

The Effectiveness of Metacognitive Strategies in Developing Research Plan Writing Skills for Master's Students at the College of Education - King Faisal University

By

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Abstract

One of the most important objectives of university education and graduation studies is to train students to prepare innovative research plans, that address research worthy problems of study and represent a scientific contribution to their field of specialization. Therefore, the current research aimed at developing the skills of the research plan's writing for master's students. To achieve this goal, the two researchers applied the quasi-experimental approach to measure the effectiveness of metacognitive strategies in developing the skills of writing the research plan for master's students, majoring in art education ,and the results proved the effectiveness of metacognitive strategies in developing research plan's writing skills for the research sample.

keywords: metacognitive strategies - research plan's writing skills - master's students

Introduction

The subject of metacognition has attained noticeable attention in the past few years, whereas it focuses on learning, practicing, and training thinking in a variety of subjects. Recent trends in university teaching have focused on integrating and applying metacognitive strategies, which are the learners' awareness of the cognitive processes they perform during learning. As well as, they are controlling them; so that they become more aware and reflective of what they are doing, when they want to reach a well-supported result, especially as the metacognitive thinking is an entry point to achieve the educational goals, that are set for the teaching and learning process on the one hand, and it is also the mental tool, that allows the learner to use the maximum possible of his abilities and scientific mental energies on the other hand. (1)

University education requires students to be able to master research plans skills, which is a key and an indicator for the preparation of distinguished scientific research and studies. Therefore, many of studies had recommended of the necessity of the research plan's writing skills developing, such:

A study (2) aimed at knowing the effectiveness of using electronic weighted feeding in developing skills for preparing a research plan for master's students at King Abdulaziz University, as well as a study (3) aimed at knowing the effectiveness of peer teaching strategy

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in developing skills writing the research plan of postgraduate students at the College of Education and their attitudes towards using the strategy, as well as a study (4) which aimed at designing a strategy via the web; to use educational blogs in developing the skills of writing a scientific research plan in educational technology for master's students, and a study (5), which aimed at identifying the common mistakes in research plans, at the Faculty of Education in Arish: as a case study. As well as, the study (6), which aimed at developing a proposed conception for developing scientific research skills in writing a research plan for doctoral students, specializing in curricula and methods of training. at Al-Imam Muhammad Ibn Saud Islamic University. Also, the study (7), which aimed at knowing the obstacles of writing the research plan in the graduation programs of the College of Education and how to support it. From the postgraduation students' opinions at the University of Hail.

The two researchers believe that mastering the skills of writing a research plan requires learners to possess metacognitive thinking skills, such as: planning, monitoring, and evaluation, through training them to apply metacognitive strategies, such as: self-questioning, thinking out loud, concepts maps, and K-W-L-H, and this is what the current research seeks to achieve.

Research Problem

According for what mentioned above, the problem of the current research is determined by the weakness of the skills of writing a research plan for master's students. This what was confirmed by:

- 1- Previous studies, that used multiple teaching strategies and approaches; to develop research plan writing skills.
- 2- The two researchers evaluated several research plans, were submitted by the students in the Master of Art Education program at the College of Education, which included many scientific errors.
- 3- Reviewing the teaching methods specified in description of the courses, which related to the preparation of research plans in the Master of Art Education program at the College of Education, noting that most of them are traditional teaching methods, and without cognitive or metacognitive strategies.
- 4- Inquiring for the opinions of the faculty members about the level of graduated students in the College of Education, in the skills of writing the research plan.

Research Questions

- 1- What are the required research plan writing skills for master's students?
- 2- What is the proposed conception for applying metacognitive strategies in developing the research plan writing skills for master's students?
- 3- What is the effectiveness of metacognitive strategies in developing the skills of writing a research plan for master's student?

Research Aims

- 1- Developing the skills of writing a research plan for master's students.
- 2- Presenting a proposed conception, showing how to apply metacognitive strategies in developing research plan writing skills.

