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Effect of YouTube on Performance of Secondary School Students in Biology Concepts in Ikwerre Local Government Area of Rivers State

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Abstract: *The study was carried out to find the effect of YouTube on the performance of students in secondary schools. Four (4) research questions, three (3) hypotheses were raised, answered and tested at 0.05 level of significance. Quasi-experimental design was employed by using pre-test post-test control group. Population is 2,221 SS2 Biology students in13 secondary schools in Ikwere Local Govt. Area of Rivers. A sample size of 109 students from two schools using purposive sampling technique was used. The instruments Biology Performance Test (BPT) was validated by science education experts. A reliability coefficient of r=0.95 was calculated using Pearson's Product Moment Correlation Formula. Mean and standard deviation were used to answer the research questions while t-test was used to test the hypotheses. The findings show that YouTube improves students 'performance. The findings also showed that the control group also performed better, there was no significant difference in the mean scores of both male and female students, it was then concluded that despite the urge and need to blend traditional classroom teaching/learning with some online YouTube contents, students can still perform better when taught concepts in Biology using enhanced conventional teaching method. It was recommended that educators should blend their teaching of curriculum contents using YouTube.*
Keywords: *YouTube, Concept of Cell Division, Students' Performance,*

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I. Introduction

In Education, the aim is always to ensure that students achieve the intended learning objectives. Teaching and learning are important element in education. The teacher uses different approaches and strategies to teach in order to make their students active learners.

One of the aims of Education is to inspire and enable individuals to develop their abilities to the highest potential levels throughout lifetime, so they can grow intellectually, well equipped for work, and be able to contribute effectively to society and achieve personal fulfillment, thereby improving their knowledge and understanding for their own sake and to render the application of the knowledge to the growth of the economy and society. (www.nap.edu)

Science is the foundation of modern day technological breakthrough. It has contributed immensely to the realization and advancement of the contemporary world and it is the bedrock of this present day technological breakthrough. (Gbamanja1999)

The major goal of science education is to develop scientifically literate individuals that are concerned with high competence for rational thoughts and actions. Science education objectives includes the following: the need to prepare students to observe and explore the environment, explain simple natural phenomena, develop scientific attitudes including curiosity, critical thinking and objectivity, apply the skills and knowledge gained through science to solve everyday problems in the environment, develop self-confidence and self-reliance through problem solving activities in science and many more. In Nigeria, science education is concern with the teaching and learning of scientific concepts, teaching strategies and also proffering solution to learner's problem in the subject area. (www.asaolusam.wordpress.com)

Biology is one of the science subjects that senior secondary school students offer at that level in Nigerian secondary schools. Biology is very important in science and it's a requirement for further learning of a lots of science-related professional courses like medicine, agriculture, pharmacy, etc. In this present Nigeria, greater emphasis is laid on science and technological development, therefore students are being encouraged to take up science-related subjects, and most students prefer the subject Biology. Presently, knowledge acquired from Biology embedded in almost all the field of human endeavor, and plays fundamental role in educational advancement as well as obvious for technological advancement in today's world due to scientific investigations. However, it is a known fact that there is high rate of failure in Biology as a subject in most secondary schools in Nigeria, (www.societyofbiology.org 2010)

Studies have shown most difficult topics in Biology in descending order of difficulty include: classification, Mendalian genetics, protein synthesis, cell division (mitosis and meiosis), genes and chromosomes, skeletal system, cellular respiration, the Calvin cycle and evolution. According to Danso (2016) the reasons why students experience challenges when learning these difficult topics are that the topics were characterized by complex terms and vocabulary, the abstract nature of the topics, the broad nature of the topics, teachers not conducting practical laboratory work but taught theoretically, lack of teaching/learning resources, and teachers' failure to cite practical examples students can relate with.

A statement by Lawal (2006) Confirmed that poor performance in Biology are often traceable to the poor scores obtained from practical works. The growing integration and use of YouTube transform the traditional teacher-driven learning style into a more interactive, self-directed and flexible mode as per the needs, interest, style and abilities of the learners. In recent years, it has become a platform for getting students involved in practical learning

A well-known fact is that practical biology attracts 80 marks as against 60 marks of theory. He presented a case using five schools where high failure rate was linked to poor handling of practical. Earlier, the chief examiner of WAEC report of May/June 2014; indicated that students attempted all the questions and performed well in questions, but their weakness he observed was drawing skills and the practical. This means that the issue of practical activities takes more than the center stage in Biology.

