Research Article

The Impact of Using the Hill Climbing Strategy on the Students' Academic Achievement in the College of Educational Sciences at Al-Hussein Bin Talal University in the Subject of the Prophetic Biography and its Teaching Methods

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Abstract

The study aimed to determine the impact of using the Hill Climbing strategy on the students' academic achievement in the College of Educational Sciences at Al-Hussein Bin Talal University in the subject of the Prophetic Biography and its teaching methods. The study sample consisted of 80 students from the College of Educational Sciences studying the Prophetic Biography and its teaching methods during the second semester of the academic year 2021-2022 at Al-Hussein Bin Talal University. The students were divided into two groups: the control group, consisting of 40 students, who learned using traditional methods, and the experimental group, also consisting of 40 students, who learned using the Hill Climbing strategy. The researchers prepared an achievement test to measure the academic achievement of the students in the topic of Prophetic Biography and its teaching methods. The results of the study showed statistically significant differences between the two study groups in the students' level of achievement, in favor of the experimental group that learned using the Hill Climbing strategy. The study recommends the necessity and importance of employing the Hill Climbing strategy in teaching other Islamic education subjects such as Jurisprudence and its teaching methods and Creed and its teaching methods. The study also recommends conducting comparative studies between the Hill Climbing strategy and other modern teaching strategies.

1. Introduction

The world is witnessing scientific, cognitive, and technological advancements that have resulted in changes in all areas of economic, political, social, cultural, and educational life. Therefore, it has become essential to prepare individuals capable of keeping up with and adapting to these rapid changes in order to advance their society, adapt to their present, and plan for their future and the future of the coming generations. This can only be achieved by providing an educational system characterized by a high degree of efficiency and development, contributing to the preparation of learners who can possess adaptive skills and cope with these changes. Those learners should also possess problem-solving and higher-order thinking skills such as creative, critical, productive, philosophical, and reflective thinking. This requires the provision of a stimulating and encouraging educational environment, relying on an active, effective, and dynamic teacher who plays an active role and possesses modern teaching strategies that help learners in the learning and teaching process. Since some teachers use traditional teaching methods while practicing the education process in the classroom, this prompted and encouraged educators to adopt modern teaching strategies, including the Hill climbing strategy. This strategy stems from the ideas and principles of the social constructivist theory. It helps the learner to reach a goal that is difficult to reach due to the lack of clarity in the solution method, the difficulty in determining the ways and means to achieve the goal, or the existence of obstacles that hinder the solution and prevent the learner from achieving what he wants. It also provides the learner with an educational climate characterized by discussion, dialogue, and diversity of opinions and ideas, when exercising the roles entrusted to him [1].

The terms 'approaching the solution', 'hill climbing', 'climbing the tree', 'climbing the mountain', or 'climbing the plateau' first appeared when it was introduced by Wood and Ross in 1976. The aim was to activate the role of the teacher in assisting the child or novice learner to be capable of solving a problem that surpasses their individual abilities through the process of reflection [2].

The importance of the Hill climbing strategy stems from the fact that it encourages learners to think not about the information and knowledge that is presented to them in a ready-made manner, but rather urges and encourages them to think and search for information and knowledge that challenge their minds, and puts them in educational situations that need thinking and reflection to reach the right solutions, and makes them able to make decisions and solve problems.

Hill climbing strategy consists of seven sequential and integrated stages as indicated in [1,3, 4]. Each stage serves a specific function that paves the way for the next one. These stages are *preparation*, *problem presentation*, *reflection*, *diagnosis*, *solutions formulation*, *solutions processing*, and *assessment/application*. These basic stages of teaching can be clarified according to the Hill climbing strategy as follows:

1. *Preparation*: The teacher presents and raises introductory questions to prepare students for the lesson's topic by presenting the problem and accurately identifying its aspects to capture their attention from all sides [5].
2. *Reflection*: The teacher asks students to reflect on all aspects of the problem and feel it while reviewing previous information.
3. *Diagnosis*: The teacher diagnoses the problem by asking questions directly related to the problem until the students answer them, correcting any mistakes and helping them approach the solution while recording their ideas for discussion.
4. *Solution Formulation*: The final formulation of solutions is made after the end of the dialogue and discussions.
5. *Solution Processing*: After the students understand the problem's elements and approach its solution, the teacher summarizes and records them [6].
6. *Assessment/Application*: Finally, the teacher applies the solution to ensure the students' level of understanding of the topic, assigning them to write a brief report for training and practice.

