

Integrating Hypermedia in Instruction of Social Studies and its Effect on Performance among Primary School Pupils

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ABSTRACT

This study was done to establish the effects of integrating hypermedia in instruction among primary school pupils. The study adopted a quasi-experimental research design. The target population was two thousand four hundred and seventy-eight class seven pupils, one hundred and sixty-four teachers of Social Studies in eighty-three diverse primary schools in Kibwezi Sub County. The study used four schools in the experimental group and four other schools in control group. Each school had a representation of forty-five learners. The sample size was three hundred and sixty learners and thirty-two teachers which were purposively selected. Data was analyzed using t-tests and results were presented using tables. The results on academic achievements of learners in pre-test and post-tests in the experimental groups were as follows: for pre-test ($M = 7.272$, $SD = 8.364$) while for post-test ($M = 14.939$, $SD = 38.825$) with t-test score of ($t [146] = -21.581$, $p=2.86E-47$). The results indicated a significant difference in academic achievements. The findings showed that incorporation of hypermedia in instruction of peace and conflict resolution topic in social studies was effective and learners enjoyed interacting with the technology hence there was a significant difference in academic performance in social studies among the experimental group category as compared to control group. Based on the findings, Integration of Hypermedia in instruction of Social Studies has a positive impact on academic achievement of pupils. The study recommended that; government should incorporate a policy for hypermedia integration in instruction in all subjects in order to improve the general academic performance of learners in all levels.

Keywords: Effect, Integrating Hypermedia, Instruction, Social Studies

INTRODUCTION

One of the main global goals of the 21st century is to promote world Peace, Justice and strong institutions. This goal was put forward on the realization that for the last two centuries the world has had devastating wars (United Nations, 2015). Social Studies is a subject taught in formal education systems across the world to promote this goal. This is because it equips learners with fundamental concepts of culture, economics and political skills to make them productive international citizens. Social Studies help learners to understand how the world works on a social level and understanding the many facets of society. This makes Social Studies essential for all grade levels of learners from elementary through college. In Kenya, one of the national goals of education is to promote international consciousness and foster positive attitudes towards other nations in addition to promoting national patriotism and national unity. Further the Kenya primary school curriculum seeks to develop awareness of, and appreciation of other nations and international community through incorporation of Social Studies subject in the Primary School curriculum.

At the global level, academic performance of learners in Social Studies subject is not done well. In Brown Centre Report, Hansen, Levesque, Valant and Quintero (2018) assert that the performance of Social Studies in the US was not good. The report shows that American students have a wide and persistent gap in knowledge of Civics, 'The size of these gaps is disconcerting' the report states. Several research reports have suggested that the policymakers and practitioners need to monitor the performance and come up with ways to provide a high-quality Social Studies education to students. According to Kenya Certificate of Primary Education (KCPE) annual reports in Kenya, the problem of poor academic performance in Social Studies among primary school

pupils also persists especially in Kibwezi, Makueni County in Kenya. The KNEC reports have reported that the mean scores for Social Studies is lower than the national mean scores for the various years. The reports have recommended adoption of new teaching approaches such as integration of modern technologies in teaching and learning. Learners learn best when they feel, watch, think and do (Sombra del Rio, Sanz and Bucari, 2019). This is what is known as the Experimental Learning Model. This method of learning caters for all categories of learners. Hypermedia embraces Experimental Learning Model because it enables learners to use various senses to enhance learning, hence can be adopted as an instruction practice in order to improve learners' academic performance in Social Studies.

Continuous improvement of instruction methods has been cited as a major practice to improve learners' achievement in pursuit of knowledge and skills. Further, Studies have indicated enhanced outcomes when hypermedia is integrated in instruction. Nelson (1995), referred to hypermedia as the extension of the term hypertext in which graphics, audio, video, plain text and hyperlinks are intertwined to create a generally non-linear medium of information. An example of hypermedia is the World Wide Web. In it we find an array of hyperlinked text, images, audios, databases, games and other applications. Nelson believed systems of paper have grave limitations for either organizing or presenting ideas. Gelbart and Zmtiule (1998) demonstrated a working computer system featuring all the trapping of what is in a personal computer today consisting of navigational mouse, a graphic user interface, multiple application windows and clickable hypertext links. "Hypermedia is powerful, and its ultimate potential is anything but clear ushering into new digital horizons, one has still an opportunity to consciously decide to sink or swim" (Gelbart & Zmtiule, 1998). Research by Koutsoupas and Papadimitrou (1999), found hypermedia increases memory and recalling, enhanced comprehension, attention and improved motivation among early childhood learners. Hypermedia enables learners to follow their favorite link to acquire content. This is achieved by allowing learners to have autonomy and have self-directed activities under the direction of the teacher. Research done by Obondo, Nabwire, and Too (2018), found that the use of hypermedia in instruction had a positive effect on motivation, retention, enjoyment, knowledge construction and self-directed learning. Integration of hypermedia has been slowed down by lack of successful development opportunities in the constructs of technology and pedagogy (Kommers, Grabinger & Dunlap, 2012). It is also noted that few teachers have adequate knowledge on the effect of integrating hypermedia technology into content areas during teaching (McFarland & Hamilton, 2006).