Al-Mukhaini, Al-Qayoudhi and Al-Badi (2014) provided evidence of existing difficulty in the process of fitting the use of technology into the learning experiences of students resulting in a mismatch leading to poor academic performance and additional frustrations for learners. In fact, Sadaf, Newby and Ertmer (2016) and Hew & Brush (2007) shared the opinion on the fitting of a broad spectrum of Web 2.0tools to teaching specific subjects in the contexts of teachers and pupils.

Studies also have shown that the use of instructional media such as YouTube have improved achievement and students' performance. (George, 2008 and Nwagbo 2006)

A researcher also thinks that the reasons why students experience challenges when learning these difficult topics are: the topics were characterized by complex terms and vocabulary, the abstract nature of the topics, the broad nature of the topics, teachers not conducting practical laboratory work but taught theoretically, lack of teaching and learning resources, and teachers' failure to cite practical examples students can relate with. Danso (2016). He also feels that some teachers could not handle the difficult topics because of their poor explanation of concepts.

Reports of literature on student's poor achievement trend in Biology particularly to the lack of instructional resources in schools are due to poor funding. This is a great challenge for principals since they cannot provide the teachers with adequate instructional material. George, (2008).Studies also have shown that the use of instructional media such as YouTube have improved achievement and students' performance. (George, 2008 and Nwagbo 2006)

YouTube is a website that enables free video sharing and makes it easy to watch videos online. It is also a public communications site online. The site is free for all registered users to upload and watch videos online. The uploaded videos can also be watched by anybody. The videos are anything from beginner videos to more professional videos including Educational Videos. YouTube being very popular has become one of the most used website and a large resource for educational content. The site has millions of videos tagged as educational, many of them uploaded by teachers, students and researchers. (Hicks 2015).YouTube is not only meant for digital entertainment but it can also be a great environment for learning and should be used in eLearning, which can truly benefit your eLearning audience. (www.elearningindustry.com)

Jones &Cutherll (2011) cited the possible uses of YouTube in the educational process, stating that YouTube videos can be used directly in the classroom as part of the teaching/learning process. They are usually used to introduce and explain some new concepts even while teaching by displaying information for the class to see, or at the end of the lesson to recommends some websites. YouTube videos can also be used as an educational resource, where the teacher uses the video as a model for classroom activities and discussions. Universities and Schools are currently incorporating free video platforms like YouTube into their classrooms activities. YouTube Sessions are produced either by teachers, content developers or lecturers themselves, using some learnable software like webcam one can easily upload educational contents to YouTube. The link is then attached in the course contents where the students can watch it at their convenient or on demand. These videos shared can be made public or private.

In a study, research showed that providing several online options in addition to traditional classroom training actually increased what students learned. This also indicates that student's satisfaction and interaction improved, allowing students learn more when blended learning is incorporated in courses. (Leonard and DeLacey, 2002).

Researcher Berk (2009) thinks that YouTube video in a science class will improve presentations, since more sense are alerted. He encourages schools to add instructional technology to their science classroom to grab

students' attention, focus students' concentration, generate interest in the class, draw on students' imagination, improve attitude toward content and learning and to make learning fun. This will go a long way in building the scientific attitude in the students

Statement of the problem

Biology as a subject has several abstract topics which may pose difficulty in presentation during instructions. In recent times, teachers are force to look for alternative ways of making abstract concepts come alive and real. Most teachers do not use visual aids as instructional materials. This possess a lot of barriers to teaching/learning process and affects the learning outcomes directly.

The teaching profession is full with countless opportunities to enhance the academic performance of students, while some educational contents will be easy for students to comprehend, other requires you to think productively to make sure that important learning aims and objectives are met. Both mobile and still visual instructional devices are important to enhance quality of instructions if effectively utilized in instructional delivery

Aim and objectives of this study

The aim of the study is to find out the effect of YouTube on the performance of secondary school students in Biology concept in Ikwerre L. G. A of Rivers State

The following objectives guided the study

1. Determine the level of students' performance when taught the concept of cell division using YouTube.
2. Determine the level of students' performance when taught the concept of cell division using enhanced conventional teaching method.
3. Ascertain if students taught the concept of cell division using YouTube perform better than those taught using enhanced conventional teaching method.
4. Compare the effect of using YouTube on male and female student's performance in the concept of cell division.

Research questions

1. What is the level of students' performance when taught the concept of cell division using YouTube?
2. What is the level of students' performance when taught the concept of cell division using ennhanced conventional teaching method?
3. What is the difference in the performances of students taught concept of cell division using YouTube and those taught using enhanced conventional teaching method?
4. What is the level of male and female students' performance when taught the concept of cell division using YouTube?

