

The Effect of Teaching with Electronic Portfolios in Developing the Historical Thinking Skills and Spatial Ability of Tenth-Grade Students in the Subject of History

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Abstract

This paper aims to investigate the effect of teaching with electronic portfolios on the development of historical thinking skills and spatial ability of tenth-grade students in the subject of history. The researchers prepared two tools for collecting data: the historical thinking skills test, which consisted of 36 items, and the spatial ability test, which consisted of 20 items, whose validity and reliability were verified. The study sample consisted of 59 students from the tenth-grade students in the Zarqasecond Directorate of Education during the first semester of the academic years 2016/2017. The sample was divided into two groups, the experimental group, with 29 students who studied the unit of (Ottoman Empire) using an electronic portfolio, and the control group which contained 30 students who studied the same unit utilizing the traditional method of instruction. The results showed that there was a statistically significant differences between the students' scores on both tests (historical thinking skills and spatial ability test). All the differences are attributed to the study variable (teaching method) and for the favor of the experimental group. In light of these results, the researchers recommended the use of electronic portfolios in the teaching of history subjects. Moreover, it is recommended to conduct other studies on the impact of electronic portfolios on other variables such as creative thinking, academic achievement and meta-cognitive thinking.

Keywords: *Electronic portfolios, historical thinking skills, spatial ability, the tenth grade*

general educational goals, including the development of citizenship, acquiring thinking skills, achieving self-concept, and developing the ability to understand information. History as a main source of social studies, which is concerned with the past and present, with its temporal and spatial events, and the practices and achievements of society and introduces the

Introduction

Among the various school subjects, social studies curriculum occupies a prominent position because it plays an important role in bringing up humans to be able to understand information, concepts, and generalizations in the social sciences, which will be useful in their daily life. Additionally, it contributes to other

The ability to think historically is closely related to spatial ability, including chronological knowledge, historical comprehension, historical analysis and interpretation, and the capability of conducting historical research. In addition to the ability to move from place to place and to plan for this movement, spatial ability involves understanding spatial relationships, visualizing the various shapes and their different positions in the imagination, and dealing with mental images. Cognitive mental activity can be characterized by the perception of movement of flat and solid shapes, as well as the perception of the spatio-visual world, as well as the ability to think and reflect. The development of spatial ability also entails an ability to understand the relationship between the individual and the things around him, and one of the most important aspects of that development is the integration of the ability with the degree of movement individuals make in the environment for their world (Belkhiri, 2005).

Spatial ability enhances the sensitivity to colors, lines, shapes, forms, place; it also enhances the relationship that exists among those elements. A spatial ability may also involve the ability to visualize and graphically represent visual or spatial ideas, and the ability to direct self appropriately in a spatial template (Abdul Karim, 2016). Gardner (1983) stated that this type of intelligence is expressed by the saying (a picture is worth a thousand words), as those who possess this type of intelligence tend to use shapes, images, designs, drawings and maps, as well as being adept at tasks requiring mental visualization, imagination and formation. He has a high ability in tasks that require eye sight with the use of the mind, such as visualization, imagination and forming mental images. In order to improve educational outcomes for learners, educators called for the use of technology by learning in order to develop educational methods; It was that the emergence of methods of distance learning, computerization of courses, or e-learning, electronic portfolios (Al-Ani, 2000).

Employing technology in learning will not replace the role of the teacher or practicing any other methods of teaching. Instead, the teacher will be able to play a more active role in the preparation, planning and implementation

individual to his society, to his past and present, and to anticipate his future (Parker, 2001).

History is considered a fertile environment for the practice of thinking and solving problems. The best way to prepare the learner to cope with these problems is to develop his independent personality, teach him self-reliance, increase his level of ambition, self-confidence, self-respect, motivate him to take responsibility for his learning, be an active researcher, and respond to life issues and problems with interest and effectiveness. The individual has to be helped to adapt to changes in his environment, and this requires a change in the way we think about learning and education as a process that is neither time nor place-bound. The need for learning thinking skills has become more vital than ever before; So that the learner can solve problems scientifically, and be able to make informed judgments; Therefore, it has become imperative to have skills of historical thinking (Francois, 2001; Mujahid, 2008).

A set of skills associated with historical thinking include acquiring knowledge, asking central questions, analyzing, solving problems, making decisions, organizing information, and being proficient in the various thinking processes (Qalladah, 1998). This makes social studies an essential subject that develops students' ability to criticize, analyze, weigh evidence, make judgments, understand information and generalizations, solve problems, identify good people in society, develop values, and trends, which become part of developing thinking as a necessary skill (Al-Sakran, 2007).

As stated by the National Center for History in American Schools (NCHS, 1994), the five main criteria for historical thinking for grades 5-12 are chronology, historical comprehension, historical analysis and interpretation, research capabilities, analysis of historical issues, and decision-making. The Ministry of Education stresses the importance of developing historical thinking skills by including history in social studies books at the basic level and using those skills in research work, writing reports, and drawing a timeline that illustrates the stages of civilization and relevant current events (Ministry of Education, 2005).

1. What is the impact of electronic portfolios on developing the historical thinking skills of tenth-grade students in the subject of history in comparison with the traditional method?
2. What is the effect of electronic portfolios on developing spatial ability of tenth-grade students compared to the traditional method?
3. What is the correlation between the mean scores of the historical thinking skills test and the spatial ability test for both students who studied via electronic portfolio and the regular method, and do these correlations differ for each of the students studied via electronic portfolios and the regular method?

