

The Effectiveness of the Flipped Learning Model on Cognitive Engagement and Critical Thinking in Upper Elementary School Students with Attention-Deficit/Hyperactivity Disorder

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E d i t o r

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R e v i e w e r s

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1. Round 1

1.1. Reviewer 1

Reviewer:

The sample-size justification in the paragraph beginning “Given the limitations associated with the inclusion criteria, time constraints, and accessibility of the target population...” needs considerably greater statistical detail. The authors report $\alpha = .05$, an effect size of $d = .80$, power = .80, and 12 participants per group based on “Cohen’s (2013) table,” but the primary analyses involve multiple outcomes, baseline adjustment, and repeated assessments rather than a simple two-group mean comparison. The manuscript should specify the statistical test on which the power calculation was based, whether the calculation was one- or two-tailed, the assumed correlation among repeated measurements or covariates if applicable, and whether the estimated sample size was adequate for the actual covariance model. A reproducible power analysis using appropriate software would provide a substantially stronger justification.

There is a serious numerical inconsistency between the sampling and Findings sections. The Methods report that “24 students were identified as eligible... and then randomly assigned... to two groups of 12 participants each,” whereas the Findings state, “Due to incomplete or invalid responses on some questionnaires and the dropout of one participant from the experimental

group, data from the two groups of 12 participants were analyzed.” If one participant dropped out after allocation, both groups cannot still contain 12 analyzed participants unless another participant was added or an imputation strategy was used. The authors must provide a transparent participant flow describing the numbers screened, excluded and reasons for exclusion, randomized, beginning treatment, completing posttest, completing follow-up, and included in the final analysis. The analytical approach should also be identified as complete-case, per-protocol, or intention-to-treat.

The inclusion criterion “Obtaining a score higher than 34 on the parent version of the Conners Attention-Deficit/Hyperactivity Disorder Scale” requires methodological documentation. The manuscript should identify the exact Conners instrument and version used, because several parent-report forms exist and their item composition, scoring system, norms, and diagnostic interpretation differ. The rationale and empirical source for the >34 cutoff should also be reported, together with evidence of validity and reliability for the language and population used in the study. Without this information, the screening procedure cannot be reproduced and readers cannot determine whether the cutoff appropriately identified probable ADHD cases.

The diagnostic procedure also needs substantially greater specification. The inclusion criteria state that participants had “a definitive diagnosis of attention-deficit/hyperactivity disorder by the psychologists and psychiatrist at the center,” but the manuscript does not explain how this diagnosis was established. The authors should report the diagnostic criteria used, whether a structured or semi-structured clinical interview was administered, whether symptoms were confirmed across both home and school settings, whether impairment and duration criteria were assessed, and how comorbid neurodevelopmental or psychiatric conditions were handled. Because diagnostic validity defines the target population of the study, this information is essential rather than optional.

Intervention fidelity is insufficiently documented. The sentence “The same instructor, who had received specialized training in flipped learning and instructional skills, taught both the experimental and control groups” is useful for controlling instructor variability, but the manuscript provides no evidence that the intervention was delivered consistently according to protocol. The authors should explain how fidelity was monitored—for example, through session checklists, independent observation, review of uploaded materials, attendance logs, completion records, or supervision. It would also be valuable to state whether contamination between the experimental and control conditions was minimized, especially because the same instructor delivered both instructional approaches.

Response: Revised and uploaded the manuscript.

1.2. Reviewer 2

Reviewer:

The medication-related exclusion criterion is potentially problematic and requires clarification. The manuscript states that students were excluded for “use of medications that could interfere with the intervention process,” but it does not define which medications were considered interfering, whether stable ADHD pharmacotherapy was permitted, or who made this determination. Medication status can substantially affect attention, impulsivity, and classroom functioning and therefore represents an important potential confounder. The authors should report baseline medication use in both groups, specify whether doses had to remain stable throughout the study, explain any medication-related exclusions, and indicate whether medication status was considered during analysis.

The construct operationalization for cognitive engagement requires reconsideration. The manuscript states that the “Revised Two-Factor Learning Process Questionnaire... was used to assess students’ approaches to cognitive processing and served as the measure of cognitive engagement.” However, the instrument is described as measuring deep and surface approaches to learning rather than cognitive engagement as a unitary construct. The authors need to provide a stronger theoretical justification for treating these learning approaches as indicators of cognitive engagement, clearly distinguish “approach to learning” from “cognitive engagement,” and use consistent terminology throughout the Introduction, Methods, Findings, and Discussion. Otherwise, the manuscript risks making conclusions about a construct that was not directly measured in the manner described.

The interpretation of the surface approach is a major conceptual concern. The manuscript reports that higher scores indicate “greater predominance of the corresponding approach” and subsequently treats the significant increase in the experimental group’s surface-approach score from 29.3 to 37.2 as evidence that “cognitive engagement” improved. A surface learning approach is generally conceptually different from deeper, strategically engaged learning and should not automatically be interpreted as a favorable outcome. The authors must revisit the scoring direction, construct definition, and interpretation of this subscale. If higher surface-processing scores represent more superficial learning, the reported increase may contradict the proposed beneficial effect of flipped learning and would require a fundamentally different discussion.

A related conceptual issue occurs with the Critical Thinking Disposition Inventory. The manuscript states that the instrument “was administered to assess participants’ disposition toward critical thinking,” yet throughout the Results and Discussion the outcome is repeatedly described simply as “critical thinking” and interpreted as improvement in critical-thinking ability or skill. Disposition toward critical thinking and demonstrated critical-thinking performance are related but distinct constructs. The authors should revise claims throughout the manuscript so that they correspond precisely to what the CTDI measures, or alternatively provide a performance-based measure if the intended conclusion concerns critical-thinking skills. Statements claiming enhanced reasoning ability should not exceed the construct directly assessed by the instrument.

The intervention paragraph beginning “The experimental group participated in eight weekly instructional sessions based on the flipped learning model...” does not report session duration. This omission prevents estimation of intervention dosage and makes replication difficult. The authors should specify the length of each classroom session, approximate duration of each pre-class activity, expected weekly home-learning time, total intervention exposure, class size, and whether all eight sessions were completed by every analyzed participant. Because treatment intensity may influence both efficacy and feasibility, these details should be incorporated directly into the intervention protocol.

The intervention appears to contain a potentially important co-intervention that should be acknowledged and controlled. The manuscript states, “Because all participants had ADHD, parents were also asked to supervise the completion of pre-class activities and encourage active participation.” No equivalent parent involvement appears to have been provided to the control group. Consequently, the observed effects cannot be attributed unequivocally to flipped learning because additional parental monitoring, prompting, and reinforcement may itself improve engagement and task completion. The authors should describe the amount and form of parental involvement, report whether adherence was monitored, and discuss parental supervision as a possible active component or confounding factor.

The control condition requires a more rigorous description. The manuscript states that “the control group received the same general curriculum content through conventional textbook-based, lecture-oriented instruction,” but it remains unclear whether instructional time, teacher contact, homework demands, lesson objectives, curricular content, and opportunities for feedback were equivalent across conditions. An active comparator should ideally differ primarily in the instructional feature under investigation. The authors should report the control-group session frequency and duration, homework expectations, teacher interactions, classroom activities, and content coverage so readers can determine whether observed effects reflect the flipped format specifically or simply greater instructional intensity and interaction in the experimental group.

Response: Revised and uploaded the manuscript.

2. Revised

Editor’s decision after revisions: Accepted.

Editor in Chief’s decision: Accepted.