Regarding the implementation of the Hill climbing strategy from a practical and applied

perspective, [7] identifies it as follows:

1. The teacher specifies the question to be discussed, which achieves the desired outcomes.
2. The teacher allocates sufficient time for the students to discuss the solution.
3. The teacher corrects some of the students who were able to solve the question orally correctly.
4. After the specified time is over, one of the students solves the question under the guidance of the teacher.
5. The teacher asks the following question to all students in the lecture: Who solves the question? So that each student expects the question to be directed specifically to him or her.
6. The teacher selects the students who will be assigned the task of solving the question in an intentional way. Their number ranges from 3 to 8 students.
7. The teacher asks a student to write the question, if necessary, with the possibility of assistance from another student, and the teacher intervenes to help if all students fail.
8. The teacher intervenes whenever he feels that a task or issue needs clarification, through his questions related to the task, ranging from simple to complex.
9. While the teacher and students are discussing the solution, the other students need to think about the teacher's question in order to maintain continuity of attention. The teacher constantly looks at the students while asking questions so that every student feels that the teacher is asking him or her.
10. The teacher asks the students to justify the answers they gave to his questions.

As for the definition of the Hill climbing strategy, there have been multiple definitions for it. [8] defined it as "an organized strategy that trains students to pay attention to the problem, to be accurate, to organize, to link, and to diagnose so that this is achieved through problem-solving and finding appropriate solutions for it". [9] defined it as "a set of procedures and activities that students carry out in the classroom to solve a specific problem whose answer is sought, then the teacher explains it". [10] defined it as "a set of teaching procedures that are based on the structural curve, consisting of seven consecutive and integrated steps. Each step works to bring the student closer to the solution that leads him to the final goal. These steps are the preparation, presentation of the problem, reflection, diagnosis, formulation of solutions, processing solutions, and assessment." [1] defined it as "a series of successive teaching procedures based on the structural curve that can be summarized in seven stages: preparation, presentation of the problem, reflection, diagnosis, formulation of solutions, processing of solutions, and assessment. These stages prepare students to face real situations and problems and provide a safe educational environment that allows discussion, and exchange of opinions and experiences. Thus, the student is a discoverer and searcher for information and knowledge and is responsible for his learning."

The researchers define the Hill climbing strategy as a set of sequential procedures and mental activities carried out by the teacher of the Prophetic Biography and its teaching methods to train students to practice and apply it when studying a subject of the Prophetic Biography. The teacher starts with preparation and presents the problem to the students. He asks the students to focus carefully and reflect on the problem to diagnose its real causes. The students search for answers and solutions step by step. They begin to formulate solutions in an interactive and positive way, practicing thinking, searching, proposing solutions, and helping each other to find appropriate solutions for the problem Then the teacher begins to evaluate the solutions in a participatory manner.

The study further posits that the integration of the Hill Climbing strategy not only enhances academic achievement but also cultivates higher-order thinking and analytical skills. By immersing students in a dynamic and intellectually stimulating learning environment, this approach fosters deeper engagement, critical reflection, and a more nuanced understanding of complex educational content

Based on the previous presentation, it can be concluded that the Hill climbing strategy, when used in the teaching process, begins with preparing and exciting the students about the lesson topic,

then presenting and defining the problem. After that, students' ideas are reviewed, revised, and connected to previous knowledge and information, linking them to the current problem presented on the board in an engaging and challenging way, in order to activate discussion and derive solutions from multiple and diverse angles. This contributes to stimulating and developing higher-order thinking skills among students.

As for the role of the teacher in the Hill climbing strategy, he works on encouraging students during the thinking process, recording their ideas during discussions, organizing the learning process from one step to another and from one activity to another, raising challenging issues and situations to stimulate students' minds, managing time, and asking open-ended questions [10].

While the learner's role is to work on solving the presented problem, answering the teacher's questions, cooperating positively with other students by interacting with members of his group, discussing all the ideas presented, and distinguishing between correct and incorrect solutions. The role of the learner is also presenting evidence and arguments in front of his colleagues, collecting information and data, predicting different solutions to the problem, discussing them, and choosing the best solution [1]. Accordingly, the Hill Climbing strategy is considered a major way to solve problems and address individual differences among students. It encourages asking questions, dialogue, and discussion, takes into account the mental and psychological characteristics and the diversity of opinions, combines teamwork and individual work, encourages cooperative work, and contributes to modifying the misconceptions among learners. Thus, it makes the learner the focus of the educational process and instills a spirit of love for knowledge and curiosity [9].

The Prophetic Biography has a great place in the educational process. In addition, the personality of the Prophet Muhammad peace be upon him was, and still is, a pedagogical role model for the learner. He considers his needs, talents, aptitudes, and abilities. He addresses people according to their minds and takes into account the individual differences between people. Thus, the study of the Prophetic Biography is not just historical events nor a narration of stories and events, but rather a practical application and embodiment of the complete Islamic religion in the highest example, the Prophet Muhammad (peace be upon him), and in all aspects of noble life.