Importance of the study

The importance of the study is represented by:

- Assessing the effectiveness of utilizing electronic portfolios in teaching by providing a vision of how the teaching and learning processes work based on the foundations and steps of creating an electronic portfolio.
- Contributing to renewal and diversification of the teaching and learning methods used by teachers in the classroom.
- Presenting a design for an electronic portfolio in the teaching of History, which researchers may benefit from in building, developing similar ones, or be useful for teachers to design similar portfolios in their teaching of Social Studies, and arousing their interest in reviewing the usual practices in education.
- Inspiring those responsible for training teachers to design new programs where teachers and students both have new roles to play.
- Providing empirical evidence to planners of educational programs and curricula on the effect of electronic portfolios on the development of historical thinking skills and spatial ability in History, and thus supporting educational thought on the effects of electronic portfolios.
- Improve and develop social studies curricula and books through the use of new approaches to provide curriculum content for centers of curriculum development, as a quasi-experimental study exploring the way in which

of lessons, and he will be required to learn new skills to deal with technology since the Ministry of Education has implemented computerized learning materials. In a classroom, computerized materials must be used as a means of communicating information to students easily and effectively, and from the perspective that the student is the center of the teaching-learning process. In order to be successful as a teacher, students must possess technological competencies, including the capability of using and dealing with technology tools, searching for information and increasing it, accessing other sources of information, and implementing projects (Abu Musa, 2008).

Teaching with e-portfolios is a possible best practice in technology-enabled classrooms. It is believed that teaching with electronic portfolios enhances educational results, increases motivation towards learning, improves thinking skills, facilitates access to information and social communication, facilitates individual activities, and increases the efficiency of correction via social media via the Internet. As well as forums, virtual classroom environments, which support individual and group learning in synchronous and asynchronous modes, and e-learning, which supports individual activities and a variety of learning and teaching models centered on problem solving and collaborative learning (Osguthorpe & Graham, 2003).

Electronic portfolios help provide learners with information electronically; It allows providing information to learners through images, text, diagrams, sound, animation and video clips, as well as the possibility of linking computerized educational portfolios to the internal network, the Internet, or the student's e-mail site (Garrison, 2008). The previous indications related to teaching and learning through electronic portfolios can contribute to improving cognitive outcomes and higher-order thinking skills. In order to determine the benefits of teaching and learning history using electronic portfolios, and to determine how they affect the development of historical thinking skills, the researchers used electronic portfolios to teach history. Based on that, the following research questions were formulated:

The study concluded that there are statistically significant differences between the mean scores of the students of the experimental and control groups in the post application, in favor of the experimental group. Ahmed (2018) conducted a study aimed to search for the effect of using the inverted classroom in social studies to develop historical thinking skills among middle school students. The results of the research confirmed the existence of statistically significant differences between the mean scores of the experimental group and the control group in the post application to the historical thinking skills test in favor of the experimental group.

Fayed and Abdul-Ati (2020) studied the effect of employing the negotiating approach on developing the historical thinking skills of Third Preparatory school students, using a descriptive analytical approach and an experimental approach. Researchers randomly selected (50) students from the third preparatory grade of Al-Saraya Basic School from Sidi Ghazi Educational Administration in Kafr El-Sheikh Governorate. The following tools were used: (a list of some historical thinking skills, a test of historical thinking skills, and a teacher's guide for teaching the chosen unit using the negotiated approach). Researchers found that there was a significant correlation between the use of the negotiation approach to train students of the experimental group on some historical thinking skills in the post-measurement.

Amin and Al-Ahdal (2021) also conducted a study aimed to reveal the effectiveness of using the constructivist learning strategy in teaching Social Studies and citizenship on developing historical thinking skills for Second Intermediate female students. The researchers adopted the quasi-experimental approach; the sample consisted of (50) female students from the Thirteenth Intermediate School in Makkah, and they were randomly distributed into two equal groups: control group, and experimental group. The experimental group was taught using the constructivist learning strategy, while the control was taught via the usual way. In order to achieve the objective of the research, the researchers prepared a teacher's guide for teaching the unit of the (Umayyad State) using the constructivist learning strategy, as well as a

history curricula are enriched and taught with electronic portfolios, leading to an integrated view of science as both material and method of research and thinking.

-This study opens up the possibility of conducting future research in this area at different educational stages (low basic stage, secondary stage, university stage), in addition to other scientific topics (National Education, Geography); to generalize the appropriateness of using these electronic portfolios in Social Studies across all scientific topics, across all branches of science, and across all educational levels.

Literature Review

Stoddard & Marcus (2010) assessed how historical films and pictures can help students develop the historical thinking skills of third, sixth and ninth grade students. Interviews and observations were used to understand what those students meant by movies, pictures and historical events. The study concluded that students' ability to determine the date of the movies and historical pictures and determine their importance improves with age without differences in gender or period. Al-Rubani and Al-Ajmi (2016) conducted a study aimed at realizing the effect of using *active learning* in developing the skills of historical thinking among ninth grade students. To achieve the goal of the research, a scientific material was prepared according to *active learning*; the researchers also prepared a test measuring historical thinking skills. The research was applied on a sample of (48) female students, the sample was divided into two equal groups for each of the experimental and control groups, (24) students for each group. The research found that *active learning* was more effective in developing historical thinking skills compared to the usual method.

