

Received: 28 June, 2026

Accepted: 27 August, 2026

Published: 17 September, 2026

The Effectiveness of an Educational Program in Developing Metacomprehension and Perceived Control among Preparatory School Students

Ghada Ziyad Sheet Taha Alyozbaky

Department of Educational and Psychological Sciences, College of Education for Humanities, University of Mosul, Mosul 41002, Iraq; ghada.eh23@student.uomosul.edu.iq

Fatima Mohammed Saleh Al-Badrany

Department of Educational and Psychological Sciences, College of Education for Humanities, University of Mosul, Mosul 41002, Iraq

Cite this article:

Alyozbaky, G. Z. S. T., & Al-badrany, F. M. S. (2026). The Effectiveness of an Educational Program in Developing Meta comprehension and Perceived Control among Preparatory School Students. *Revista Cultura Científica*, (24), pp. 1280–1296. <https://doi.org/10.70517/revcc2624107>

Abstract

The current research aims to investigate the effectiveness of an educational program in developing metacomprehension and perceived control among preparatory school students. It also aims to construct scales for measuring the two variables and to determine the students' levels of metacomprehension and perceived control. To achieve these objectives, the research adopted an experimental method using a four-group design comprising two experimental groups and two control groups. The study was conducted on a sample of 60 male and female students from the fourth scientific grade in Mosul, with 15 students assigned to each group, after establishing equivalence among the groups in terms of demographic characteristics, academic achievement, and intelligence. The research instruments consisted of a metacomprehension scale comprising 45 items, developed according to Brown's theory (1978) [1], and a perceived control scale comprising 45 items, developed according to Conner and Armitage's theory (1998) [2]. The validity, reliability, and other psychometric properties of both scales were

verified. In addition, an educational program consisting of 8 sessions was developed and implemented. The data were statistically analyzed using one-way analysis of variance and the t-test. The results showed that the participants in the final application sample exhibited levels below the hypothetical mean in both metacomprehension and perceived control. Furthermore, statistically significant differences were found at the 0.05 significance level between the experimental and control groups in the development of metacomprehension, including its dimensions, and perceived control, with the post-test results favoring the experimental groups. These findings confirm the effectiveness of the educational program. The research recommends integrating metacomprehension and perceived control skills into school curricula and designing educational content and activities that contribute to the development of these skills among students.

Keywords: educational program, metacomprehension, perceived control, adolescents, preparatory school students

1. INTRODUCTION

Adolescence is considered one of the most critical developmental stages, during which fundamental transformations occur in the cognitive, psychological, emotional, and behavioral structure of preparatory school students. These transformations require students to be provided with appropriate skills that enable them to manage and direct their learning processes efficiently and independently. In this context, the concept of “metacomprehension” emerges as one of the fundamental cognitive components that enables students to plan, monitor, and evaluate the extent of their understanding of academic material and to modify or regulate their reading and learning strategies accordingly. This process functions in integration with “perceived control,” which reflects students’ beliefs regarding their own abilities to control their educational environment and direct their academic behavior toward successful outcomes. Since the researcher works as an educational counselor in the school environment, she observed a noticeable decline in the level of these skills among adolescents at the preparatory school stage. Accordingly, the present research focuses on constructing a structured educational program and investigating its effectiveness in developing metacomprehension and perceived control among this group of students, thereby contributing to the enhancement of their integrated cognitive, psychological, and educational development.

The current era is characterized by rapid and continuous changes in almost all aspects of life as a result of complex technological, scientific, social, and educational developments. Such developments require students in general, and preparatory school students in particular, not merely to comprehend information at a superficial level, but also to move toward the stage of metacomprehension. Metacomprehension refers to the ability to understand and become aware of the mental processes that individuals employ during learning and to select and apply the most appropriate cognitive strategies in order to achieve a deeper level of understanding, improve information processing, and generate new ideas [3].

Metacomprehension is manifested in an individual’s awareness of when comprehension has been successfully achieved and when difficulties in understanding are encountered. It also involves awareness of what has already been understood, what still requires additional explanation or reinforcement, and which strategies can assist the learner in achieving comprehension more effectively and efficiently [4].

Cognitive psychologists attribute one of the important reasons for failure in comprehension, as well as students’ inability to judge accurately the extent of their learning, to the inappropriate use, ineffective selection, or incorrect application of cognitive strategies during the processes of learning, understanding, and information processing [5].

The concept of metacomprehension skills refers to a complex cognitive structure that is reflected in the multiplicity of its strategies, the diversity and branching of its dimensions, and the variety of its meanings, interpretations, and contexts of application. Consequently, metacomprehension represents a multidimensional cognitive concept that cannot be limited to a single process or strategy [6].

The process of metacomprehension is regarded as a complex constructive and cognitive process that requires the use of advanced and higher-order mental capacities in order to make appropriate judgments about the learning process. It also contributes to strengthening willpower, enhancing awareness of one’s cognitive processes, improving the regulation of learning, and reducing the likelihood of rigid commitment or excessive adherence to particular ideas, beliefs, or ineffective patterns of thinking [7].

Despite the considerable expansion of the literature and the increasing number of studies that have addressed this concept during recent decades, the formulation of a comprehensive and universally accepted definition of metacomprehension remains a matter of debate among researchers and specialists. This situation reflects the continuing ambiguity surrounding the determination of its precise conceptual boundaries. Such divergence in definitions may itself be regarded as an indication of the importance of the research problem and of the necessity of studying the variables associated with metacomprehension, in addition to examining and analyzing the relationships and patterns of correlation among them [6].

Through the researchers’ work in the educational and counseling field, they became aware of the existence of a significant problem related to students’ metacognitive development. They observed that school students frequently demonstrate weaknesses in metacognitive skills, including metacomprehension, as well as limited ability to employ their mental capacities effectively when confronting academic and life situations. Such weaknesses may lead many students to experience difficulty in controlling and regulating the course of their own learning. This situation can be observed in students’ frequent reliance on private tutoring and their dependence on parents in organizing their daily lives in general and their academic activities in particular.

Furthermore, weakness in preparatory school students’ awareness of their own ability to control the course of their academic and social lives, which is represented by their awareness of and responsibility for their personal choices, may be associated with the developmental stage through which they are passing, namely adolescence, and with the accompanying psychological and cognitive factors. These factors may influence students’ ability to comprehend, organize their time, regulate their effort, persist in learning, and select suitable strategies that can help them employ their abilities effectively in both their academic and practical lives. Such skills may influence not only their present academic achievement but also their future educational, professional, and personal lives. In addition, the researchers did not identify an experimental

study that simultaneously addressed metacomprehension and perceived control among preparatory school students.