Moreover, studying the Prophetic Biography helps to understand and interpret many of the verses of the Holy Qur'an through the events that the Prophet went through. He was of great character and honest in his conduct with his people and companions. He presented his call to Allah Almighty with wisdom and good exhortation and exerted extreme efforts in conveying his message. He was the head of a state governed by consultation, justice, benevolence, tolerance, mercy, and wisdom. He was an ideal husband and a compassionate father to his family, considerate of the rights and duties of both the wife and children. He was a skillful and sincere leader, a worshipper devoted to his Lord, and a kind and pleasant person with his family and companions [11]. The Hill Climbing strategy in education initiates with stimulating engagement, presenting a problem that interweaves prior knowledge with current challenges, driving critical discourse and diverse problem-solving approaches. The teacher, as a guide, orchestrates this process through layered questioning and intellectual provocation, while students engage deeply in analysis, defending solutions, and collaborative reasoning.

The Prophetic Biography conveys and illustrates everything related to the life of Prophet Muhammad (peace be upon him), including all its details, whether in his personal or public affairs. It narrates historical events with the existence of material evidence that confirms their accuracy and conformity to what is mentioned in those events. All of this supports the truthfulness of the prophethood of Muhammad (peace be upon him). The Prophetic Biography has been documented side by side since an early time in the life of the Prophet (peace be upon him), such as his mission and the beginning of revelation, and everything that happened before the migration, then his migration to Medina, and the migration of some of his companions to Abyssinia before that. It covers his marriage, battles, travels, and all matters related to his personality and behavior throughout his life. So, we know, for example, his skin color, hair color, height, walking and sitting posture, the way he speaks and laughs, his favorite food, and how he eats and drinks. We also know the effects of his

environment and his remains. His grave, in which he was buried, still exists today, and all the traits attributed to him can be confirmed through modern scientific means. His biography has been preserved and transmitted in a way that was not available to humans before because he was the last of the prophets and the last messenger of Allah Almighty. He worked on upbringing the Islamic nation and establishing the state in a comprehensive, integrated, and balanced way. He also taught his companions the divine method and what it contains of concepts, values, beliefs, and correct perceptions about Allah Almighty, humans, the universe, life, Paradise and Hell, destiny, and fate. The Prophetic Biography confirms that Prophet Muhammad (peace be upon him) was a human being whom Allah Almighty sent to all people as a bearer of mercy, goodness, and peace, from whom they could learn high ethics, good morals, sound beliefs, proper worship, elevated manners, purity of heart, love of jihad and truth and justice, and helping the weak and oppressed until their rights are restored [12].

In light of the above, there is a crucial need to improve the methods of teaching The Prophetic Biography at the university level, by using modern teaching strategies in order to assist students in participating in the learning process actively and effectively and to acquire skills, knowledge, information, experiences, and values. Therefore, colleges of education in Jordan seek to be pioneers in preparing teachers based on the latest research and global studies in education, providing scientific expertise that equips students with the necessary specialization competencies that contribute to the elevation of society and the preparation of qualified personnel to work in the field of education, and keep pace with scientific and technological advancements, encourage scientific research, and develop and update curricula, programs, and courses in line with the developments of the era. Additionally, colleges of education also contribute to providing the necessary competencies for the local community of all higher degrees (Higher Diploma, Master's, and Doctorate) in various educational disciplines, and work towards leading the process of development, renewal, improvement, and modernization in education.

Thus, it is clear that the Hill climbing strategy is one of the applications of the constructivist social theory in student-centered learning and interaction. It focuses on students' prior experiences and contributes to preparing the cognitive structure of their knowledge, skills, and experiences through dialogue and discussion with their peers. Since the subject of The Prophetic Biography is based primarily on events, stories, and practical application of Islamic religion in all aspects of life, this study aims to understand the impact of using the Hill climbing strategy on the achievement of students at the Faculty of Educational Sciences at Al-Hussein Bin Talal University in the subject of The Prophetic Biography and its teaching methods.

1.1   Study hypotheses

1. There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the mean scores of the students in the achievement pre-test for the control and experimental groups.
2. There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between the mean scores of the students in the achievement post-test for the control and experimental groups.

1.2   Study Problem

There is a general weakness among students in the practical application of some strategies, methods, and techniques that should be practiced and applied correctly during the teaching and learning process. This may be attributed to the weakness of theoretical and practical experiences and knowledge gained during the academic learning and teaching process, especially since the prevailing approach in university teaching does not make the student the center of the educational process. In most cases, the student is passive, receiving, and not actively participating. This contradicts modern

education and contemporary trends that call for the necessity of using modern teaching strategies that revolve around the students, helping and encouraging them to interact and participate, which may have a positive effect on their achievement, motivation, and desire to learn. It should be noted that the reality of teaching The Prophetic Biography and its teaching methods course at the Faculty of Educational Sciences at Al-Hussein Bin Talal University does not fully align with the desired goals and outcomes that need to be achieved. The teaching methods still rely on rote learning by the teacher, who is the center of the teaching process, and the students are still passive listeners trying to memorize everything in the university curriculum, with the focus being on information rather than the correct way of thinking, researching, and understanding.