The Problem

Analysis of pupils' achievement in Social Studies in KCPE National levels showed persistent underperformance. The underperformance was attributed to several factors including pupils' attitude towards the subject, inadequate instruction and learning resources (KNEC Report, 2019). Several researches done in Secondary schools and colleges have indicated that the use of hypermedia improves performance in all subjects. Evidence shows that integration of hypermedia in instruction positively influences performance in high School learners as well as tertiary educational institutions. There is scanty information available on the effect on performance of integration of hypermedia in instruction among primary school pupils especially in Social Studies. This study therefore sought to establish the effect of integrating hypermedia in instruction of Social Studies on academic performance among learners in Kibwezi Sub County, Kenya.

Objective

The objective of the study was to establish whether the integration of hypermedia in instruction of Social Studies Influences performance.

Significant of the Study

The study plays a momentous role in the Government of the Republic of Kenya. This is because it helps the nation to achieve Information Communication Technology (ICT) literacy in the country as outlined in the National ICT Policy of 2006. Through hyperlinks the Ministry would be able to provide varied rich hypermedia resources to the primary school institutions to enhance learning in all subjects. Further, it could be easier to monitor the progress and coverage of content with the help of various learning management platforms.

The study findings can enlighten teachers on integration of hypermedia during teaching and learning consequently promoting high academic achievement among learners. The knowledge of integration of hypermedia instruction promotes effective and efficient management of; time, resources and mental energies that would otherwise be used in assembling many resources like television, radio, projector, realia and expensive experiments needed in conventional teaching approaches.

The study would help learners in Primary Schools because they would enjoy learning and schooling in that, content delivered through hypermedia is multi-dimensional as compared to traditional classroom. As a result every learner uses his/her favourite learning style. Finally, the study is essential to scholars, researchers and curriculum developers since it provides information regarding hypermedia integration in instruction.

LITERATURE REVIEW

Rapid changes in technology have influenced education as they do in every other aspect of human lives. As the number of technological advancements adopting the education sector increase, more studies are needed to observe the effect these advancements have in education. One of these technological advancements is hypermedia. Hypermedia is the usage of hypertexts, images, videos, graphics, audio and hyperlinks collaborated in a way to generally have a multi-dimensional medium of information. Ilhan and Oruc (2016) found that use of hypermedia created positive attitudes among the learners. These findings are supported by Yunkul and Er KO (2014) who carried out a descriptive study on multimedia software, teachers reported that their students' attitude towards the subject was positive which led to improvement in academic performance. The study however, covered a wide scope as compared to this study which was quasi-experimental and sought to focus on hypermedia. Quasi-experimental design ensured that the learners were more engaged in its use as compared to multimedia where the learners are passive.

Yamat, Ismail and Shah (2012), Yara and Wanjohi (2013), and Gachinu (2014) carried out different studies to evaluate how ICT integration in instruction affected the content delivery of English. The findings indicated that the developed courseware was suitable and applicable in English classrooms. Further it was found that incorporating aspects of hypermedia like texts, graphic, audio and visual in courseware material made learning an interesting and meaningful process which enhanced comprehension of text. These findings are similar to those of Yara and Wanjohi (2013) who found that hypermedia integration in the classroom enhanced comprehension of content. Nevertheless, the findings are based on descriptive study in English and Mathematics while this research focused on experimenting on the effects of integrating hypermedia in instructing Social Studies in primary school learners.