Abdullah, Abdullah, and Suleiman (2017) revealed the effect of using the narrative approach in teaching History to develop historical thinking skills of second year preparatory students. The researchers used the quasi-experimental approach by dividing the sample into two groups: an experimental group that studied the material using the narrative approach, and a control group that studied the material in the usual way. A post-historical thinking skills test was applied on both groups.

ability and deductive thinking among students of architectural industrial schools. The researcher used the descriptive approach, the systems analysis approach, as well as the quasi-experimental approach. The research sample consisted of a group of students chosen from the Second Industrial Grade "the three-year system" specializing in Water Networks and Sanitary Works from Mahasna Industrial School in Sohag Governorate. The research tools consisted of an integrated e-learning based program for teaching educational content, and a teacher's guide, as well as an achievement test in the planning and production management course for second-year students specializing in Water Networks and Sanitary Works, a test of spatial ability, and a test of deductive reasoning. The tools were applied on the research sample before and after the application of the program. The study concluded that the integration strategy based on using the integrated electronic program in the teaching of Planning and Production Management had a significant impact on raising the level of students' ability to think inductively and to develop thinking and spatial abilities.

AbdulKarim (2016) also conducted a study aimed to know the effect of using electronic mind maps in learning physics and its impact on developing spatial ability and scientific inclination among first-year secondary students. The results showed the existence of a statistically significant difference between the scores of the experimental group students who studied some physics topics selected for the research experiment using electronic mental maps, and the scores of the control group students who studied the same subjects in the usual way in the post application of the spatial ability test, and the scientific inclination scale, which were prepared for these two purposes in favor of the students of the experimental group. The results also showed a significant effect of electronic mind maps in developing spatial ability and scientific inclination in favor of the students of the experimental group; these results indicate that learning using electronic mind maps has a significant impact on developing spatial ability and scientific inclination among students of the research sample.

list of historical thinking skills appropriate for the age of the students, and an achievement test in the unit of Umayyad State. The results showed that there were statistically significant differences at the level (0.05) between the mean scores of the students of the control and experimental groups in the post-measurement of the historical thinking skills test in favor of the experimental group.

In the context of developing spatial ability, Liu (2007) conducted a study to discover the relationship between creativity and spatial ability among third-grade students in Taiwan. The study population consisted of 11653 students taken from (99) schools, of which 16 schools were randomly selected to be the study sample. The researcher used the Toarns Scale (a) and a test of self-image. Findings showed a positive relationship between creativity and spatial ability, and there were statistically significant differences attributed to gender in favor of females in the originality test and the self-image test, the results also showed that there were no statistically significant differences between males and females concerning fluency and flexibility.

Al-Rassam (2008) conducted a study aimed at revealing the differences in abstract thinking and spatial visualization between outstanding and low-achieving students in the intermediate school stage in the State of Kuwait. The study sample consisted of (200) eighth grade male and female students from Kuwait who were randomly chosen, the researcher developed a test of abstract thinking and another one for spatial visualization. The results showed that there are significant statistical differences in the test of abstract thinking attributed to the variables of gender and achievement (Aljawarneh & Atan, 2018). On the other hand, the differences in performance on the spatial visualization test were significant for the gender variable, but not significant for the achievement variable. The results also showed that there was no significant effect in the interaction between achievement and gender.

The study of Al-Qadi, Obaid, Ma'bad and Al-Khouli (2016) aimed to reveal the effectiveness of an integrated e-learning based program in teaching the course of Planning and Production Management in developing spatial

the post application. The results showed that there was a statistically significant difference between the mean scores of the two research groups in the pre and post applications of the achievement test for the cognitive aspects of spatial ability and for the achievement test for the performance aspect of spatial ability in favor of the post application (Aljawarneh et al., 2020).

Concerning electronic portfolios, Swan (2004) confirmed the effectiveness of using technology and multimedia in developing historical thinking among high school students in three American states. Contribute to the development of historical survey, and its results indicated the importance of having sites for historical libraries on the Internet, and that libraries contain archives of historical documents. The researcher focused on the teachers' identification of teaching approaches that engage students in historical study while utilizing primary sources in order to contribute to the development of historical investigation. They also found that historical libraries operate on the internet and have access to historical documents held in libraries.

Al-Ajlouni and Abu Zina (2006) conducted a study aimed at knowing the effect of computerized teaching portfolios and the regular methods on the achievement of secondary school students in Physics and their attitudes towards computerized educational portfolios. The study sample consisted of (78) male and female students distributed in three public schools. The sample was divided into four groups; two experimental and two control groups. The two experimental groups studied the unit "optical properties of the material" using the computerized educational portfolio, while the two control groups studied the same unit via the usual way. The results of the study showed that there were statistically significant differences between the mean scores of the groups attributed to the method of teaching in favor of the computerized educational portfolios method, and there were also statistically significant differences between the mean scores of the groups due to the variable of gender in favor of females. On the other hand, there were no statistically significant differences attributed to the interaction between the method and gender. Concerning the

Al-Obaidat (2017) aimed to develop a unit of study in Geography for the seventh grade according to the spatial thinking approach, and to measure its impact on developing students' spatial ability and their attitudes towards. The sample consisted of (86) male and female students from Mlaih Basic School for Girls and Al-Istiqal Basic School for Boys, from Thiban Directorate of Education. The study results showed that there are differences in the level of spatial ability and attitudes among students, due to the nature of the developed study unit, but there are no differences in the level of spatial ability and attitudes towards Geography among students of the experimental and control groups due to the variable of gender. The results also showed that there are differences in the level of spatial ability among the students the experimental group due to the variable of gender, in favor of females, but the results did not show any differences in the level of students' attitudes towards Geography, due to the variable of gender.