Research Hypotheses

1. **Ho1**There is no significant difference in mean scores of student's performance after being taught the concept of cell division using YouTube.
2. **Ho2**There is no significant difference in the mean scores of students taught the concept of cell division using YouTube and those students taught using enhanced conventional teaching method.
3. **Ho3**There is no significant difference in the mean score of male and female students' performance after being taught the concept of cell division using YouTube.

II. Methodology

Quasi-experimental design of the pre-test, post-test experimental and control group was used for the study. The population for the study is two thousand, two hundred and twenty-one (2,221) students which comprised of all the Senior Secondary two (SS2) class offering Biology as a subject in all the thirteen secondary schools in Ikwerre Local Government Area, Rivers State, Nigeria. Using purposive sampling techniques, two secondary schools were selected from the population of the study, the sample size of one hundred and nine (109) students were used for the study using an intact class. The research instrumentwas developed by the researcher for this study as Biology Performance Test (BPT) and a face and content validity was done by two Lecturers of Science Education in the Department of curriculum studies and educational technology, and a reliability coefficient "r=0.95" was calculated using Pearson's Product Moment Correlation formula. Mean and standard deviation were used to answer the research questions while t-test was used to test the hypotheses.

Table 1: Sample distribution

S/N	school	group	School type	male	female	Total
1.	**A**	Experimental	Private/mixed	22	34	56
2.	B	Control	Public/mixed	23	30	53
			Total	45	64	109

The research instruments used for the study was Biology Performance Test (BPT). It consisted of 30-items multiple choice test questions for section A. Section B consist of 10-item Yes/No answers. Face and Content validities were ensured by science education experts in the Faculty of Education, University of Port-Harcourt, Port-Harcourt. Using Pearson's Product Moment Correlation, areliability coefficient r=0.95 was calculated. The researcher with the help of a research assistant, administered the pre-test and were retrieved immediately. Treatment was done and post-test administered within three weeks and were also retrieved immediately. Mean and standard deviation wereused to answer the research questions raised, while the hypotheses were tested at 0.05 level of significance using t-test respectively.

III. Results and Discursions

Research Question one: What is the level of students' performance when taught the concept of cell division using YouTube?

Table 2: Mean and Standard deviation of pre-test, post-test scores of students taught the concept of cell division using YouTube

Group	Tests	n	X	SD	Std. Error	Mean Gain
Experimental	**Pre- test**	**56**	**17.39**	**3.808**	**0.509**	**3.11**
	Post-test	**56**	**20.50**	**4.541**	**0.607**	

The table above shows both the pre-test and post-test mean value of the experimental group, that is those taught using YouTube as 17.39 and 20.50 respectively. A standard deviation (SD) of 3.78 was recorded for the pre-test while the post-test standard deviation (SD) of 4.50 was also recorded respectively. The result shows that there was an increase in the mean values, having a mean gain of 3.11

Research Question two: What is the level of students' performance when taught the concept of cell division using the conventional teaching method?

Table 3: Mean and Standard deviation of student's performance when taught the concept of cell division using the conventional teaching method.

Group	Tests	n	$\overline{X}$	SD	Std. Error	Mean Gain
Control Group	**Pre- test**	**53**	**18.10**	**3.682**	**.506**	**5**
	Post-test	**53**	**23.10**	**5.361**	**.736**	

The table above shows that the mean value for the pre-test scores of the control group (The conventional method) was 18.10 and a standard deviation (SD) of 3.682 while the mean value for the post-test score of the same group is 23.10 and a standard deviation (SD) of 5.36 respectively.
The result shows that there was a significant increase in the mean value of the control group with a mean gain of 5.

Research Question three: What is the difference in the performances of students taught concept of cell division using YouTube and those taught using enhanced conventional teaching method?

Table 4: Comparing the mean scores of students' performance when taught the concept of cell division using YouTube and conventional teaching method.

Group	Teaching method	Tests	N	X	Mean Gain
Experimental	Use of YouTube	Pre-test	56	17.39	3.11
		Post-test	56	20.50	
Control	Conventional method	Pre-test	53	18.10	5
		Post-test	53	23.10	

Table 4shows that the pre-test mean score of the experimental group is 17.39 while that of the control group is 18.10, and the post-test mean score of experimental group is 20.50 while that of the control group is 23.10. The mean gain of 3.11 was recorded for the experimental group, while a mean gain of 5 was also recorded for the control group respectively. The mean gain shows that the control group performed better.