Pressure to provide learners with an efficient and effective learning environment and educational experiences has led to an increased uptake of hypermedia component use in classrooms. In this respect, De Souza, Ritcher and Nel (2017) undertook a quasi-experimental study to establish how exposing learners to different hypermedia combinations affected the academic achievement of learning Social Sciences in South African learning institutions. The researchers found that use of hypermedia combinations enabled the use of varying teaching and learning styles which helped the learners to construct their own knowledge through enriched approaches that promoted meaningful learning. These views are similar to those of Shah and Khan (2015) who asserted that the use of hypermedia in History and Geography made learning more meaningful thus enhancing the overall academic performance in secondary schools. The study, however, compounded by its wide scope on the general use of hypermedia in Secondary School learners. The current study narrowed down its scope to examine how hypermedia integration in instruction influences Social Studies performance among primary school learners.

Acikalin and Duru (2015) investigated the influence and use of computer technologies in Social Studies classrooms. The researchers conducted a review of published works on how ICT influenced Social Studies classes. According to their review, the use of computer technologies was found to enable students develop skills in retrieval of information. It also promoted understanding of the subject content and students' perspectives. In general, it was found that through the internet, computer-based technologies [hypermedia] influence the learning process by widening the learners, scope of learning and their knowledge. Chandler (2009) found that the use of hypermedia like concept mapping, clustering, mind mapping and graphic organizers helped learners to go deeper

into ideas and concepts. Despite the study's contribution to the existing literature on the benefits of hypermedia, the study is a review of secondary sources which are prone to bias and lack a methodology section that can be replicated by other researchers.

Sáiz - Manzanares et al (2019) investigated whether the use of learning management systems with hypermedia meant improved student learning outcomes among university students of occupational therapy in Spain. The study utilized quasi experimental with descriptive correlation design. It found out that the use of hypermedia with learning management systems increased the effectiveness of student learning, facilitated personalized learning and enhanced in depth and better-quality learning. This study was done in Spain targeting University students which have different social and economic aspects as compared to this study which targeted primary school pupils in Kenya.

Finally, Gaudence (2017) sought to investigate how the use of hypermedia during Geography landforms instruction affects the learning achievement of the hearing-impaired learners in mixed special secondary schools in Kenya. Anchored on the pragmatic research design, the researcher adopted a quasi-experiment the findings revealed that hypermedia promoted learning and positive attitude towards learning on land forms. This resulted in higher learning achievement through improved instruction and delivery. The study contributed to the local literature of hypermedia use, but its focus is on learners with hearing impairment, hence, the need for another study targeting normal Primary Schools learners. Therefore, there was a dare need for a study.

METHODOLOGY

The study adopted a quasi-experimental research approach. Cash, Stankovic and Storga (2016) define experimental research design as keeping records of observations, either qualitative or quantitative made by defined and recorded operations conducted under defined conditions, and examination of data using appropriate mathematical and statistical rules to determine whether significant relations exist. Quasi experiment design was chosen because it was capable of demonstrating cause and effect and provides high quality evidence. The experiment involved training on the integration of hypermedia instruction in Social Studies to the teachers in the experiment schools only as an intervention while the control group continued with conventional teaching methods and approaches. The process of intervention involved creation of a learning website by the researcher, uploading of learning resources and sharing among the teachers in the experimental group category. The website gave access to wide computerized resources which learners accessed through computers connected to the internet. This was done under the supervision of the teacher. The resources which included videos, notes, group activities and games helped learners in learning and understanding the topic of peace and conflict resolutions. The teachers in the experimental group and the researcher came up with topics and lessons that were to be taught during the data collection period. Later, the researcher and computer technicians of experiment schools tested and verified the suitability of desktops, tablets and laptops for use in integrating hypermedia in instruction. The pre-test instrument was then administered to the experiment and control group before the intervention so as to establish homogeneity. The test covered several topics taught in classes five and six. The pre-test was administered by the teachers of Social Studies with help of the researcher. This was followed by twenty lessons for both groups in which the experiment group had the intervention. In order to establish the influence, the intervention has on pupils' performance, post-test instruments were given out.

