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Designing an E-Learning Environment to Develop Critical Historical Thinking Skills among secondary school students

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Abstract
The aim of the current research was to develop historical critical thinking skills among first-year secondary school students through the use of an e-learning environment. To achieve this goal, the research tools were prepared, including a test for historical critical thinking skills, the design of a selected unit in an e-learning environment, and a teacher's guide for teaching the unit. These tools were applied to a sample of 60 first-year secondary school students, who were divided into two groups: a control group and an experimental group, at Abdullah Yassin Hamad Secondary School, affiliated with the Talla Education Directorate. The results showed a statistically significant difference between the mean scores of the experimental and control groups in the post-test for historical critical thinking skills, in favor of the experimental group. Based on these results, a set of recommendations and suggestions was presented, the most important of which was to emphasize the importance of using e-learning environments in teaching history and working on developing historical critical thinking skills among students at different educational stages by utilizing e-learning environments that support this development.

Keywords: *E-Learning Environment – Historical Critical Thinking Skills*

Introduction

The History is an important subject and a fertile field of information and historical events that require interpretation, analysis, and critique. This encourages students to explore the past, understand the present, and imagine the future. History is no longer merely a field where students enjoy reading its events and stories, but it also develops their thinking skills and challenges their minds with the historical events and issues they confront.

Historical thinking and critique are powerful cognitive processes that aim to provide a comprehensive understanding of the past based on evidence, respect for differing viewpoints, and an awareness of historical changes. These processes emphasize that the relationship between cause and effect is not always clear and that much historical evidence may not be trustworthy (Gorzycki & Elder, 2011, 15).

Historical thinking involves a range of skills that students acquire and apply when studying historical events. These skills enable them to understand the chronological sequence of events and interpret them consciously by relying on research methods and historical critique. This helps them analyze and interpret sources, identify logical analyses and explanations, and issue judgments based on evidence. These skills include recognizing the relationships between different historical periods, identifying the causes behind historical events, connecting causes with effects, and distinguishing between different viewpoints (Sherin Abdel Hadi, 2008, 27).

The definitions of historical critical thinking skills have varied due to their use across different teaching contexts. According to Magdy Ibrahim (2005, 396), these are the

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cognitive processes and strategies used by individuals to make judgments, decisions, and interpretations of what they observe in various situations.

Dafermos (2016, 34) defines historical critical thinking as an analytical awareness of historical cognitive frameworks and their connections to personal, collective, and social practices among history students.

Middleton (2017, 1) defines it as the kind of reflection that focuses on the individual to help develop both liberatory and transformative practices as seen in critical social theory. Self-knowledge is a fundamental condition for critical reflection, enabling individuals to understand knowledge and existence, become aware of their interactions with others, and thus grow personally and assist others in their growth.

Heba Allam (2021, 2300) defines it as a set of higher cognitive abilities that help students reach a stage of liberatory awareness of history, enabling them to acquire awareness of their historical self and achieve liberating meanings and diverse perspectives on historical events.

For the purposes of this study, **historical critical thinking skills** are defined as the ability of secondary school students to examine historical content, verify its credibility, identify the historical issues involved, understand the chronological order of events, perceive relationships between them, and issue judgments based on evidence and data.

As a subject, history depends on critique and investigation, involving analysis and reasoning. It relies primarily on primary sources that allow students to research, inquire, and question in order to reach historical truths supported by arguments and evidence. Thus, students need to acquire research and historical critique skills that allow them to effectively study history (Ahmad al-Luqani & Ali al-Jamal, 1996, 188 ; Wuryani, E., sunardi, S., & Nugroho, L. 2023).

Historical critical thinking skills are among the essential goals that students should acquire as they enable them to approach historical content scientifically and with awareness. These skills help students understand the causes of historical issues, phenomena, and events, interpret them, and understand their interconnections and relevance to the present. They also assist in explaining historical phenomena and events.

