

Effect of three-dimensional tutorial on cognitive achievement of anatomy for students of the faculty of physical education for boys-Benha University

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Abstract

The research aims to identify the effect of a 3D tutorial on cognitive achievement of anatomy for students of the faculty of physical education for boys -Benha University . The study sample consist of (90) students were divided into three equal groups each group include (30) student, The results An improvement for the experimental group 1 and 2 in the cognitive achievement of a substance anatomy, The researcher recommended using three-dimensional programs in the teaching of anatomy

Keywords: Three-dimensional human anatomy atlas teaching anatomy

Introduction

Scientific progress has become one of the most important features of information technology we live in and which spread to all branches and fields of different Sciences, making us keep up with this development and we blend in and live with and we imitate him until we become an integral part of the life of modern societies.

And the educational process under modern technological became strong and based on modern teaching techniques and to achieve the goals of

various educational institutions, Mustafa Mohammed Abdel Samya indicates (1999) that the use of educational technology in university teaching leads to better teaching and more effective than a conviction of faculty teaching techniques, and forming positive attitudes towards use in the teaching process, as well as knowledge and skills must be developed to deal with this new technology(Mustafa Mohammed,1999p62)

research problem

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And human anatomy atlas program exposure of medical 3D educational programmes and depends on human anatomy (great organ-muscular-nervous system) as the program allows the user to access the part you want to study and see the different organs of the human body in more detail make the picture rounded and keep off in all directions which helps user to see this part of all sides and lets him Coloring this part in color as the user sees fit

(<http://cdblog2013.blogspot.com/2015/01/3d-human-anatomy.htm>)

The researcher finds that using human anatomy atlas in education helps to create an active learning environment depends on the dazzling element in Accurate details to exciting interaction they bring user to attachment in reality which makes the user recognizes the finest detail

Research Objectives

The research aims to identify the effect of a 3D tutorial on cognitive achievement of anatomy for students of the faculty of physical education for boys - Benha University

-The effect of using traditional methods on cognitive achievement of anatomy for students of the Faculty of physical education for boys- Benha University

-The effect using the traditional methods in addition to 3D program (Human anatomy atlas) on cognitive achievement of anatomy for students of the Faculty of physical education for boys - Benha University

The effect of using self-learning method using mobile phone for human anatomy atlas (3D program)) on cognitive achievement of anatomy for students of Faculty of physical education.

Research hypotheses

- There are statistical significance differences between pre and post test measurements for control group in cognitive achievement test in favor for post test measurement

- There are statistical significant differences between pre and post test measurements for study group 1 (one) in cognitive achievement test in favor for post test measurement

- There are statistical significant differences between pre and post test measurements

for study group 2(two) in cognitive achievement test in favor for post test measurement - There are statistical significant differences between three research groups in post test measurements in cognitive achievement test in favor for post test measurement to all study groups(one – two).

Method

Design: The researcher used the experimental method for three groups {study group (one- two) and one control group} to suits the nature and objectives of the research.

sample: The selection of students in study sample intentionally from first year in the faculty of physical education for boys in benha University year 2015/2016, the total number of first year in the faculty (704) students divided

as follows (310 Relative newcomer-322 Egyptian students- 72 deposit student). The researcher excluded relative newcomer, deposit student and student not regular in attendance. The study sample consist of (90) students were divided into three equal groups each group include (30) student.

number of students participating in the exploratory study (30) students from first year, faculty of physical education for boys, Benha University year 2014/2015.

Homogeneity of the research sample

Researcher conducting research sample homogeneity in the following variables: (age – length – weight – level of intelligence).

**Table (1)
The homogeneity of the research sample in some basic variables under consideration N (1) =N (2) =N (3) =30**

Variable	Medium	Mean	Standard deviation	Skewness coefficient
Age	١٦.٩٧٩	17	٧٣٤١.	.035
Level of intelligence	٣٦.١٣	٣٧	٢.٤٨٦	٢.٢٢

Table (1) indicates that, the Skewness coefficient was between ± 3 for each age,

and level of intelligence. Which suggesting homogeneity

of the sample under investigation. After ensure that the tests and measurements free from distributions moderate was conduct the Skewness coefficient the researcher a

divided sample into three groups (study group 1 – study group 2 — control group) each groups consist of (30) students to perform their equivalence in the variables under consideration.