Research Question four: What is the level of male and female students' performance when taught the concept of cell division using YouTube?

Table 5: Mean scores of male and female students' performance when taught the concept of cell division using YouTube

Gender	N	Pre-test X	SD	Post-test X	SD
Male	22	16.81	4.7	20.59	5.0
Female	34	17.76	2.93	20.44	4.14

Table 5 The table shows that the pre-test mean score of male students' is 16.81 with a standard deviation SD of 4.73 and the post-test of 20.59 with a SD of 5.01 respectively, while the pre-test mean score of the female students' performance is 17.76 with a SD of 2.96 and a post-test mean score of 20.44 with a SD of 4.14 respectively was recorded. The result shows that there was an increase in the mean value of both male and female students' performance respectively after being taught the concept of cell division

Hypothesis One: There is no significant difference in mean scores of student's performance after being taught the concept of cell division using YouTube.

Table 6: t-test for comparing two means of dependent samples to find the significant difference between the mean scores of students' performance when taught the concept of cell division.

Group	n	$\sum x^1$	$\sum x^2$	D	D^2	df	Sl	t-cal	t-tab	Decision
Experimental group	56	974	1148	-160	1310	55	0.05	-5.43	-2.00	Reject

The table above is the analysis comparing the two mean value to check the significant difference.

Since the calculated t-value of -5.43is greater than the tabulated t-value of -2.00 the null hypothesis under investigation is Rejected at 0.05 level of significance. This means that there was a significant difference in the mean scores of students' performance after being taught the concept of cell division using YouTube.

Hypothesis Two: There is no significant difference in the mean scores students taught the concept of cell division using YouTube and those students taught using the conventional teaching method.

Table 7: t-test for the null hypothesis on the significant difference between the mean scores of students' performance when taught the concept of cell division using YouTube and those taught using enhanced conventional method in Biology at 0.05 significant level under the degree of freedom of 107

Group	variable	n	X	SD	Std. Error	Df	t-cal	t-tab	Decision
Experimental	Post-test	56	20.50	4.541	0.607	107	2.731	1.980	Reject
Control	Post-test	53	23.09	5.361	0.731				

The result in the table above, shows that the calculated value of t = 2.731 is greater than the tabulated value of t 1.980, therefore the null hypothesis under investigation is rejected. That there is a significant difference in mean scores of students' performance in the concept of cell division between the experimental and control groups.

Hypothesis Three: There is no significant difference in the mean score of male and female students' performance after being taught the concept of cell division using YouTube

Table 8: t-test on the significant difference of the mean scores of male and female students' performance when taught the concept of cell division using YouTube

Group	Experiment	Tests	n	x	SD	Std. Error	Df	t-Cal	t-Tab	Decisions
Male	Use of YouTube	Post-test	22	20.59	5.01	1.092	54	0.112	2.00	Accept
Female	Use of YouTube	Post-test	34	20.44	4.14	.720				

The result above shows that the calculated t-value of 0.112 is less than the tabulated value of 2.00 under the df of 54, therefore the null hypothesis is accepted, that there is no significant difference in the mean scores of both male and female students' performances after being exposed to treatment

IV. Discursions of findings

The result gotten from research question one as reflected in table 2 depicts that there was positive effect in the level of student's performance having been taught using YouTube with a mean gain of 3.11.

The test of hypothesis ($\mathbf{Ho_{1)}}$ as contained in Table 6,that the value for t (-5.43) is more than the critical value of t (-2.00) at 0.05 level of significance under the degree of freedom of 55, therefore the null hypothesis under investigation is rejected. That there is significant difference between the mean scores of students' performance after being taught the concept of cell division using YouTube in Biology.

Studies also have shown that the use of instructional media such as YouTube have improved achievement and students' performance. (George, 2008 and Nwagbo 2006).

Research shows that blending the traditional classroom learning with some online contents actually increased what students learn. This also indicates that student's satisfaction and interaction improved. (Leonard andDeLacey, 2002).

The result of research question two as contained in table 3, shows that there was a significant increase in the mean value of the control group with a mean gain of 5. This shows that there was an improvement in the student's performance two weeks after the pre-test. A press released by PRLog (2012) on face to face classroom environment, a researcher shared his experience after taking and teaching courses in both online and traditional classes, he discovered that students consistently get a much more valuable education by learning in a traditional classroom environment. This also agrees with the research carried out by Sitzmann T., Kraiger K., and Wisher R. (2016), when students interact with their teacher and classmates, they create an opportunity to practice good dynamics, cooperative activities and team work. The traditional classroom environment can be made to be very exciting when enhanced with materials like pictures, graphics and some online prints. A good teacher can can make teaching fun since questions get feedback and clarification immediately.