- 3- Measuring the effectiveness of applying metacognitive strategies in developing the skills of writing a research plan for master's female students.

Research Hypotheses

- 1- There are statistically significant differences between the mean scores of the experimental group in the pre-and post-measurements, in favor of the post-measurement
- 2- The effectiveness of applying metacognitive strategies reaches a level, not less than 1.2, as measured by the "Black" modified gain equation.

Research Importance

- 1- Developing research plan writing skills, to enable researchers to prepare distinctive research plans.
- 2- Enabling master's students to practice metacognitive thinking skills, during their study of the various courses, will reflect positively on their research plans and academic achievement.
- 3- Reaching a procedural teaching conception, that shows how to apply metacognitive strategies, can be used in teaching various university courses.

Research Limits

- 1- A sample of master's students, majoring in Art Education, College of Education - King Faisal University.
- 2- Applying K-W-L-H , self-questioning , concept maps and thinking out loud strategies.
- 3- The implementation of the strategies took an entire semester (fourteen weeks), during the academic year (2021 / 2022 AD).

Research Methodology

- 1- The descriptive analytical approach in tracking previous studies and literature.
- 2- Quasi-experimental approach for measuring the effectiveness of applying specific metacognitive strategies and drawing conclusions. The research sample was intentionally selected from the master's students in the College of Education, specializing in Art Education, and their number is (9) students. and the research design with one experimental group was adopted with the presence of a pre-and post-measurement scale for estimating the skills of writing the research plan.

Key Words

1 -Metacognitive Strategies:

A set of methods and styles, that contribute to help learners to perform and choose appropriate processes and strategies for the educational situation, set their own goals, self-evaluation, awareness of their abilities, and control their way of thinking. (8)

It is a set of procedures, which carried out by the learner, that confirms the extent of his awareness and realization of what he is learning, his control over, his ability to make specific plans: before/ during learning, after reaching his goals through remembering, discussion, interpretation, organization, and continuous evaluation of what he had learned. (9)

2- Research Plan:

A written proposal for a research project, which reflects the researcher's mental perceptions of a specific problem and how to address it, is considered one of the basic steps in the research, and included a detailed description of the stages, that the researcher follows in collecting data, defining, formulating, and treating the problem. (10)

Theoretical Framework

The first axis- Metacognitive Strategies:

Metacognitive strategies are defined as a set of procedures and steps, that an individual follows to realize the processes, he uses before, during, and after learning the processes, that involved the solving problems.

Metacognitive strategies include training on four skills:

- 1- Planning: It is the individual's ability to achieve goals.
- 2- Regulation: It is the individual's ability to review the progress towards achieving goals.
- 3- Evaluation: It is the individual's ability to analyze the characteristics of the task.
- 4- Comprehension Monitoring: It is the individual's awareness of the different strategies, he uses for learning and understanding. (11)

Requirements for metacognitive thinking:

- 1- Knowledge: It includes the learner's knowledge of the nature's learning, its processes, objectives, effective learning strategies, and when to use them.
- 2- Awareness: It means the learner's awareness of the procedures, that should be taken to achieve a specific result and includes three dimensions: awareness of personality variables, awareness of educational situation variables, and awareness of appropriate strategy variables.
- 3- Control: It refers to the nature of conscious decisions made by the learner, according for his knowledge and awareness. (12)

Metacognitive Components:

Metacognitive thinking consists of two main components:

Metacognitive knowledge

It includes a part of the acquired knowledge that is related to psychological matters.

Metacognitive experience

Metacognition is an individual concept that is subjected to the student's own thinking in his administration and is subjected to his own paths of thinking. It is also considered the highest level of mental activity and its practice requires high mental abilities, that its owner has, preventing him from failure to implement a certain task. (13)

Importance of Teaching by Using metacognitive strategy:

Educators have unanimously agreed that students' use of metacognitive strategies in different learning situations helps to provide an educational thinking environment and can contribute to achieve the following: (14)

- 1- Developing the mental processes and cognitive skills of the learner.
- 3- The ability to think about the subject of learning, control thinking and then control learning.