Table (2)
Variance analysis in one way between three research groups in basic variables under consideration (age – high IQ)
N(1)=N(2)= N(3)=30

Variable	Source of variance	Total of square	Degree of freedom	Average of squares	F	Significance
Age	Between groups	1.067	2	.533	1.604	Not significance
	Inside groups	28.933	87	.333		
	Total	30.000	89			
Level of intelligence	Between groups	30.689	2	15.344	2.632	Not significance
	Inside groups	507.267	87	5.831		
	Total	537.956	89			

(* F) test significance at 0.05 level, and degree of freedom = (3.09)

Table (2) reveal that, F significance level at 0.05, but not have statistical significant, F index value were greater than calculated F value in all study variables Which indicates the presence of equal between three study groups (Age – high level of intelligence)

Tool of data collection:

(A)Tools and equipment used in the research:

- A. Human anatomy atlas program index (1)
- B. Students data registration form (length – weight – age)index (2)
- C. Intelligence question (IQ) test for (Dr. Ahmed El Sayed Khairy) the test consists of 42 questions graded in difficulty and includes different samples of actual function (Concentration,

attention, recognize difference between shapes, verbal reasoning and numerical reasoning) this test applied to different studies and validity and reliability coefficient respectively 0.522, 0.881 this demonstrates that with a high degree of reliability and honesty of reliable to use in this search index (3)

D. Computers index (4)

E. Data Projector Show index (5)

F. Computer disc

G. A knowledge test form design test to determine the level of academic achievement for students of the first year at the Faculty of physical education for boys in Benha index(6)

Steps of Implementation of the study

1- The exploratory study :

• First exploratory study

The researcher conducting the first exploratory on a sample of (30 students) first year students, Faculty of physical education for boys with benha University year 2014/2015 excluded from original research sample from 20-4-

2015 till 25-4-2015 first exploratory sample.

With a view to identify scientific cognitive test transactions (coefficient of difficulty – coefficient of discrimination) index (14)

• Second exploratory study

The researcher conducting the first exploratory on a sample of (30 students) first year students, Faculty of physical education for boys with benha University year 2014-2015 excluded from original research sample from 1-5-2015 till 15-5-2015 on first exploratory sample.

With a view to

- Test validity and reliability used in the research index (15)
- Make sure tools and devices probability function used in measurements of search.
- Make sure places of research suitable for application of program.
- Try to apply of educational program and identify understanding abilities of students.

General field work for the implementation of the program

The researcher scans of Arab and English reference of another studies on international information network in the field of descriptive and functional anatomy and take opinion of experts in determining software distribution program, so that the researcher identified the following:

-Duration of time for program (9 week)

-Time of teaching units (90 minutes)

Appropriate content in each unit:-

Preparations (15 minutes)

-Part of tutorial (60 minutes)

-Closing (15 minutes)

Field work

First: Study sample

First: Control group uses the traditional method in teaching

Second: Study group one (1) uses the traditional method in addition to human anatomy atlas program by the teacher

Third: Study group two (2) uses self-learning method through downloading human anatomy atlas program application on the mobile phone

Second: Test and measurement

Pre test: Researcher conducting pre measurement test for the three study groups {control- study group (one), study group (two)} in Faculty of physical education for boys from 1/2/2016 to 3/2/2016.

Post test: Researcher conducting post measurement test for the three study groups {control- study group (one), study group (two)} in Faculty of physical education for boys from 25/5/2016 to 27/5/2016

Statistical Work

Mean - Median - Standard deviation- The correlation coefficient- Skewness -T Test - Percentage improvement

Results

The results

Table (3)
The statistical significance differences between (pre-post) for the control group in cognitive side N=30

	Variables	Unit of measurement	Pre test		Post test		difference average	T test
			Mean	Standard deviation	Mean	Standard deviation		
١	Principles of Anatomy	Degree	٧.٠٠	٤٦٦	٦.٠٦٦	٨٦٨	-٠.٣٦٦	*٣٣.٠٣
٢	Skeletal system	Degree	٧.٠١	.595	٧.٠٦٦	.739	-٦.٣٦٥	*٣٤.٨٩
٣	Muscular system	Degree	.٨٦٦	٣٤٥.	٧.٢٣٣	٦٧٨.	-٦.٣٦٦	43.12*
٤	Joints	Degree	1.066	.583	٧.433	.817	٦.37	31.75*
٥	Terminology	Degree	.633	.490	٨.10	.922	-7.466	40.57*
٦	Total	Degree	3.96	1.188	35.90	1.493	-31.93	82.03*