Comparing the performance of the two groups shows that both groups have some level of understanding of the concept taught in Biology prior to the pre-test, also comparing the mean gains of the two groups shows that the students taught the concept in Biology using the enhanced conventional teaching method performed better than those taught using the YouTube.

The calculated t-value of (2.731) is more than the tabulated t-value of (1.980), therefore, the null hypothesis raised by the research question was Rejected. This shows that there was a significant difference in

the performance of students who were taught the concept of cell division using YouTube and those students taught using the enhanced conventional teaching method only.

This result agrees with Young's view that says "Despite its fame, online instruction has yielded inconsistent results when trying to produce positive student outcomes. The study also revealed the fact that despite the urge and need to blend traditional classroom teaching and learning with some online YouTube contents, students can still perform better when taught concepts in Biology using the conventional teaching method. (Young, 2009)."

This does not agree with Garrison research that says that" It has also been argued that learning outcomes will be enhanced when the rich dynamics of fast-paced communication technology are well incorporated into the traditional classroom learning instruction (Garrison et al, 2004)". In a research carried out by Morgan and Collins, they also have this to say" One of the practices that are most often mentioned among those provided by blending is the chance to improve on educational applications prevailing in both blended learning and face-to-face traditional learning environments. Within this framework, computer-centered learning environments such as blended learning can help improve the student-centered learning strategies and activities,thereby helping in the navigation from teacher-centered instruction to a student-centered learning strategies increase student interest towards learning and increase student's consultation services. (Collins 2003, Morgan 2003).

Comparing the performances of both male and female students' performance, the result shows that there was a progressive improvement in the performance of both male and female students both in their mean scores but the female performed better than the male students in the pre-test administered, maybe due to the fact that they were more in number. Gender differences perhaps did not influence students' performance in the concept of cell division in Biology. This contradict the European Union (EU) opinion on gender differences. In science achievement, despite performing equally well as boys in most countries, girls show weaker self-concept in the subject Biology than their males counterpart, that is to say that the boys believe in their ability to study sciences than the girls. Nevertheless, both boys and girls show a considerable level of interest in sciences, and there is no indication that only the boys will take up science courses or jobs in the future. The reason why boys perceive Biological concepts easier than girls could be attributed to socialization factors and classroom experiences leading to low self-esteem and passive dependent behavior among girls. (EU, 2010). The hypothesis test also shows that there was no significant difference

V. Summary of findings

1. There was an increase in the level of student's performance having been exposed to the treatment in the concept of cell division in biology
2. The study also revealed the fact that despite the urge and need to blend traditional classroom teaching and learning with some online YouTube contents, students can still perform better when taught concepts in Biology using the conventional teaching method
3. The study has also shows that there was no significant difference in the mean scores of male and female students' performance irrespective of their learning environment**.**

VI. Conclusions

1. The study shows that use of YouTube enhances students' performance
2. Student can still perform better when the traditional teaching method is enhanced and not necessary taught with instructional technological materials such as YouTube.
3. Both male and female students performed better in their posttest mean scores after being exposed to treatment

Recommendations

1. Since the use of YouTube is connected with differentiated instruction, educators should decide on which curriculum contents will improve their students' abilities and arouse their interest, learning activities
2. Educators should choose a learning environments that best suit the individual needs of the students, by exploring the appropriate conditions, which would entice learners to adopt the new approach thereby improving their learning satisfaction
3. Learning activities can also be changed to use technologies such as YouTube in a classroom to substitutes for biology Practical sections

References

[1]. Al-Mukhaini, Elham M.; Al-Qayoudhi, Wafa S.; Al-Badi, Ali H.(2014) Adoption of Social Networking in Education: A Study of the Use of Social Networks by Higher Education Students in Oman*: Journal of International Education Research,* v10 n2 p143-154 2014.

[2]. Anugom, F.O. (2015) Gender equity and roles in the sustainability of secondary school administration in Nigeria. International *Journal of Gender and Development Issues*, 1(4)1-7.
[3]. AviHofstein, Vincent N. Lunetta (2003) *Laboratory in science educated on: foundation for the 21st century*, wiley periodicals Inc.
[4]. Collins, B. (2003). *Course Redesign For Blended Learning*: Modern Optics for Technical Professionals. *International Journal of Continuing Engineering Education and Lifelong Learning.13*(1/2).
[5]. Collins, R. (2008). Creating the culture for ICT, Communication: A Content Analysis of YouTube Videos Cited in Academic cross-national study. *Educational Research and Evaluation*, 1, 289–317.