The present study is distinguished by addressing metacomprehension in its psychological and cognitive form beyond its traditional restriction to reading texts, and by employing an educational program to develop these concepts among preparatory school students. It also addresses perceived control through a program developed in accordance with the model of Conner and Armitage. From this perspective, the present study seeks to identify patterns of variation in these variables and to examine their development among male and female students. Based on the preceding discussion, the problem of the current research can be formulated through the following question:

Is there an urgent need to construct and implement an educational program for developing metacomprehension and perceived control among preparatory school students?

The concept of metacomprehension has received considerable attention from researchers in cognitive psychology since the mid-1980s because of its pivotal role in enabling individuals to deal efficiently and effectively with different cognitive experiences. It represents an important factor in achieving success in situations that require the employment of advanced mental and cognitive strategies. Metacomprehension may also contribute to producing positive changes in behavioral habits and in the methods individuals employ when dealing with different situations, so that these habits and behaviors become subject to greater regulation and control through conscious mental processes [8].

Developmental and cognitive psychologists have also focused considerable attention on the role played by metacomprehension strategies in supporting cognitive growth and regulating human behavior. This growing interest has made the concept one of the prominent research topics in different fields of psychology, particularly in applied, educational, and clinical domains. Since that period, scientific attempts have multiplied to identify the nature of metacomprehension, determine its principal components, explain its theoretical foundations, and develop appropriate methods for its measurement and assessment [9].

Metacomprehension skills are considered essential factors that contribute to the development of advanced thinking systems among individuals across different developmental and age stages. Because these skills involve analytical, interactive, regulatory, and constructive processes, their effective realization requires a sufficient degree of awareness in the use of mental activities and the accompanying cognitive processes. It is also evident that the effectiveness of these processes is related to the extent to which individuals possess appropriate cognitive abilities for processing information, together with their competence in employing memory processes in organized, deliberate, and conscious ways [10].

Perceived control is considered a fundamental determinant of human behavior and self-adaptation in its various forms. Interest in this concept has extended into educational and pedagogical fields after it became evident that perceived control provides an important framework for understanding students' behavior and identifying the factors associated with academic failure, weak adjustment, and ineffective adaptation to the surrounding environment. Accordingly, perceived control has emerged as one of the essential dimensions of human personality because of its profound influence on individual behavior, decision-making, and actions. When individuals develop convictions about themselves and perceive themselves as intelligent, persevering, capable, and diligent, these perceptions are reflected in their behavior and their interactions with others. Consequently, the close relationship between individuals' behavior and the way in which they perceive themselves becomes clearly apparent [11].

It can therefore be argued that every human being possesses an internal motivation to make decisions concerning his or her own destiny and future. This motivation directs the individual toward choosing behavioral patterns that strengthen independence and reduce excessive dependence on or control by others. In order for individuals to become capable of determining their own destiny and managing their choices effectively, they must possess an appropriate degree of self-control and the ability to manage the personal capabilities, opportunities, and available resources that they possess [12].

From this perspective, the researchers believe that paying attention to the development of perceived control can contribute significantly to preparing students who are better able to adapt to the requirements of school life and are more prepared to confront the challenges of subsequent educational stages and future life in general. Accordingly, studying perceived control among preparatory school students does not possess merely theoretical importance; rather, it also has an important practical and educational dimension. This practical dimension is represented by enabling students to invest their abilities, skills, and potential in improving their academic achievement, developing positive attitudes toward learning, strengthening personal responsibility, and enhancing their ability to adapt successfully to academic, psychological, and life pressures. Thus, perceived control can be regarded as one of the cornerstones in building a balanced, conscious, independent, and responsible personality during this sensitive stage of human development.

The current research aims to identify the effect of an educational program on developing metacomprehension and perceived control among preparatory school students.

To achieve the objectives of the research, the following null hypotheses were formulated:

1. "There is no statistically significant difference at the level of significance (0.05) among the mean scores of meta-

comprehension development in the four research groups.”

2. “There is no statistically significant difference at the level of significance (0.05) among the mean scores of perceived control development in the four research groups.”

RESEARCH LIMITS

The current research is defined within the following limits:

- **Spatial limits:** Preparatory school students affiliated with the Hamdaniya Education Directorate in the Nineveh Plain.
- **Temporal limits:** The academic years 2024–2025 and 2025–2026.
- **Human limits:** Male and female preparatory school students enrolled in the fourth and fifth scientific grades.

DEFINITION OF TERMS

1. **Effect:** “The process of influencing the values, beliefs, attitudes, and behavior of the person.”
2. **Educational Program:** In light of the aforementioned definitions, the educational program can be theoretically defined as a systematically organized set of experiences, skills, activities, and educational practices that are planned in advance and governed by principles of perceived control. These experiences and activities are provided within the framework of metacomprehension education in order to achieve the intended comprehension and learning objectives of the learner.

Operational Definition of the Educational Program: The educational program refers to the preparation and implementation of a sequential and systematically organized series of lessons based on the theoretical perspectives of Brown and Conner & Armitage. The program consists of a number of instructional lessons, with each lesson including a metacomprehension framework, metacomprehension objectives, metacomprehension practices, feedback, homework activities, and evaluation procedures. These lessons are specifically prepared for preparatory school students with the purpose of developing metacomprehension and perceived control under the supervision, guidance, and direct teaching of the researcher within a predetermined and specified period of time.

3. **Metacomprehension (Meta-comprehension):** “Procedural or executive skills that enable the individual to control the processes of preparing and processing information through organizing its flow sequentially and simultaneously in a manner that ensures that such processes proceed efficiently and harmoniously” [1].

Operational Definition of Metacomprehension: “The total score obtained by the respondent after answering all items included in the metacomprehension scale prepared and adopted in the current research.”

4. **Perceived Control:** “The individual’s perception of his abilities to perform or control a certain behavior” [2].

Operational Definition of Perceived Control: “The total score obtained by the respondent after answering all items included in the perceived control scale prepared and adopted in the current research.”

2. RESEARCH PROCEDURES

2.1. RESEARCH POPULATION AND EXPERIMENTAL SAMPLE

The population of the experimental research consisted of Middle School students enrolled in the fourth scientific grade during the academic year 2025–2026. The total research population comprised 2190 male and female students, including 1024 male students and 1166 female students, according to the data available for the academic year 2024–2025. This population constituted the general framework from which the experimental sample of the current research was selected.

After identifying the four schools in which students obtained the lowest scores below the hypothetical mean on both the metacomprehension and perceived control scales, the students who met the required criteria were selected to constitute the experimental-design sample. The final experimental sample consisted of 60 male and female students, distributed equally among four research groups, with 15 students in each group. Khazna Middle School for Boys and Al-Muwafaqiya Middle School for Girls represented the two experimental groups, whereas Shaqli Middle School for Boys and Al-Ihsan Middle School for Girls represented the two control groups. Thus, the experimental design included both male and female students and allowed comparisons to be made between experimental and control conditions.