- 4- The learner's positivity in collecting, organizing, following up, and distinguishing between information during learning.
- 4- Continuous encouraging to perform the self-evaluation. (15)
- 5- Transforming the learner from the level of quantitative and numerical learning to the level of qualitative learning.
- 6- Growth of many human capabilities of the learners, and their transformation from students to experts.
- 7- Increasing the efficiency of students in solving their own problems. (16)
- 8- Achieving self-learning and how to search for knowledge through its various sources.
- 9- Increasing the learner's ability to use the information and recruitment it in the different learning situations.
- 10- Improving the learner's ability to choose the most effective and appropriate strategy.

Types of Metacognitive Strategies:

There are many metacognitive strategies, of their different names and procedures, but they, all, agree that the student is the core of their attention.

Below, there are some of these strategies:

Self-questioning Strategy:

This strategy is based on directing a set of questions, that the learner offers to himself, on processing the information and makes him more able to perform the self-derive for the questions, which facilitates his comprehension of the scientific material, encourages him to examine / scrutinize and maintain his activity and vitality in learning. Also, it can develop his skill, concerning the making decisions. (17)

The self-questioning strategy consists of several stages, that the learner goes through during his use of this strategy, namely:

Pre-learning Stage

In which the teacher presents a topic or task, that is required to be completed to raise some questions; to activate metacognitive processes to identify the students' previous experiences with the topic or task. Among these questions: What is the previous knowledge that helps in performing the task? What do I do? And why do I do this? And why is this important?

Within- learning Stage

Students offer some questions and ask themselves to modify their thinking path and generate new ideas, which increases their ability to organize their thinking. Among these questions: Am I on the right path? Should a different strategy be used to perform the task? What other information do I need? What are the main ideas in this situation?

Post-learning Stage

In which, the students ask themselves some questions to evaluate their performance of the task, such as: Is what you learned closed to what you expected? Do I need to redo the task? How can I use this information in new life situations? What is my level of performance for this task or subject? (18)

Brainstorming Strategy:

It is also known as the strategy of seeding ideas and depends on presenting a topic or a specific problem to the students, informing them of all its aspects and the factors affecting it,

then asking them to provide immediate verbal solutions. A possible number of proposed solutions to the problem, then these solutions are presented, and the appropriate ones are selected after the brainstorming session. (19)

When using this strategy, we must be committed for these two principles:

The first principle

Postponing the issuance of any judgment on the ideas, presented during the first stage of the brainstorming process.

The second principle

Quantity generates quality, meaning that many ideas of the usual type can be presented to reach valuable or unusual ideas at a later stage. At the end of the brainstorming session, a list of ideas that were presented is written and distributed to the participants; to review what has been approached, and this procedure helps to explore new existing ideas, in preparation for the evaluation session. (20)

Self-scheduling Strategy (K, W, L, H):

It is a metacognitive strategy, that helps students to construct, construct meaning, aims to activate the thinking processes before/during, and after studying the subject, to activate the students' previous knowledge and make it a starting point or a fulcrum to link it to new information.

Strategy (K, W, L, H) consists of four stages:

K: stands for the word: What do I know about this subject? This stage is concerned with the teacher's assistance to his students; to recall what they know from previous information on this subject.

W: stands for What do I want to know about this topic?

L: is concerned with what are the new information learnt by the student himself.