Educators have emphasized the importance and necessity of directing teaching in a way that provides integrated experiences for learners that are appropriate to their abilities, inclinations, desires, and developmental characteristics so that they can innovate through learning skills and attitudes that enable them to think correctly and work continuously, this can only be achieved through practicing learning. Humans only learn by practicing and applying skills themselves and one of the main goals of learning for students is to learn how to learn and how to be effective and active. Thus, learning depends on the learners themselves, and learners become the axis of the educational process. Therefore, it is necessary to try out modern teaching strategies that are consistent with educational orientation. This study came to contribute to facilitating the teaching of The Prophetic Biography and its teaching methods, through the use of the Hill climbing strategy to improve students' academic achievement and improve the process of learning, teaching,

1.3 Study Objective

This study aims to contribute to the development of teaching the subject of the (Prophetic Biography and its teaching methods) by examining The impact of using the Hill Climbing strategy on the students' academic achievement in the College of Educational Sciences at Al-Hussein Bin Talal University in the subject of the Prophetic Biography and its teaching methods

1.4 Importance of the study

The importance of the current study arises from the following:
1. The importance of university education, especially in the College of Education, as it is responsible for preparing and training teachers in various disciplines.
2. This study is considered the first -to the best of the researchers' knowledge- to address the Hill climbing strategy in teaching the subject of the (Prophetic Biography and its teaching methods) in academic education at the College of Education.
3. The importance of using the Hill climbing strategy in teaching, as it is a modern thinking strategy that makes the student the center of the learning and teaching process, which facilitates learning and teaching the study materials and performs high mental processes. It also makes the student an active and cooperative participant with the teacher and other students. This helps the student to acquire skills in dialogue, competition, expressing opinions, self-confidence, problem-solving, and taking responsibility.
4. This study presents a procedural model for teaching the (Prophetic Biography and its teaching methods) using the Hill climbing strategy, which helps to improve the teaching strategies by developing them to achieve the desired outcomes.

1.5 Study boundaries

1. Students studying the Prophetic Biography and its teaching methods at the Department of Curriculum and Instruction, College of Education, Al-Hussein Bin Talal University for the academic year 2021-2022.

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2. Five topics from (The Prophetic Biography and its teaching methods) course: the Secret Breaching, the Year of Sorrow, the Pledge of Allegiance at Al-Aqaba, the Prophet's Migration, and the Conquest of Mecca. Taken from the main textbook and reference for this course (Al-Wajeez fi Al-Sirah Al-Nabawiyya) by the author [11].

1.6 Procedural Study Terms

1. Effect: The extent of change that the independent variable (the Hill climbing strategy) in the experimental group has on the dependent variable (academic achievement) when teaching the five topics of (The Prophetic Biography and its teaching methods.)
2. Strategy: A set of consecutive procedures and steps taken by a faculty member according to a plan aimed at implementing the topics of (The Prophetic Biography and its teaching methods) in a way that achieves the educational outcomes specified in the study tool represented by the achievement test.
3. Hill climbing Strategy: A teaching strategy based on a set of cognitive activities, investigation, and discovery in a positive interactive learning environment between the teaching faculty member and students following multiple stages of preparation, problem presentation, reflection, diagnosis, solutions formulation, solutions processing, and assessment/application. The teacher poses a question to a group of students in one task and then moves on to another task. The discussion is directly between the teacher and the students with the encouragement of cooperation to accomplish the task in all the topics of (The Prophetic Biography and its teaching methods) so that the level of achievement of the experimental group students is measured.
4. Academic Achievement: The amount that the student obtains and acquires of information and concepts, estimated by the grades obtained in the achievement test prepared by the researchers after teaching the topics of (The Prophetic Biography and its teaching methods.)
5. Traditional Method: A method based on lecturing rather than dialogue and discussion. It neglects the practical aspect so that the teacher is the center of the educational process instead of the student. The role of the student is to write down what the teacher says and answer the questions asked by the teacher, which are mostly within the lower cognitive levels of memorization, recall, understanding, and comprehension.
6. Subject areas of the Prophetic Biography: Five topics from the book (Al-Wajeez fi Al-Sirah Al-Nabawiyya), (Concise Prophetic Biography) by the author (Qabbani, Mohammad, 2008), which is the main and primary reference for the subject of the (The Prophetic Biography and its teaching methods). These topics are The Secret Breaching, The Year of Sorrow, The Pledge of Allegiance at Al-Aqaba, The Prophet's Migration, and The Conquest of Mecca.