2.2. CONSTRUCTION OF THE EDUCATIONAL PROGRAM

The educational program represents a structured set of lessons, educational experiences, activities, exercises, and instructional procedures prepared by the researchers on the basis of several theoretical foundations related to metacomprehension and perceived control. One of the major objectives of the current research was to construct an educational program specifically designed to develop metacomprehension and perceived control among Middle School students. Accordingly, the program was organized systematically so that its objectives, content, instructional techniques, activities, and evaluation procedures were consistent with the theoretical framework adopted in the research.

The educational program was designed according to a sequence of organized stages and procedures, as described below.

2.2.1 Objectives of the Educational Program

One of the most important characteristics of any educational program is the clarity, organization, sequencing, and precise specification of its objectives. Clearly formulated objectives provide the fundamental framework through which the content, activities, instructional procedures, and evaluation methods of the program can be determined. Therefore, considerable attention was given to defining both the general and specific objectives of the current educational program.

The objectives of the program were formulated as follows:

1. **General Objectives:** The general objectives of the educational program were represented in the following:
 - Developing metacomprehension among students enrolled in the fourth scientific grade.
 - Developing perceived control among students enrolled in the fourth scientific grade.
 - Providing students with appropriate strategies and patterns of response at both the personal and social levels, particularly in relation to emotions, feelings, attitudes, and behaviors.
2. **Specific Objectives:** In light of the general objectives of the educational program, a set of specific objectives was identified to be achieved through the implementation of the program. These objectives were formulated according to the principal themes and dimensions included in the program and were intended to contribute directly to the development of metacomprehension and perceived control among the participating students. The specific objectives were stated clearly at the beginning of each educational session so that the intended learning outcomes and behavioral expectations of each session could be identified in advance.

2.2.2 Structure and Organization of the Program Sessions

The educational program, in its initial form, consisted of 18 instructional sessions. Each session had a duration of approximately 45 minutes. The sessions were arranged systematically and sequentially in accordance with the theoretical foundations and dimensions adopted in the research. Each session included a number of integrated themes and components designed to facilitate the achievement of the intended educational objectives.

The main components of each educational session were organized as follows:

1. **Title of the Session:** The title of each session was determined according to a logical and progressive sequence consistent with the general nature, theoretical foundations, and intended objectives of the educational program. The sessions were prepared according to the dimensions of the metacomprehension scale, namely planning, stimulation pattern, verification, review, and evaluation, as well as the dimensions of perceived control, namely importance of belief, past habitual behavior, perceived behavioral control, moral standards, self-identity, and emotional beliefs. This organization was intended to ensure systematic coverage of the dimensions included in both research variables.
2. **Specific Objectives:** The specific objectives of each session were formulated according to the characteristics of the students in the experimental groups and the nature of the educational content presented during that session. These objectives clarified the expected outcomes that students were intended to achieve after participating in the activities, discussions, exercises, and other instructional procedures included in each session.
3. **Techniques Used:** A variety of instructional and educational techniques were employed during the presentation and implementation of the sessions. The techniques were selected according to the content and objectives of each session and included discussion, dialogue circles, lectures, role-playing activities, and video presentations. The use of different techniques was intended to encourage active student participation and to provide multiple opportunities for understanding, interaction, practice, and application.

4. **Tools Used:** Several instructional and auxiliary tools were used to assist the researcher in presenting the educational sessions effectively. These tools included a projector (data show), a laser pointer, an electronic board, colored pens, and an oil board. These materials were employed according to the requirements and activities of each session and were intended to facilitate explanation, presentation, interaction, and clarification of the session content.
5. **Session Content:** The content of each educational session was systematically organized and consisted of the following components:
 - **Introduction:** The session began by welcoming the participating students, creating an appropriate educational atmosphere, and thanking them for their attendance and participation.
 - **Presentation:** This component included all material directly related to the topic of the session. It included the definition of the topic, the principal theme of the session, relevant characteristics, objectives, procedural steps, important features, explanations, and illustrative images whenever required.
 - **Exercises and Questions:** A number of exercises and questions related directly to the theme and objectives of the session were presented to the students. These activities were intended to stimulate thinking, promote active participation, and provide students with opportunities to apply the concepts presented during the session.
 - **Discussion:** The researcher received the students' responses to the exercises and questions and discussed these responses with them. The discussion continued until the most accurate and appropriate answers were reached, thereby encouraging students to analyze their responses and reconsider them when necessary.
 - **Final Evaluation of the Session:** At the conclusion of each session, a number of questions were presented to evaluate the extent to which the objectives of the session had been achieved. This final evaluation also provided feedback concerning students' understanding, participation, and acquisition of the targeted knowledge and skills.
 - **Homework:** Each session included a set of activities, exercises, and questions presented to the students in the experimental groups. The students were required to complete these activities outside the session in order to reinforce the concepts, strategies, and skills introduced during the educational program.

2.2.3 Validity of the Educational Program

To determine the apparent validity and suitability of the educational program, the initial version of the program, consisting of 8 sessions, was presented to a group of specialists, experts, and referees in educational and psychological sciences. The total number of experts and referees was 30. They were requested to examine the content of each session and express their professional opinions regarding its suitability, relevance, organization, clarity, and consistency with the objectives of the program.

The experts were also requested to indicate whether any session, activity, objective, procedure, or component should be modified, added, reorganized, or deleted. Their observations and recommendations were considered in evaluating the program before its final implementation. The validity of the educational program was subsequently confirmed, as the program obtained an expert agreement percentage of 100%. This level of agreement indicated that the experts considered the program appropriate for achieving the objectives for which it had been developed.

2.3. EXPERIMENTAL DESIGN

Experimental design refers to the systematic plan or framework followed by researchers when conducting an experiment. It is characterized by its ability to distribute participants among experimental and control groups and to organize the application of the experimental treatment. Random distribution contributes to controlling variables that have not been included directly in the study and reduces the possibility that uncontrolled factors will influence the interpretation of the experimental results.

For this reason, experimental designs are often referred to as random designs because they depend on the random distribution of individuals, whether during the process of drawing samples from the original population or when distributing and applying the experimental treatment among the research groups [13].

After the sample had been selected, the participants were organized into the experimental and control groups included in the research design. Before beginning the actual implementation of the experiment, equivalence among the experimental and control groups was established in several variables that could potentially influence the dependent variables, namely metacomprehension and perceived control.

The statistical control method was employed in order to achieve equivalence among the groups and to control variables considered important because of their possible relationship with the dependent variables. Establishing equivalence before the implementation of the educational program was necessary to increase confidence that any subsequent differences

between the experimental and control groups could be attributed more appropriately to the educational program rather than to pre-existing differences among the groups.