One of the key factors that help students engage with history is developing positive attitudes toward the subject. Research has shown that the more engaged students are with history, the more they understand its relevance and significance. Teaching history effectively can help students develop desired attitudes and interests, such as a love for the subject, appreciation for historical figures, and respect for others (Arwa Abdulaziz, 2015, 6).

History curricula serve as an essential domain for teaching various skills and values, as they encompass relationships, stories, heroism, wars, and the connections to society, focusing on social relationships. Since history is centered on life, it is one of the most important subjects through which new skills, driven by technological advancements, can be developed. These skills are essential in adapting education systems to modern educational demands (Partnership for 21st Century Skills, 2009).

E-learning technologies, including computers, the internet, and multimedia tools, have proven to be effective in providing dynamic educational environments that foster creativity, interactivity, and skill development (Lynch, 2002).

The teacher's role has shifted towards creating opportunities for students to participate actively in the learning process, promote independent learning, and focus on developing research, critique, communication, and decision-making skills. The teacher now plays a crucial role in integrating students into both curricular and extracurricular activities that nurture their talents and enhance their capabilities, which in turn provides students with opportunities to learn how to use technological tools in the learning process (Ibrahim Al-Far, 2012, 685).

However, despite the important role of history curricula in shaping societal thoughts and directions, teaching methods still rely heavily on lecture-based delivery of factual information, which often fails to engage students. Students tend to memorize and forget information quickly once the academic year ends (Ali Maabad, 2007, 95).

The challenges in teaching history lie in the abundance of theoretical facts and information within curricula, which requires effective teaching and learning methods that can bring them to life and avoid the stagnation that often characterizes traditional approaches (Atef Badawi, 2014, 128); Alzahrani, S. 2024 ;p5).

Therefore, attention has been directed toward using more effective methods that match the digital age, encouraging student engagement and activity. E-learning, particularly with the advent of Web 2.0 tools, has become a preferred approach to facilitate knowledge exchange and promote interaction. It allows students to collaborate, create documents, and conduct real-time interactions (Mawra Al-Kafrawi, 2017, 4 ; ibrahem, K., & Fayed, S. 2024;p3).

Hence, the researcher has decided to use an e-learning environment to develop historical critical thinking skills among secondary school students.

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Definitions of e-learning environments are diverse, with some of the most relevant definitions being:

- **E-learning environments** are those that transform textual content into interactive electronic activities where students are active participants who research and analyze information (Isa Shah, 2017, 10 ; Al-Sabbagh, A. 2023p;7).
- They are computer- or network-based learning environments that facilitate learning by interacting with various e-learning resources. These environments use technologies and tools to deliver and manage educational content and processes either synchronously or asynchronously, aiming to achieve specific educational objectives (Mohamed Khamis, 2018, 10 ; Ezz Elarab, H., & Maddy, M. 2021.).
- E-learning environments are creative ways of presenting an interactive learner-centered environment, designed to be accessible from anywhere, at any time, using internet and digital technologies, in accordance with principles of open, flexible, and distributed learning design (Asmaa Hussein, 2021, 261).
- E-learning refers to a set of educational tools and media aimed at serving both students and teachers, enhancing the learning process through online course delivery and utilizing the internet's features to deliver curricula in a variety of ways (Huda Mahmoud, 2023, 13).

The researcher defines e-learning environments operationally as a set of teaching methods that center on secondary school students and rely on the internet to teach historical topics in order to develop citizenship and historical critical thinking skills, thus ensuring maximum individual success for each student.

Characteristics of E-learning Environments:

- **Interactivity**: Two-way interaction between the teacher and student, or between students, or between students and content.
- **Integration**: All components of the e-learning environment work together to achieve the learning goals.
- **Freedom of Learning**: Students can choose the time and place of learning that suits them.
- **Diversity**: Use of multiple interaction tools (texts, images, videos).
- **Flexibility**: Learning is not constrained by time or place.
- **Privacy**: Each student learns individually, fostering a sense of self-worth.
- **Organization**: The presence of applications and tools that help organize and facilitate the learning process (Reham Al-Ghoul, 2015, 28).