T) indexes value test significance at 0.05 =2.04(

Table(3) shows that, that there were statistically significant differences between pre and post test for control group in cognitive achievement, The (t) value was limited and confined

between(31.75:82.03),were (T) test index value smaller than calculated (t) test value at 0.05, Which indicates the presence of statistical significant differences.

Table (4)
Statistical Significant differences between (pre-post) to study group one (1) in cognitive side N=30

	Variables	Unit of measurement	Pre test		Post test		difference average	T test
			Mean	Standard deviation	Mean	Standard deviation		
١	Principles of Anatomy	Degree	.533	.507	8.866	.628	8.33-	51.62*
٢	Skeletal system	Degree	.800	.714	12.66	١.241	-11.866	44.99*
٣	Muscular system	Degree	.966	.556	11.200	.761	-10.23	52.25*
٤	Joints	Degree	.933	.583	10.600	.498	-9.66	65.99*
٥	Terminology	Degree	.533	.507	11.33	.922	-10.800	51.41*
٦	Total	Degree	3.766	1.906	54.66	2.24	-50.900	80.63*

(T) indexes value test significance at 0.05 =2.04

Table (4) Illustrated that, that there were statistically significant differences between pre and post test for study group one (1) in cognitive achievement, The (t) value was limited and confined

between(4.93:80.63),were (T) test index value smaller than calculated (t) test value at 0.05, Which indicates the presence of statistical significant differences.

Table (5)
Significant differences between (pre -post) to study group two (2)
in cognitive side N=30

	Variables	Unit of measurement	Pre test		Post test		difference average	T test
			Mean	Standard deviation	Mean	Standard deviation		
١	Principles of Anatomy	Degree	.700	.466	9.300	.651	-8.600	*57.89
٢	Skeletal system	Degree	.833	.698	13.60	1.32	-12.76	*48.07
٣	Muscular system	Degree	.871	.427	11.51	.625	10.64	*78.51
٤	Joints	Degree	1.10	.607	10.83	.379	-9.73	*67.92
٥	Terminology	Degree	.645	.486	11.51	.674	-10.87	*71.52
٦	Total	Degree	.633	.490	56.8	2.74	-56.16	*109.7

T) Indexes value test significance at 0.05 =2.04(

The table (5) show that, there were statistically significant differences between pre and post test for study group two (2) in cognitive achievement, The (t) value was limited and confined

between(١.٠٩.٧:٤٨.٠٧),were (T) test index value smaller than calculated (t) test value at 0.05, Which indicates the presence of statistical significant differences.

Table (6)
Variance analysis for post test measurements for all study groups

Variables	Source of variance	Total of square	Degree of freedom	Average of squares	F	Significance
Principles of Anatomy	Between groups	184.82	2	92.411	176.18*	Significance
	Inside groups	45.63	87	.525		
	Total	230.45	89			

Follow Table (6)
Variance analysis for post test measurements for all study groups

Variables	Source of variance	Total of square	Degree of freedom	Average of squares	F	Significance
Skeletal system	Between groups	749.15	2	374.578	291.61*	Significance
	Inside groups	111.73	87	1.284		
	Total	860.89	89			
Muscular system	Between groups	343.356	2	171.678	358.75*	Significance
	Inside groups	41.633	87	.479		
	Total	384.989	89			
Joints	Between groups	216.422	2	108.211	306.32*	Significance
	Inside groups	30.733	87	.353		
	Total	247.156	89			
Terminology	Between groups	222.822	2	111.411	154.26*	Significance
	Inside groups	62.833	87	.722		
	Total	285.656	89			
Total	Between groups	7935.4	2	3967.744	802.46*	Significance
	Inside groups	430.1	87	4.944		
	Total	8365.6	89			

F) value test significance at 0.05 =3.74(

Table (6) indicates that, calculated F test value greater than index value in all study

variable. Which indicates the presence of statistical significant differences.