The procedures used to establish group equivalence were as follows:

1. **Pre-test of Metacomprehension:** After administering the metacomprehension scale as a pre-test to the four research groups, the responses were scored and analyzed statistically. The arithmetic mean of the responses of the experimental male group was 144.466, with a standard deviation of 9.920. The arithmetic mean of the responses of the experimental female group was 143.533, with a standard deviation of 9.234.

The arithmetic mean of the responses of the control male group was 139.466, with a standard deviation of 14.667, whereas the arithmetic mean of the responses of the control female group was 141.000, with a standard deviation of 9.501. The overall arithmetic mean for the 60 participants was 142.116, with a standard deviation of 10.957.

To examine whether the observed differences among the mean scores of the four groups were statistically significant, the relevant descriptive statistics were calculated. Table 1 presents the arithmetic means and standard deviations of the four groups in the pre-measurement of metacomprehension.

Table 1. Arithmetic Means and Standard Deviations for the Equivalence of Groups in the Results of the Pre-measurement of Metacomprehension for the Four Groups

Group	Number	Arithmetic Mean	Standard Deviation
Experimental Males	15	144.466	9.920
Experimental Females	15	143.533	9.234
Control Males	15	139.466	14.667
Control Females	15	141.000	9.501
Total	60	142.116	10.957

To establish equivalence among the four research groups in the pre-measurement of metacomprehension, a one-way analysis of variance (ANOVA) was employed. The calculated F -value was 0.646. This value was compared with the tabulated F -value of 2.887 at the significance level of 0.05 and with degrees of freedom of 3 and 56.

The comparison showed that the calculated F -value was smaller than the corresponding tabulated value. Therefore, no statistically significant differences existed among the four research groups in their metacomprehension pre-test scores. This result indicates that the four groups were statistically equivalent in the pre-measurement of metacomprehension before implementation of the educational program. The results of the one-way analysis of variance are presented in Table 2.

Table 2. One-way Analysis of Variance for the Equivalence of the Four Groups in the Pre-measurement of Metacomprehension

Sources of Variance	Degrees of Freedom	Sum of Squares	Mean Sum of Squares	Calculated F	Tabulated F	Significance
Between Groups	3	236.983	78.994	0.646	2.887	Equivalent
Within Groups	56	6847.200	122.271			
Total	59	7084.183				

2. **Pre-test of Perceived Control:** After administering the perceived control scale as a pre-test to the four research groups, the students' responses were corrected, scored, and recorded for statistical analysis. The arithmetic mean of the responses of the experimental male group was 146.466, with a standard deviation of 12.0229. The arithmetic mean of the responses of the experimental female group was 147.600, with a standard deviation of 12.350.

The arithmetic mean of the responses of the control male group was 146.600, with a standard deviation of 29.825, whereas the arithmetic mean of the responses of the control female group was 151.333, with a standard deviation of 10.314. The overall arithmetic mean of the 60 students was 148.000, with a standard deviation of 17.628.

It should also be noted that the tabulated F -value was 2.887 at degrees of freedom of 3 and 56. The arithmetic means and standard deviations obtained for the four research groups in the pre-measurement of perceived control are presented in Table 3.

Table 3. Arithmetic Means and Standard Deviations for the Equivalence of Groups in the Results of the Pre-measurement of Perceived Control for the Four Groups

Group	Number	Arithmetic Mean	Standard Deviation
Experimental Males	15	146.466	12.0229
Experimental Females	15	147.600	12.350
Control Males	15	146.600	29.825
Control Females	15	151.333	10.314
Total	60	148.000	17.628

To determine the statistical equivalence of the four research groups in the pre-measurement of perceived control, a one-way analysis of variance (ANOVA) was used. The calculated F -value reported in the explanatory text was 0.646. This value was compared with the tabulated F -value of 2.887 at the significance level of 0.05 and at degrees of freedom of 3 and 56.

Because the calculated value was reported as being smaller than the tabulated value, the result indicated that there was no statistically significant difference among the four research groups in the pre-measurement of perceived control. Consequently, the four groups were considered equivalent with respect to perceived control before the educational program was implemented. The detailed results of the one-way analysis of variance are presented in Table 4.

Table 4. *One-way Analysis of Variance for the Equivalence of the Groups in the Pre-measurement of Perceived Control*

Sources of Variance	Degrees of Freedom	Sum of Squares	Mean Sum of Squares	Calculated F	Tabulated F	Significance
Between Groups	3	233.733	77.911	0.241	2.887	Equivalent
Within Groups	56	18102.267	323.255			
Total	59	18336.000				

2.4. IMPLEMENTATION OF THE EDUCATIONAL PROGRAM

The educational program was implemented after the necessary official and legal approvals had been obtained from the Hamdaniya Education Directorate. The approvals permitted the implementation of the educational program in the two schools selected to represent the experimental groups, namely Khazna Middle School for Boys and Al-Muwafaqiya Middle School for Girls.

After obtaining these approvals and completing the required preparatory procedures, the educational program was administered to the students assigned to the experimental groups. The sessions of the program were implemented in accordance with the predetermined and agreed-upon schedules. The organization of the sessions followed the sequence established during the program-development stage, and the instructional content, techniques, exercises, discussions, evaluations, and homework activities were presented according to the structure prepared by the researchers.

The implementation procedures were designed to provide equivalent educational conditions for the students participating in the experimental groups and to ensure that the content of the program was delivered systematically throughout the specified period. The control groups did not receive the experimental educational program during this stage, thereby making it possible to evaluate the effect of the intervention by comparing the performance of the experimental and control groups.

2.5. STATISTICAL TREATMENT OF THE DATA

For the purpose of organizing, processing, and statistically analyzing the data collected during the different stages of the research, the Statistical Package for the Social Sciences (SPSS) was employed. The software was used to calculate the descriptive and inferential statistical indicators required for examining group equivalence and evaluating the research hypotheses and experimental results.

3. PRESENTATION OF RESULTS AND DISCUSSION

The principal objective of the current research was to identify the effect of an educational program on developing metacomprehension and perceived control among Middle School students. More specifically, the study sought to determine whether participation in the educational program produced measurable development in the two dependent variables when compared with the corresponding performance of students in the control groups.

This objective was addressed in light of the procedures described previously in Chapter Three concerning the construction, organization, and implementation of the educational program designed to develop perceived control and metacomprehension among Middle School students. The program consisted of eight sessions, with each lesson or training session lasting approximately 45 minutes. The sessions were organized in accordance with the theoretical foundations adopted in the research and were intended to provide students with systematic educational and psychological experiences capable of strengthening their awareness of their learning processes and their perceived ability to regulate and control their academic behavior.

To achieve the objective of the research and determine the effectiveness of the educational program, the following hypotheses were formulated and tested statistically.

3.1. RESULTS RELATED TO METACOMPREHENSION

1. Null Hypothesis for Metacomprehension:

“There is no statistically significant difference at the level 0.05 between the means of metacomprehension development among the four research groups.”