[6]. Danso G. (2016)Biology topics perceived as difficult to learn by senior high school biology students in the mampong and ejura-sekyedumase municipalities: *a thesis in the department of science education, faculty of science education submitted to the school ofgraduate studies,* University of education, winneba
[7]. EU., 2010. Gender Differences in Educational Outcomes: Study on the Measures Taken and the Current Situation in Europe. *Education, Audiovisual and Culture ExecutiveAgency* (EACEA P9Eurydice) (http://www.eurydice.org).
[8]. Federal Republic of Nigeria (2004). National Policy on Education. Lagos: NERDC press.
[9]. Garrison, D.R and Kanuka, H (2004) '*Blended learning: uncovering its transformative potential in higher education', Internet and Higher Education,* vol. 7, no.2, pp. 95-105.
[10]. Gbamanja S.P.T. (1999). M*odern methods in Science Education in Africa*, Port Harcourt: paragraphics.
[11]. George, G. O. (2008). Causes of Poor Achievement in WAEC Biology Examinations in TarabaState Secondary Schools. *International Journal of Life Sciences and Technology* 21 (3).
[12]. Hew, K. F., & Brush, T. (2007*). Integrating Technology into K-12 Teaching and Learning: Current Knowledge Gaps and Recommendations for Future Research. Education Technology Research and Development*, 55, 223-252.
[13]. https://www.researchgate.net/publication/268255789_What_makes_biology_learning_difficult_and_effective_Students'_views. Retrieved May 23 2018.
[14]. LawalF.K.(2006) Availability and impact of material resource in achievement in biology in selected secondary school kastina metropolis. *Africa journal of Education and Development Studies* (Ajeds) 1&2, 143-146
[15]. Morgan, K. R. (2003). *Blended Learning: A Strategic Action Plan for a New Campus*. Seminole, FL: University of Central Florida.
[16]. Nwagbo, C.R. (2016). Effects of two teaching methods on achievement and Attitude to Biology of Students of different levels of scientific literacy. *International Journal of Educational Research* 216 – 229. www.elsevier.com/locate/ijdures.
[17]. Orús, Carlos & José Barlés, María&Belanche, Daniel &CasalóAriño, Luis &Fraj-Andrés, Elena &Gurrea, Raquel. (2016). *The Use OfYoutube As A Tool For Learner-Generated Content: Effects On Students' Learning Outcomes And Satisfaction*. Computers & Education. 95. 10.1016/j.compedu.2016.01.007
[18]. PRLog (Press Release)- Nov. 18, 2012 –
[19]. Roodt, S. &Peier, D. (2013). Using YouTube in the classroom for the net generation of students. Issues in Informing Science and Information Technology, 10, 473-487. *Publications. Journal of the American Society for Information Science and Technology*. Rock to El Big Bang.
[20]. Sadaf, A.; Newby, T. J.; Ertmer, and P. A.(2016) *An Investigation of the Factors That Influence Preservice Teachers' Intentions and Integration of Web 2.0 Tools:* Educational Technology Research and Development, v64 n1 p37-64 Feb 2016
[21]. Singh, Y.k (2005*); Instructional Technology in Education*, published by Darya ganj new Delhi.
[22]. Sitzmann, T, Kraiger, K, Stewart, D and Wisher, R (2006), 'The comparative effectiveness of web-based and classroom instruction: a meta-analysis', *Personnel Psychology*, vol. 59, no. 3, pp. 623-664. Social Sciences, 1(59): 7 20. http://archive.minfolit.lt/arch/14501/14551.pdf [10 May 2012].
[23]. Video Sharing: A YouTube-based Measurement Study. IEEE Transactions on Multimedia.
[24]. Vikoo, B.(2013) Computer in Educational Research and Development, springfield publisher Ltd, oweeri.
[25]. Wang, S.K., & Yang, C.C. (2002). An investigation of a web-based learning environment designed to enhance the motivation and achievement of students' in learning difficult mental models in high school science. Paper presented at the ED-MEDIA 2002, World Conference on Educational Multimedia, Hypermedia and Telecommunications.
[26]. Young, J. R. (2009). 'Hybrid' teaching seeks to end the divide between traditional and online instruction.