The target population of the study comprised eighty-three primary schools with an enrolment of 2,478 pupils in upper primary and 164 teachers of Social Studies totalling to 2,642. The total number of respondents was three hundred and sixty pupils. Purposive sampling was used to select Makueni County and Kibwezi Sub County since they had shown declining performance in the subject over the years. Moreover, there was scanty information on studies done on hypermedia integration in teaching and learning peace and conflict resolutions. Also, the Sub County has several primary schools with reliable ICT infrastructure supported by a non-governmental organization. At School level, four schools with reliable ICT infrastructure were purposively selected to cater for the experiment group. The other four control group schools were randomly selected from the Sub County. Eight schools were used as study groups. The researcher divided the study group into two. Four schools were for the experimental group and the other four schools for the control group. Majority of schools in the area of study have class seven enrolments of more than forty pupils. Each of the schools involved in the study was

represented by forty-five learners leading to a sample size of three hundred and sixty. Where schools had higher number of learners than the sample size, the researcher subjected all of them to the same test and instruction but during the analysis, the extra learners were randomly removed. A total of thirty-two teachers of Social Studies were engaged who could teach Social Studies in the selected schools. The sample for pupils was three hundred and sixty which represents 14.5% of the targeted pupil population. The sample size was within the recommended boundaries of between 10 and 30 percent.

Data collected using pre-test and post-test and was only quantitative. Analysis was done using both descriptive and inferential statistics in the form of t-tests using statistical package for the Social Sciences. Presentation of data was in forms of the tables.

RESULTS AND DISCUSSION

The objective was to find out how the integration of hypermedia in instruction of Social Studies influences performance of the pupils. The objective was measured in terms of paired t-test for the scores of both control and experimental groups. The results for pre-test and post-test were as presented in tables 1 and 2 below.

Table 1: T-Test: Paired Two Sample for Means for the Control Group

	T1 Pre-Test	Post-Test
Mean	6.40	11.16
Variance	7.20	18.58
Observations	147	147
Df	146	
t Stat	-25.25	
P(T<=t) two-tail	3.93404E-55	
t Critical two-tail	1.976345655	

The data in Table1 above, show that the difference between the means of the tests (two) in the control group where test 1 was (M = 6.401, SD = 7.201) and test 2 (M = 11.156 SD=18.585) were significant (t [146] = -25.249, p <3.93E-55). This means that there was improvement in the control group without any teaching intervention. The researcher proceeded to compare the scores of the learners in the experimental group from the first test and the second test. Table 2 presents the findings.

Table 2: Paired t-test for the Experimental Group

	Pre-Test	Post-Test
Mean	7.27	14.94
Variance	8.36	38.82
Observations	147	147
Df	146	
t Stat	-21.5806	

P(T<=t) two-tail	2.86E-47	
t Critical two-tail	1.976346	

The results in Table 2 above shows that the mean differences of the two tests in the experimental group where test 1 (M = 7.272, SD = 8.364) and test 2 (M = 14.939, SD = 38.825) were significant (t [146] = -21.581, p=2.86E-47). This result implies that, there was significant improvement in the scores of the learners with a difference of 7.767 meaning that the integration of hypermedia had a significant positive improvement on pupils' academic performance in Social Studies. The average mean score was greater than that of the control group implying the pupils' performed better than those in the control group. The results also imply that the mean difference in performance was significant (t [146] =-21.581, p= 2.86E-47). This means that integration of hypermedia in instruction of Social Studies helped learners to synthesize the content and to perform better compared to the control group which was instructed using conventional teaching methods.

The null hypothesis was stated as follows;

H₀₁: There is no significant difference in performance between learners taught using Hypermedia technology and those taught without the technology was thus rejected in favour of the alternative and restated as follows:

H₁: There is a significant difference in academic performance between learners taught using Hypermedia technology and those taught without the technology.

The results agree with Inhan and Oruc (2016) who found hypermedia improved learner performance. However, they slightly agree with Yunkul and Er (2014) who found hypermedia only boosted learner attitude towards multimedia software in specific subjects. This is the same as Yasmal et al. (2012) who found hypermedia boosted attitudes towards teaching and learning of English, the same as Gachinu (2014) and Yara and Wanjohi (2013) who saw improved comprehension of content in Kenya. Other studies that agree with the current study are De Souza and Nel (2017) and Shah and Khan (2015) who found learners who used hypermedia were able to construct their own knowledge through enriched approaches that promote meaningful learning.

The results were in agreement with Harshstone (2015) and Davies and West (2014) studies. The studies found that hypermedia improved knowledge of content and learners' motivation and improved communication between teachers and learners respectively. The study agrees with Saiz Manzanares et al. (2019) who found that using hypermedia with learning management systems increased the effectiveness of student learning, facilitated personalized learning and enhanced in-depth and better-quality learning. Also, Sombra del Rio et al. (2018) found an overall positive learning experience with the use of hypermedia which agrees with the current study. Finally, the study resonates with Gaudence (2017) who found that hypermedia promoted learning achievement through improved instruction and delivery.

