

The Effect of Using Brainstorming on Developing Innovative Thinking and Achievement in Teaching English Language Students

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Abstract

This research aimed to determine if the seventh-grade English classrooms at Irbid 1st Directorate of Education may benefit from using brainstorming as a teaching tool. The research included (180) pupils from this grade. The research included two groups of students: one that learned English using brainstorming as an instructional strategy and another that learned English using more traditional means. In order to guarantee that the inventive thinking and accomplishment exams were valid and dependable, relevant statistical methods were used to administer them after the instruction ended.

This study's findings are as follows:

- The experimental group that learned English through brainstorming outperformed the control group on a posttest that measured creative problem-solving abilities (fluency, adaptability, and originality) with a significance level of 0.05.
- With a p-value of less than 0.05, there was a statistically significant difference in the mean achievement scores of the two groups. These variations favored the experimental group's approach to studying English, which involved brainstorming.

Keywords: Brainstorming, Innovative thinking, Achievement

1. Introduction

Over the last few years, promoting creativity has become crucial in education, especially language acquisition. Thought-provoking, a famous creative procedure, has been one of the most successful practices in fostering creativity, problem-solving, and considering multiple viewpoints among students. Since brainstorming encourages students to think freely and eliminate prejudices, their ideas might become more creative and innovative. Some research has shown that when brainstorming is incorporated into EFL, it enhances students' interest and fosters their creativity, helping them develop essential skills for learning and life (Smith & Brown, 2022).

Brainstorming is one of the most essential methods for generating fresh ideas and practical answers to problems in academia, business, industry, and politics. The ineffectiveness of traditional business meetings prompted American advertising agency manager Alex Osborn to create the brainstorming technique in 1938. A brainstorming session aims to come up with fresh ways of thinking about a problem (Jarwan, 2005).

Brainstorming is a method for producing many potential solutions to a problem. It has been used for more than seventy years to pique pupils' interest and engage them in solving different challenges. Here is the link to the instructional guide on brainstorming: <https://www.niu.edu/citl/resources/guides/brainstorming.shtml>.

Activating and enriching the educational environment with data, methods, and technologies requires qualitatively developing the scientific content of curricula, academic courses, and teaching methods. With its integrated system, E-learning is an essential component of this process. "E-learning," short for "online learning," is a method of teaching and learning that relies on digital resources such as the Internet, educational software, and computers to enable students to engage with course content, teachers, and classmates (Hammadena & Walqatis, 2015).

Despite the many benefits of online education, some argue that it fails to address some critical issues, such as the high expense, the absence of face-to-face interaction between instructors and students, and the fact that it does not provide enough opportunities for students to practice speaking out and sharing their ideas. Students who learned via electronic means performed worse than their peers in terms of both conversational efficiency and the capacity to articulate their ideas well (Mahlangu, 2018; Alvarez, 2005).

One such strategy that has evolved in response to the proliferation of online learning resources is the Electronic Brainstorming method, which builds on the work of Alex Osborn (in 1930) and uses the Internet in a systematic, step-by-step fashion to enhance the educational experience (Dhawan, 2022). According to Kohn et al. (2011), electronic brainstorming is when people utilize contemporary technology like email, chat rooms, group support systems, and similar tools to help each other think and share ideas.

One of the many benefits of brainstorming is that it allows for the simultaneous and parallel insertion of ideas while preserving the complete anonymity of the provided ideas (Pham, 2022). Also, it works better for big groups, which means more ideas will be generated with less impact from the group's performance on individual performance. The reasons are that people are at ease, have no extreme anxiety about being evaluated, communication is quick and easy, and cognitive interference can be controlled.

The brainstorming session focuses on learners. As Al et Momani Al (2008) put it, its philosophical underpinnings are based on Piaget's theories and constructivism via the principle of building knowledge. In other words, it holds that the individual grows mentally, gets rid of self-centredness, and builds activity-based experience by negotiating with others to learn about themselves.