Table (7)
I.S.D test for study group {control study- group one (1)- study group two(2)}

Variables	Groups	Mean	Standard deviation	Control group	Study group one (1)	study group two (2)
Principles of Anatomy	control study	6.0667	.868		*.۲.۸۰	*3.23
	group one (1)	8.8667	.629			-.433
	study group two(2)	9.3000	.651			
Skeletal system	control study	7.0667	.7396		*5.60	*6.53
	group one (1)	12.6667	1.241			*.933
	study group two(2)	13.6000	1.328			
Muscular system	control study	7.2333	.67891		*3.96	*4.30
	group one (1)	11.2000	.76112			.333
	study group two(2)	11.5333	.62881			
Joints	control study	7.4333	.81720		*3.166	*3.400
	group one (1)	10.6000	.49827			.23333
	study group two(2)	10.8333	.37905			
Terminology	control study	8.1000	.92289		*3.23	*3.43
	group one (1)	11.3333	.92227			.200
	study group two(2)	11.5333	.68145			
Total	control study	35.9000	1.49366		*18.76	*20.900
	group one (1)	54.6667	2.24888			*2.133
	study group two(2)	56.8000	2.74678			

Table (7) Illustrated that, there are statistical significance differences between post test measurements for all study groups {control-study group one (1)-study group two(2)}.

Discussion

Discuss the first hypothesis:

There are statistical Significant differences between pre and post test measurement for control group in cognitive achievement in favor to post test measurement

Table (3) illustrated by that there were statistically significant differences between pre and post test measurement for control group in cognitive achievement, the (t) value was limited and confined between (31.75 :82.03), were (T) test index value smaller than calculated (t) test value at 0.05, which indicates the presence of statistical significant differences.

The researcher requires the advances to show the effect of tutorial applied to control group using the traditional style which lead to an improvement in the level of the control group in addition to the teacher's role in answering questions for students and review on parts of the program that is explained to students in

the end of lecture, which lead to improving students knowledge requirements (question)

This is study consistent with the study of **Ahmed Shawqi Mohammad (2010)** where the important of traditional method emphasizes the they play role in improving the cognitive achievement of students, as a teacher have a greater role in the planning and implementation of lesson, there is contact with the students, the teacher helps identify communication requirements for students, help it to reach positive results and improve the educational process.

The validity of this hypothesis achieved: statistical significant differences between pre and post test measurement for control group in cognitive achievement in favor to post test measurement.

Discuss the hypothesis:

There are significant differences between pre and post for study group one (1) in cognitive achievement in favor to post test measurement.

Table (4) illustrated that there were statistically significant differences between pre and post test measurement for study group one(1)

achievement, the (t) value was limited and confined between (80.63: .934) were (T) test index value smaller than calculated (t) test value at 0.05, which indicates the presence of statistical significant differences.

The researcher attributed this progress to use the study group one (1) traditional explanation method in addition to the 3D program human dimensions 3D anatomy atlas. This method provides an opportunity for students to see the parts that are explained in the lecture, so that this program is a tool for interactive simulation that allows students to explore the human body in 3D technology, and easy to use and allow students an element of suspense and attract attention through opportunity to coloring process parts that are studied in color, also provide factors for the student to apply element for more excitement and remove being bored and negative feeling experience from use the traditional method (21).

This study consistent with the results of each study of **Eglal Ali Hassan (2003)**, **Sally Mohamed Mohamed**

(2005), **Ahmed Talat Abuo Zad (2007)**, **Ibrahim Ibrahim Abdo (2009)** where a successful education depends on detection and experimentation and it comes only from traditional education, but that provide the learner with information, knowledge and use of modern technology methods that contribute to increase the efficiency of the learning process and improve the final product of the educational process.

The validity of this hypothesis achieved: statistical significant differences between pre and post for study group one (1) in cognitive achievement in favor to post test measurement.

Discuss the hypothesis:

There are statistical significant differences between pre and post for study group two (2) in cognitive achievement in favor to post test measurement.

Table (5) Illustrated that there are statistically significant differences between pre and post test for study group two (2) in cognitive achievement, the (t) value was limited and confined between (109.7:48.07) was indexed value smaller than calculated

value at (0.05), which indicates the presence of statistical significant differences.