H: It symbolizes how I learn more and aims at helping students, getting more learning and discovery materials, searching for other sources that develop their knowledge and deepen their expertise on this topic. (21)

Using of this strategy has many advantages, perhaps the most important of which, is to promote the idea of learning, that makes the student the core of the educational process, instead of the teacher. It enables the teacher to enhance the classroom learning's environment. The teacher can start the school year with clear goals, that he sets in advance, and then think with his students in a coordinated and cooperative manner about the extent, to which the goals are achieved. The teacher can enable students to process any scientific content, no matter how difficult it is, by activating their knowledge, and motivating their curiosity. This strategy can be used at any stage of the study. (22)

“Think out loud” Strategy:

It is a strategy, based on self-analysis, that is presented as a means for students to determine the types of thinking processes, that they undertake and go through during their learning, such as self-monitoring, asking questions, and summarizing (22). In this way, students

realize which of the previous processes they have used, and which ones they need to integrate into their current readings.

Learners need to talk about their ideas; to be communicated with each other and with their teachers. When the teacher is planning and solving the problems, he thinks out loud; so that the learners can follow the steps of thinking clearly by providing them with examples and encouraging them to discuss among themselves. This is to develop the language, they need to think /express their thoughts, and help them to discover their systems of thinking and the stages of meaning development for them (23)

This strategy can be applied in the following cases:

- 1- When the teacher wants to show the student how to think about academic content and learning styles.
- 2- When the teacher wants to diagnose or evaluate what, how the student thinks and knows.
- 3- When there is a desire for the learner to become more capable, accurate, and regular when performing tasks assigned to him that require thinking.

Concept Maps:

It is an alternative strategy to summarize the outline of the subject, condense its elements, and in some cases, it is more effective than it, in dealing with complex learning materials. The map is prepared by preparing a representation, visual representation, or illustration of how important ideas in a particular topic are interconnected with each another. Concept maps are like road maps, but they are concerned with relationships between ideas, rather than relationships between places.

The concept maps that were presented by "Ousubel" are related to meaningful learning.

The concept map is considered a visual organizer of information, concepts ,and relationships between them, which accelerates meaningful learning by teaching connections and bonds between content concepts, and it encourages students; to find their own connections and ties between concepts (24)

The second axis- Research Plan:

The research plan is a preliminary design, that reflects the researcher's vision of the problem, and the steps he will follow in addressing it. It is also a mirror that reflects his intellectual, linguistic, researching ,and organizational capabilities.

Writing a research plan is one of the most important stages of research work, through which the research problem, its objectives, importance, and procedures are determined, and it is certainly a task that requires an organized mindset, capable of foreseeing reality and objectively extrapolating its problems. (2)

Elements of a research plan:

The research plan includes a set of components, that are not separated from each other, but rather complement for each other. These components are:

The address:

The title of the research is the first main element, that attracts readers to view the research. So, it is distinguished by its importance in the research plan. To write a good title, the following conditions must be provided:

It should be comprehensive to the topic of the research, clear and understandable, doesn't contain any judgments or results, brief, innovative, original, and free from linguistic errors.

Research introduction:

In the research introduction, the reader is gradually prepared; to realize, at the end of the research, the existence of a problem, the need to find a solution to it, and in which the gradual progression is made from the general to the specific. Among the things that must be considered in writing the introduction: It must be brief, expressive of the research, fully related to its variables, forming an entry point to reach the problem, including justifications for feeling the problem, reflecting the personality of the researcher, and be written in a meaningful scientific language.

The introduction should start with a paragraph from the researcher's creation, and it addresses the literature that highlights the importance of the topic, explains the impact of the absence of such research, explains the shortcomings that were not addressed by previous studies / researches, and arranges the sources of feeling the problem in a logical order: experience, previous studies/researches, then exploratory studies. (25)

Research Problem:

The research problem is formulated in specific and clear phrases, that express the content of the problem and its dimensions. So, they are linked to the title of the research, and lead to the research questions, whether the problem is identified in the form of a declarative statement, or in the form of one or more questions. Among the considerations to be considered, when formulating: the accuracy of the formulation and its inclusion of all the problem's aspects.

Research Questions:

It comes after defining the research problem, and includes a set of questions, that are related to the research problem and required answering them to reach a solution to the research problem. It must not be compound ones.