Using infographics to teach social studies, El-Sherbiny (2020) aimed to develop rapid learning skills and spatial abilities among students of fifth grade. One of the most important results of the study was its ability to develop rapid learning skills and spatial ability for fifth graders. In addition, the use of infographics provided an appropriate learning environment, which had a significant impact on students' understanding of images and shapes. Abdul-Baqi, Abu Zaid, and Abdul-Jalil (2021) conducted a study designed to develop the spatial abilities of outstanding students in the preparatory stage. A guide for the teacher, and an achievement test designed to measure the cognitive aspect of spatial ability of outstanding students in the preparatory stage, and a note card designed to measure the performance aspect of spatial ability of outstanding students in the preparatory stage were prepared, and pre-application of the tools on the research group, teaching the research group art education using mental visualization strategy, and the post application of the tools, analysis of the results and doing necessary statistical treatments. The cognitive aspects of spatial ability and the achievement test of the performance aspect of spatial ability in favor of

The results of the research showed that there were statistically significant differences between the average scores of the students of the research group in both the pre- and post-measurement tests in the historical thinking skills test and in the social communication skills scale in favor of the post-measurement.

Al-Sayyad, Abdul-Fattah, and Al-Baz (2018) conducted a study that aimed to measure the effect of using the electronic portfolio in developing information generation skills in Science. The research group consisted of (50) students from the fifth grade students in Port Said Governorate, the group was divided randomly into two equal groups; the experimental group which studied using the electronic portfolio and the control group which studied the same material via the usual method. To reach the objectives of the research, the researcher prepared a set of educational materials and tools represented in a list of information generation skills, an information generation skills test, and an e-portfolio. Research results indicated that there were statistically significant differences in the skills of generating information in Science for the students of the experimental group compared to the students of control group.

Olaimat (2019) investigated the effect of electronic portfolios on learning motivation and achievement among eighth grade students in Jordan. The sample consisted of 80 eighth grade students chosen intentionally. For the purposes of collecting data, two tools were prepared: a science achievement test which contained 30 items, and a learning motivation scale, containing 36 items. Both tools were valid and reliable, and the study followed a quasi-experimental design. According to the study findings, there was a statistically significant difference at (0.05) between the students' mean scores in the achievement test of Science; and there was also a statistically significant difference at (0.05) between the scores of students' performance in the learning motivation scale. All the differences are attributed to the study variable (teaching method), in favor of the experimental group that studied using electronic portfolios. Also, all the correlation coefficients between the performance scores on the learning motivation scale, and the scores in the achievement test in

attitudes, both males and females showed positive attitudes towards computerized educational portfolios, and that there were no statistically significant differences in the attitudes of the experimental group students towards computerized educational portfolios due to gender.

Risinger (2008) tried to develop the skills of historical thinking and analysis of history teachers through the use of the Internet. The results of the study found that the use of some educational resources, ideas and topics made available by internet websites related to the skills of historical thinking and analysis helped to develop the skills of historical thinking and analysis of History teachers. Muhammad (2012) investigated the effect of digital documentary teaching portfolios on developing teaching competencies of students of the English Language Division at the College of Education. The study group consisted of the third-year students of the English Language Division at the Faculty of Education in Suez, Egypt (N=48); the sample was randomly divided into two equal groups, namely, control group and experimental group (N=24) for each group. The teaching competency test was conducted pre and post teaching, and the results showed that there were statistically significant differences between the mean scores of the experimental and control groups on the post teaching competency test in favor of the experimental group. And there were statistically significant differences in the mean differences between the pre and post teaching competency test for the experimental group in favor of the post teaching competency test.

Dargham (2015) aimed to reveal the effectiveness of a proposed digital technology-based program in social studies to develop the skills historical thinking and social communication for students of 3rd preparatory class. The research group consisted of a group of 3rd preparatory students in Cairo Governorate. The researcher used both of descriptive and experimental methods. The researcher prepared the tools of the study which were represented in a list of historical thinking skills, historical thinking skills test, and scale of social communication skills. The tools were applied twice before and after the application.

Ottoman Empire) from the history book, the first edition (2016/2017) for tenth-grade students in the electronic portfolio as follows: Reviewing the educational literature and previous studies on preparing electronic portfolios; listing the objectives of the second unit (the Ottoman Empire) found in the History Book for the Tenth Grade, then listing the scientific concepts.

The unit was distributed into lessons, so that each lesson included: learning products related to scientific concepts, solving important problems and terms, diagnostic test, and illustrative examples of solving problems included in the lesson content, as well as defining explanatory examples of concepts included within the lesson content, discussions, exercises, activities, and electronic media which included simulation, movement, tutorial video, exercises, and self-assessment checklist.