The researcher attributed that to use the study group two (2) for self-learning method by downloading application of 3D human anatomy atlas on the mobile phone and allow the student to deal with program. Provide students search for multiple levels of human anatomy can view various body parts, down to the smallest parts and allow the student to understand how the human body away.

Also Johnson Jonassen, D (2001) mentions that the purpose of using self learning is given time to work individually with student privacy and help to achieve and satisfy the desires of the student.

This Results of the study confirms with **Ahmed El Sayed(1999), Zeinab Mohammed (2000), Abdullah Mohammad (2000), Esam El-Din Abbas (2000), Emad Abd El Ghani (2000)** on the importance of using technology in teaching process to keep pace with the technological development and even keep up with the new requirements of the students

generation and interact with them, we can provide an educational product fit in the mental abilities and the saturation of their desires and ambitions.

The validity of this hypothesis achieved: there are statistical significant differences between pre and post test for study group two (2) in cognitive achievement in favor to post test measurement.

Discuss the hypothesis:

There are statistical significant differences between all post test for groups {control- study group one (1) - study group two (2)} in cognitive achievement in favor to all post test measurement for all study group.

table (6) illustrated that arithmetic mean of post test measurements for groups {control- study group one (1) - study group two (2)} in cognitive achievement, statistically significant differences between post test measurements for groups {control- study group one (1) - study group two (2)} in cognitive achievement test in favor post test for two groups {study group one(1) and study group two (2)} to

illustrate the differences into using (L.S.D)

table (7) shows that, there are statistically significant differences between two post test measurement for groups {study group one (1) - study group two (2)} in favor to post test measurement of study group two(2)

the reasons for statistically significant differences between post measurements for groups {control – study group one (1) - study group two (2)} in cognitive achievement test for post test measurement of groups {study group one (1) - study group two (2)} to use two study group(one and two) traditional learning method in addition to 3D software 3D dimensional human anatomy atlas and use study group two(2)for self-learning style through the use of a mobile phone by downloading 3D application of human anatomy atlas dimensions.

The researcher returns an statistically significant differences between the study group one(1) and study group two (2) in favor study group two(2) because using of study group two 2 self-learning method by

downloading the software application on the phone which features the adoption of student and student find information away from the usual constraints imposed by the traditional method or lecture this method also works on individual differences between students, where every student is commensurate with his abilities and aptitudes and potential resulting in Performance plus

This results are consistent with the results of the study both **Afaf Abdel Karim Hassan (1994), Ahmed Abdel kader (1999), Ahmed Yusuf Ahmed Ashour (2002), Kai Cais.X (1995), Ahmed Mohamed (2005), Ahmed Shawqi (2010)** that one of the main differences between the traditional methods of learning and self-learning method is to use the time in traditional methods of each learner response method directly from master signal, either self-learning method there is a period of time available for the learner to practice and take Making the teacher when instructing learners to go to start

Discuss the hypothesis:

Statistically significant differences between post test measurement for groups {control – study group one (1)-study group two (2)} in favor to post test measurement to study groups

Conclusions and recommendations

Conclusions

In light of study results and research sample and its characteristics based on statistical and program proposed of 3D tutorial on cognitive achievement of anatomy for students of the Faculty of physical education for boys-Benha University the following could be concluded:

A. There are statistically significant differences between pre and post test measurement for control group in cognitive achievement in favor post test measurement

B. There are statistically significant differences between pre and post test measurement for study group one(1)in cognitive achievement in favor post test measurement

C. There are statistically significant differences between pre and post test measurement for study group two(2) in cognitive achievement in favor post test measurement

D. There are statistically significant differences between arithmetic mean for post test measurement for three study group {control –study group one (1)-study group two (2)} control group used the traditional method and study group one (1) used traditional method in addition to the 3D human anatomy atlas program and study group two (2) using self-learning method through downloading on mobile phone for human anatomy atlas 3D program)) in cognitive achievement test for post test measurement in favor study group (one and two).

Recommendation

In light of the study, research sample and study results based on the findings of this study can recommend the following:

A. The 3D program guide in teaching curriculum of sport health sciences

B. Take benefits from this study and program used in other design other programs.

C. Further research in the using of other 3D programs.

D. Using human anatomy atlas in teaching curriculum of descriptive and functional anatomy lectures

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