History, as a branch of social studies, deals with the study of events, interactions, and relationships between humans and the environment. It plays a vital role in developing students' thinking abilities, as it relies on critique, comparison, and the search for information and results, and it fosters critical thinking through evidence-based judgments. This helps develop students' self-confidence and their ability to think critically and analytically about historical matters.

Several studies have recommended the use of electronic programs in education, including:

- **Saber Al-Sharqawi's Study (2016)**, which suggested an electronic program to assess the performance of students with intellectual disabilities, emphasizing its role in identifying strengths and weaknesses.
- **Saad Mahmoud's Study (2019)**, which recommended the use of a multimedia e-program to enhance history learning, fostering students' conceptual understanding of historical facts.
- **Mona Abdel Wahab & Nora Ali's Study (2019)**, highlighting the effectiveness of an e-program in improving environmental awareness among students with intellectual disabilities.
- **Hanin Al-Mutrefi's Study (2020)**, which focused on the use of e-learning in improving teaching skills in mathematics.
- **Abeer Mansi's Study (2021)**, which showed the benefits of e-learning in enhancing health education for kindergarten children.
- **Amira Al-Saeed's Study (2021)**, which examined the role of e-learning in enhancing skills in mind map production among university students.
- **Sultan Al-Mutairi's Study (2022)**, which emphasized the role of e-learning in increasing motivation and academic achievement among university students.
- **Amira Al-Sharqawi's Study (2023):** This study aimed to explore the effectiveness of **divergent thinking strategies** through an **e-learning platform** in developing political awareness among middle school students, particularly through the teaching unit on "Good Citizenship"

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in social studies curricula. The research recommended a revision of the social studies curriculum (particularly history) to incorporate political concepts and issues, thereby enhancing political awareness among middle school students.

From the previous studies, it is clear that **e-learning environments** play a vital role in introducing elements of engagement and novelty, reaching a larger number of learners in a shorter time and with lower costs. They also help develop relevant skills by linking educational situations to students' real-life experiences, allowing them to live the educational experience in its authentic context.

Research Problem and Its Questions:

The problem is identified in the **weakness of high school students in historical critical reflection skills**. The problem can be formulated in the following main question:

How can historical critical reflection skills be developed among high school students through the design of an e-learning environment?

This main question gives rise to the following sub-questions:

1. What is the effectiveness of using an e-learning environment to develop overall historical critical reflection skills among high school students?
2. What is the effectiveness of using an e-learning environment to develop each specific historical critical reflection skill among high school students?
3. What historical critical reflection skills should be developed among high school students?

Hypotheses:

In light of the research problem and the findings of previous studies, the hypotheses can be formulated as follows:

1. There is no statistically significant difference at the level of $(0.05 \geq \alpha)$ between the mean scores of the experimental group and the control group in the post-test of overall historical critical reflection skills.
2. There are no statistically significant differences at the level of $(0.05 \geq \alpha)$ between the mean scores of the experimental group and the control group in the post-test of each specific historical critical reflection skill.

Objectives:

The study aims to:

1. **Prepare a list of historical critical reflection skills** that need to be developed among high school students.
2. **Prepare a list of citizenship values** that need to be developed among high school students.
3. **Examine the impact of designing an e-learning environment** on developing historical critical reflection skills and citizenship among high school students.

Significance of the Research:

The results of this research are expected to benefit the following:

1. **Students:** The study will engage students' interest in studying history through an e-learning environment, providing them with the opportunity to perform cognitive tasks that promote critical thinking, making them active participants in the learning process. This will transform teaching into a collaborative and interactive process between the teacher and students, as well as among the students themselves.
2. **Teachers:** The research will offer teachers a guide on how to design historical topics using e-learning strategies. It will help them prepare lessons and teaching strategies tailored to each student, with a focus on developing historical critical reflection skills that are difficult to cultivate using traditional methods.
3. **Curriculum Planners:** The research highlights the importance of integrating **e-learning environments**, **historical critical reflection skills**, and **citizenship values** into history curricula during the curriculum development process.
4. **Researchers:** The tools used in this research can be applied in various educational stages. The findings can serve as a valuable resource for researchers, offering insights for proposing new studies that could be implemented in the field.