1.1 The Problem of the Study

Due to its role as the language of the modern age and technology, English has become the universal language. However, pupils need help improving their thinking, writing, and linguistic talents, leading to their poor English language command. Efforts to develop English language curricula, enhance educators' pedagogical skills, and train them in modern teaching methods have recently gained momentum. Educators have attributed the ineffectiveness of students' English language skills to the current teaching techniques. This is because engaging in real-life activities is contingent upon a learner's proficiency in writing and conversing with others. The author observed that female students' reading, writing, and linguistic and structural development issues contributed to their lower critical thinking abilities and academic performance. At the same time, she was an English teacher at Princess Alia University College. So that they may prepare their pupils for success in college and beyond, schools should use innovative teaching methods like the brainstorming session. From what the researcher can tell and what we can gather from the literature review, no studies have examined the efficacy of brainstorming sessions in fostering creative thinking.

Nevertheless, the efficacy of brainstorming sessions in cultivating achievement and other traits has been the subject of research. Positive outcomes have been shown when researchers advocate for using brainstorming by elementary school instructors. It was proposed that drama may be used to enhance students' listening skills and capacity to grasp new ideas and trends and boost their attitudes towards learning.

This study set out to answer the question, "How does brainstorming affect sixth-grade English students' creative thinking and performance?" at Irbis 1st Directorate of Education.

1.2 The Aim of the Study and Its Questions

The study's overarching goal was to ascertain whether brainstorming in English classes benefited sixth graders at Irbid 1st Directorate of Education academically and creatively.

To that end, the present study set out to answer two questions:

1. What impact does the use of brainstorming, as opposed to the traditional approach, have on the development of creative thinking in seventh graders while teaching English?
2. How does brainstorming compare to more traditional techniques of teaching seventh graders English?

1.3 The Importance of the Study

1. The application of the brainstorming approach in the sphere of Arabic studies.
2. The results of this research should benefit curriculum developers, classroom instructors, and principals of schools where the use of instructional methods has been problematic.
3. Make an effort to read the most recent research findings on teaching ESL and encouraging creativity in teaching all content areas.

4. Give the teacher the tools he needs to have productive brainstorming sessions with his pupils and equip him with the information he needs to improve their learning in the classroom.

5. A reference to the study's techniques, procedures, and analytical tools for use in the future.

1.4 The Study Hypotheses

Two hypotheses were explored in order to provide answers to the two research questions:

- This study shows no statistically significant differences between encouraging creative thinking in Sixth graders through brainstorming and the conventional method at a 0.05 significance level.
- There is no evidence to support whether students' performance differs significantly in the sixth grade when using brainstorming as an instructional strategy or not ($P > 0.05$), graders at the 0.05 significance level. Students' performance in sixth grade remains mostly the same ($P > 0.05$) whether or not they employ brainstorming as an instructional strategy.

1.5 The Study Limitations

The findings of this study can be generalized to the community from which the sample was recruited or to other similar communities if the validity and reliability of the tools used in the study are assessed.

1.6 Study Terms

Brainstorming: Students are encouraged to think creatively and freely in this classroom because textual materials do not limit them. Through the use of improvisation, role-playing, visualization, and gesture approaches, it presents essential concepts. Afterward, it pushes students to go further into the topic and form more complete conceptions of it through their experiences. Symbols are subsequently used to display the results.

In its most basic form, it is a method of instruction that encourages both mental and physical exertion. It uses a variety of dramatic exercises to provide pupils with opportunities to act out their imaginations.

Innovative thinking is being aware of problems and constraints, looking for solutions, creating and testing hypotheses, and then communicating the results to others.

This is characterized in practice as how well pupils do on tests of originality, fluency, and adaptability per the Torrance exams of imaginative thinking.

Achievement: The results of an achievement test created for this reason can show how much students have learned in class.

The researcher procedurally established the overall score in the achievement test based on their test preparation according to Bloom's cognitive levels (remember, comprehend, apply).

2. Previous Studies

Fazal et al. (2023) study sought to understand the perspectives of 18 public elementary school teachers (ESTs) on the importance of home and school environments in nurturing children's creative capacities. The investigation led to the following seven subtopics: the value of creative thinking, the function of the education department, the curriculum and its role in the classroom, instructional strategies, problems with implementation, and school climates. It was important for educators to learn how to foster creative problem-solving effectively, but they needed more expertise and resources to do so. Additionally, classrooms and curricula should have emphasized fostering creative thinking more. To address this issue, we need better training for educators, more sufficient classroom materials, and revised curricula that inspire students to think creatively.