To verify the validity of this hypothesis, the researchers calculated the arithmetic means and standard deviations of the difference scores for the four research groups. A one-way analysis of variance (ANOVA) was subsequently employed to determine whether the differences among the four group means were statistically significant. In addition, Scheffé's post hoc test was used to identify the pattern and direction of the differences among the groups after the overall analysis of variance indicated statistically significant differences. The descriptive statistics for the four groups are presented in Table 5.

Table 5. Arithmetic Means and Standard Deviations of the Differences among the Four Groups in Metacomprehension

Group	Number	Arithmetic Mean of Difference	Standard Deviation of Difference
Experimental Males	15	29.6667	12.29208
Experimental Females	15	46.1333	17.18748
Control Males	15	0.7333	3.47371
Control Females	15	1.6667	2.19306

As shown in Table 5, the experimental female group obtained the highest arithmetic mean of the difference scores, reaching 46.1333, with a standard deviation of 17.18748. The experimental male group also obtained a comparatively high mean difference of 29.6667, with a standard deviation of 12.29208. In contrast, the mean difference scores of the two control groups were considerably smaller. The control male group obtained a mean difference of only 0.7333, whereas the control female group obtained a mean difference of 1.6667.

These descriptive results indicate a clear numerical superiority of the two experimental groups compared with the two control groups in the development of metacomprehension. The magnitude of the mean differences suggests that students who participated in the educational program demonstrated substantially greater development in metacomprehension than students who did not participate in the program. The experimental female group displayed the greatest numerical improvement, followed by the experimental male group, whereas the changes observed in the two control groups were comparatively limited.

This pattern of results provides preliminary descriptive evidence that the educational program had a positive effect on students' metacomprehension. In other words, exposure to the educational activities, strategies, exercises, discussions, and feedback included in the program appears to have strengthened students' ability to become aware of, monitor, regulate, and evaluate their own comprehension processes.

Figure 1 provides a graphical representation of the arithmetic means of the difference scores among the four research groups and visually demonstrates the substantial separation between the experimental and control groups.

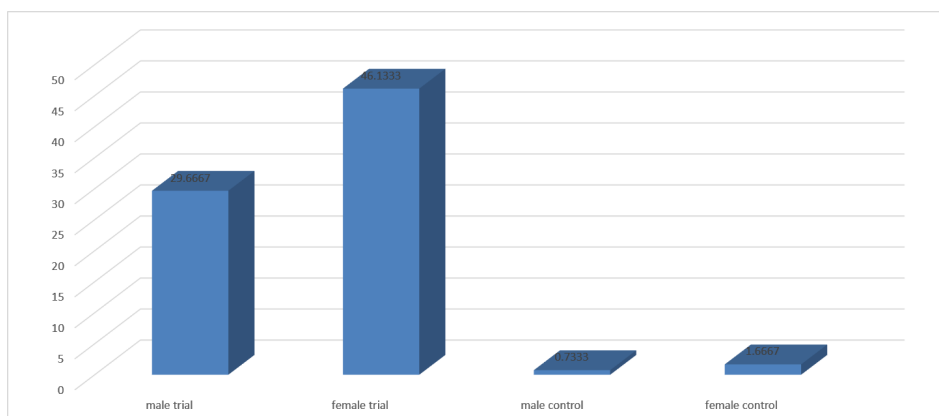


Figure 1. Bar chart showing the comparison of the arithmetic means of the differences among the four groups for metacomprehension.

Although the descriptive statistics indicate considerable differences among the four groups, inferential statistical analysis is necessary to determine whether these observed differences are statistically significant rather than being attributable to sampling variation. Accordingly, a one-way analysis of variance was conducted. The analysis included the sums of squares, mean squares, calculated F -value, tabulated F -value, and significance value. The results are presented in Table 6.

Table 6. One-way Analysis of Variance for Metacomprehension among the Four Groups

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square	Calculated F	Tabulated F	Sig. Value
Between Groups	3	22243.517	7414.506	64.004	2.877	0.000
Within Groups	56	6487.333	115.845			
Total	59	28730.850				

The results presented in Table 6 demonstrate that the calculated F -value was 64.004, which is substantially greater than the tabulated F -value of 2.877. In addition, the reported significance value was 0.000, indicating that the observed differences among the four research groups were statistically significant at the adopted significance level of 0.05.

Therefore, the results of the one-way analysis of variance indicate statistically significant differences among the means of the four research groups in the development of metacomprehension. In practical terms, the results demonstrate that the developmental scores obtained by the experimental groups differed significantly from those obtained by the control groups.

These findings provide statistical support for the effectiveness of the educational program in developing metacomprehension among the Middle School students participating in the experiment. Consequently, the null hypothesis stating that there is no statistically significant difference among the means of metacomprehension development in the four research groups is rejected, whereas the corresponding alternative hypothesis is accepted.

Because the overall analysis of variance revealed statistically significant differences among the groups, Scheffé's post hoc procedure was used to investigate the pattern of these differences and to determine the homogeneous groupings. The results of the Scheffé analysis are presented in Table 7.

Table 7. *Scheffé Values Indicating the Significance of Differences for Metacomprehension*

Group	Number	1	2	3
Experimental Males	15	–	29.6667	–
Experimental Females	15	–	–	46.1333
Control Males	15	0.73330	–	–
Control Females	15	1.6667	–	–
Sig. Values: 0.996		1.000	1.000	

As shown in Table 7, columns 1, 2, and 3 represent homogeneous subsets or homogeneous groups. Groups appearing within the same homogeneous column are interpreted as not differing significantly from one another according to the post hoc classification, whereas groups appearing in separate homogeneous subsets represent groups that differ more clearly in their mean scores.

The two control groups appear together within the first homogeneous subset because of the close similarity between their mean difference scores of 0.73330 and 1.6667. By comparison, the experimental male group and experimental female group appear at substantially higher levels of metacomprehension development. The pattern therefore supports the conclusion obtained from the analysis of variance and indicates that the most substantial development occurred among participants exposed to the educational program.

3.1.1 Effect Size for Metacomprehension

Statistical significance alone does not provide sufficient information about the practical magnitude of an intervention. Therefore, effect-size indicators were also calculated in order to estimate the magnitude of the relationship between the group variable and the development of metacomprehension. Eta squared (η^2) and Cohen's f were used for this purpose.

The values obtained for these indicators are presented in Table 8.

Table 8. *Effect-Size Indicators (η^2) and Cohen's f According to the Group Variable in the Development of Metacomprehension*

Indicator	Calculated Value	Small	Medium	Large	Effect
η^2	0.774	0.01	0.06	0.14	Large
Cohen's f	1.223	0.10	0.25	0.40	Large

Table 8 shows that the calculated value of eta squared was $\eta^2 = 0.774$. This value substantially exceeds the stated reference criterion of 0.14 for a large effect. Cohen's f was also very high, reaching 1.223, compared with the stated large-effect reference value of 0.40.