Design of the E-Learning Environment

Research Methodology:

This study utilizes both **descriptive** and **quasi-experimental** research methods. The researcher selected a sample of first-year high school students, divided into two groups (experimental and control). The following diagram illustrates the quasi-experimental design of the study:

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The researcher adopted a **pre-test/post-test design** for the two groups, one experimental and the other control, as shown in the following diagram:

Sample Group	Pre-test Measurement	Treatment	Post-test Measurement
Experimental Group	Historical Critical Reflection Skills Test	The unit is taught using the e-learning environment	Historical Critical Reflection Skills Test
Control Group		The unit is taught using traditional methods	

Figure 1: Quasi-Experimental Design of the Study

Procedures:

A: Preparation of a List of Historical Research Skills Required for First-Year High School Students

This was achieved by following the steps outlined below:

1. **Defining the Purpose of the List:**

The purpose of this list is to identify key **historical critical reflection skills** that should be developed among first-year high school students.

2. **Determining the Sources for Deriving the List:**

The **historical critical reflection skills** required for first-year high school students were derived by referencing the following sources:

- A theoretical study of historical critical reflection skills, including their nature, importance, levels, and specific skills, based on literature, research, and previous studies that addressed these skills in the field of social studies in general and history in particular. Notable studies include:
  - Marwa Al-Kafrawi (2017)
  - Mohamed El-Sayed (2020)
  - Ahmed Qassem (2021)
  - Heba Allam (2021)
  - Mansouria Kadour (2021)
- The objectives and nature of history as a subject.
- The developmental characteristics of high school students.

Preparation of the Initial Version of the List:

4. **Refining the List and Presenting It in Its Initial Form:**

The list includes five main skills, as follows:

- **Skill in using historical evidence to acquire knowledge**, which includes 4 sub-skills.
- **Skill in historical analysis and interpretation**, which includes 6 sub-skills.
- **Skill in critiquing historical events**, which includes 4 sub-skills.
- **Skill in making judgments and decisions**, which includes 5 sub-skills.
- **Skill in historical and chronological sequencing**, which includes 3 sub-skills.

B: Revising the Experimental Unit (Greek and Roman Civilizations) According to E-Learning Environment Instruction:

The unit was restructured for teaching through the e-learning environment and can be accessed through the following link: https://ddpru.tanta.edu.eg/course/view.php?id=26

C: Preparing the Teacher's Guide for Using the E-Learning Environment for the Selected Unit:

After extensive review of the literature and previous studies, the researcher developed this guide to be used as a reference when applying the e-learning environment in teaching. The guide includes the following components:

- **Introduction to the Guide.**
- **Objective of the Guide.**
- **Lessons Included in the Unit**, with each lesson containing the following:
  - Instructions for studying the content.
  - The specific objectives for each lesson.
  - A description of the lesson, including the topics and subjects covered.
  - The tools and resources used.
  - Educational activities.
  - Assessment.

Guide Adjustment:

The researcher presented the **teacher's guide** to a group of reviewers in order to receive feedback on the following points:

- The appropriateness of the guide for the research objectives.
- The accuracy of the operational objectives for each lesson in the unit.
- The correctness of teaching procedures to achieve the goals of each lesson.
- The suitability of the language formulation.
- Suggestions for deletion, modification, or addition.

Based on the reviewers' feedback, the guide was revised through the addition, deletion, and modification of certain sections, making it suitable for final implementation.

D: Developing the Historical Critical Thinking Skills Test:

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The **historical critical thinking skills test** was developed following these steps:

1. **Determining the objective of the test**: The objective of the test is to **measure some of the historical critical thinking skills** of first-year secondary students in history for the second unit.
2. **Defining the content measured by the test**: The test includes the topics covered in the **Greek and Roman Civilizations** unit, specifically:
   - **Greek Civilization "Hellenistic"**: The pioneer of Western thought and culture.
   - **Egypt under the rule of the Ptolemies.**
   - **Roman Civilization.**
   - **Egypt under Roman rule.**
3. **Test boundaries**: The test focuses on the five chosen **main historical critical thinking skills**, which are:
   - Skill of using historical evidence to acquire knowledge.
   - Skill of historical analysis and interpretation.
   - Skill of critically evaluating historical events.
   - Skill of making judgments and decisions.
   - Skill of chronological and historical sequencing.