2. Literature Review

Through the researchers' review of a number of Arabic and foreign studies that have addressed the Hill climbing strategy, there is no study that has examined the impact of using the Hill climbing strategy on learning the Prophetic Biography and its teaching methods. However, there are some previous studies that have addressed the Hill climbing strategy in other topics, including:

[13] conducted a study aimed at identifying the effect of using the Hill climbing strategy supported by enrichment activities in teaching the Arabic language on improving Quranic performance, comprehension of reading, and developing creative problem-solving skills among gifted students with learning difficulties in primary school. The research sample consisted of 23 gifted students. The study employed the experimental method and utilized the one-group pretest-posttest design and used the Pictorial Intelligence Test, Torrance Test of Creative Thinking-Figural (B), and Reading Difficulties Scale. The study also used tools such as the Reading Performance Index, the Reading Comprehension Test, and the Creative Problem-Solving Test. The study found statistically

significant differences in favor of the post-test, indicating the effectiveness of the Hill climbing strategy in improving Quranic performance, comprehension of reading, and developing creative problem-solving skills. The study recommended the importance of using the Hill climbing strategy in developing critical and creative thinking skills, academic achievement, and treating some language disorders.

[14] conducted a study on the use of the Hill climbing strategy in teaching history to develop productive thinking skills and engagement in learning for elementary school students. The study sample consisted of two groups, one is an experimental with 40 students, and the other is a control with the same number of students. The research used the descriptive-analytical methodology in surveying previous studies and presenting the theoretical framework, as well as in preparing research tools. The experimental method was used to conduct the current experiment, The measurement tools were prepared, namely the productive thinking skills test and the learning errors scale. The research tools were applied preliminarily to both the experimental and control groups. The topics of the prepared unit were taught according to the hill climbing strategy, and then the two tools were re-applied to both the experimental and control groups post-instruction. The study concluded that the Hill climbing strategy is highly effective in developing productive thinking skills and engagement in learning for the students of the experimental group. The study recommended the importance of using the Hill climbing strategy in teaching history in other educational stages.

[1] aimed at investigating the effectiveness of using the Hill climbing strategy supported by enrichment activities in teaching science to develop problem-solving skills among gifted elementary school students. The research sample consisted of eight fourth-grade students, and a quasi-experimental method was used to determine the level and development of problem-solving skills among gifted students. After conducting pre- and post-tests on both the experimental and control groups, the research found that the Hill climbing strategy was more effective than the traditional control group in developing problem-solving skills among the research group of students.

[7] conducted a study aimed at determining the effect of using the Hill climbing strategy in teaching the Islamic Jurisprudence unit on the academic achievement of 10th-grade students in the Education Directorate of Al-Mafraq Governorate. The study sample consisted of 44 students, divided into two groups: an experimental group of 22 students who used the Hill climbing strategy, and a control group of 22 students who used traditional methods. To assess the impact of the Hill climbing strategy on academic achievement, a test was prepared to measure the degree of student achievement in the Islamic Jurisprudence unit. The study found statistically significant differences between the two groups in the degree of student achievement, in favor of the experimental group that learned using the Hill climbing strategy. The study recommended the importance of employing the Hill climbing strategy in teaching Islamic education subjects and training teachers on its principles and procedures, as well as incorporating educational topics taught using the Hill climbing strategy into Islamic education curricula.

[2] conducted a study on the impact of using the Hill climbing strategy. The study concluded the importance of using the Hill climbing strategy supported by enrichment activities in improving the reading performance of gifted students with learning difficulties.

[15] conducted a study on the importance of using the Hill climbing strategy in teaching gifted students. The study recommended the use of the Hill climbing strategy supported by enrichment activities in teaching reading skills to gifted students with learning difficulties. This strategy involves a set of teaching procedures based on constructive meaning, which helps develop students' inference and deduction skills, as well as their higher-order thinking skills.

After reviewing previous studies and comparing them with the current study, the research showed that the Hill climbing strategy outperformed the traditional method. These results were consistent with the results of previous studies such as [1], [2], [13], and [14]. Most previous studies addressed various branches of knowledge but did not address branches of Islamic education except for only one study, which was [7]. It addressed the branch of jurisprudence, while the current study addressed the branch of the Prophetic Biography and its teaching methods. Previous studies were

conducted on school students, while the current study was conducted on students of the Faculty of Education at Al-Hussein Bin Talal University. This study aims to investigate the impact of using the Hill climbing strategy on the academic achievement of university students compared to the traditional teaching method.

