Clinical Trial Protocol
Iranian Registry of Clinical Trials

08 Nov 2026

Effect of Concept Map-Based Instruction on Learning and Critical Thinking in Undergraduate Forensic Dentistry Education

Protocol summary

Study aim

To evaluate the effect of concept map-based instruction on learning and critical-thinking skills among undergraduate dental students enrolled in a forensic dentistry course.

Design

A quasi-experimental pretest–posttest study involving 42 fifth-year dental students in intervention (n=21) and control (n=21) groups. Concept map-based instruction was compared with conventional lecture and PowerPoint-based instruction. Learning and critical thinking were assessed before and after the intervention.

Settings and conduct

The study was conducted in the first semester of 2018–2019 at Kerman University of Medical Sciences, Iran. Both groups were taught by the same instructor using a standardized protocol. Knowledge was assessed with a 12-item researcher-developed test, and critical thinking with the Persian version of the California Critical Thinking Skills Test (CCTST-B).

Participants/Inclusion and exclusion criteria

Forty-two fifth-year dental students enrolled in the compulsory forensic dentistry course at Kerman University of Medical Sciences were included. Eligibility criteria were fifth-year enrollment, participation in the course, willingness to participate, and no previous experience with concept map-based instruction. Absence from one or more instructional sessions was an exclusion criterion.

Intervention groups

Participants were randomly assigned to two groups of 21. The intervention group received concept map-based instruction using case scenarios, key concept identification, concept map construction, and guided discussion, while the control group received conventional PowerPoint-based lectures. Both groups received the same content and learning objectives.

Main outcome variables

Knowledge score in forensic dentistry and critical-thinking score measured before and after the intervention. Concept map construction performance was also assessed in the intervention group.

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20260910071001N1**
Registration date: **2026-10-17, 1405/07/25**
Registration timing: **retrospective**

Last update: **2026-10-17, 1405/07/25**
Update count: **0**

Registration date

2026-10-17, 1405/07/25

Registrant information

Name
Maryam Moosanejad
Name of organization / entity
Country
Iran (Islamic Republic of)
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+98 34 3281 5019
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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2018-03-21, 1397/01/01

Expected recruitment end date

2019-05-11, 1398/02/21

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Effect of Concept Map-Based Instruction on Learning and Critical Thinking in Undergraduate Forensic Dentistry Education

Public title

Effect of Concept Map-Based Instruction on Learning and Critical Thinking in Undergraduate Forensic Dentistry Education

Purpose

Education/Guidance

Inclusion/Exclusion criteria

Inclusion criteria:

Fifth-semester dental students who were willing to participate in the study No prior training in the concept map-based teaching method.

Exclusion criteria:

There was one absence during the forensic dentistry training course.

Age

No age limit

Gender

Both

Phase

N/A

Groups that have been masked

No information

Sample size

Target sample size: **42**

More than 1 sample in each individual

Number of samples in each individual: **21**

The intervention group consisted of 8 boys and 13 girls, and the control group consisted of 14 boys and 7 girls.

Randomization (investigator's opinion)

Randomized

Randomization description

A total of 42 fifth-semester dental students currently taking the forensic dentistry course were included in the study via a census approach; they were assigned to either a control group or an intervention group. Given the limited number of students, all eligible dental students were recruited using purposive sampling; although random assignment to groups was employed, the study deviated from true randomization and assumed a quasi-experimental design.

Blinding (investigator's opinion)

Not blinded

Blinding description

Placebo

Not used

Assignment

Other

Other design features

This prospective quasi-experimental controlled study was conducted among 42 fifth-year dental students enrolled in a compulsory forensic dentistry course. Participants were randomly allocated to either a concept map-based instruction group (n = 21) or a conventional lecture-based teaching group (n = 21). Both groups received identical educational content over two instructional sessions delivered by the same instructor. Knowledge was assessed using a validated researcher-developed 12-item multiple-choice examination, and critical-thinking skills were measured using the Persian version of the California Critical Thinking Skills Test before and after the intervention. Between-group and within-group comparisons were performed using independent- and paired-samples t-tests.

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Ethics Committee of Kerman University of Medical Sciences

Street address

University of Medical Sciences Campus, beginning of Haft-Bagh-e Alavi Boulevard, Kerman

City

Kerman

Province

Kerman

Postal code

7616910002

Approval date

2019-02-18, 1397/11/29

Ethics committee reference number

IR.KMU.REC.1397.492

Health conditions studied

1

Description of health condition studied

Forensic Dentistry Education

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description

Students’ learning score in forensic dentistry course content

Timepoint

Before the intervention and immediately after the intervention

Method of measurement

Measured using a 12-item written test designed to assess learning; each correct answer was scored 1 point and each incorrect answer 0 points, and the total number of correct responses was calculated as the learning score.

2

Description
Students' critical thinking score
Timepoint
Before the intervention and immediately after the intervention
Method of measurement
Measured using the California Critical Thinking questionnaire

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group: Concept map-based instruction in the forensic dentistry course. The course content was reviewed and organized into scenarios, and concept maps were developed following analysis of the content and presented during two instructional sessions.
Category
Other

2

Description
Control group: Conventional instruction in the forensic dentistry course using lectures and PowerPoint presentations.
Category
Other

Recruitment centers

1

Recruitment center
Name of recruitment center
School of Dentistry, Kerman University of Medical Sciences
Full name of responsible person
Esmat Nouhi
Street address
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Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Kerman University of Medical Sciences
Full name of responsible person
Dr. Hamid Sharifi
Street address
Deputy of Research and Technology, Kerman University of Medical Sciences, Ibn Sina Street, Somayeh Intersection (Tahmasab Abad), Kerman, Iran
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Email
sharifihami@gmail.com
Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
No
Title of funding source
Kerman 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
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Full name of responsible person
Esmat Nouhi
Position
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Person responsible for updating data

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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
Due to the need to protect participants' confidentiality and privacy, and considering the educational nature of the study, there is no plan to make individual participant data (IPD) publicly available.
Study Protocol
No - There is not a plan to make this available
Statistical Analysis Plan
No - There is not a plan to make this available
Informed Consent Form
No - There is not a plan to make this available
Clinical Study Report
Not applicable
Analytic Code
Not applicable
Data Dictionary
Not applicable