The Impact of Using The Cloud Computing to Teaching Algorithms Upon The Student Achievement, Attitudes and Retention of Information

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Abstract :

The purpose of the research is to find out the effect of using cloud computing in teaching algorithms in the achievement of students and their attitudes and keeping information for a sample of first grade students in the computer systems department at the Technical Institute / Nassiriya for the 2015-2016 academic year. The sample consisted of (66) male and female students. The sample was divided into three equal and equal groups in a number of variables affecting the safety of the experimental design of the research, which is the design of equal groups with the post-test: two groups and a control group. Six topics were selected from the curriculum for theoretical algorithms during the first semester. They defined the teaching objectives and prepared the teaching plans for each group. The research tools were the final achievement test which consisted of (30) questions of multiple choice questions, (20) paragraphs and extracted the cykometric characteristics such as honesty and consistency using appropriate statistical methods Then, the initial application of the students' scale towards the use of cloud computing in education was applied to the students of the three groups together and analyzed the results. There were no statistically significant differences between them. The research found the superiority of the first experimental group on the second experimental group and the control group in the dependent search variables. The research concluded the effectiveness of cloud computing in the achievement and trends towards the use of cloud computing in education and retention of information and recommended use in the teaching process.

Keywords: Cloud Computing, Achievement, Attitudes, Retention of Information.

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1 .The problem and importance of research
1.1. The study problem :

Due to the increasing interest of the university in using methods of learning based on the use of computing in various fields and the active role of modern technologies in the development of learning methods that provide a suitable environment, which helps to stimulate students and interest, and emphasis on the use of e-learning teaching and use of computing. According to this interest, the researcher conducted this research to identify the effectiveness of learning based on cloud computing to improve the students' achievement and attitudes towards the use of cloud computing in education and retention of information in experimental conditions and to identify the positive aspects for the purpose of enhancing them and avoiding and dealing with non-positive things.

The research problem was formulated as follows: What is the effect of the use of cloud computing on students' first grade acquisition of algorithms in the computer systems department of the Technical Institute in Nassiriya, and the impact of using cloud computing on developing student attitudes using cloud computing in education and retention Informative.

1.2. The study importance :

The importance of this research as a result of the emergence of modern technologies and the fact that cloud computing is the most important and the latest of these modern technologies, which entered the process of education, because of these technologies of many different programs and applications, and also provides this technology large storage space in a very welcoming space and follow up data and information easily At the lowest cost. The study was designed to add a new addition to the use of cloud computing to improve student achievement and attitudes towards the use of cloud computing in education and retention of information to address the vulnerability of the Students when they adopt the traditional method of teaching. This research may be useful in promoting positive trends towards the use of cloud computing. Research can further provide an interactive learning environment to take account of individual differences among learners.

1.3. The Study Objectives:

The research aims at conducting a pilot study to determine the effect of using cloud computing in light of the following:

- Improve student achievement.
- Develop students' attitudes to use cloud computing in education.
- Keep students informed.
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1.4 . The study limits :

- Spatial: Technical Institute of Nassiriya - Southern Technical University.
- Temporal: The first semester of the academic year (2015-2016) .
- Human: students of the first grade in the Department of computer systems.
- Semester: Six topics of the vocabulary of Algorithms.

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1.5 . The Study Questions:

The research sought to answer the following question: Does the achievement of students who have learned algorithms using cloud computing and their trends to use cloud computing in education and retention of information differ from their peers who have learned algorithms in the usual way? .

1.6 . Research hypotheses:

Try to check the validity of the following zero hypotheses:

1.6.1. Achievement:

- There were no statistically significant differences (0.05) between the average scores of the control group and the first experimental group in the final achievement test.
- There were no statistically significant differences (0.05) between the average scores of the control group and the second experimental group in the final achievement test.
- There were no statistically significant differences (0.05) between the mean scores of the first experimental group and the second experimental group in the final achievement test.

1.6.2. Trends:

- There were no statistically significant differences (0.05) between the mean scores of the control group and the first experimental group in the trend scale.
- There were no statistically significant differences (0.05) between the mean scores of the control group and the second experimental group in the trend scale.
- There were no statistically significant differences (0.05) between the mean scores of the first experimental group and the second experimental group in the trend scale.

1.6.3. Retention of information:

- There were no statistically significant differences (0.05) between the mean scores of the control group and the first experimental group in the retention test.
- There were no statistically significant differences (0.05) between the average scores of the control group and the second experimental group in the retention test.
- There were no statistically significant differences (0.05) between the mean scores of the first experimental group and the second experimental group in the retention test.