The researchers designed the electronic portfolio; it included enrichment and remedial activities, worksheets as homework to master learning, and links to websites related to the unit's topics. The student can access the electronic portfolio at any time, whether inside or outside the school as the researcher uploaded it to Prezi App on the Internet and gave each student their login name and password; to be able to access the portfolio at any time he wants.

Validity of the electronic portfolio

The validity of the portfolio was verified by presenting it to (10) content judges, chosen from faculty members in Jordanian universities, educational supervisors, teachers, specialists in the field of teaching social studies, and specialists in designing electronic programs, in order to verify its consistency with the features of electronic portfolios, in which the lessons were designed in their light regarding validity, clarity of wording, and relevance to tenth grade students. Content judges' notes have been taken into consideration and modifications have been made according to their observations.

The historical thinking skills test

The researchers prepared the test to measure four skills of historical thinking; chronology, historical comprehension/understanding, historical analysis and interpretation, capabilities of historical research and investigation, where

Science were statistically significant at (0.05) in favor of the experimental group.

By extrapolating previous studies, the researchers noted that there are studies that focused on revealing the level of historical thinking skills, and others that went to search for how to develop it, but most of them dealt with the university level. The researchers also noted that spatial ability took a kind of interest, but in topics other than history, and they examined the relationship between spatial ability and the various types of thinking, and as for the interest in electronic portfolios in the field of social studies, the interest in spatial ability was absent. Therefore, this study is distinguished from its predecessors in that it is the first one at the local level in terms of: the use of electronic portfolios in history, and the disclosure of its impact on the development of historical thinking and spatial ability together, and it also reveals the existence of a relationship between historical thinking and spatial ability.

Methodology

The sample

The number of the tenth-grade students enrolled in the schools of the Zarqa second Directorate of Education in the first semester of the academic years (2016/2017) was (1829) students, and they are distributed over (25) schools in (52) sections. To facilitate the procedures for applying the study, and the availability of technological means that help in the implementation of the study, two of the four sections of Al-Hashmiya Secondary School for Boys were intentionally selected; The number of students in the two sections was (59) students, and these two sections were randomly distributed to an experimental group ($n = 29$), which was taught the second unit of the History Book for the tenth-grade via the electronic portfolio, and the other section formed the control group ($n = 30$), whose students were taught the aforementioned educational material in the usual method.

Instrumentation

To collect the necessary data for the study, the researchers used three tools. The next section describes these tools, their construction, validity, and reliability.

The electronic portfolio

An educational material has been prepared by including the second unit (the

which it belongs; (6) paragraphs were modified in light of the arbitrators' observations.

Validity of the construction of the historical thinking skills test

The test was applied on an exploratory sample from outside the study sample consisting of (30) students, chosen randomly from Ibn Al-Anbari Basic School for Boys in Al-Hashemiah Town. Items were correlated for both the skill and the test; items with correlation coefficients less than 0.40 with the skill score to which they belong were deleted, and items with correlation coefficients less than 0.40 with the overall test score were discarded. The correlation coefficients of the items of the historical thinking skills test with the skill score and their correlations with the overall test score are shown in Table 1.

Table (1): Correlation coefficients of the items of the historical thinking skills test with the skill score and their correlation with the overall test score

Skill	Correlation coefficients of the paragraphs with the domain score	Correlation coefficients of the paragraphs with the overall test score
Chronology	0.31-0.78	0.56-0.72
Historical comprehension	0.26-0.69	0.43-0.87
Historical analysis and interpretation	0.17-0.74	0.33-0.82
Historical research and investigation capabilities	0.48-0.71	0.67-0.85

Table (1) indicates that the correlation coefficients of the items with the skill score ranged between (0.33-0.87), and the correlation coefficients of the items with the overall test score ranged between (0.17-0.78), and it was found that there is a paragraph that has a coefficient of correlation with the skill score to which it belongs (0.33), and another paragraph whose correlation coefficient with the overall scale score (0.17), so these two paragraphs were crossed out; Because they do not achieve what is required of them (Oudah, 2010). In its final form, the test consisted of (36) paragraphs.

Concurrent validity of historical reasoning skills test

For the purposes of confirming the concurrent validity of the historical thinking skills test (historical research and investigation capabilities, chronology, historical comprehension/understanding, historical analysis and interpretation), the correlation coefficients among historical thinking skills were calculated, table (2) shows the results.

Table (2): Inter-correlation coefficients between historical thinking skills

skill	Capabilities of research and historical investigation	Chronology	Historical comprehension	historical analysis and interpretation
Chronology	0.50			

Historical comprehension	0.47	0.51		
Historical analysis and interpretation	0.49	0.40	0.83	
Total skills test	0.76	0.57	0.83	0.81

The test was administered twice to a sample of 30 students (not included in the sample of the study) randomly selected from Ibn Al-Anbari Basic School for Boys in Al-Hashmiah, with an interval of three weeks between the two applications, repetition reliability coefficient "Pearson correlation coefficient" was calculated, and the reliability coefficient was (0.82); the internal consistency of the test and its skills was also calculated using the Cornbach alpha equation on the first administration of the test, the internal reliability coefficient was (0.91). Table (3) shows these results.