Each main skill contains several associated sub-skills.

4. **Formulating test items**: To create the test items, the researcher referred to studies that dealt with the development of tests for historical critical thinking skills, such as:
   - **Mervat Al-Kafrawy's study (2017)**.
   - **Mohamed El-Sayed's study (2020)**.
   - **Ahmed Qassem's study (2021)**.
   - **Heba Allam's study (2021)**.

The total number of test items is **45**. The questions are primarily **essay-type**, as they are more suitable for assessing learning outcomes.

5. **Developing the test specifications table**: The **test specifications table** includes the skills being measured, the number of questions assessing each skill, their respective numbers, and the relative weight of each skill, as shown in the following table:

Specifications Table for the Historical Critical Thinking Skills Test

Skills	Question Numbers	Number of Questions	Relative Weight
Using Historical Evidence to Acquire Knowledge	30, 34, 33, 9, 21, 3, 22, 17	8	18%
Historical Analysis and Interpretation	18, 27, 42, 45, 44, 40, 39, 28, 8, 4, 12, 23, 14, 5, 25	15	33%
Criticizing Historical Events	32, 37, 10, 1, 28, 19, 43	7	15%
Making Judgments and Decisions	16, 29, 31, 24, 20, 13, 2, 15, 7, 6, 26, 11	12	27%
Chronological and Historical Sequencing	36, 35, 41	3	7%
Total		45	**100%**

Formulating the Test Instructions:

The researcher formulated a set of instructions for the students, aimed at clarifying the nature of the test and how to answer it. These instructions were designed to be clear, accurate, and easy to understand, ensuring that the students could follow them easily and perform the required tasks without confusion. The test instructions were designed to clarify the following:

- The purpose of the test.
- The number of questions the students are required to answer.
- Carefully reading the questions, instructions, and illustrative examples.
- The questions are of the essay type, and the test consists of 45 items.
- The time required to answer the test.

- Test Adjustment:

The initial version of the test was presented to a group of experts in curricula and teaching methods, and it was revised based on their feedback and suggestions to ensure the following:

- The appropriateness of the language used for the sample students.
- The suitability of the test for measuring its intended objectives.
- The relevance of the test items to the selected critical historical thinking skills.
- The addition or removal of items as deemed necessary.

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Based on their consensus and suggestions, the test was modified, and the items that were agreed upon for deletion or revision were adjusted accordingly.

7- **Pilot Test for the Exam:**

After finalizing the test, it was administered to a pilot sample that was different from the main study sample. This sample consisted of 30 students from the first-year secondary class at Abdullah Yaseen Hamad Secondary School in the Monufia Governorate, during the first semester of the academic year 2023-2024. This pilot sample was similar to the study sample in terms of age, social, and economic status. However, the students in the pilot sample were not included in the main study sample. The researcher administered the test to this sample for the purpose of determining the following using appropriate statistical methods:

- Calculating the reliability of the test.
- Calculating the necessary validity coefficient for the test.
- Determining the duration required for the test.

A- Validity of the Test:

Validity refers to whether the test measures what it is intended to measure.

To ensure the validity of the Critical Historical Thinking Skills test, the researcher followed this procedure:

- **Apparent Validity (Judgmental Validity):** The researcher presented the initial version of the test to a group of expert reviewers specialized in curricula and teaching methods. The experts were asked to provide their feedback and suggestions to finalize the test. Their review focused on the following aspects:
  - The suitability of the test for application to first-year secondary students.
  - The accuracy of the language and the scientific and historical formulation of the test questions.
  - The appropriateness of the questions in relation to the primary and sub-skills they were designed to assess.
  - The clarity and correctness of the test instructions.
  - Suggestions for revisions, including deletions or additions, as needed.