The studies reviewed consistently highlight the superiority of the Hill Climbing strategy over traditional teaching methods in enhancing student achievement. For instance, [7] demonstrated significant improvements in academic performance among 10th-grade students learning Islamic Jurisprudence, while [2] and [15] focused on its efficacy in improving reading skills for gifted students with learning difficulties. Unlike these studies, which primarily focused on school students and various disciplines, the current research explores the application of this strategy within the Prophetic Biography for university students, further validating its broader pedagogical impact across different educational levels and subjects.

3. Study Methodology and Procedures

3.1 Study Method

The researchers used the experimental method to determine the effect of using the Hill climbing strategy on the academic achievement of the students at the College of Education, Al-Hussein Bin Talal University in the subject of the Prophetic Biography and its teaching methods. Two groups were selected, one control group consisting of students who studied the subject of Prophetic Biography in the traditional way, and the second experimental group consisting of students who studied the subject using the Hill climbing strategy.

3.2 Study Sample and Community

The Faculty of Educational Sciences at Al-Hussein Bin Talal University comprises three departments: Curriculum and Instruction, Special Education, and Requirements Department. Since the researchers themselves teach the subject of the (Prophetic Biography and its teaching methods) in the Curriculum and Instruction Department, this department was deliberately chosen to apply the study on a purposive sample consisting of 80 students from the Curriculum and Instruction Department, which includes a total of 458 students in the academic year 2021-2022. Table (1) shows the study sample.

Table 1: The study sample in terms of the subject section and the number of students.

Group	Section number	Number of students
Control	1	40
Experimental	2	40
Total	80	

3.3 Study tool

To achieve the aim of the study and its hypotheses, the researchers prepared an achievement test to measure the achievement level of the students in the experimental and control groups. The researchers prepared the test according to the following steps:

1. Determining the scientific material: The researchers have previously determined the material subject to the experiment, which is five topics chosen from the main textbook and reference for this course (Al-Wajeez fi Al-Sirah Al-Nabawiyya) by the author [11]
2. Determining the objective of the test: The achievement test aims to measure the level of cognitive achievement of the students in the subject matter under study, which was

mentioned previously.

3. Choosing the type of questions in the test: The achievement test included 15 multiple-choice questions. This type of test is one of the best and most important tests due to the ability to formulate it in different ways and use it to measure various aspects such as students' ability to acquire knowledge and information, comprehension, discrimination, comparison, decision-making, and issuing the correct judgment. Also, this type of test is very suitable for university students and for the current study nature.

4. Writing test items: The test items were written according to the behavioral objectives of each topic, by giving four randomly arranged alternatives for each question, with one correct alternative among the four alternatives for each question.

5. Distributing test grades: The researchers ensured the objectivity of the test correction by assigning two marks for each correct answer and zero for the wrong answer, and thus the total mark is 30 marks distributed equally on the achievement test items.

6. Test validity: To ensure the test validity, the researchers presented it to a number of experts in the fields of measurement and assessment, Islamic education curriculum and teaching methods, and educational psychology, in order to get their opinions on the clarity and accuracy of the test questions, in terms of vocabulary, content, and their suitability for the level of students and the outcomes to be measured. Some of the test items were modified based on the feedback and guidance of the expert reviewers.

7. Test reliability: The test reliability was ensured by calculating the reliability coefficient using the test-retest method. The test was applied to a random sample of 30 students, and after a two-week interval, it was applied to the same sample again. Test reliability was confirmed by using the Pearson correlation coefficient between the two applications, which was 0.86. This percentage indicates a high level of reliability and is suitable for the purposes of this study and is educationally acceptable and reliable. The coefficient ranged from 0.37 to 0.78, which is also educationally acceptable and reliable.

3.4 Study Implementation Procedures

1. Selecting five topics from the book (Al-Wajeez Fi Al-Seerah Al-Nabawiyya), which is the main reference for The Prophetic Biography and its teaching methods subject in the second semester of the academic year 2021-2022, to teach them to the study sample.

2. Dividing the study groups into two groups: a control group and an experimental group.

3. Teaching the control group using traditional methods and teaching the experimental group using the Hill climbing strategy.

4. Preparing an achievement test and presenting it to a group of experienced referees for reviewing and assessment.

5. Verifying the equivalence of the two groups by conducting a pre-test and analyzing its results.

6. Application of the achievement test on the two groups.

7. Analyzing the results, discussing them, and making recommendations.

3.5 Study Variables

The study included the following variables:

1. **The independent variable:** The teaching method, which has levels (the Hill climbing strategy for the experimental group and the traditional method for the control group).

2. **The dependent variable:** The students' academic achievement in the subject of The Prophetic Biography and its teaching methods in the five topics.

- **Statistical analysis**

Arithmetic means and standard deviations were calculated to analyze the responses of the two study groups. Then, the t-test was used to show the differences between the control and experimental

groups in the pre-test and post-test, and the data were statistically processed using the statistical packages for social sciences (SPSS).

