INFLUENCE OF E-LEARNING POLICY PEDAGOGY ON STUDENT-CENTERED COLLABORATIVE LEARNING AND DEVELOPMENT IN HIGHER INSTITUTIONS

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ABSTRACT

Background: this research on E-learning was geared towards determining how E-learning policy pedagogy influences student-centred collaborative learning and development in higher institutions.

Objectives: the objectives were to determine: the effect of E-learning on students' achievement; the extent of the relationship between learner-centered pedagogy and students' performance; the extent to which students-centered collaborative learning affect development.

Design: 246 was realised as sample size using Topmans formula at 5% level of tolerance and 95% level of confidence from infinite population. Questionnaire was used to collect data, 246 copies of the questionnaire were distributed and 230 copies were returned.

Method: Descriptive research method was adopted for the study. Three hypotheses were tested; the first and the third were tested using linear regression while the second was tested using Pearson product moment correlation coefficient statistics.

Findings: The findings show that E-learning had a significant positive effect on students' achievement; secondly, there is a significant relationship between learner-centered pedagogy and students' performance; thirdly, Student-centered collaborative learning had a significant positive effect on development.

Result: Teachers, students and other administrative staff should be involved in the full utilisation of the educational system of teaching, learning and the use of modern information and communication technologies (ICT).

Recommendation: The study recommends that for e-learning to be effective, E-learning facilities should be appropriately maintained. Stable internet should be provided to support easy and fast learning and teaching; the staff and students should learn the basic knowledge on how to operate the computer and its peripheral devices; electricity is a basic requirement needed for the computer and its peripheral devices to function, so government should ensure that all institutions are connected to a stable electric grid.
KEYWORDS: Development, E-learning, learning, Pedagogy, Student

1. INTRODUCTION

Contingent information on learner-centered pedagogy together with student achievement remains essential to instructors (Saunders, 2008). Schools need this knowledge to aid student progress in development, instructional management, and staff enhancement. Educators embrace learner-centered pedagogy because it imparts to the progress of collaborative learning and student performance (Morals and Holguin, 2017). Professionals and the entire manpower in the private and public sectors of any economy need this sort of skill that equips them and, consequently, their economy to make steady progress. This sort of education has to be introduced and maintained with a learning model that helps students to acquire the essential knowledge for the future.

"Intel World Ahead Program (2009) mentioned some of these skills, as identified by the International Society for Technology in Education (ISTE) that will help students to work and live in the twenty-first century. The skills include conducting independent research, thinking critically, solving problems, using technology to communicate and collaborate, and understanding societal issues related to digital citizenship." Information and Communication Technology (ICT) is now everywhere in the country today by all levels of education as a delivery system of transmitting knowledge to students. UNESCO (2011) says that ICT provides teachers and students access to huge stores of education more than the expectation of knowledge in school, also with technological tools to add to this store of knowledge. The vast growth of computers, the internet and other electronic devices provide global opportunities for education, especially studying in another place outside the school environment (Ngwoke, 2011).

The observation of these concepts, has led to the Federal government of Nigeria to direct the National Policy on Education to set standards, influence framework for the distribution of ICT infrastructure at all levels of education in the country. The Federal Government of Nigeria (FGN) urged the state government to adopt the National Policy on Computer Education of 1998 which has its aim to inspire teachers to acquire a mutual understanding with computer and gain in value its potentials for finding a solution to the problem of teaching and learning and to secure computer knowledge that penetrate mutually in all activities in institutions of learning (Adeosun, 2010). Teacher's orientation to pedagogy is marked by a tendency to find and call attention to learning; effective e-Learning prospects and options do not happen without a teacher's careful pedagogical actions. These opportunities create spaces for mutual, collaboration and thinking to occur in educative means, using e-Learning tools and affordances in reliable ways. Nussbaum; Alvarez; Mcfarlane; Gomez; Claro and Radovic (2009) assert that collaboration or the active construction of knowledge between learners can improve result, this is not necessarily happening without having been planned; it must be learned. Teaching learners and
students how to collaborate, and in particular how to interact to negotiate meaning, is a necessary part of the collaborative learning process which can enhance outcomes further (Nussbaum et al., 2009).