Based on their feedback and consensus, the necessary changes were made, and the final version of the test was prepared.

Additionally, the test was uploaded to the following link for further reference: https://ddpru.tanta.edu.eg/course/view.php?id=26

Reliability of the Test:

Reliability refers to whether the test provides consistent results when administered to the same sample on two separate occasions. The researcher calculated the reliability coefficient as follows:

- **Cronbach's Alpha Method:** The reliability coefficient, **Cronbach's Alpha**, was calculated using the SPSS software. This method allows the calculation of the discriminative power of each item in the test. Items with a weak or negative discriminative power are removed to improve the overall reliability. The following table illustrates this process:

Table (2): Cronbach's Alpha Coefficients for Critical Historical Reflection Skills

No.	Skill	Cronbach's Alpha
1	Skill of Using Historical Evidence for Knowledge Acquisition	0.64
2	Skill of Historical Analysis and Interpretation	0.63
3	Skill of Critiquing Historical Events	0.72
4	Skill of Judgment and Decision-Making	0.59
5	Skill of Chronological and Historical Sequencing	0.58
6	Overall Test Reliability	0.68

Cronbach's Alpha coefficient was calculated to be 0.68, which is a good reliability coefficient, indicating the test's stability and providing confidence in its results, applicability, and validity for the study.

Internal Consistency Validity Calculation:

The construct validity of the test was measured by calculating the following:

- The internal consistency coefficient between the score of each item within a subskill and the total score of that specific subskill.
- The internal consistency coefficient between the score of each subskill and the overall test score.

This is demonstrated in the following table:

Table (3): Correlation Coefficients Between Each Item of the Historical Critical Thinking Skills Test and the Overall Skill Score

No.	Skill	Correlation Coefficient	Significance at 0.05 Level
1	Skill of Using Historical Evidence to Acquire Knowledge	0.57	Significant

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No.	Skill	Correlation Coefficient	Significance at 0.05 Level
2	Skill of Historical Analysis and Interpretation	0.68	Significant
3	Skill of Critiquing Historical Events	0.59	Significant
4	Skill of Making Judgments and Decision-Making	0.55	Significant
5	Skill of Chronological and Historical Sequencing	0.57	Significant

The above correlation coefficients are considered acceptable internal consistency coefficients and are statistically significant.

Thus, the researcher has ensured the validity and reliability of the test items, confirming that the test is suitable for application to the main study sample.

Second: Verifying the Equivalence of the Study Samples

1. To ensure the equivalence of the two study groups concerning the variable of historical critical thinking skills among high school students, the Historical Critical Thinking Skills Test was administered directly to the students of both the experimental and control groups before using the proposed e-learning environment.

The mean, standard deviation, and the "t" value were calculated after confirming the prerequisites for using the "t-test," as shown in Table (3):

Table (4):The "t" Value and Its Statistical Significance for the Difference Between the Mean Scores of Students in the Experimental and Control Groups on the Pre-Application of the Historical Critical Thinking Skills Test

Group	Sample Size	Mean	Standard Deviation	Degrees of Freedom	Significance Level	"t" Value	Significance at 0.05
Control (Post)	30	7.2	3.47	58	0.909	0.115	Not statistically significant
Experimental (Post)	30	7.3	3.24				

The results in Table (4) indicate that the experimental and control groups are equivalent in historical critical thinking skills. The calculated "t" value is not statistically significant at a degree of freedom (58) and a significance level of (0.05).

8- Test Scoring Method:

The scores were determined based on the outcomes to be measured. The test consisted of 45 questions, with each correct answer assigned "1 point" and each incorrect answer assigned "0 points," resulting in a total test score of 45. The test was uploaded and corrected electronically. Once the student completed the test, the results were generated in a report containing their name, completion time, duration, score, and a statistical description of the number and percentage of correct and incorrect answers.