Accordingly, both effect-size indicators classify the observed group effect on metacomprehension as large. The results therefore demonstrate not only statistical significance but also substantial practical importance. The value of $\eta^2 = 0.774$ indicates that a large proportion of the variation in metacomprehension development was associated with differences among the research groups under the experimental conditions of the present study.

This finding strengthens the interpretation that participation in the educational program was associated with marked improvement in students' metacomprehension. The difference between the experimental and control groups was therefore not limited to a small numerical change but represented a substantial developmental pattern within the sample.

The researchers attribute this result to the nature and organization of the educational program and to the transformation that occurred in students' awareness of their own learning processes. Through participation in the program, the students were encouraged to move from relatively passive engagement with learning toward a more conscious state in which they could observe, monitor, regulate, and evaluate their own comprehension.

Another possible explanation is that the training program provided students with specific and practical strategies rather than relying exclusively on theoretical instruction. The exercises incorporated into the program were focused on the cognitive and psychological processes underlying metacomprehension and were intended to provide repeated opportunities for application, reflection, evaluation, and correction.

Through these activities, students were gradually encouraged to become more independent in learning. They were also trained to evaluate the degree to which they understood academic material, recognize situations in which comprehension was incomplete, identify weaknesses in their own comprehension processes, and select more appropriate strategies for overcoming these weaknesses.

The development observed among the experimental groups may therefore reflect a combination of increased awareness, repeated practice, structured feedback, and opportunities for self-evaluation. Together, these components appear to have contributed to improving the students' capacity to assume greater responsibility for monitoring and regulating their own learning.

3.2. RESULTS RELATED TO PERCEIVED CONTROL

2. Null Hypothesis for Perceived Control:

"There is no statistically significant difference at the level 0.05 between the means of perceived control development among the four research groups."

To verify the validity of the second null hypothesis, the arithmetic means and standard deviations of the perceived-control difference scores were calculated for the four research groups. These descriptive statistics were used to identify the magnitude and direction of development within each group before inferential statistical procedures were applied.

The descriptive results are presented in Table 9.

Table 9. Arithmetic Means and Standard Deviations of the Differences among the Four Groups for the Perceived Control Scale

Group	Number	Arithmetic Mean of Difference	Standard Deviation of Difference
Experimental Males	15	40.2000	17.39951
Experimental Females	15	52.4000	15.21184
Control Males	15	-1.2000	5.75946
Control Females	15	-0.7333	3.59497

The results presented in Table 9 indicate that the two experimental groups achieved the highest levels of positive development in perceived control. The experimental female group obtained the highest arithmetic mean difference, reaching 52.4000, with a standard deviation of 15.21184. The experimental male group also demonstrated substantial improvement, with a mean difference of 40.2000 and a standard deviation of 17.39951.

In contrast, the control male and female groups obtained slightly negative mean difference scores. The mean difference for the control male group was -1.2000 , while the corresponding mean for the control female group was -0.7333 . These values are relatively close to zero and indicate that the control groups did not demonstrate positive development in perceived control during the experimental period. Instead, the descriptive results indicate a very slight decline.

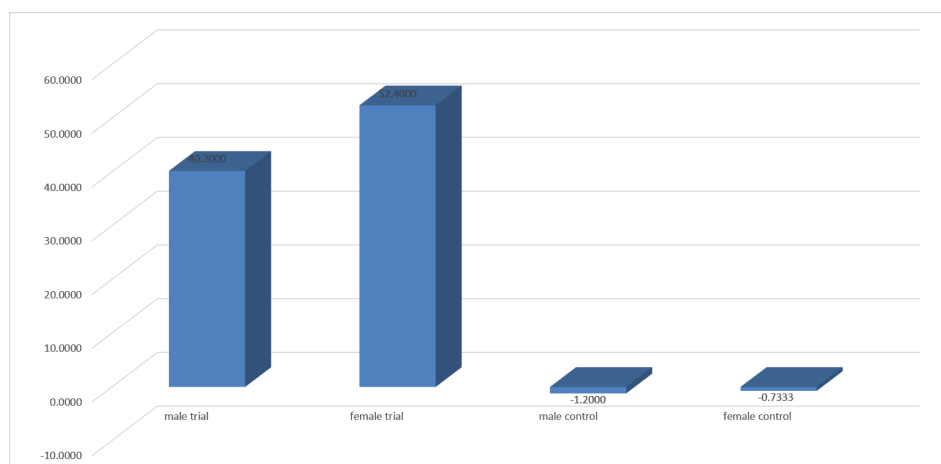


Figure 2. Bar chart showing the arithmetic means and standard deviations of the differences among the four groups for the perceived control scale.

The contrast between the positive difference scores observed in the experimental groups and the small negative differences observed in the control groups provides descriptive evidence in favor of the effectiveness of the educational

program. Students who participated in the program exhibited marked improvement in perceived control, whereas students who were not exposed to the program maintained approximately similar levels or demonstrated slight decreases.

Figure 2 illustrates the arithmetic means and standard deviations of the difference scores for the four research groups and provides a graphical representation of the substantial difference between the experimental and control conditions.

To determine whether the differences observed descriptively among the four groups were statistically significant, a one-way analysis of variance was subsequently conducted. The sums of squares, mean squares, calculated and tabulated F -values, and significance value were obtained. The results are presented in Table 10.

Table 10. *One-way Analysis of Variance (ANOVA) for Perceived Control among the Four Groups*

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square	Calculated F	Tabulated F	Sig. Value
Between Groups	3	34630.000	11543.333	79.577	2.77	0.000
Within Groups	56	8123.333	145.060			
Total	59	42753.333				

Table 10 shows that the calculated F -value was 79.577, whereas the tabulated F -value was 2.77. Because the calculated value is substantially greater than the tabulated value, the difference among the four research groups is statistically significant at the adopted level of significance.

The reported significance value of 0.000 further confirms the statistical significance of these differences. Therefore, the results indicate that the development of perceived control differed significantly among the four research groups and that the students in the experimental groups demonstrated substantially greater development than those in the control groups.

Accordingly, the null hypothesis stating that there is no statistically significant difference among the means of perceived-control development in the four groups is rejected, whereas the corresponding alternative hypothesis is accepted.

The results support the interpretation that the educational program was effective in improving perceived control among the participating Middle School students. The considerable differences between the experimental and control groups suggest that exposure to the structured training activities was associated with improved beliefs regarding students' ability to regulate their academic behavior, make decisions, employ available resources, and exercise greater control over their learning environment.

Scheffé's post hoc procedure was subsequently used to investigate the pattern of differences among the experimental and control groups. The results are presented in Table 11.