Research Importance:

It reflects the benefits that can be derived from the results of the research, and what can be generalized in the educational process and scientific research in general. On writing the importance, it is necessary to highlight the expected theoretical and practical importance of the research, in a clear and convincing way, and not to be confused about them. Also, it must be formulated in a clear and specific language, with a statement of the benefiting groups from the research, including: learners, teachers, and researchers.

Research Limits:

It is to determine the borders of the research, its sample, and the domain of its applications. Given that it is not possible to study all aspects of the problem, so the researcher pays his attention to specific points, with the aim of studying them in a deep and not superficial manner. Among the considerations to be cared, on writing boundaries: dividing them into objective, human, temporal, and spatial, and clarifying their logical justifications.

Research Hypotheses:

They are possible solutions to the problem, being studied by the researcher. The hypothesis is an intelligent guess or conclusion, that the researcher approaches and adheres temporarily; so that the results of the research prove or deny its validity, and therefore it

represents the initial opinion to solve the problem. Among the considerations, that are to be taken into account in formulating hypotheses: It must be brief and clear, highlight the relationship between the variables factors, and formulated in a light of the results of previous studies, in a way that is testable / validated by the attained research tools.

Research Methodology:

It is the methods and procedures, that are used in collecting and processing data to attain logical results and interpretations. There are multiple approaches, used by researchers in the field of educational research, according to the nature of the research problem. The most common in the field of curriculum and teaching methods are: descriptive, analytical, which used to establish the theoretical framework and review previous studies and researches, that related to its variables, the experimental approach that is used during the field application of the research, for verifying the validity of its hypotheses, and the historical method, which used for studying the development of the curriculum and its development models.

Research Procedures:

They are the steps, that must be followed to answer the research questions and verify the validity of its hypotheses. Its include the following: a survey of educational literature, previous researches / studies, a vision of how to build tools; to achieve the desired goals, to ensure their validity / stability, to determine the research community and how to choose it, and the steps that the researcher will follow in the application field.

Research Terms:

The mentioned terms in the title of the plan should be defined linguistically, by reference to linguistic dictionaries/terminologically through references and specialized books in educational literature, and procedurally according to the nature of the research itself; to show how to treat it. Among the considerations to be followed in writing terminology: determining the basic characteristics of the term to be defined, writing it in a procedural and measurable manner, not quoting it from university theses, and referring to it, through the relevant sources and references.

Writing Sources and References:

Scientific integrity requires writing the sources and references, that were used during the preparation of the plan in the list of references. Also, there must be a complete matching between the contained references in the text and the list. Among the considerations to be followed, on writing references is their documentation in a correct manner, and their alphabetical arrangement.

Research Procedures

First: Preparing and adjusting the research tools:

1- List of research plan writing skills.

The objective of preparing the list:

Determine the skills of writing the required research plan for the master's female students.

The initial picture of the research plan writing skills list:

The two researchers had approached the initial list of research plan writing skills, consisting of main skills, and each main skill includes sub-skills. Then, the two researchers put the skills in a list, in preparation for presentation to a group of arbitrators.

Setting the list:

The researcher presented the initial list to a group of arbitrators, specialized in discussing research plans and supervising scientific theses, particularly in Art Education at the College of Education. The two researchers asked the arbitrators to express their views on several points:

- Relevance of research plan writing skills for master's female students.
- Adding the missed suitable skills to the list.
- Deletion what they think it must be deleted.
- Modifying what needs to be modified.

After gathering the arbitrators' proposals, the list was modified, and thus it became in its final form. (**Appendix 1**)

2-Preparing an estimation card for writing the research plan skills:

Determining the purpose of the card

Estimate the skills of writing the research plan, in a quantitative form.