9- Determining the Test Duration:

The appropriate time for completing the test was calculated by recording the time taken by the first student (75 minutes) and the last student (85 minutes). The average of these times was then calculated to determine the required time for answering the test questions using the following formula:

Test Time=Time for the First Student+Time for the Last S tudent2=75+852=80 minutes\text{Test Time} = \frac{\text{Time for the First Student} + \text{Time for the Last Student}}{2} = \frac{75 + 85}{2} = 80 \text{ minutes}Test Time=2Time for the First Student+Time for the Last Student=275+85=80 minutes

Adding 5 minutes for reading the test instructions:

Total Test Time=85 minutes\text{Total Test Time} = 85 \text{ minutes}Total Test Time=85 minutes

10- Final Version:

After ensuring the validity and reliability of the test and following the aforementioned procedures, the test was finalized and became ready for application to the main study sample.

Findings:

First: Results Related to the First Hypothesis:

To examine the results regarding the performance of high school students in the study group on the Historical Critical Thinking Skills Test as a whole, the research sought to answer the following question:

"What is the effectiveness of using the proposed e-learning environment in developing overall historical critical thinking skills among high school students?"

To compare the performance of the experimental and control groups on the post-application of the Historical Critical Thinking Skills Test as a whole, after the experimental group used the proposed e-learning

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environment, the researcher calculated the "t" value and its statistical significance for the differences between the mean scores of the experimental and control groups on the post-test as a whole.

Table (5) provides a summary of these results.

Table (5): The "t" Value and Its Statistical Significance for the Difference Between the Mean Scores of the Experimental and Control Groups on the Post-Application of the Historical Critical Thinking Skills Test as a Whole

Group	Sample Size	Mean	Standard Deviation	Degrees of Freedom	Significance Level	"t" Value	Significance at 0.05
Control (Post)	30	8.40	3.7	58	0.0001	25.05	Statistically significant
Experimental (Post)	30	39.3	5.7				

Results Summary:

The results in **Table (5)** indicate that the difference between the mean scores of the experimental and control groups on the post-application of the Historical Critical Thinking Skills Test as a whole is statistically significant at the 0.05 level, in favor of the experimental group. The calculated "t" value (25.05) is statistically significant at this level.

Consequently, the null hypothesis stating, *"There is no statistically significant difference at the level of ($\alpha \leq 0.05$) between the mean scores of the experimental and control groups on the post-application of the Historical Critical Thinking Skills Test as a whole,"* was rejected.

The findings demonstrate that the independent variable (the proposed e-learning environment) has a statistically significant impact on the dependent variable (historical critical thinking skills as a whole). However, this does not indicate the size or degree of the relationship between the two variables. To determine the strength of the relationship, the **effect size (d)** was calculated to be **6.58**, which is greater than **0.8**, indicating a strong effect of the independent variable (proposed e-learning environment) on the dependent variable (historical critical thinking skills as a whole).

This confirms the practical effectiveness of the proposed e-learning environment.

Second: Presentation of Results Related to the Performance of High School Students in the Study Group on the Historical Critical Reflection Skills Test for Each Skill Separately:

To determine the extent of improvement in high school students' performance on historical critical reflection skills, the study posed the following question:

"What is the effectiveness of using the proposed e-learning environment in developing historical critical reflection skills for each skill separately among high school students?"

To compare the performance of the experimental and control groups in the post-application of the historical critical reflection skills test after implementing the proposed e-learning environment with the experimental group, the researcher calculated the "T" value and its statistical significance for the differences between the mean scores of students in both groups on the post-application of the test for each skill separately.

Table (6)

The "T" value and its statistical significance for the difference between the mean scores of the experimental and control group students on the post-application of the historical critical reflection skills test for each skill separately.