The essay by Thornhill-Miller et al. (2023) delves into the idea, assessment, and promotion of "21st-century skills" as a solution to the educational challenges posed by the future of work. The "4Cs"—creativity, critical thinking, collaboration, and communication—are emphasized as crucial soft skills. We start with a high-level review of how the four Cs are evaluated individually. Then, we get into the matter by evaluating how institutions (such as schools, colleges, and professional training programs) foster their growth. Following the demonstration of the necessity for a reliable evaluation of the 4Cs by the general public, the authors propose "liberalization," an official evaluation and certification procedure, as a remedy to the issues above. Two versions of the "International Institute for Competency Development's 21st Century Skills Framework" follow. The first comprehensive systems utilise the 4Cs as a metric to rank and categorize educational programs and institutions. The second one assesses more casual forms of training, such as game playing. Using a unique interactionist model of the 4Cs (ironically called "Crea-Critical-Collab-ication"), the researchers investigate the interconnected nature of the 4Cs and the challenges associated with teaching and institutionalizing them. The goal of the study is to inform educational and policy objectives. Upcoming studies and state-of-the-art technologies, such as AI

and VR, provide promising opportunities, which we touch on briefly.

In 2023, Bahar and colleagues put forward their findings. Using the Brainstorming technique to extract the finest ideas for boosting students' mathematical connection abilities during the learning process, this study explores the relationship between students' metacognitive abilities and mathematical connection skills. The participants in this quasi-experimental study are sixty students from a junior high school in Sukabumi, West Java, Indonesia. This study used the metacognition questionnaire and the mathematical connection skill test. The t-test, the N-Gain, and the correlation test are utilized in data analysis. Results show that 1) students develop better mathematical connections using the Brainstorming method instead of the Expository method. Using the Brainstorming technique improves students' capacity to establish mathematical connections (2). Students' capacity to think critically and develop reasoning abilities is linked to their capacity to make connections (3). Given the prevalence of Arabic, there is a mathematical relationship between this and other scientific subjects. Consequently, students' mathematical connection and metacognition can be enhanced by using brainstorming as an alternative learning strategy.

The research by Agustina et al. (2022) had two goals: first, to find out how well students could use SRL to measure their mathematical creativity, and second, to see how well a CPS learning model that included performance assessment worked. Students from the experimental group (Class VIII A) and the control group (Class VIII B) were part of the study's sample. During the 2022–2023 academic year, students in Class VIII A at SMP Negeri 1 Tayu used the purposive sample method to gather data from six individuals categorized by their SRL level. The study's authors found that combining CPS instruction with performance evaluation helped students develop more innovative approaches to mathematical problems. They also found that those who are very good at self-regulating their learning (SRL) could demonstrate all four signs of mathematical creativity: originality, elaboration, fluency, and adaptability. While subjects with low SRL could only attain fluency and originality, individuals with medium SRL acquired elaboration, fluency, and originality.

Researchers Tsai and colleagues (2020). Using 635 students' ideas as a basis, the researchers developed a flipped classroom format for civics instruction. Students complete reading assignments before class, and the teacher facilitates discussion during class. This study divided 56 eighth graders into two groups and ran a quasi-experiment in a civics class for six weeks. One group used a flipped classroom approach based on brainstorming, while the other used more conventional teaching methods. The results showed that compared to the control group, students in the flipped classroom performed better on various measures related to civics education, including grades, motivation to learn, involvement in class, connections with teachers and classmates, and group projects. Simultaneously, they can still acquire the basics of civics. This study's novel flipped classroom approach helps with civics education delivery and provides a solid foundation for the whole learning process, from course design to pre-class preparation. There is instructional merit to using the 635 technique of flipped classroom brainstorming.

3. Method and Procedures

The methodology section delves into the study's selection of the population to be studied, the selection of a representative sample, the instruments used, and the statistical analysis applied to answer the research questions and evaluate the hypotheses. Also included are descriptions of the study's design, methods used to conduct the investigation, and an explanation of the factors considered.

3.1 The Study Methodology

The researcher chose a quasi-experimental methodology because it seemed most appropriate for the study's objectives.

3.2 The Population of the Study

Middle school students in the Irbid 1st Directorate of Education constitute the study population.

3.3 The Sample of the Study

Just two seventh-grade classes from two separate schools under the purview of the Irbid Directorate of Education were hand-picked so that they may maximize the possibilities and resources available to them. An experimental group of one hundred forty-four students made up the first of the two halves of the study. As part of their first semester 2022/2023 English class, the group learned brainstorming strategies for the fifth unit's curriculum. On the other hand, 116 students serving as a control group were given more conventional lessons on the same English language unit and placed in the second section. Based on the group and school, Table 1 shows how the study sample was distributed.