CONCLUSION, IMPLICATIONS AND LIMITATIONS

Conclusion

Utilization of Hypermedia in instruction of Social Studies has a positive effect on pupils' academic performance in Social Studies.

Implications and Limitations

Despite the limited use reported by teachers, applying the same in instruction of Social Studies may prove effective in disseminating information related to the subject. Teachers integrate hypermedia in instructing learners in Social Studies if computers are available and because it is easy to use. This means that given its availability, teachers are likely to apply it in teaching Social Studies and even other subjects when properly motivated and given enough skills. Further, creating ample time for teachers can help them handle different topics with ease. Since integration of hypermedia in instruction of Social Studies has a positive effect on the

performance of pupils, government should incorporate a policy for hypermedia integration in instruction at all levels of education in order to improve the general academic performance of learners in all learning areas.

Primary school teachers should be trained with the requisite skills of integrating computers during instruction in order to ensure a maximum benefit from integrating hypermedia in instructing Social Studies. This can be achieved by incorporating hypermedia technologies in teacher education curriculum. Primary schools management committees should create a policy for continuous checks and upgrades so as to address challenges faced by teachers and learners in using computer devices, and also allocate necessary resources for maintenance of computer resources.

This study focused on integration of hypermedia in instruction of Social Studies. More studies should be done focusing on other subjects like languages and mathematics. Also, the study used quasi-experimental design which was limited to only four schools in experimental group; other studies can be conducted using other designs to describe how hypermedia impacts the instruction of Social Studies.

REFERENCES

1. Acikalin, M., & Duru, E. (2005). The use of computer technologies in the social studies classroom. *Turkish Online Journal of Educational Technology-TOJET*, 4(2), 18-26.
2. Cash, P., Stanković, T., & Štorga, M. (2016). An introduction to experimental design research. *Experimental design research: Approaches, perspectives, applications*, 3-12.
3. Chandler, P. (2009). Dynamic visualisations and hypermedia: Beyond the “Wow” factor. *Computers in Human Behavior*, 25(2), 389-392.
4. Davies, R. S., & West, R. E. (2014). Technology integration in schools. *Handbook of research on educational communications and technology*, 841-853.
5. De Sousa, L., Richter, B., & Nel, C. (2017). The effect of multimedia use on the teaching and learning of Social Sciences at tertiary level: a case study. *Yesterday and today*, (17), 1-22.
6. Del Río, L. S., Sanz, C. V., & Búcarí, N. D. (2019). Incidence of a hypermedia educational material on the Teaching and Learning of Mathematics. *Journal of New Approaches in Educational Research*, 8(1), 50-57.
7. Engelbart, D. C., & English, W. K. (1968, December). A research center for augmenting human intellect. In *Proceedings of the December 9-11, 1968, fall joint computer conference, part I* (pp. 395-410). English for specific purposes. *Procedia - Social and Behavioural Sciences* 46(2012) 4874 – 4879
8. Gachinu, J. T. (2014). Influence of ICT integration on performance in mathematics in public secondary schools in Embu north district of Kenya (Doctoral dissertation, University of Nairobi).
9. Hansen, M., Levesque, E., Valant, J. and Quintero, D. (2018). The 2018 Brown Centre Report on American Education. Quintero Elizabeth Mann J. V. Diana M.H.
10. Hartshorne, R. (2005). Effects of integrating hypermedia into elementary science professional development on science content knowledge. *Journal of Science Education and Technology*, 14, 415-424.
11. Hus, V., & Hegediš, P. J. (2018). Future Primary School Teachers Attitudes toward Intercultural and Bilingual Education in Primary Schools. *Creative Education*, 9(16), 2939-2949.
12. Ilhan, G. O., & Oruc, S. (2016). Effect of the Use of Multimedia on Students' Performance: A Case Study of Social Studies Class. *Educational Research and Reviews*, 11(8), 877-882.
13. Kenya National Examinations Council, (2019). The Year 2019 Kenya Certificate of Primary Education (KCPE) Examination Report
14. Kommers, P. A., Grabinger, S., & Dunlap, J. C. (Eds.). (2012). *Hypermedia learning environments: Instructional design and integration*. Routledge.
15. Koutsoupias, E., & Papadimitriou, C. (1999, March). Worst-case equilibria. In *Annual symposium on theoretical aspects of computer science* (pp. 404-413). Berlin, Heidelberg: Springer Berlin Heidelberg.
16. Kumar, S., & Daniel, B. K. (2016). Integration of learning technologies into teaching within Fijian Polytechnic Institutions. *International Journal of Educational Technology in Higher Education*, 13, 1-17.
17. Lepper, M. R. (1985). Microcomputers in education: Motivational and social issues. *American psychologist*, 40(1), 1.