Table 3: Reliability coefficients for both test of the historical thinking skills and the reliability coefficients of the internal consistency for each skill and for the test as a whole.

Historical thinking skills test	Reliability of internal consistency	Reliability of repetition	Number of paragraphs
Chronology	0.76	0.81	9
Historical comprehension	0.75	0.82	9
Historical analysis and interpretation	0.76	0.80	9
Historical research and investigation capabilities	0.92	0.79	9
Total correlation of the test	0.91	0.82	36

Table (3) shows that the reliability coefficient is (0.82) and the internal consistency coefficient (0.91); these values are a good indicators of the test quality, and its capability to measure what it was designed to measure (Oudah, 2010).

facilitate handling of the test, the arbitrators' comments, which included reformatting the test, were taken into consideration. (80%) of the arbitrators' unanimous consent was adopted, and their comments, which included reformatting the test, were taken into account, no paragraphs were deleted or added to the scale. Arbitrators asserted that the test was appropriate for revealing spatial skills, and this was considered an indicator of using it in this study.

2. Validity of construction

A sample of 30 students from outside the study sample was used to find the validity of construct of the test. The items were analyzed, and the discrimination coefficient for

Table (2) shows that the values of the inter-correlation coefficients of skills with the total test ranged between (0.57- 0.81), and the values of the inter-correlation coefficients between the skills of the total test ranged between (0.40 - 0.83), which are considered good indicators of the quality of the scale construction (Hinkle, Wiersma & Jurs, 1988).

The Reliability of the historical thinking skills test

Spatial ability test: Paper folding test-vz-2-brace

The test consists of (20) questions, each question consists of a paper that is folded differently from the next question, and the test consists of two parts, each part consists of (10) questions, that is answered within (3) minutes.

Validity of paper folding test

The validity of the test was verified by:

1. Validity of Content

In order to verify the validity of the content, the test was presented to 10 experienced arbitrators from university faculties, who evaluated the paragraphs based on translation accuracy, clarity, and ease of understanding, and to make any observations and modifications they deem appropriate. To

coefficients between the items and their total score ranged between 0.36 and 0.72 for the paper folding test. Table (4) illustrates this.

Table 4: Correlation coefficients between paragraphs and the total score of the paper folding test

paragraph	paper folding test	paragraph	paper folding test	paragraph	paper folding test	paragraph	paper folding test
1	.44(*)	6	.47(**)	11	.60(**)	16	.60(**)
2	.36(*)	7	.67(**)	12	.49(**)	17	.72(**)
3	.43(*)	8	.65(**)	13	.53(**)	18	.43(*)
4	.50(**)	9	.45(*)	14	.46(*)	19	.41(*)
5	.71(**)	10	.65(**)	15	.48(**)	20	.59(**)

specialized in Curriculum and Teaching in Jordanian universities, educational supervisors, teachers, and specialists in educational technology design to complete the preparation of the educational material in the electronic portfolio.

-Preparing the test of historical thinking skills, and verifying its validity and reliability.

- Preparing the spatial ability test, and verifying its validity and reliability.

- Selecting the study sample from the tenth-grade students intentionally; so as to facilitate the study procedures, as well as obtain a similar sample in terms of cultural and economical level, social and environmental conditions.

- Preparing the notes to prepare the lessons for students of the control group in light of the usual method.

- Starting the application of the study at the beginning of the first semester of the academic year 2016/2017.

- Applying the pre-test (historical thinking skills test and spatial ability test) before carrying out the experiment to ensure the equivalence of groups.

- Teaching the experimental group began through using the electronic portfolio, and the control group according the usual method, in mid-November 2016/2017.

- Applying the (the historical thinking skills and spatial ability) post-tests on the experimental and control groups after the experiment, after correcting the tests the researcher kept the results.

Results and Discussion

Results related to the first question

To answer this question; the means and standard deviations of the scores of the pre and

each one was calculated. As the coefficient of discrimination represents an indication of validity for each item, the correlation

Concurrent Validity: The correlative validity was verified by calculating the Pearson correlation coefficient between the paper folding test and the cut test. The results showed the existence of a positive, statistically significant correlation, as the correlation coefficient is (0.54), which indicates that the test is correlative valid.

Reliability of the Paper Fold Test: To check the reliability of the test, the reliability coefficients were extracted in two ways:

1- Test-Retest Method

The test was applied twice on an exploratory sample from outside the study sample (N=30) from Ibn Al-Anbari Basic School for Boys within a three-week interval between the two applications. Pearson correlation coefficient of the test was (0.84).

2- Internal consistency equation (Cronbach Alpha)

In order to ensure the test's reliability, the internal consistency was calculated using Cronbach alpha equation, Cronbach alpha was (0.86).