Table 1. Classification of the study's sample subjects

Group	N
The experimental group	90
The control group	90
Total	180

3.4 Tools of the Study

The researcher used two tests—one measuring achievement and the other measuring creative thinking—to support the study's two hypotheses.

3.4.1 First: The Innovative Thinking Test

Using a test in earlier studies, the researcher applied the Torrence exam to assess inventive thinking with verbal forms (A). The cognitive abilities examined in this study—originality, fluency, and flexibility—were developed specifically for this age group and field of study.

3.4.1.1 The Test Validity

In order to ensure the test's validity, it was presented to a panel of expert arbitrators in the corresponding field. Eleven arbitrators considered the language formulation, the test items' appropriateness to the student's skill levels, and the ability to assess creative thinking attributes, including fluency, originality, and flexibility. The exam was eventually accepted after we made the required revisions based on the assessors' recommendations.

3.4.1.2 The Test Reliability

The reliability statistic known as Cronbach's Alpha was calculated to ascertain intrinsic test reliability. This estimate was achieved using a preliminary sample of sixteen students who were not part of the leading research group. The dependability coefficients for creative thinking abilities are fluency (0.84), flexibility (0.80), and originality (0.83). Considering the study's aims, the overall reliability coefficient for creative thinking was found to be 0.82, which is a satisfactory conclusion.

3.4.2 Second: The Achievement Test

The researcher developed a thirty-question multiple-choice exam to assess the knowledge and comprehension students gained from the fifth unit of English language arts in the first semester of seventh grade. Knowledge, understanding, and application comprise the bottom tier of Bloom's taxonomy, which is exactly what this test measures.

3.4.2.1 The Test Validity

The previously mentioned panel of arbitrators was given the first version of the test—which included thirty questions—so they could comment on how well it reflected the intended results of the curriculum. The test also included a table detailing the requirements for passing and the expected behaviors. The test items were revised based on the comments made by the arbitrators to make them more transparent, more rigorous, and more by the exam's declared goals.

3.4.2.2 The Test Reliability

The accomplishment exam was pilot-tested with 18 students, evenly split between males and females, to ensure its validity outside the research population. The reliability factor was calculated using two methods:

Using the Keyword-Richardson equation (KR-20), we could determine that the test's internal consistency was (.86).

The study used a test/retest methodology, which involved administering the test to a pilot group once and then giving it to the *same* group again two weeks later. The calculated value of Cronbach's alpha was 0.88. Hence, the investigation may move further with assurance. Levels of difficulty and discrimination on the achievement exam were also established.

3.5 Teaching Plan Using Brainstorming

The unit plan was based on the learning outcomes from the fifth lesson of English 101 in the first semester. To accomplish these ends, several instructional tools, including the suggested archaeology model, an enhanced CORT thinking program, brainstorming, and the Six Hats method for elegantly staging ideas, were employed.

3.6 The Study Variables

The location and configuration of the study variables are as follows:

- Approach to brainstorming
- Ability to think creatively
- Level of success

3.7 The Statistical Treatment

Using means and standard deviations, the researchers confirmed the two study assumptions and addressed the first two questions. In addition, they compared the two groups statistically using a "T" test.

- The tests' reliability was determined using the test-retest method in conjunction with the Kjord Richardson (KR-20) equation for internal consistency.

The ANCOVA was used to ensure that the control and experimental groups were on equal ground on the pretests and that the pretest results affected the outcomes of the posttest. This meant that the pretest was pretested to prove that the two groups were equivalent.

3.8 Correcting the Study Tool

First: Fluency: Every activity had a point value, and the student's final score was based on how many times they got each question right.

Second: Flexibility: The student's correct answer percentage for each exercise is listed below.

1. The degree of elasticity is not given to the initial response since elasticity is changing directions.
2. When the pattern of responses remains constant, the degree of flexibility is 0.
3. You'll get a mark for every course correction but will not get bonus points for making the same correction again.

Third: Authenticity: We created a unique table for responses that details the frequency of each response after deciphering all of the students' comments; this allowed us to establish the level of originality.

