

# Clinical Trial Protocol

## Iranian Registry of Clinical Trials

15 Jun 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

Academic Engagement, Learning Outcomes, and Critical Thinking Disposition

#### 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

#### 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

##### Name of organization / entity

##### Country

Iran (Islamic Republic of)

##### Phone

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##### Email address

shirazifa@sums.ac.ir

##### 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.

##### **City**

Shiraz

##### **Province**

Fars

##### **Postal code**

7134814336

#### **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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School of Nursing and Midwifery, Nemazee Hospital,  
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**Sponsors / Funding sources****1****Sponsor****Name of organization / entity**

Shiraz University of Medical Sciences

**Full name of responsible person**

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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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**Position**

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## Person responsible for updating data

### Contact

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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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School of Nursing and Midwifery (SA), Namazi Square  
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**Postal code**

## 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