Procedures

The study was applied by preparing its tools and collecting necessary data and performing statistical processing according to the following procedures:

- Preparing the educational material (the second unit of the History Book for the Tenth Grade) (the Ottoman Empire) in light of the features of electronic portfolios. To prepare the electronic portfolio the researchers referred to previous studies dealt with electronic portfolios, the portfolio contained the scientific concepts included in the unit (the Ottoman Empire). The researchers also consulted faculty members

historical thinking skills, table (5) shows these results.

post-tests of students of the experimental and control groups were calculated on the test of

Table (5): Means and standard deviations of the scores of the two groups for the pre and post tests of historical thinking skills

Group	N	Pre-test		Post-test		Adjusted mean
		Mean	SD	Mean	SD	
Control	30	8.75	2.60	9.75	2.40	10.02
experimental	29	9.22	2.40	27.25	2.80	27.12
Total	59	8.99	2.50	19	2.60	

*Maximum test score = 36

Table (5) shows that the average means of the experimental group's scores on the pre-test of historical thinking skills test was higher than the average means of the scores of the control group (M=9.22, 8.75) respectively, and the average means of the scores of the experimental group on the post-historical thinking skills test was higher than the average means of the scores of the control group (M=27.25, 9.75) respectively. It was also noted that individual differences between students of the experimental group on the post-historical thinking skills test decreased, while it increased among students of the control group; Perhaps the pre-explanation of the new teaching method to the students of the experimental group made these differences. To explore the significance of the differences between these means, analysis of variance associated with the pre and post historical thinking skills tests' scores for the students of the two study groups was made, table (6) shows the results.

Table (6): Analysis of variance accompanying to the scores of both groups on the of post and pre historical thinking skills tests

Source of variance	Sum of squares	Degree of freedom	Mean squares	f	Sig.	Effect size
Associated	0.883	1	0.883	3.466	0.068	5.83%
Group	7.394	1	7.394	29.028	*0.000	34.14%
Error	14.265	56	0.255			
Total	71.463	58				

results, formulating generalizations, and practicing thinking skills such as analysis, synthesis, inference, and evaluation. The electronic portfolio also links the topics of the scientific material to daily life in the form of educational and learning situations related to the historical sequence, and supports them with movements, images, multimedia and maps. Student are asked to contemplate these situations carefully; determining the main events, the primary and secondary reasons behind their occurrence, making inferences about the true causes of these historical events, issuing a judgment on the findings they reached, and providing a logical justification based on a scientific basis for their judgment. It also provides educational learning/teaching environments that meet the diversity of students' abilities and needs, so that students can continue learning inside and outside of the school, and that each student learns in accordance to his abilities, meditates and thinks about the subject in a more profound manner,

It is noticed from the results of the accompanying analysis of variance presented in the previous table that the teaching method was very effective in the historical thinking skills, with effect size of (34.14%), and that the difference between the scores of the historical thinking skills of the students of the electronic portfolio(experimental group) and the students of the regular method (control group) is statistically significant ($\alpha = 0.05$), in favor of the experimental group who scored (27.12), while the average score of the control group was (10.02) as shown in Table (5).The superiority of the effect of the method of teaching via electronic portfolios on historical thinking skills compared to the usual method can be explained as follows:

With the electronic portfolio, students are exposed to learning contexts that present them with real scientific problems using computer simulations and multimedia, in which they can practice scientific investigation, formulating hypotheses, testing them, gaining

fear of the score, and provides the opportunity for students to discuss the outcomes of their learning through direct communication inside and outside the classroom. This is reflected positively on the skills of historical thinking.

Results related to the second research question

To answer this question; means and standard deviations of the scores of the students of the two study sample groups were calculated for the pre and post spatial ability tests, table (7) presents these results.

draws conclusions and explains them clearly, and justifies the validity of these conclusions based on scientific basis; perhaps these educational learning environments that take into account individual differences help students to practice thinking according to their abilities, and the electronic portfolio also includes self-training, focusing on practicing the processes of induction and deduction, solving problems, providing solutions to them and justifying them, confronting students with historical events and their interpretation, and self-evaluation of the learning outcomes without psychological pressure, anxiety and

Table (7): Means and standard deviations of the scores of the two groups for the pre and post tests of spatial ability skills

Group	N	Pre-test		Post-test		Modified mean
		Mean	SD	Mean	SD	
Control	30	7.40	2.79	8.27	2.32	8.38
experimental	29	8.35	2.53	25.67	2.91	25.55
Total	59	7.88	2.66	16.97	2.62	

*Maximum test score = 30

It is noted from the above table that the mean scores of the experimental group on the pre-spatial ability test was higher than the mean scores of the control group (M=8.35;7.40) respectively, and the mean scores of the experimental group on the post-spatial ability test was higher than the mean scores of the control group (M=25.67;8.27) respectively. To find the significance of the difference between these averages, an analysis of the associated variance with the post and pre spatial ability scores was conducted for the students of the two study sample groups, table (8) presents these results.

Table (8): Analysis of variance accompanying to the scores of both groups on the of post and pre spatial ability skills tests

Source of variance	Sum of squares	Degree of freedom	Mean squares	f	Sig.	Effect size
within	25.554	1	25.554	3.895	0.053	6.50%
Group	4208.968	1	4208.968	641.454	*0.000	91.97%
Error	367.450	56	6.562			
Total	4860.381	58				

superiority of the effect of the electronic portfolio method of teaching on spatial ability over the usual method can be explained as follows: The individual's ability to perceive visible places, through pictures, maps, charts, and drawings and shapes; as well as the ability to use colors and to perceive relationships between objects within drawings and shapes, it takes sensitivity to color, line, shape, nature, field, and space for this type of intelligence to

It is noted from the results of the accompanying analysis of variance in table (8) that the teaching method was very effective on spatial ability, with an effect size of (91.97%), and that the differences between the scores on the spatial ability test for the students of experimental and control groups were statistically significant ($\alpha=0.05$), in favor of the experimental group whose average scores are (25.55), while the average scores of the control group are (8.38) according to Table (7).The

resources allow students to better understand and link things together. Using the electronic portfolio also allows students to practice higher levels of thinking, including reflective and creative thinking, improving their spatial ability. Additionally, the portfolio contains web pages that present self-training on some historical events in different places, which need to be understood in relation to one another in order to have a positive impact on spatial ability.