1.7. Definition of the key terms:

1.7.1. Cloud computing:

It is known as the National Institute of Standards and Technology : a model for enabling easy and convenient access to a common set of computing resources (eg. algorithms, servers, storage, applications and services) that can be provided with a minimum effort and a fast SQL. [16]

It is a set of physical and software resources and network resources that combine multiple servers to offer different kinds of services over the Internet.

A wide range of servers can be easily accessed from anywhere, with low financial access to various computing applications, and the ability to store and retrieve files, text documents, drawings, tables, charts and other services, taking into account the security and privacy used by the students.

1.7.2. Achievement:

Abu Jado (2008): The outcome of what the student learns after a specific period of time can be measured by the degree that the student obtains in the achievement test in order to know the success of the strategy that the teacher sets and plans to achieve his goals and the student's information translated into grades. [1]

It is defined as the sum of what the students learned from the information in the networks material after the completion of the research period, estimated in the grades obtained in the final achievement test prepared by the researcher.

1.7.3. Attitude:

Zayton, (1994): A set of cognitive, emotional and behavioral components that relate to the individual's response to a particular issue, subject or situation and how these responses are accepted and rejected. [7]

Psychological or personal tendencies or a positive attitude towards specific knowledge are formed in the sample of the research towards a certain educational or non-educational skill as a result of exposure to a particular experience.

1.7.4. Retention of Information:

Mustafa, (2010): It is the residual effect of the educational experience passed by the students, measured by the mark obtained by the student in the test, which was given to the members of the study after a period of the end of the experiment. [9]

It is defined as: the residual effect of the educational experiences experienced by the students in the research sample in the article, and measured by the grades obtained by the student in the achievement test, which was re-applied three weeks after the first application to be a test to retain the information.

2. Background theory and previous studies
2.1. Background Study:

As a result of the emergence and spread of computers in large numbers with advanced software and reasonable prices, and connectivity with broadband Internet has become possible to solve many of the complex problems quickly and at a lower cost. Where ICT is used, education is transformed, the emergence of cloud computing, the cloud computing platform, and the presence of rich educational content as a global phenomenon.

Therefore a need to redesign the education system to meet the learning needs and current e-learning features by combining the features of e-learning and regular teaching. There is a close relationship between technology and education, and this relationship can be seen more clearly with institutions of higher learning.

With the advent of Web applications in 1999, some of these applications were adopted as essential tools in the teaching and learning environment. A number of these applications, including Google and other search engines, have emerged and new methods of teaching, interaction, dialogue, exchange and collaboration have emerged, and these applications contribute to the delivery of ideas and knowledge to learners.

These applications do not meet the growing demand for the vast amount of information and other services. Thus, the idea of providing a service capable of providing services of another kind was developed through this platform through which the worlds of knowledge can explore, explore and retrieve data and information, request files and save data, information and files on disks in the worlds of this platform. This platform is called Cloud Computing.

So when we want to store or retrieve any of the documents stored on this platform, such as texts, images, tables, files, forms, and graphics, it can easily be considered with some considerations, the most important

of which is the subject of document security and archiving in space through cloud computing. Such documents as they wish for the purpose of updating them as well as privacy.

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The idea of cloud computing dates back more than 50 years ago when (John Ma Karthy wrote in the 1960s), and perhaps one day computing will be important, a public facility or a public service. Cloud computing offers a very high service for users around the world as resources and high performance, at low cost compared to data centers and information, and that's why cloud computing is so important.

According to Wikipedia, cloud computing is one of a variety of computing computations made up of thousands of continuous computers to provide a series of services to the user as if anyone were using very large resources or resources.

This system provides multiple services of data and information available on the Internet, very large computer resources, and data processing servers.

The concept of cloud computing has existed since the early 1950s, although the time-sharing system dates back to 1960-1990, and the group of experts has not hinted at the era of cloud computing in their books or quotations. They also said that telecommunications companies that offer virtual private networks instead of Custom links were decent in quality of service but were relatively inexpensive [14].

Nabil (2012) points to the superiority of Internet-based education to traditional education. Cloud computing is a sophisticated technology that relies on the transfer of processing and computer storage space to the so-called cloud computing [6].

Education activities in higher education depend not only on classrooms and classrooms, but also on research activities on data and information, analysis and interpretation of access and storage of data and information, in order to reach, verify and process the results.

With the advent of cloud computing, the areas of teaching in higher education, education and learning have varied and have moved to virtual space for easy access to books, data retrieval and the ability to interact with researchers [11].

Two important features are accessibility and security when we want to store and retrieve any documents, text or image files, charts, and tables when we use an open system such as cloud computing and the Internet [13].

