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Does reading on a tablet affect how much medical students learn, compared with reading on paper?

Submission date
18/11/2026

Recruitment status
No longer recruiting

Registration date
18/11/2026

Overall study status
Completed

Last Edited
18/11/2026

Condition category
Other

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
Medical students increasingly read their course material on tablets and laptops instead of on paper. This change has happened mainly for practical reasons, because digital material is cheaper and easier to distribute, rather than because anyone has shown that students learn just as well from a screen. Earlier research on reading, mostly outside medicine, has found that people sometimes understand a little less when they read from a screen than when they read from paper. This study asked whether that difference also appears when medical students read a piece of academic text under controlled conditions, and whether reading on a tablet feels different, for example more tiring on the eyes or more distracting.

Who can participate?
Third-year medical students aged 18 or over at the Faculty of Medicine, Zonguldak Bülent Ecevit University, who agreed to take part and to stay for the whole session.

What does the study involve?
Students were placed into one of two groups by chance. Both groups were given exactly the same 1,210-word text about attention-deficit/hyperactivity disorder (ADHD). One group read it as a PDF on a tablet computer and the other read it as a printed handout. Everyone was given the same 30 minutes to read, and nobody was allowed to take notes, highlight, zoom in or search the text, so that the reading format was the only thing that differed between the groups. Before reading, all students took a 12-question multiple-choice test on the subject, and immediately after reading they took a second test of the same length. They also answered a few short questions about how the reading had felt. Everything took place in a single session and there were no further visits.

What are the possible benefits and risks of participating?
Participants revised a clinical topic and received no payment. Taking part was voluntary and had no effect on their marks. The study involved nothing more than half an hour of supervised reading, so the risks were very low; the main possible inconvenience was tiredness or eye strain.

Where is the study run from?
Zonguldak Bülent Ecevit University, Zonguldak, Türkiye

When is the study starting and how long is it expected to run for?
April 2026 to October 2026

Who is funding the study?
The study received no external funding and was carried out by the investigators using the host university's own facilities.

Who is the main contact?
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Contact information

Type(s)
Public, Scientific, Principal investigator

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Study information

Scientific Title
Tablet-based versus printed reading and learning performance in medical students: a randomised controlled educational trial

Study objectives
Primary objective: To determine whether immediate knowledge acquisition from a fixed 30-minute reading of an identical academic text differs between medical students who read the text as a PDF on a tablet computer and those who read it as a printed handout.

Secondary objectives: To compare the within-group change in knowledge score from before to after reading between the two formats, and to compare the subjective reading experience, perceived mental effort, distraction, eye strain, ocular discomfort, format comfort and willingness to use the same format again, between the two formats.

Hypothesis: Learning gains were hypothesised to be comparable across the two reading formats, with the subjective reading experience assessed as a secondary objective.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 01/04/2025, Non-Interventional Clinical Research Ethics Committee, Zonguldak Bülent Ecevit University (Zonguldak Bülent Ecevit University, Faculty of Medicine, Esenköy, Zonguldak Merkez, 67000, Türkiye; +903722613260; info@beun.edu.tr), ref: Meeting no. 2026/06, decision no. 3

Primary study design
Interventional

Allocation
Randomized controlled trial

Masking
Open (masking not used)

Control
Active

Assignment
Parallel

Purpose
Educational intervention; acquisition of knowledge in undergraduate medical education.

Study type(s)

Health condition(s) or problem(s) studied
Learning and knowledge acquisition in undergraduate medical education.

Interventions
Participants were randomised to read an identical 1,210-word academic text on attention-deficit /hyperactivity disorder for a fixed 30 minutes, either (a) as a PDF on a tablet computer (Samsung Galaxy Tab A9, 8.7-inch screen) or (b) as a printed handout. Content, layout, typeface and exposure time were identical in both arms. To isolate reading medium from the interaction affordances that normally accompany it, annotation, highlighting, zooming, searching and note-taking were prohibited in both arms, and writing implements were removed before the session began. All sessions were held face-to-face in university teaching rooms. Allocation was by simple randomisation from a published table of random numbers, generated jointly by the investigators, with no stratification, blocking or fixed allocation ratio. There was no follow-up period: all outcomes were assessed using a purpose-built 12-item, five-option single-best-answer

multiple-choice test within the same session, immediately before and immediately after the reading period. Analysed by analysis of covariance on the post-test score with allocated group as a fixed factor and pre-test score as a covariate,

Intervention Type
Other

Primary outcome(s)
1. Immediate post-reading knowledge score measured using a purpose-built 12-item, five-option single-best-answer multiple-choice test, machine-scorable and scored against a fixed answer key; metric is the percentage of items answered correctly (0–100%), immediately at the end of the 30-minute reading period, within the same session

Key secondary outcome(s)
1. Knowledge score from before to after reading measured using the arithmetic difference between the pre- and post-test percentage scores on the parallel 12-item multiple-choice forms, expressed in percentage points, at pre-test and immediately after the 30-minute reading period, within the same session

2. Between-group difference in change score measured using Difference between arms in the mean change from pre-test to post-test, in percentage points, compared by independent-samples t-test with a mixed-design analysis of variance as a secondary test, at pre-test and immediately after the 30-minute reading period, within the same session

3. Subjective reading experience measured using single-item five-point Likert agreement ratings, administered on paper; one item each for perceived mental effort, distraction, eye strain, ocular discomfort, format comfort and willingness to use the same format again, at immediately after the post-test, within the same session.

Completion date
06/10/2026

Eligibility

Key inclusion criteria
1. Third-year medical student enrolled at the host faculty at the time of the study
2. Aged 18 years or older
3. Informed about the study and provided written informed consent
4. Agreed to remain for the full session

Healthy volunteers allowed
Yes

Age group
Adult

Lower age limit
18 Years

Upper age limit

30 Years

Sex
All

Total final enrolment
94

Key exclusion criteria
1. Declined consent
2. Failed to complete either the pre-test or the post-test
3. Did not complete the reading task within the allotted time, or left the session early
4. Unable to receive the allocated intervention for technical reasons such as device failure
5. Visual impairment severe enough to prevent performance of the reading task

Date of first enrolment
06/04/2026

Date of final enrolment
06/07/2026

Locations

Countries of recruitment
Türkiye

Sponsor information

Organisation
Zonguldak Bülent Ecevit University

ROR
https://ror.org/01dvabv26

Funder(s)

Funder type

Funder Name
Zonguldak Bülent Ecevit University

Alternative Name(s)
Zonguldak Bülent Ecevit University, Bülent Ecevit University, Bülent Ecevit Üniversitesi, ZBEÜ, BEU

Funding Body Type
Government organisation

Funding Body Subtype
Universities (academic only)

Location
Türkiye

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated and analysed during the current study are not publicly available because the informed consent obtained from participants and the approval granted by the institutional ethics committee did not cover public deposition of individual-level data, and the working file contains participant names and student numbers. A fully de-identified dataset is available from the corresponding author, İlke Aktuğ Buzkan (aktugbuzkan@hotmail.com), on reasonable request.

IPD sharing plan summary
Available on request