Results related to the third question:

To answer this question, the correlation coefficients were calculated between the students' scores in the post tests of historical thinking skills and spatial ability according to the study variable (teaching method) and the difference in significance of the difference between them and zero, Then the values of the correlation coefficients were converted to their corresponding index (Z) values, and by using the equation of the difference between two correlation coefficients for two independent samples, the statistical significance was determined as shown in table (9) below.

the first party of the relationship	The other side of the relationship	Group	Correlation coefficient	Number	Z value	Statistical significance
Historical thinking skills	Spatial Ability	Usual Method	0.10	30	0.100	* 0.007
		Electronic Portfolios	0.65	29	0.775	

students who studied with the electronic portfolio.

The superiority of this effect of the electronic portfolio on the correlation coefficients between the scores in both the historical thinking skills test and the spatial ability test in comparison to the usual method can be explained as follows:

Electronic portfolios present learning material in a logical order, utilizing cutting-edge technical tools to provide educational learning situations in which students are confronted with real-world scientific issues. They also contain photos, maps, charts, sketches, and figures, which aid students in forming historical concepts in a logical and orderly manner, as well as tying them to earlier concepts in the process of knowledge

form images and mental imaginations that he uses to solve problems.

Utilizing modern technology, the electronic portfolio presents the learning material in a logical sequence. Furthermore, it provides images, maps, diagrams, drawings, and figures that assisted the students in constructing historical concepts in a logical and orderly manner, and linked them to prior concepts in order to build understanding; in addition to helping students to become aware of the relationships between things in drawings and shapes, it helped them to form mental images and imaginations they can use to solve problems. The electronic portfolio also states the active and effective role of the learner, and provides the opportunity for him to ask questions, for mutual discussions and interpretations with his colleagues. The electronic portfolio also provides various sources for student learning; enriching the learning process through positive communication between the teacher and students, and between the students themselves, and this communication is supported through the windows of the network. Diverse learning

Table (9) shows that all the correlation coefficients between the mean scores of the historical thinking skills test, and the mean scores of the spatial ability test were statistically significant at ($\alpha = 0.05$), in favor of the students of the experimental group who were taught via the electronic portfolio, but they are not statistically significant at ($\alpha = 0.05$) among the students of the control group who studied in the usual way.

It is also noted from the results in table (9) that there is a statistically significant difference at ($\alpha = 0.05$) between the correlation coefficients of the relationship between each of the historical thinking skills test and the spatial ability test due to the study variable (teaching method), and in favor of the experimental group

he practices learning as a mental pleasure, and discusses, analyzes, evaluates, interprets, and makes inferences, and arrives at logical conclusions that are subject to discussion and justification.

Recommendations

The researchers suggest the following in light of the study's findings and discussions: first, asking history teachers to teach their students by using electronic portfolios, as they have great effects in improving the skills of historical thinking and spatial abilities of students. Second, conducting research on the use of electronic portfolios in history classes at various levels of education, as well as other variables such as conceptual change, academic accomplishment, metacognitive thinking, and creative thinking. Third, performing similar studies in other social studies subjects, such as geography and national education.

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construction. It also assisted students in realizing the relationships between items within drawings and shapes, and that the electronic portfolio employing computer simulation programs and multimedia, in order for learning to be meaningful, As the electronic portfolio links the topics of the scientific material to daily life in the form of educational and learning situations related to the historical sequence, and supports them with images, multimedia, and maps, students practice scientific investigation, put hypotheses and test them, reach results, formulate generalizations, and practice thinking skills such as analysis, synthesis, inference, and evaluation. The student is expected to accurately contemplate these situations, including determining the main events, the primary and secondary reasons for their occurrence, making inferences to arrive at the true causes of these historical events, issuing a judgment on his findings, providing a logical justification based on a scientific basis for this judgment, and forming mental images and fantasies that he uses in problem solving, as well as providing portfolios. Electronics allow students to practice practical skills, strategies, and performances in which learning is centered on the learner, increasing motivation to learn, improving the quality and quantity of social interactions between students, improving skills in using electronic resources to aid in the acquisition of scientific concepts, developing thinking skills, and making the student active in the learning process. Capable of learning scientific topics and applying them while honing thinking skills, the student's active participation is determined by the electronic portfolio, which allows him to perform research and scientific investigation, ask questions, present and discuss concepts and ideas, record the results, and link them to previous knowledge, and he obtains this active role. It is enjoyable to learn, and it enhances spatial ability by allowing the pupil to practice writing. Knowing and solving difficulties, as well as boosting the student's self-confidence in his problem-solving abilities; As it is possible that this was reflected positively on the correlation coefficients between the scores of each of the historical thinking skills test and the spatial ability test, the student feels the importance of earnestness in learning to achieve success, and

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