There is a need to use IT services in all higher education activities and technical and educational institutes, as cloud computing provides resources and services at present, and cloud computing has the power and ability to help improve the quality of educational work. Higher institutions and institutions face financial constraints and high costs to provide technology, especially in the field of education, as cloud computing is now available to use at reasonable prices and can provide support for the educational environment [11].

Cloud computing is one of the most important advanced changes in the history of information technology, from the emergence of the global Internet, cloud computing is one of the latest technologies in the world of information technology as it has an important impact in the process of teaching and learning. Most of the traditional forms of education are currently unsuited to the demands of educational progress and development and the inability to catch up with large educational changes. Computer networks have brought opportunities. However, the traditional e-learning style on the Internet is accompanied by many problems, Cloud computing is an attractive technology for dynamic scalability, efficient use of resources and resources. Cloud computing has become a powerful new technology for researchers to benefit from their applications [18].

Cloud computing is a computing model that increases capacity or adds dynamic potential without investing in new infrastructure or purchasing new licensed software. Cloud computing can be seen as an extension of existing IT capabilities. Cloud Computing is a concept where information is permanently stored in temporary and temporary computer servers, which include desktop computers, tower computers, laptops, and sensors [10].

Cloud computing is an Internet-based development and use of computer technology. A cloud that symbolizes the Internet and is an abstract idea of complex infrastructure. Information technology (IT) is seeking to outsource computer hardware by leasing the CPU through cloud computing services. A computing model in which IT capabilities are provided as a service, allowing users to access technology-based services from the Internet (in the cloud).

Hassan, (2014) points out that the emergence of e-learning, which is a follow-up to a revolution on traditional educational systems, has created a philosophy and objectives and a new approach to learning systems management [6].

In the past few years, Google, Yahoo mail, Microsoft, Windows Live and Hotmail have made significant advances in higher education in universities and colleges in the United States, so cloud computing is easy to use and accessible from any Place and even more reliable, and computing provides the power of choice between low-cost or free computer services [8].

2.2. Previous studies:

There have been many studies and scientific research on the use of cloud computing to know the impact and effectiveness in teaching and learning and effectively in the educational process of higher education and technical institutes and higher to know their potential in helping students during the educational process to accommodate the subjects they are studying, and varied and varied results of these studies and research according to For different applications. Some of these studies are presented here:

Al shetty, (2013): Aimed at addressing the concepts and characteristics of cloud computing and the benefits and constraints of the use of cloud computing and its services, and the application of cloud computing in e-learning at the University of Qassim, to see the application of cloud computing in the development of self-learning skills of students at the University of Qassim using the experimental method by electronic decision Using a scale based on a questionnaire to measure the trend towards online learning to measure the learning skill of college students [4].

Al-Rahaily, (2013): The purpose of the study was to find out the effect of using some of the educational applications of Google in teaching the curriculum of educational techniques in the achievement of academic and social intelligence and towards it among the students of Taibah University.

The experimental method was used with semi-experimental design, and a number of tools were used, such as the achievement test, the social intelligence scale, and the attitudes of female students towards using some Google educational applications.

The researcher concluded the need to use participatory education through the integration of Google applications in the curricula for the development of academic achievement and towards it [3].

Hassan, (2014): The aim of the study was to find out the effect of using some Google educational applications in developing the cognitive aspect of the skills of designing electronic courses and the skillful performance of course design [6].

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Koodichimma, Ezendu Ariwa study, (2015), which aims to explore the benefits of cloud computing, assess challenges, assess the impact of cloud computing, develop a strategic model for effective cloud computing adoption, and benchmark cloud computing in higher education institutions in Nigeria [16].

Muslimi, (2015): The aim of this course was to investigate the effect of the use of the Google search engine on the development of learning achievement at the levels of memory, understanding and application in the Bloom classification in the computational test of the computer course and the discovery of new teaching methods for the educational process by harnessing cloud computing for education [8].

Alzahrani, (2015): Aimed at understanding the reality and expectation of applying cloud computing in education at Al Baha University and identifying obstacles and barriers that may impede the use of cloud computing and finding solutions and recommendations that will help the teacher to use cloud computing for learning in higher education and knowledge. Needs of the cloud infrastructure used in higher education [13].

3. Research Procedures
3.1. Experimental Design:

The researcher used the design of the test-equivalent groups to be experimental design for this research. The experimental groups are taught using cloud computing, a group that is collectively taught using cloud computing through a search engine, Google, and a group that uses cloud computing individually Google, and the control group is taught in the usual way.

