Clinical Trial Protocol
Iranian Registry of Clinical Trials

10 Jun 2026

Comparing the Effects of Flipped Classroom and Traditional Lecture Method on Academic Performance and Classroom Environment Perception among Nursing Students: A Randomized Controlled Trial

Protocol summary

Study aim
Comparison of two methods: flipped classroom and lecture on academic performance and perception of nursing students

Design
This was a randomized controlled pre- and post-test trial with a control group.

Settings and conduct
All nursing students in the second semester of the Faculty of Nursing and Midwifery of Qom who had taken the Adult and Older Adult Nursing 1 course were included in the study if they were eligible to participate. They were assigned to the intervention and control groups using simple random assignment. This study was conducted in a single-blind manner, such that the researchers who collected and assessed the outcome were unaware of the type of intervention.

Participants/Inclusion and exclusion criteria
Inclusion criteria included taking the Adult and Older Adults Nursing 1 course for the first time; having access to devices such as mobile phones, computers, and the Internet for retrieving educational materials; and expressing willingness to participate in the study. The exclusion criteria included completion of training courses related to fluid and electrolytes, known learning disabilities, and participation in a similar study at the same time.

Intervention groups
"Intervention group:" Teaching in the intervention group was inverted as follows: students had to read the educational content related to the same session at home that was provided to them in advance and come to the classroom prepared for the next session. In the class, students were divided into groups of five to six and discussed the scenarios and questions designed by the teacher. The intervention was planned for 4 2-hour sessions, which were delivered over 4 consecutive weeks. "Control group:" The instructor presented the educational content in the form of a lecture and via PowerPoint presentation.

Main outcome variables
academic performance, students' perceptions

General information

Reason for update

Acronym

IRCT registration information
IRCT registration number: **IRCT20240610062078N2**
Registration date: **2025-12-21, 1404/09/30**
Registration timing: **retrospective**

Last update: **2025-12-21, 1404/09/30**
Update count: **0**

Registration date
2025-12-21, 1404/09/30

Registrant information

Name
Mahboubeh Sadat Yousefi

Name of organization / entity

Country
Iran (Islamic Republic of)

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+98 21 8865 5366

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Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2020-02-04, 1398/11/15

Expected recruitment end date
2020-03-10, 1398/12/20

Actual recruitment start date
2020-02-04, 1398/11/15
Actual recruitment end date
2020-03-10, 1398/12/20
Trial completion date
2020-04-03, 1399/01/15

Scientific title
Comparing the Effects of Flipped Classroom and Traditional Lecture Method on Academic Performance and Classroom Environment Perception among Nursing Students: A Randomized Controlled Trial

Public title
impact of flipped classroom on nursing students' learning and understanding
Purpose
Education/Guidance
Inclusion/Exclusion criteria
Inclusion criteria:
taking the Adult and Older Adults Nursing 1 course for the first time having access to devices such as mobile phones, computers, and the Internet for retrieving educational materials expressing willingness to participate in the study
Exclusion criteria:
completion of training courses related to fluid and electrolytes. known learning disabilities participation in a similar study at the same time
Age
No age limit
Gender
Both

Phase
N/A
Groups that have been masked

- Outcome assessor
- Data analyser

Sample size
Target sample size: **60**
Actual sample size reached: **58**
Randomization (investigator's opinion)
Randomized
Randomization description
The students were divided into two intervention and control groups using simple randomization. A Microsoft Excel random number generator with a 1:1 ratio was used to generate sequence numbers. The sequence numbers were then coded and placed in sealed opaque envelopes. The research assistant divided the students into intervention (29 people) or control (29 people) groups based on the sequence numbers in the envelope of their choice. The entire randomization process was carried out by a research assistant who was not involved in the intervention and data analysis.
Blinding (investigator's opinion)
Single blinded
Blinding description
This was a single-blind study. Because this study adopted educational interventions that made it difficult to blind the participants (students) and the researcher (instructor) conducting the intervention, only the researchers responsible for data collection and analysis and for assessing the outcomes were blinded to group assignment. Thus, the researchers responsible for collecting and assessing outcomes had no access to the list of participants assigned to the intervention and control groups. The collected data were recorded and stored using random identifiers (such as unique numbers unrelated to grouping). These codes were created by the principal investigator, who had access to the decoding key. Blinded researchers collected data based on these codes and conducted outcome assessments (such as scoring tests or analyzing responses) without knowledge of the participant groupings.
Placebo
Not used
Assignment
Parallel
Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee
Name of ethics committee
Ethics Committee of Qom University of Medical Sciences
Street address
Shahid Lavasani (Saheli) St., Qom, I.R. Iran
City
Qom
Province
Ghoum
Postal code
3716993456
Approval date
2018-07-03, 1397/04/12
Ethics committee reference number
IR.MUQ.REC.1397.056