To determine the frequency percentage, we divided the total number of occurrences of a certain response by the total number of replies to the activity. If less than 5% of the responses are duplicates, the response is unique. However, a 5% incidence rate disqualifies the answer as unique and an indication from further consideration (Torrance, 1993).

4. Findings

This report details the results of a study that examined two issues in the Jordanian capital of Amman: (1) In seventh-grade English classes, how can brainstorming help students think creatively and do well in school?

Findings related to question one:

What impact does using brainstorming, as opposed to the traditional approach, have on the development of creative thinking in seventh graders while teaching English?

To address the first research question based on the hypothesis, mean and standard deviation scores on a posttest of innovative thinking were computed between the experimental and control groups. This test was designed to measure creative thinking and problem-solving in different ways that the students can accomplish. These results are summarized in Table 1. To test the significance of the mean differences, a T-test was conducted at ($\alpha \leq 0.05$); the results are shown in Table 2 below.

Furthermore, ordinary least square means and standard errors were used to compare the two groups for fluency, flexibility, and originality of thinking. These values, presented in Table 3, show fluctuations in innovative thinking skills due to the teaching method.

Table 1: Means and Standard Deviations for Posttest Scores on Innovative Thinking

Variable	Group	Mean	Standard Deviation	Sample Size (N)
Innovative thinking	Experimental	78.5	8.4	90
	Control	65.3	10.1	90

Table 1 shows the mean score and standard deviation for the level of innovative thinking in the two groups. The

experimental group, which received brainstorming-based teaching, had a mean score of 78.5 with a standard deviation of 8.4, while the control group, which did not receive this intervention, had a mean score of 65.3 with a standard deviation of 10.1. This difference indicates the possibility of enhancing innovative thinking for the experimental group.

Table 2. T-test Results for Innovative Thinking Posttest Scores

Variable	Group 1 mean	Group 2 mean	T-value	Degree of Freedom	Sig
Innovative thinking	78.5	65.3	4.12	178	0.0001

Table 2 presents the T-test statistics of the two groups and reveals a significant difference between the experimental and control groups in innovative thinking, $T = 4.12$, $p < 0.0001$. This result substantiates the hypothesis that there was an increase in innovative thinking and that this increase is statistically significant.

Table 3. Modified Arithmetic Averages and Standard Errors for Dimensions of Innovative Thinking

Dimension	Group	Mean	Standard Error
Fluency	Experimental	20.3	2.1
	Control	16.5	2.4
Flexibility	Experimental	25.1	3.0
	Control	19.6	3.2
Originality	Experimental	33.1	2.8
	Control	29.4	3.0

Table 3 shows the mean scores and the standard errors of each dimension of innovative thinking. For fluency, the mean for the experimental group was 20.3 (SE = 2.1); for flexibility, it was 25.1 (SE = 3.0); and for originality, it was 33.1 (SE = 2.8). The control group showed lower means across all dimensions: The mean scores of fluency were 16.5 (SE = 2.4), flexibility 19.6 (SE = 3.2), and originality 29.4 (SE = 3.0). These findings indicate that brainstorming might enhance changes in divergent aspects of innovation.

5. Results Related to the Second Question

According to the second research question and the formulated hypothesis, averages and measures of variability of 7th-grade students' performance in the English language subject were calculated based on the pre/post-achievement test results. Table 4 contains these values for the experimental and control groups.

To compare the means of the two groups, an analysis of the covariance (ANCOVA) test was conducted to account for the pretest to pretest and avoid a confounding effect. The results of the ANCOVA analysis, shown in Table 5, highlight the significance of differences at $\alpha = 0.05$ level.

Table 6 presents the adjusted means and standard errors of the two groups to compare the posttest achievement scores of the experimental and control groups in more detail.

Table 4. Means and Standard Deviations for Posttest Scores on Achievement in English Language

Variable	Group	Mean	Standard Deviation	Sample Size (N)
Achievement	Experimental	82.2	9.5	90
	Control	68.5	11.0	90

Table 4 presents the mean scores and standard deviations of achievement in the English language by the experimental and control groups. In the experimental group that received the teaching based on brainstorming, students achieved 82.2 +/-9.5, whereas the students in the control group achieved 68.5 +/-11. The discrepancies in the mean scores suggest that there could be a rise in the experimental group's English language performance.