18. Lin, C. C., Yu, W. W., Wang, J., & Ho, M. H. (2015). Faculty's perceived integration of emerging technologies and pedagogical knowledge in the instructional setting. *Procedia-Social and Behavioral Sciences*, 176, 854-860.
19. Littrell, A. B., Zagumny, M. J., & Zagumny, L. L. (2005). Contextual and psychological predictors of instructional technology use in rural classrooms. *Educational Research Quarterly*, 29(2), 37-47.
20. Makokha, G. L., & Mutisya, D. N. (2016). Status of e-learning in public universities in Kenya. *International review of research in open and distributed learning*, 17(3), 341-359.
21. Marín-Díaz, V., Riquelme, I., & Cabero-Almenara, J. (2020). Uses of ICT tools from the perspective of Chilean university teachers. *Sustainability*, 12(15), 6134.
22. Mathayo, M. H. (2016). Teachers' experience on the use of ICT to facilitate teaching: A case of Ilala District Secondary Schools (Doctoral dissertation, The Open University of Tanzania).
23. McFarland, D. J., & Hamilton, D. (2006). Adding contextual specificity to the technology acceptance model. *Computers in human behavior*, 22(3), 427-447.
24. Merriam, S. B. (1998). *Qualitative Research and Case Study Applications in Education. Revised and expanded from "Case Study Research in Education."*. Jossey-Bass Publishers, 350 Sansome St, San Francisco, CA 94104.
25. Mezieobi, K. A., Fubara, V. R., & Mezieobi, S. A. (2008). *Social studies in Nigeria: Teaching methods, instructional materials and resources*. Owerri: Nigeria Acada Peak.
26. Miima, F., Ondigi, D. S., & Mavisi, R. (2013). Teachers' Perception about Integration of ICT in Teaching and Learning of Kiswahili Language in Secondary Schools in Kenya.
27. Momanyi, L., Norby, R., & Strand, S. (2006). The need for integration of technology in K-12 school settings in Kenya, Africa. *AACE Review (formerly AACE Journal)*, 14(2), 154-177.
28. Morris, M., & Ogan, C. (1996). The Internet as Mass Medium *Journal of Computer-Mediated Communication*. URL: <http://onlinelibrary.wiley.com/doi/10.1111/j.1083-6101>.
29. Nelson, T. H. (1995). The heart of connection: hypermedia unified by translation. *Communications of the ACM*, 38(8), 31-33.
30. Obondo, G., Nabwire, V. K., & Too, J. K. (2018). Effects of hypermedia on learning achievement in geography for hearing impaired learners in mixed special secondary schools in Kenya.
31. Okebiro, G. N. (2018). *Creative Approaches to Higher Education and Training for Sustainable Quality University Education for Sustainable Development in Kenya*. Machakos University Journal Of Science And Technology, 173.
32. Republic of Kenya, (2006). *The National ICT Strategy for Education and Training*, Nairobi.
33. Sáiz-Manzanares, M. C., Marticorena-Sánchez, R., Díez-Pastor, J. F., & García-Osorio, C. I. (2019). Does the use of learning management systems with hypermedia mean improved student learning outcomes? *Frontiers in psychology*, 10, 88.
34. Shah, I., & Khan, M. (2015). Impact of multimedia-aided teaching on students' academic achievement and attitude at elementary level. *US-China Education Review A*, 5(5), 349-360.
35. United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. New York: United Nations, Department of Economic and Social Affairs.
36. Yara, P. and Wanjohi.W. (2013). Performance Determinants of Kenya Certificate of Secondary Education (KCSE) in Mathematics of Secondary Schools in Nyamaiya Division, Kenya. *Asian Social Science*, 7, (2)
37. Yasmat, H., Ismail, A., & Shah, A. A. (2012). Developing hypermedia reading courseware for
38. Yünkül, Er KO (2014). The Effect of Multimedia Software Course on Student Attitudes. *EğitimdeKuramveUygulama*. 10(2):316-330