Skill	Group	Sample Size	Mean	Standard Deviation	Degrees of Freedom	Significance Level (p)	T-Value	Statistical Significance (0.05)
Using historical evidence for knowledge acquisition	Control (Post-Test)	30	2.03	1.50	58	0.0001	4.95	Statistically Significant
	Experimental (Post-Test)	30	9.50	7.00				
Historical analysis and interpretation	Control (Post-Test)	30	2.50	1.16	58	0.0001	18.68	Statistically Significant
	Experimental (Post-Test)	30	12.70	2.73				

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Skill	Group	Sample Size	Mean	Standard Deviation	Degrees of Freedom	Significance Level (p)	T-Value	Statistical Significance (0.05)
Critiquing historical events	Control (Post-Test)	30	1.67	1.18	58	0.0001	19.13	Statistically Significant
	Experimental (Post-Test)	30	6.43	0.68				
Judgment and decision-making skills	Control (Post-Test)	30	1.73	1.05	58	0.0001	23.56	Statistically Significant
	Experimental (Post-Test)	30	10.53	1.763				
Chronological and historical sequencing	Control (Post-Test)	30	0.50	0.63	58	0.0001	15.40	Statistically Significant
	Experimental (Post-Test)	30	2.70	0.47				

The results of Table (6) indicate that the differences between the mean scores of students in the experimental and control groups on the post-application of the historical critical reflection skills test for each skill separately are statistically significant at the (0.05) level, in favor of the experimental group across all skills. The calculated T-values were statistically significant at the (0.05) level for each skill individually.

Accordingly, the second null hypothesis of the study, which states that *"There are no statistically significant differences at the level of ($\alpha \leq 0.05$) between the mean scores of the experimental and control groups in the post-application of the historical critical reflection skills test for each skill separately,"* was rejected.

Findings:

The results of the study demonstrated that the redesigned unit, based on the use of the e-learning environment, had a positive impact on developing historical critical thinking skills among first-year secondary school students. This confirms the acceptance of the research hypotheses, which state:

1. There is a statistically significant difference at the 0.05 level between the mean scores of the experimental and control groups on the Historical Critical Thinking Skills Test as a whole and its subskills, in favor of the experimental group.
2. There is a statistically significant difference at the 0.05 level between the mean scores of the experimental group in the pre-test and post-test of the Historical Critical Thinking Skills Test, in favor of the post-test.

Recommendations:

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

1- **Utilizing E-learning Environments:** Leverage e-learning environments and integrate them into the educational process, while raising awareness among educational institutions and organizations about their importance across different educational stages and curricula.

2- **Developing Social Studies Curricula:** Emphasize the need to develop social studies curricula in general, and history courses in particular, to align with e-learning environments and modern technological advancements, ensuring relevance to contemporary developments.

3- **Implementing Modern Teaching Methods:** Adopt innovative teaching methods and strategies aimed at fostering historical critical thinking skills. These approaches should emphasize active student participation and engagement in the learning process, thus enhancing their inclination towards learning through digital learning applications.

4- **Fostering Critical Thinking Skills:** Focus on cultivating various critical thinking skills through the use of technological educational environments.

Proposed Studies and Research:

1. **Comparative Studies on the Effectiveness of E-learning Environments:** Compare the effectiveness of e-learning

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environments in developing other variables such as historical imagination, creative thinking, divergent thinking, and emotional intelligence among secondary school students.

2. **Designing Enhanced and Virtual E-learning Platforms:**
   Develop enriched and virtual e-learning environments and platforms for teaching history, aimed at fostering historical reflection skills among secondary school students.
3. **Proposed Training Program for History Teachers:**
   Design a training program for history teachers focused on utilizing e-learning environments in history teaching to enhance their instructional methods.
4. **Studies on the Effectiveness of E-learning Environments:**
   Conduct research to explore the effectiveness of e-learning environments in teaching various curricula across different educational stages.

Ethical Approval Declaration

"All procedures involving human participants in this study were conducted in accordance with the ethical standards set by applicable research guidelines and the principles of the 1964 Declaration of Helsinki and its subsequent amendments. Ethical approval was secured before the commencement of data collection."

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The datasets generated and analysed during the current study will be available from the author upon reasonable request.

Consent for publication:-

I hereby provide consent for the publication of the manuscript detailed above.

Competing interests:-

The authors declare no competing interests.

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