Card Components:

- The card includes the skills of writing the appropriate research plan for the master's students, that have been reached and ensuring its validity.
- Quantitative assessment of the students' performance, where each skill was given a numerical value as follows:
 - The student is given three marks, if the skill is high.
 - The student is given two marks, if the skill is at an intermediate level.
 - he student is given one point, if the skill is weak. (**Appendix 2**)

Second: Building the proposed conception for the implementation of metacognitive strategies: The proposed conception for the implementation of metacognitive strategies includes the following stages:

Activating prior knowledge

By applying the first phase of the K-W-L-H strategy; assigning the students to answer the question: What do you know about the topic?

Determining goals in agreement with the students: by applying the second phase of the K-W-L-H strategy and assigning the students to answer a question: What do you want to know? Then discuss the students' answers and formulate them, with the students, in the form of goals to be achieved during the lecture.

Discussing the new information, that related to the main skill and sub-skills to be acquired: by dividing the students into pairs and assigning them to different activities and tasks; to apply strategies for self-questioning and thinking out loud, preparing concept maps that reflect their understanding of the subject, and enabling students to practice metacognitive thinking skills, in the tasks associated with writing the plan research paper, with the following questions:

- Is my previous information sufficient to achieve the objectives of the lecture?
- o What do I need to achieve these goals (information - skills - values)? Example: What do I need to determine a research problem, worthy of study in my major?

- Is the problem you have come up, presenting an addition to my field of expertise, and why?

Providing an action plan; to achieve these goals, including the required time to complete the work.

4-Evaluation: by answering the question: What did you learn? and asking the following questions:

- How was my performance?
- Were all goals achieved?
- Was the action plan you implemented appropriate?
- What modifications are required?

How can I be sure of my performance? With the training of students on self-assessment, peer evaluation, and collective evaluation of their research plans, using the particular criteria for each element of the research plan.

5- Application:

By discussing the following question with the students: How do I find out more? Where female students identify the tasks and activities, that they had carried out; to learn more about the topic and be able to write their research plan skills. Activities can be individual or group tasks.

Third: Applying research tools and teaching research plan writing skills:

To apply the research tools and conduct the experiment, the two researchers followed the following steps:

- 1- Pre-application of research tools: The research sample was assigned to write a research plan in their field of specialization, that includes the following elements: The research title, research introduction, research problem, research questions, research objectives, research hypotheses, research methodology, writing procedures, and the results were monitored.
- 2- Teaching research plan writing skills: After completing the process of pre-application of research tools, teaching began to teach research plan writing skills, in accordance with the proposed vision for applying metacognitive strategies.
- 3- Post-application of the research tools: After the completion of teaching the skills of writing the research plan, the scale for estimating the skills of writing the research plan was applied afterward, and the results were monitored.

Research Results

To verify the validity of the first hypothesis:

There are statistically significant differences between the mean scores of the experimental group in the pre-and post-measurements in favor of the post-measurement.

The two researchers calculated the differences between the results of the experimental group in the pre-and post-applications of the scale of estimating the skills of writing the research plan, and the results were as shown in the following table (1).

Table (1) *The results of the Wilcoxon test and the value of (z) and its significance for the differences between the mean ranks of the experimental group in the pre-and post-measures of research plan writing skills*

