

Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Research Ethics Committees of Schools of Nursing and Midwifery, Management and Medical Information

Street address

Vice-Chancellor for Research, Shiraz University of Medical Sciences, Zand Blvd.

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Shiraz

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Postal code

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Approval date

2025-10-18, 1404/07/26

Ethics committee reference number

IR.SUMS.NUMIMG.REC.1404.081

Health conditions studied

1

Description of health condition studied

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description

Learning Outcomes

Timepoint

In both groups, in the first in-person session, the pre-test forms will be completed by the students in person, and in the fourth teaching session, which is the end of the intervention, the post-test forms will be completed by the students for the second time in person.

Method of measurement

A researcher-made test will be used to measure student learning. This test will contain 15 four-choice questions. A correct answer to each question will be worth 1 point and an incorrect answer will be worth 0 points, which will be a total of 15 questions, 15 points. Face and content validity will be reviewed by 3 faculty members who are familiar with teaching this content, and CVI will be calculated, and the Koder-Richardson statistical test will be used to confirm reliability.

2

Description

Academic Engagement

Timepoint

In both groups, in the first in-person session, the pre-test forms will be completed by the students in person, and in the fourth teaching session, which is the end of the intervention, the post-test forms will be completed by the students for the second time in person.

Method of measurement

The Academic Engagement Questionnaire was designed and developed by Riv (2013) to measure academic engagement. This questionnaire has 17 questions and 4 dimensions, which are answered based on a seven-point Likert scale.

3

Description

Critical Thinking Disposition

Timepoint

In both groups, in the first in-person session, the pre-test forms will be completed by the students in person, and in the fourth teaching session, which is the end of the intervention, the post-test forms will be completed by the students for the second time in person.

Method of measurement

To examine students' tendency to think critically, the Critical Thinking disposition Questionnaire, designed by Ricketts in the United States in 2003, will be used.

Secondary outcomes

empty

Intervention groups

1

Description

Intervention group: the intervention will begin with the introduction and training of artificial intelligence tools, in a non-face-to-face manner and three weeks before the wound training sessions. The training content at this stage includes the introduction of artificial intelligence chatbots and content production tools (introduction to different chatbots, how to access them, how to write prompts, how to produce content such as text and images, PowerPoint and video), which will be presented to students in the form of micro-learning in the form of shortened content with a duration of 3 to 5 minutes as offline educational content in the form of films and written texts on the WhatsApp platform. After selecting the participants, introducing the research and obtaining informed consent in person; the educational topic of wounds and nursing care will be carried out using the flipped classroom method and with content creation by students. The list of educational content of wounds and modern dressings and nursing care will be provided to students as a header to be used to coordinate the content in content creation. The books and articles of the day, which have been approved by the group professors, will be provided to students to use in content production. Students are required to produce content in the form of a video or PowerPoint with audio before the in-person session using artificial intelligence tools and according to the provided list of contents. It should be noted that each group must place individual tasks in content production along with the tools used at the beginning of the content. The content produced is evaluated by the researcher and the best content produced is selected in terms of completeness, novelty, conceptuality, and attractiveness. If necessary, it is edited, corrected, and completed, and the final version is uploaded to the Navid system. Students then answer five related multiple-choice questions individually before the in-person class. These questions will be different from the multiple-choice questions of the learning level test. The content of the in-person sessions in the intervention group will be in accordance with the following categories:1. Content of the first session:At the beginning of the first session, the purpose of the research, how to implement flipped classroom training, individual and group tasks, and the general process of participating in the study are explained to the students. After obtaining written consent from the volunteers, the students are divided into groups of 6 to 8. Also, questionnaires related to the variables under study are completed by the participants. Finally, an introduction to the topic of the second session will be provided for mental preparation.2. Content of the second session:The educational content of the second session is dedicated to the basic concepts of wounds, the structures that make up the skin, types of wounds, wound assessment, the wound healing process, factors affecting the progress of wound healing, problems related to wound healing, and appropriate nursing measures in clients with impaired skin integrity. After reviewing the materials as a group and answering the questions, each group is faced with a relevant clinical scenario and is tasked with analyzing and formulating appropriate nursing measures. Subsequently, the representative of each group presents its findings to the group. The session ends with a general introduction to the topic of the next session.3. Content of the third session:In this session, the definition of pressure ulcer, the cause of pressure ulcer, types of pressure ulcer, pressure ulcer assessment, factors affecting the development of pressure ulcer, and areas at risk of pressure ulcer and factors affecting it are discussed. The training process is similar to the second session, and group activities focus on analyzing clinical scenarios based on the content presented. At the end, the researcher will provide an introduction to the next session.4. Content of the fourth session:The final session is dedicated to teaching concepts related to the prevention and treatment of pressure ulcers, familiarization with types of dressings and new technologies in wound management. In-person activities will also be carried out according to the pattern of previous sessions. At the end of this session, the research questionnaires will be completed by the students for the second time.

Category

Behavior

2

Description

Control group: In the control group, like the intervention group, 4 flipped classroom training sessions will be

provided with the same content as in the intervention group. In-person sessions will be held in exactly the same style and in accordance with the intervention group, with the only difference being that in the control group, the content of each session in the pre-class activity section will be uploaded by the researcher to the Navid system in the form of video content, and no training will be provided on artificial intelligence.

Category
Behavior

Recruitment centers

1

Recruitment center

Name of recruitment center
Fatemeh School of Nursing & Midwifery

Full name of responsible person
Dr. Malek fereidooni Moghadam

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity
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Full name of responsible person
Dr Hamid Mohammadi

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Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?
Yes

Title of funding source
Shiraz University of Medical Sciences

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
Shiraz University of Medical Sciences

Full name of responsible person
Fatemeh Shirazi

Position
Associate professor

Latest degree
Ph.D.

Other areas of specialty/work
Nursery

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Sharing plan

Deidentified Individual Participant Data Set (IPD)

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

Study Protocol

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

Statistical Analysis Plan

Undecided - It is not yet known if there will be 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

Not applicable

Analytic Code

Not applicable

Data Dictionary

Not applicable