Table 11. *Scheffé Values Indicating the Significance of Differences in Perceived Control among the Four Groups*

Group	Number	1	2
Experimental Males	15	–	40.2000
Experimental Females	15	–	52.4000
Control Males	15	-1.2000	–
Control Females	15	-0.7333	–
Sig. Values: 1.000		0.064	

The results presented in Table 11 indicate that the four research groups were classified into homogeneous subsets according to the similarity of their arithmetic means and the absence of statistically significant differences within each subset.

The two control groups appear together in the first homogeneous subset, reflecting the close similarity between their mean difference scores. Likewise, the experimental male and experimental female groups appear within the second homogeneous subset. Although the experimental female group achieved a numerically higher mean difference than the experimental male group, the reported post hoc pattern indicates that this numerical difference did not reach the level required to conclude that the two experimental groups differed statistically from one another.

Therefore, although female participants in the experimental condition showed greater numerical development in perceived control, the results do not provide sufficient evidence to conclude that the effectiveness of the program differed significantly according to gender within the experimental condition.

At the same time, the clear separation between the experimental and control subsets reinforces the broader conclusion that students exposed to the educational program demonstrated substantially greater development in perceived control than students who were not exposed to the program.

3.2.1 Effect Size for Perceived Control

In addition to statistical significance, the magnitude of the observed effect was estimated using eta squared (η^2) and Cohen's f . These statistics provide information regarding the practical size of the differences associated with the research-group variable.

The calculated effect-size values are shown in Table 12.

Table 12. *Effect-Size Indicators (η^2) and Cohen's f According to the Group Variable in the Development of Perceived Control*

Indicator	Calculated Value	Small	Medium	Large	Effect
η^2	0.809	0.01	0.06	0.14	Large
Cohen's f	1.381	0.10	0.25	0.40	Large

The results presented in Table 12 demonstrate that the calculated value of eta squared was 0.809, which is substantially greater than the stated minimum criterion of 0.14 for a large effect. Cohen's f was 1.381, which likewise substantially exceeds the stated large-effect criterion of 0.40.

Accordingly, the effect of the group variable on the development of perceived control can be classified as large according to both reported indicators. The magnitude of these values suggests that the observed differences possess considerable practical significance in addition to being statistically significant.

The eta-squared value of 0.809 indicates that approximately 80.9% of the variance in perceived-control development within the statistical model was associated with differences among the research groups. This represents a very substantial proportion of explained variance and indicates a strong relationship between the experimental grouping and the observed development of perceived control under the conditions of the current research.

Nevertheless, this value should be interpreted within the context of the experimental design, sample characteristics, measurement procedures, and other methodological conditions of the study. It provides strong evidence of a substantial program-related effect within the present sample, although replication with additional samples would further strengthen the generalizability of the findings.

The researchers attribute the substantial effect observed in perceived control to the systematic construction and organization of the educational program and to the degree to which its training activities were aligned with the psychological and educational needs of the participating students. The program was designed to address the students' beliefs, perceptions, behaviors, and practical responses rather than presenting theoretical information alone.

The substantial value of eta squared ($\eta^2 = 0.809$) indicates that the observed effect is unlikely to represent a trivial difference between the groups. Instead, it suggests that the educational and psychological experiences included in the program were strongly associated with the development of perceived control among students in the experimental groups.

The researchers further attribute the magnitude of this effect to the theoretical foundations of Conner and Armitage's (1998) model [2], on which important aspects of the educational training were based. The program was not limited to providing students with general theoretical guidance or advice. Rather, it attempted to influence perceived control through complementary psychological and behavioral processes.

The first of these processes involved modifying students' internal beliefs and perceptions regarding their own abilities. By encouraging students to recognize their capabilities, reconsider ineffective beliefs, and develop greater confidence in their capacity to manage learning situations, the program sought to strengthen the internal psychological foundations of perceived control.

The second process involved providing students with practical opportunities to employ available school, educational, social, and environmental resources. Students were encouraged to identify resources in their surrounding environment and to consider how such resources could be used effectively in managing academic demands and overcoming difficulties.

The integration of changes in internal beliefs with practical training in the use of available resources may explain the substantial improvement observed among the experimental groups. Rather than treating perceived control as an abstract psychological concept, the program translated it into practical behaviors, decisions, strategies, and responses that students could employ within their academic environment.

The results therefore suggest that the educational program possesses considerable potential for practical application within Middle Schools. Its value is represented not merely in producing statistically significant differences but also in providing students with structured opportunities to strengthen initiative, responsibility, awareness, self-regulation, and confidence in their capacity to influence their own academic behavior.

From an educational perspective, increasing perceived control may assist students in moving from patterns characterized by hesitation, excessive dependence, or academic withdrawal toward greater initiative, purposeful decision-making, and awareness of the consequences of their behavior. Such development may also contribute to strengthening intrinsic motivation because students who believe that their actions can influence educational outcomes may become more willing to invest sustained effort in learning.

The very large effect size observed in the present study provides substantial empirical support for the usefulness of the adopted training program within the examined sample. It suggests that psychological strategies based on the multiple-treatment model may contribute meaningfully to empowering students and increasing their perceived ability to control and regulate their academic environment.

This interpretation is also consistent with the theoretical principles underlying the theory of planned behavior, according

to which an individual's perception of behavioral control is closely connected with the formation and regulation of behavior. When individuals believe that they possess the necessary ability, opportunities, and resources to perform a particular behavior, they are more likely to organize their actions toward achieving intended goals.

In the educational context, students who perceive greater control over their academic behavior may therefore become more capable of planning their actions, regulating their effort, selecting appropriate strategies, persisting when difficulties arise, and directing their behavior toward desired educational goals. The development of perceived control may consequently represent an important psychological mechanism through which educational interventions can promote more autonomous, responsible, and purposeful learning.

Taken together, the findings related to metacomprehension and perceived control indicate that the educational program produced substantial developmental differences between the experimental and control groups. The results of the arithmetic means, standard deviations, analyses of variance, post hoc comparisons, and effect-size calculations consistently support the effectiveness of the intervention within the studied sample.

The improvement in metacomprehension indicates that students became more capable of monitoring, evaluating, and regulating their comprehension processes, whereas the improvement in perceived control suggests that they developed stronger beliefs regarding their capacity to manage and direct their academic behavior. These two outcomes are theoretically complementary because effective learning requires both awareness of one's cognitive processes and confidence in one's ability to control and regulate behavior.

Accordingly, the results of the current research provide empirical support for educational programs that integrate cognitive, metacognitive, psychological, and behavioral training. Such programs may provide students not only with strategies for understanding academic material more effectively but also with the confidence and self-regulatory capacity required to apply those strategies independently in different educational situations.