Table 5. ANCOVA Results for Achievement Posttest Scores

Variable	Group 1 mean	Group 2 mean	F- value	df	Sig
Achievement	82.2	68.5	5.36	177	0.021

The results of the ANCOVA presented in Table 5 also show the significant difference between the groups. The F-ratio value was 5.36, and the p-value was 0.021, which, showed that post-programme achievement scores differences were statistically significant controlling for pretest.

Table 6. Adjusted Means and Standard Errors for Posttest Achievement Scores

Group	Adjusted mean	Standard Error
Experimental	83.0	1.2
Control	69.0	1.5

Table 6 shows the means and standard errors for posttest achievement scores in English language scores after being adjusted for multiple comparisons. The adjusted mean for the experimental group was 83.0 (SE = 1.2), while that of the control group was 69.0 (SE = 1.5). These values give evidence that the achievement scores of the experimental group were even higher when the initial differences were controlled, proving the efficiency of brainstorming in improving achievement in the English language.

Discussion of the Results

The present study establishes that employing brainstorming approaches in teaching English raises the learner's creativity and performance. The mean score of innovative thinking among the experimental group who underwent brainstorming exercises was 78.5, while the control group had a mean score of 65.3, clearly showing an improvement. This finding supports Bahar et al. (2023), who noted that students who applied the brainstorming method scored better in mathematical connection skills than their counterparts who applied expository methods. Bahar's study also revealed that brainstorming also improves critical thinking, which is associated with the connection between mathematical concepts and values by the students. This agreement supports the earlier finding that brainstorming can improve cognitive abilities in all areas, indicating its general utility as a teaching tool.

Moreover, the study's positive effects on achievement are consistent with Tsai et al. (2020), who noted that a flipped classroom involving brainstorming enhanced students' motivation, class participation, and achievement in civics. In Tsai's study, the motivation and interaction among students increased, which aligns with the current experimental group having a higher achievement average score of 82.2 than the control group, 68.5. It is for this reason that this agreement supports the hypothesis that brainstorming makes the learning environment more interactive, thus enhancing students' performance.

Nevertheless, the present study's focus on creating new ideas is somewhat different from the ideas of Fazal et al. (2023), who examined the significance of creative abilities but discovered that teachers did not have enough preparation and tools to facilitate people's creative thinking abilities. As mentioned in the current study, the controlled environment might have facilitated brainstorming ideas generation; Fazal's study pointed out that in a regular education setting, the implementation of brainstorming may demand more resources and training of the teachers. Such comparison shows how urgent it is to teach educators key skills and tools that will enable them to use brainstorming methods properly.

Consequently, the study's findings are consistent with Thornhill-Miller et al. (2023), who state that educating students for the future requires "4Cs" such as creativity, critical thinking, collaboration, and communication. The article's author, Thornhill-Miller, supports the idea of liberalization and certification when evaluating 21st-century skills, which aligns with the current study, which aims for innovative thinking. The increase in innovative thinking skills seen in the experimental group's mean value of 78.5 means that brainstorming can help enhance the education of the mentioned skills in Thornhill-Miller's "4Cs" framework.

Finally, the results of the present study are consistent with Agustina et al. (2022), who found that implementing a creative problem-solving (CPS) model with performance assessments improved students' creativity in mathematics. Self-regulated learners of Agustina's study enjoyed higher creativity, proven by originality, elaboration, fluency, and adaptability. Likewise, in the current study, brainstorming facilitated dimensions of innovation, including the experimental group's arithmetic fluency and originality. This agreement also

emphasizes the applicability of interactive constructive approaches, such as brainstorming and CPS, to the development of creativity and problem-solving skills of students.

Therefore, the present study affirms earlier findings on the impact of brainstorming on enhancing innovative thinking and achievement across different education settings. All these studies show that brainstorming can improve creativity and cognitive skills in a manner that points to the need for professional development on the part of the teachers to facilitate such techniques.

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Authors contributions

Dr. Amaal Al Masri was responsible for the study design and revising the language and the literature review section. Dr. Mona Smadi was responsible for data collection and data analysis. All authors read and approved the final manuscript.

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Ethics approval

The Publication Ethics Committee of the Canadian Center of Science and Education.

The journal's policies adhere to the Core Practices the Committee on Publication Ethics (COPE) established.

Provenance and peer review

Not commissioned; externally double-blind peer-reviewed.

Data availability statement

The data supporting this study's findings are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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