4. Results and Discussion

The aim of the study was to investigate the effect of using the Hill climbing strategy on the academic achievement of students in the subject of The Prophetic Biography and its teaching methods at the College of Education, Al-Hussein Bin Talal University. After applying the study tools, collecting, and analyzing data by teaching two groups, one using the traditional method and the other using the Hill climbing strategy, and preparing a test to measure academic achievement and ensuring the validity of the test items and their difficulty and discrimination indices and reliability coefficients; the study results are presented according to the order of its questions and hypotheses.

4.1 Study results related to the first hypothesis.

Hypothesis statement: There are no statistically significant differences at the significance level ($\alpha \leq$ 0.05) between the mean scores of the students in the achievement pre-test for the control and experimental groups.

Table 2: T-test for the comparison between the control and experimental groups in the pre-test.

Group	Number	Arithmetic means	Standard deviation	t-value	Significance level
Control	40	8.07	1.84	0.258	0.203
Experimental	40	7.84	2.74		

From Table (2), it is evident that the mean of the control group was (8.07) with a standard deviation of (1.84), while the mean of the experimental group was (7.84) with a standard deviation of (2.74). The t-value was (0.258), which is not significant at the significance level of (0.05). This means that there is no statistically significant difference between the two groups in the pre-test.

4.2 Study results related to the second hypothesis.

Hypothesis statement: There are no statistically significant differences at the significance level ($\alpha \leq$ 0.05) between the mean scores of the students in the achievement post-test for the control and experimental groups.

Table 3: T-test for the comparison between the control and experimental groups in the post-test.

Group	Number	Arithmetic means	Standard deviation	t-value	Significance level
Control	40	8.18	1.86	8.96	0.01
Experimental	40	12.19	1.80		

From Table (3), it is evident that the arithmetic mean of the control group was (8.18) with a standard deviation of (1.86), while the arithmetic mean of the experimental group was (12.19) with a standard deviation of (1.80). The t-value was (8.96), which is significant at the significance level of (0.01). This means there are statistically significant differences at the significance level (0.05) in the arithmetic means of the achievement test scores in favor of the experimental group. This implies that the use of the Hill climbing strategy in teaching the Prophetic Biography has had a significant impact on improving the academic achievement of students in this subject and its teaching methods.

To determine whether there were statistically significant differences at the significance level of (0.05) between the mean scores of students in the pre-and post-achievement test, a t-test was used to

compare the pre-test and post-test scores for the experimental and control groups. The results are shown in Table (4).

Table 4: T-test for the comparison between the pre-and post-achievement tests.

Group		Number	Arithmetic mean	Standard deviation	t-value	Significance level	Effect size
Control	Pre-test	40	8.07	1.84	1.28	0.205	-
	Post-test	40	8.18	1.86			
Experimental	Pre-test	40	7.84	2.74	7.58	0.001	1.33
	Post-test	40	12.19	1.80			

From Table (4), it is evident that the mean score of the control group increased from 8.07 to 8.18, and the t-value was 1.28, which is not statistically significant at the significance level of 0.05. This means that there were no statistically significant differences in the mean scores of the students in the pre-and post-achievement tests for the control group.

On the other hand, the mean score of the experimental group increased from 7.84 in the pre-test to 12.19 in the post-test, and the t-value was 7.58, which is statistically significant at the significance level of 0.01. This indicates that there is a statistically significant difference in the mean scores of the students in the pre-and post-achievement tests in favor of the post-test, with an effect size of 1.33.

4.3 Interpretation and Discussion of the Study Results.

The results of the study indicate the presence of statistically significant differences between the mean scores of the experimental group and the control group in the post-achievement test. Students in the experimental group who learned using the Hill climbing strategy performed better academically.

The results also suggest that the Hill climbing strategy develops thinking skills, problem-solving, understanding, dialogue, discussion, communication, research, exploration, and inquiry. Teaching in this way encourages collaboration, participation, interconnection, interaction, sequencing, comprehensiveness, motivation, and exchange of information, knowledge, and experience, which helps increase students' achievement.

The study adds that the teacher in the Hill climbing strategy helps and collaborates with students, especially when discussing questions and when implementing activities, and exchanging opinions on issues and topics. The teacher guides and monitors the learning process and intervenes when necessary. In contrast, the teacher in the traditional method is limited to the educational process, as a source of knowledge and memorization, and a conveyor and teacher of information.

The superiority of the Hill climbing strategy in increasing student achievement can be explained by the fact that it provides a learning environment that makes the student the center of the learning process and creates a climate based on freedom of expression of opinions and solutions in the presence of a democratic environment in which students learn self-confidence, responsibility, appreciation of working with other students, avoiding individualism and selfishness, and promoting social cohesion and interaction within the same group and between different groups and between groups of students and the teacher, especially as there is a disparity in the levels of individuals in the groups, which helps to increase mutual experiences among them, and led to expressing opinions and ideas freely. Also, providing immediate reinforcement, immediate feedback, and continuous evaluation practice helped increase the effectiveness of teaching, which led to an increase in the achievement of students in the subject of The Prophetic Biography and its teaching methods for those who studied using the Hill climbing strategy.