Health conditions studied

1

Description of health condition studied
-
ICD-10 code
-
ICD-10 code description
-

Primary outcomes

1

Description
academic performance

Timepoint
One week before the start of the intervention and after the end of the intervention
Method of measurement
To assess academic performance (primary outcome), pre- and post-intervention test scores were used to measure the students' knowledge gains. The tests consisted of 20 multiple-choice questions (with four options each) on knowledge related to fluid and electrolyte topics. Each correct answer was worth 1 point, with scores ranging from 0 to 20; higher scores indicated better knowledge of fluids and electrolytes.

Secondary outcomes

1

Description
students' perceptions of the classroom environment (secondary outcome)
Timepoint
After the end of the intervention
Method of measurement
The College and University Classroom Environment Inventory (CUCEI) was used to assess students' perceptions of the classroom environment.

Intervention groups

1

Description
Intervention group: According to the lesson plan, the fluid and electrolytes topic was structured into four two-hour sessions delivered over four consecutive weeks. To deliver instruction using the flipped classroom approach, the instructor provided the students with all the content intended for a single session one week in advance. Students were required to review the educational materials at home or in a non-classroom setting and to arrive prepared at the subsequent session. The materials distributed included short topical videos and PowerPoint presentations (each 10–15 minutes long), along with a PDF of the lecture notes, all uploaded to the virtual educational group (Telegram). Each video and presentation concluded with a question or scenario to guide self-directed learning and evaluate students' grasp of key outcomes. Additionally, the instructor prepared questions and clinical scenarios tied to each session's core concepts prior to the class. In-Class Activities1. At the start of the class, the instructor spent 10-15 minutes addressing students' questions and clarifying misunderstandings about the educational content in order to resolve any misconceptions. 2. The instructor engaged individually with the students regarding the questions raised in the pre-class materials, which took approximately 15 minutes. 3. The students were divided into groups of five to six members to discuss the scenarios and questions prepared by the instructor. This involved the instructor presenting predesigned clinical scenarios using PowerPoint. Each group was given a few minutes to deliberate and collaborate internally in order to formulate their responses. A representative of the group presented the answer in this scenario. Members of other groups could offer comments and ask questions. Finally, the instructor addressed any remaining issues and student queries. In this way, students practically applied their theoretical knowledge by analyzing and responding to clinical scenario questions.
Category
Other

2

Description
Control group: The instructor delivered educational content via a lecture using PowerPoint slides. Students' questions were addressed at the end of the class.
Category
Other

Recruitment centers

1

Recruitment center
Name of recruitment center
School of Nursing and Midwifery
Full name of responsible person
Abbas Moghadam
Street address
Western 2nd Alley, Mo'allem St., Qom, Iran
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Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Ghoum University of Medical Sciences
Full name of responsible person
Dr Ali Ebrazeh
Street address
Fourth floor, Qom University of Medical Sciences, Shahid Lavasani St., Qom, Iran
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Postal code
3716993456
Phone
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Email

ebraze1880@yahoo.com

Grant name

Grant code / Reference number

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

Yes

Title of funding source

Ghoum 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

Ghoum University of Medical Sciences

Full name of responsible person

Mahboubeh Sadat Yousefi

Position

Instructor

Latest degree

Ph.D.

Other areas of specialty/work

Nursery

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Person responsible for scientific inquiries

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Full name of responsible person

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Position

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Other areas of specialty/work

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Person responsible for updating data

Contact

Name of organization / entity

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Sharing plan

Deidentified Individual Participant Data Set (IPD)

Yes - There is a plan to make this available

Study Protocol

Yes - There is a plan to make this available

Statistical Analysis Plan

Yes - There is a plan to make this available

Informed Consent Form

Yes - There is a plan to make this available

Clinical Study Report

Not applicable

Analytic Code

Yes - There is a plan to make this available

Data Dictionary

Yes - There is a plan to make this available

Title and more details about the data/document

It can be shared after de-identifying individuals.

When the data will become available and for how long

Access begins one year after results are published.

To whom data/document is available

People working in academic and scientific institutions

Under which criteria data/document could be used

Subject to agreement with Qom University of Medical

Sciences

From where data/document is obtainable

Faculty of Nursing, Qom University of Medical Sciences, Ms. Mahboubeh Sadat Yousefi

What processes are involved for a request to access data/document

Written and official request to the Vice President of Research, Faculty of Nursing

Comments