Writing Skills	Pre-Average	Post-Average	Direction of Ranks	N	Average of Ranks	Total of Ranks	Z	The Lowest Value of The Sign	Level Indication
Research Title	2.62	8	Negative ranks positive ranks	0 8	zero 4.5	zero 36	2.55	0.011	0.05
Research Introduction	5.50	14.00	Negative ranks positive ranks	0 8	zero 4.5	zero 36	2.58	0.010	0.05
Research Problem	1.75	5.75	Negative ranks positive ranks	0 8	zero 4.5	zero 36	2.63	0.008	0.05
Research Questions	2.75	8.37	Negative ranks positive ranks	0 8	zero 4.5	zero 36	2.55	0.011	0.05
Research Objectives	2.75	8.62	Negative ranks positive ranks	0 8	zero 4.5	zero 36	2.58	0.010	0.05
Research Hypotheses	3.50	11.50	Negative ranks positive ranks	0 8	zero 4.5	zero 36	2.63	0.008	0.05
Research Methodology	2.75	8.37	Negative ranks positive ranks	0 8	zero 4.5	zero 36	2.56	0.010	0.05
Research Procedures	4.37	11.37	Negative ranks positive ranks	0 8	zero 4.5	zero 36	2.63	0.008	0.05
Research Terms	3	8.87	Negative ranks positive ranks	0 8	zero 4.5	zero 36	2.54	0.011	0.05
Sources and References	3.75	8.75	Negative ranks positive ranks	0 8	zero 4.5	zero 36	2.63	0.008	0.05
Linguistic and Scientific Drafting	2.37	5.87	Negative ranks positive ranks	0 8	zero 4.5	zero 36	2.58	0.010	0.05
The Scale As a Whole	34.75	99.5	Negative ranks positive ranks	0 8	zero 4.5	zero 36	2.53	0.011	0.05

It is clear from Table (1): that there are differences between the mean scores of the experimental group, in favor of the dimensional application, in each skill of writing the research plan skills and in the total skills as a whole, and also between the mean ranks of the experimental group's scores for those skills in the pre and post measurements, in favor of the post-measurement, and it was the lowest value of that significance was (0.008), which is less than the significance level (0.05), and thus it is statistically significant, which indicates the existence of statistically significant differences between the mean scores of the experimental group for the skills of writing the research plan, in the pre and post measurements, in favor of the post measurement.

To verify the validity of the second hypothesis:

The effectiveness of applying metacognitive strategies reaches a level, not less than 1.2 as measured by the "Bleak" modified gain equation.

The two researchers calculated the effectiveness of applying metacognitive strategies and the results were as shown in the following table (2).

Table (2) *The averages of the experimental group's scores, in the pre-and post-application of the scale, for estimating the skills of writing the research plan and the adjusted earnings ratios for Bleak*

skill	Pre-Average	Post-Average	Total Mark	Modified Gain Ratio (Bleak)	Indication
Research Title	2.62	8	9	1.44	Acceptable
Research Introduction	5.5	14	15	1.46	Acceptable
Research Problem	1.75	5.75	6	1.61	Acceptable
Research Questions	2.75	8.37	9	1.52	Acceptable
Research Objectives	2.75	8.62	9	1.59	Acceptable
Research Hypotheses	3.5	11.5	12	1.61	Acceptable
Research Methodology	2.75	8.37	9	1.52	Acceptable
Search Procedures	4.37	11.37	12	1.50	Acceptable
search Terms	3	8.87	9	1.63	Acceptable
Sources and References	3.75	8.75	9	1.51	Acceptable
Linguistic and Scientific Drafting	2.37	5.87	6	1.55	Acceptable
The Scale as A Whole	34.75	99.5	105	1.54	Acceptable

It is clear from **Table 2**: that the application of metacognitive strategies was effective, as the adjusted gain percentage was (1.2%), and this indicates the acceptance of the second hypothesis which states: The effectiveness of the proposed strategy reaches a level, not less than 1.2, as measured by Bleak's modified gain equation.

It is clear from the results of the research, that the hypotheses are correct, and these results can be attributed to the following:

- Diversification in the application of metacognitive strategies and identifying the most appropriate strategies for developing research plan writing skills, as well as for the university stage
- Diversification in educational tasks and activities, with a focus on the learner's positivity, starting with setting goals
- Paying attention to evaluation and training students on self-evaluation, peer evaluation, and group evaluation.

Research Recommendations

- 1- Training male and female students, at all academic levels, to employ metacognitive strategies in their study of various subjects and courses.
- 3- Training male and female teachers to apply metacognitive strategies in their teaching of different subjects and courses.
- 3- Developing course descriptions and including modern teaching strategies that focus on the learner and his positivity and help in developing his skills.

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