3.2. Research Community:

The study population consists of all students who are studying in the first grade in the computer systems department at the Technical Institute of Nassiriya, the Southern Technical University for the academic year 2015-2016, with 92 students.

3.3. Research Sample:

A random sample of the research community was used. It consisted of 66 students. It was divided into three groups of equal number and equal in a number of variables affecting the safety of experimental design of the control group and two experimental groups. These variables are:

- Students' results during the first semester
- The economic level of the student's family
- The cultural level of the student family
- Tribal trends of learning among students

3.4. Research requirements:
3.4.1. Determination of subjects:

The researcher identified six topics of the curriculum, for the subject of theoretical algorithms.

3.4.2. Determination of teaching objectives:

The researcher formulated specific teaching objectives that can be observed and measured in accordance with the general objectives of the study subject, and presented to a number of specialists to indicate their validity and calculated the degree of agreement between them according to the Cooper

equation and set goals after the amendment and by agreement (80%) to be teaching objectives Should be achieved after the completion of the experiment.

3.4.3. Preparation of teaching plans:

The researcher prepared six teaching plans for each of the three groups in order to teach students according to them during the lecture. And presented to a number of specialists and amended according to their observations.

3.5. Research tools:
3.5.1 Final collection test:

The researcher prepared a final collection test of the type of multiple choice consisting of (30) questions aimed at (measuring the theoretical information acquired by the students in the selected subjects of the theoretical algorithms that were studied after the completion of the teaching process), and extracted his virtual honesty by presenting a number of The experts to clarify their observations, and modified some questions and was adopted Cooper's agreement to the agreement of the arbitrators by (80%).

3.5.1.1. Extracting the validity of the test:

For the purpose of conducting the statistical analysis of the test was applied to a sample of non - research sample and extracted the discrimination and difficulty and the effectiveness of the wrong alternatives to the test questions using the appropriate statistical methods. It turns out that all the questions are distinctive, their difficulties are appropriate, and the wrong alternatives are good, so the test is honest.

3.5.1.2. Extraction of the stability of the test:

The method of re - application was used on the same survey sample after two weeks after the first application. The stability coefficient was calculated using Pearson correlation coefficient (0.85) and the coefficient of stability of the Kronbach-Alpha equation was 0.89. The test is therefore fixed and valid for application in its final form on the research sample.

3.5.2. Scale students' attitudes to the use of cloud computing:

The researcher prepared a 20-question scale designed to identify students' attitudes to using cloud computing using known steps. This measure aims at identifying the students' attitudes towards the use of cloud computing according to the five-dimensional Likert scale. The instructions were presented to a number of specialists based on Cooper's equation to calculate the degree of agreement between them.

3.5.2.1. Extracting the validity of the scale:

The statistical analysis of the scale was carried out by applying it to a survey sample without the research sample. The discrimination coefficients and the degree of consistency of the vertebrates were extracted with the degree of the total scale using the appropriate statistical methods, all the paragraphs were distinct and consistent between them and the paragraphs of the total scale and thus the meter is honest.

3.5.2.2. Stability of the measure :

The method of re-application was used on the same survey sample two weeks after the first application of the scale. The coefficient of stability using Pearson correlation coefficient was (0.80). The

coefficient of stability of the Kronbach-alpha equation was calculated (85.0) and thus the meter was fixed and valid for application in its final form.

3.6. Implementation of the research:

3.6.1. Apply the trend scale to students of the three groups at the same time.

3.6.2. Analysis of the results of the responses of students on the trend scale and the observation of the absence of statistically significant differences between the three groups.

3.6.3. Teaching the three groups to reduce the impact of external variables on the search results according to the study plans for each group. As follows:

- The traditional method of instruction was adopted only for the control group.
- The standard teaching method plus the use of Google for cloud computing purposes was adopted collectively within the laboratory hall and under the supervision of the subject teacher.
- The standard teaching method plus the use of Google for individual cloud computing purposes was adopted outside the laboratory hall and followed by the subject teacher.

3.6.4. The experiment lasted for six weeks.
3.6.5. Application of the final collection test to the students of the three groups at the same time.
3.6.6. Re-apply the trend scale to the students of the three groups at the same time.
3.6.7. Re-application of the final achievement test for students of the three groups together and at the same time three weeks after the first application to be a test to retain information.
3.6.8. Analysis of the results of the tests and the scale using appropriate statistical methods.

3.7. Statistical means:

The researcher used the statistical program (SPSS) to conduct the equivalence process for the students of the two groups and to extract the validity and consistency of the tests and the form and analysis of the results of the research and the significance of the statistical differences.