These results are consistent with the findings of previous studies, including the studies conducted by [1, 7, 13, 14], all of which concluded that the Hill climbing strategy has a positive effect on increasing academic achievement among students compared to the traditional method.

5. Study Recommendations

1. It is necessary to employ the Hill climbing strategy in teaching The Prophetic Biography and other Islamic education branches, as it has a positive impact on class interaction, coherence, and academic achievement.
2. The inclusion of the Hill climbing strategy in teaching strategies, and training Educational Sciences students on its principles, procedures, and accurate implementation.
3. Conducting more studies on using the Hill climbing strategy in teaching The Prophetic Biography and its teaching methods, and other Islamic education branches in terms of other new variables beyond academic achievements, such as thinking skills, concept acquisition, attitudes, motivation, values development, mastery of recitation and intonation, and listening, reading, and writing skills.
4. Conducting more studies aiming at comparing the Hill climbing strategy with other modern strategies to determine their impacts on academic achievement and other variables. These strategies may include the fishbone diagram, the listening triangle, mind mapping, question generation, the 5555 technique, snowball discussion, colored cups, and others.

References

Abdulradhi, A. A. (2021). The effectiveness of using the hill climbing strategy in teaching history to develop cognitive achievement, metacognitive skills, and mental alertness among first secondary grade students. *Scientific Research Journal in Education, Ain Shams University*, (22)(2), 431-461.

Abu Riyash, H. (2007). *Cognitive learning*. Dar Al-Seera for Publishing, Distribution, and Printing.

Ahmed, S. J. (2020). Employing the hill climbing strategy supported by enrichment activities in teaching science to develop problem-solving skills among gifted primary stage students. *Educational Journal, Sohag University, Faculty of Education*, (78)(1), 341-371.

Al-Hajji, A. R. A. (1999). *The prophetic biography: Its study methodology and its events overview*. Dar Ibn Kathir.

Ali, M. I. (2017). The effect of the fishbone and hill climbing strategies on acquiring and retaining historical concepts among 7th grade female students. *Alustath Journal for Human and Social Sciences, Baghdad University*, (223)(2), 225-252.

Al-Zubi, I. A. (2014). The effect of using the hill climbing strategy in teaching the unit of Islamic jurisprudence on the achievement of 10th-grade students in Al-Mafraq City. *Journal of Educational Studies, University of Jordan*, (1)(41), 347-361.

Ammar, S. M. (2021). Using the hill climbing strategy in teaching history to develop productive thinking skills and engagement in learning among elementary stage students. *Journal of the Educational Society for Social Studies, Ain Shams University*, 18(133), 223-294.

Barbakh, A. (2020). The effectiveness of employing the hill climbing strategy in developing jurisprudential concepts and reflective thinking in the unit of Islamic jurisprudence among 6th grade female students in Khan Yunis Governorate. *Academic Journal of Research and Scientific Publishing*, (17)(1).

Lerman, S. (2001). Cultural, discursive psychology: A sociocultural approach to studying the teaching and learning of mathematics. *Educational Studies in Mathematics*, 46(1/3), 87–113. http://www.jstor.org/stable/3483241

Mar'i, T., & Al-Hila, M. (2006). *General teaching methods*. Dar Al-Maseera for Publishing and Distribution.

Qabbani, M. (2008). *Al-Wajeez fi Al-Sirah Al-Nabawiyya*. Dar Wahy Al-Qalam for Publishing and Distribution.

Safin, H. T. (2021). Employing the hill climbing strategy supported by enrichment activities in teaching Arabic language and its impact on improving reading performance, comprehension, and developing creative problem-solving skills among gifted students with learning difficulties in the primary stage. *The Educational Journal of the Faculty of Education in Sohag*, 1(88), 204-263.

Shafiq, I. A. (2020). The effectiveness of the hill climbing strategy in the achievement of humanities education students at Al-Muthanna University in the curricula subject and their self-confidence. *Uruk for Humanities, Al-Muthanna University*, (1)(13), 434-456.

Swan, K., Vahey, P., van't Hooft, M., Kratcoski, A., Rafanan, K., Stanford, T., ... & Cook, D. (2013). Problem-based learning across the curriculum: Exploring the efficacy of a cross-curricular application of preparation for future learning. Interdisciplinary Journal of Problem-Based Learning, 7(1), 8.

Zaytoun, H. H. (2003). *Teaching strategies: A contemporary vision of learning and teaching methods*. Alam Al-Kutub.