4. CONCLUSIONS

Based on the findings of the current research and the statistical results obtained from the experimental application of the educational program, the following conclusions can be drawn:

1. The training program based on the development of metacomprehension skills contributed effectively to enhancing students' awareness of their own cognitive processes, particularly those related to planning, stimulation pattern, verification, review, and evaluation skills. This development reflects the students' transition from a relatively superficial level of information processing toward a deeper and more organized level of cognitive processing. It also indicates an improvement in their ability to monitor, regulate, and evaluate their own learning processes. This finding is consistent with theoretical propositions emphasizing that an active and effective learner is one who possesses the ability to observe, monitor, organize, and direct his or her own thinking processes during learning situations.
2. The existence of statistically significant differences between the pre-test and post-test measurements in favor of the post-test indicates that the observed changes in the levels of metacomprehension and perceived control were not random or incidental. Rather, these changes can be attributed to the effect of the educational training program implemented with the experimental groups. This result strengthens the credibility of the program and supports its effectiveness in achieving the educational and psychological objectives for which it was developed. It also demonstrates the importance of structured educational interventions in improving students' cognitive awareness, self-regulation, and perceived ability to control their academic behavior and learning processes.

5. RECOMMENDATIONS

In light of the findings and conclusions of the current research, the following recommendations are proposed:

1. There is a need to integrate metacomprehension skills explicitly, systematically, and progressively into school curricula so that these skills do not remain implicit, incidental, or unintended components of the educational process. Students should be trained in these skills in a structured and methodical manner through carefully designed educational activities and learning experiences. This requires reconsidering the organization and design of educational content so that it includes specific activities aimed at developing planning, monitoring, verification, review, and evaluation skills, thereby enabling students to become more conscious and independent learners.
2. Greater attention should be given to preparing specialized training programs for teachers that aim to develop their awareness and understanding of metacomprehension processes and perceived control. Such programs should enable teachers to employ appropriate metacognitive strategies within classroom teaching and to provide students with opportunities to monitor and regulate their own learning. Developing teachers' ability to apply these strategies may contribute to improving the quality of educational practices, strengthening student participation, promoting self-regulated learning, and enhancing the effectiveness of the overall teaching and learning process.

6. SUGGESTIONS FOR FUTURE RESEARCH

Based on the scope, findings, and limitations of the current research, the researchers suggest the following directions for future studies:

1. Conducting similar studies at different educational stages, such as primary, intermediate, secondary, and university education, in order to verify the extent to which the findings of the current research can be generalized across different age groups and educational contexts. Such studies may also help determine whether the effectiveness of educational programs designed to develop metacomprehension and perceived control varies according to students' age, developmental stage, academic level, or educational environment.
2. Conducting a comparative study of perceived control between academically outstanding students and their ordinary peers in Middle Schools. Such a study could contribute to identifying the extent to which perceived control differs according to academic achievement level and may provide a clearer understanding of the relationship between students' perceptions of control, their academic performance, their ability to regulate learning behavior, and their capacity to adapt successfully to different educational demands and challenges.

AUTHORSHIP AND CONTRIBUTIONS

All authors contributed substantially to the conception and development of the study, critically reviewed the manuscript, approved the final version, and agreed to be accountable for all aspects of the work.

FUNDING STATEMENT

This research received no external funding.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data are available from the corresponding author upon reasonable request.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

In the course of preparing this manuscript, the authors employed ChatGPT to improve the linguistic quality and readability of the content. After utilizing this AI tool, the authors conducted comprehensive review and necessary revisions to ensure the accuracy, integrity, and scientific rigor of the manuscript. All authors bear full responsibility for the final content of the published work, including any errors or inconsistencies that may arise.

REFERENCES

- [1] Brown, Ann L. "Knowing When, Where, and How to Remember: A Problem of Metacognition." *Advances in Instructional Psychology*, edited by Robert Glaser, vol. 1, Lawrence Erlbaum Associates, 1978, pp. 77–165.
- [2] Conner, Mark, and Christopher J. Armitage. "Extending the Theory of Planned Behavior: A Review and Avenues for Further Research." *Journal of Applied Social Psychology*, vol. 28, no. 15, 1998, pp. 1429–64.
- [3] Anderson, Mary C. M. *Why Generating Delayed Summaries Improves Metacomprehension Accuracy for Regular and Poor Readers*. 2005. University of Illinois at Chicago, PhD dissertation. ProQuest Dissertations & Theses, publication no. 3174162.
- [4] Bereiter, Carl, and Marlene Bird. "Use of Thinking Aloud in Identification and Teaching of Reading Comprehension Strategies." *Cognition and Instruction*, vol. 2, no. 2, 1985, pp. 131–56.
- [5] York, Kathleen Christine. *An Exploration of the Relationship between Metacomprehension Strategy Awareness and Reading Comprehension Performance with Narrative and Science Texts*. 2006. University of Southern Mississippi, PhD dissertation.
- [6] Mustafa, Fathi Mohamed Mahmoud. "Self-Efficacy and Its Relationship to Metacomprehension Skills in Light of Certain Variables among Qassim University Students." *Arts for Psychological and Educational Studies*, no. 8, 2020, pp. 70–123, <https://journal.tu.edu.ye/index.php/artsep/article/view/149>. In Arabic.

- [7] Perkins, D., and R. Richhart. "Mindfulness has also been found to enhance flexible and critical thinking skills." *Journal of Social Issues* 1.56 (2000): 1-13.
- [8] Palincsar, Annemarie Sullivan, and Ann L. Brown. "Reciprocal Teaching: Activities to Promote 'Reading with Your Mind.'" *Reading, Thinking, and Concept Development: Strategies for the Classroom*, edited by Theodore L. Harris and Eric J. Cooper, College Entrance Examination Board, 1985, pp. 147–59.
- [9] Hassan, Noora Hamid. *Metacomprehension and Its Relationship to Personal Intelligence among University Students with High and Low Self-Efficacy*. 2017. University of Basrah, master's thesis. In Arabic.
- [10] Afflerbach, Peter, et al. "Clarifying Differences between Reading Skills and Reading Strategies." *The Reading Teacher*, vol. 61, no. 5, 2008, pp. 364–73.
- [11] Hussein, Mahmoud Ata. "Self-Concept and Its Relationship to Levels of Emotional Tranquility." *Journal of Social Sciences*, vol. 15, no. 3, 1987, pp. 103–28. In Arabic.
- [12] Deci, Edward L., and Richard M. Ryan. "A Motivational Approach to Self: Integration in Personality." *Perspectives on Motivation*, edited by Richard A. Dienstbier, U of Nebraska P, 1991, pp. 237–88. *Nebraska Symposium on Motivation*, vol. 38.
- [13] *Guide to Research Methods in Psychology*. Coordinated by Tawfiq Abdallah Salloum, Department of Psychology, Faculty of Letters and Human Sciences, Lebanese University, 2022, https://www.ul.edu.lb/files/announcements/annonce_5_9322_8666.pdf. In Arabic.