4.The Study Results

4.1.The study results :

From tables (1, 2, 3) we find that:

Achievement :

- There were statistically significant differences (0.05) between the mean scores of the control group and the first experimental group in the final achievement test. For the first experimental group
- There were statistically significant differences (0.05) between the average scores of the control group and the second experimental group in the final achievement test. For the second experimental group
- There were statistically significant differences (0.05) between the mean scores of the first experimental group and the second experimental group in the final achievement test. For the first experimental group.

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Table (1): Results of achievement:

calculated T value	standard deviation	arithmetic mean	The Groups	Hypothesis
5.334	10.118	64	Control group	1st.
	8.579	81.117	First experimental group	
2.880	10.118	64	Control group	2nd.
	8.951	73.411	Second experimental group	
2.569	8.579	81.117	First experimental group	3rd.
	8.951	73.411	Second experimental group	

Directions :
- There were statistically significant differences (0.05) between the mean scores of the control group and the first experimental group in the trend scale. For the first experimental group.
- There were statistically significant differences (0.05) between the mean scores of the control group and the second experimental group in the trend scale. For the second experimental group.
- There were statistically significant differences (0.05) between the mean scores of the first experimental group and the second experimental group in the trend scale. For the first experimental group.

Table (2): Results of students' attitudes

calculated T value	standard deviation	arithmetic mean	The Groups	Hypothesis
6.881	7.328	64.6	Control group	1st.
	7.012	82.6	First experimental group	
3.476	7.328	64.6	Control group	2nd.
	6.188	73.2	Second experimental group	
3.897	7.012	82.6	First experimental group	3rd.
	6.188	73.2	Second experimental group	

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Keeping information :
- There were no statistically significant differences (0.05) between the mean scores of the control group and the first experimental group in the retention test. For the first experimental group.
- There were no statistically significant differences (0.05) between the average scores of the control group and the second experimental group in the retention test. For the second experimental group.

- There were no statistically significant differences (0.05) between the mean scores of the first experimental group and the second experimental group in the retention test. For the first experimental group.

Table (3): Results of retention of information:

calculated T value	standard deviation	arithmetic mean	The Groups	Hypothesis
6.856	10.275	60.294	Control group	1st.
	6.770	80.705	First experimental group	
3.445	10.275	60.294	Control group	2nd.
	9.366	71.882	Second experimental group	
3.156	6.770	80.705	First experimental group	3rd.
	9.366	71.882	Second experimental group	

4.2. Discussion of the results :

From the results of the research, we note the significant positive benefits obtained by the use of cloud computing in the teaching of algorithms to be a positive factor in student learning.

The results indicate that applications of cloud computing are important in the educational process and this requires searching for the most effective ways and means through the use and appropriate times.

The two experimental groups received an additional opportunity to learn through the use of cloud computing to obtain additional reinforcement information on the subject matter studied, as well as additional time to increase their learning and comprehension of the subject matter more than did the students of the control group. This led to the consolidation of the information they studied and opened new horizons for them to learn more.

Where cloud computing in learning algorithms was an interesting learning method, making students eager to use it for learning, and making this information more compelling to the students of the control group than the results of the final achievement test in which they obtained high grades, and the survival of this information for longer and more established This is what was observed in the test of the retention of information that was carried out without prior notice to the students. It also led to the development of students' attitudes towards using cloud computing in learning.

It was also observed that the first experimental group that used cloud computing individually outside, at the time of the regular lecture, had surpassed the collection and retention of information and trends on the second experimental group that used cloud computing during the regular lecture. This shows the advantage of using cloud computing outside the usual lecture.

4.3. Conclusions :

Through the results of the research we conclude the following:

- Use of cloud computing to teach algorithms have a positive impact on student achievement.
- The use of cloud computing to teach the algorithms have a positive impact in the retention of students information.
- Using cloud computing to teach the subject of algorithms have a positive impact in the development of students' attitudes towards cloud computing
- The use of cloud computing to teach algorithms separately outside the lecture time has a more positive impact than the use collectively in the lecture in the collection of students and their attitudes and retention of information.
- The use of cloud computing to integrate with the regular lecture is a useful method in the educational process.
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4.4. Recommendations:

Through the results of the research we recommend the following:

- Use of cloud computing in the teaching of algorithms to develop their normal teaching methods.
- Emphasize the positive role of the student and individual learning in the educational process.
- Urging teachers and technical trainers on the importance of using e-learning techniques and applications in the various process of theoretical teaching and practical training in university institutions and involvement in training courses in this area.
- Benefit from the results of applied and experimental research in the field of e-learning and cloud computing and its introduction in the field of actual application of the development of the educational process.

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