The utilisation of e-learning in various educational systems is to introduce and put in knowledge that will enhance efficiency and effectiveness in Curriculum implementation. However, higher institution students in Nigeria have been finding education processes and research difficult because of the traditional educational teaching system still in practice. In this system of traditional learning, students find it difficult to cope with learning because teaching is mainly theoretical. In this educational system, distance is identified as a problem to both the undergraduates and post graduate students of the higher institutions and also contribute to the over stay of students in school. In response to the above situation, this study geared towards finding a new innovation in educational sector that will help to eliminate these problems. Specifically, it seeks to assess the extent to which E-learning policy pedagogy has impacted on the following aspects of student-centered collaborative learning and development: i) the effect of E-learning on students' achievement; ii) the extent of the relationship between learner-centered pedagogy and students' performance; iii) the extent to which students-centered collaborative learning affect development.

II REVIEW OF THE RELATED LITERATURE

The Concept of E-learning

E-learning also known as electronic learning is a product of the internet which has been variously defined by various authors. It comprises all forms of electronically supported applications for teaching and learning. "It is to the brick wall classroom learning, what mobile phone is to fixed analog. While brick wall classroom is situated at a place where students and teachers meet and interact face-to-face". E-learning takes place anyplace, anytime, without being together (Ugwuoke, 2011). It consists of the use of network technologies to develop, motivate, deliver and alleviate learning. Ugwuoke (2011) adds that it encompasses face-to-face, distance, mixed and blended delivery models that utilises electronic means.

Hedge and Hayward (2004) stipulate that e-learning is an innovative approach for instructing electronically mediated, well-designed, learner-centered and mutual learning environment to anybody, anytime and anywhere by utilizing the internet and digital technologies in connection with instructional design principles. Nwokike (2010) defines e-learning as the use of computer as the central building block component of the education environment. E-learning involves the use of Information and Communication Technology (ICT); this is the makeup of computer networks, communication and mobile technologies in order to make learning better and attractive (Asah, 2013). These technologies help to render and make knowledge and information accessible to anybody that needs it. "It is an instruction delivered via an electronic media (Chitana, Makaza and Madzima, 2008)".

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Anowor (2002) states that the concept of electronic learning comprises:

1. The use of all forms of electronically supported learning and teaching;
2. The use of technology to enable people to learn anytime and anywhere;
3. The use of ICT in developing skills as well as concept-based knowledge;
4. The use of instructional media in form of texts, images, animation, video and audio devices.

Hence, the international Forum of Education Technology and Society (IFETS, 2010) see e-learning as the use of different technological tools that are web-based, web-distributed or web-capable for the purpose of learning. "E-learning courses can be delivered using a variety of Information and Communication Technology (ICT) such as HTML based on-line tutorial which relies on web pages accessed through browser, text and graphics on mobile device like digital assistant interactive video and audio images delivered through CD-ROM, and video and audio conferencing conducted over telecommunications channels such as telephone lines, Local Area Networks (LAN) and the internet (Akubilo, 2011)". Leonard (2013) state that the processes of e-learning include: Web based learning, Computer based learning, virtual classroom and digital collaborations, where content is delivered via the internet/ intranet, audio and or video tape satellite, TV and CD-ROM. It can be self-paced or instructor led and includes media in the form of text message, image, animation, streaming video and audio. It can also be referred to as Computer Based Training (CBT) or Internet Based Training (IBT) or Web Based Training (WBT).

Changing the Higher Education Process With E-learning

In recent years the lastest technological trends and advancements has precipitated transformation in the higher education sector. Several factors make e-learning the way forward in educational institutions for both learners and teachers. For instance, the availability of the Internet eliminates learning barriers of time and distance. At the same time it allows students to take charge of their learning as they learn from their own comfort zone (Mills and Fadel, 2012). Students are now opportuned to join the knowledge society and knowledge-based economy as they benefit from and have access to a variety of applications, learning resources and expert advice. In the today's social media world E-learning has created opportunities to meet the increasing student learning and networking needs. For instance, course materials and assignments can be delivered in a timely manner via electronic means and at a reduced cost, making e-learning a cost effective option (Usoro and Abid, 2007). The collaborative research and learning options and prospects presented through e-learning are desirable attributes required to facilitate the growing demand for knowledgeable and skilled personnel in the global labour market. E-learning is vital for providing avenues for human development, bridges the digital divide and enables students to fit into the global economy (Hollow and Icwe, 2009).
Garrison (2007) notes that although e-learning offers numerous opportunities to support learning, we have yet to experience fully the transformative effect of e-learning. Creating an e-learning experience involves "serious commitment to understanding the different features of this medium and the ways it can be used most advantageously to impart learning" (Garrison and Anderson, 2003). Friesen and Lock (2010) further affirmed that there is no quantifiable correlation between the improved learning outcomes and applications of technology. Additionally, the paradigm shift from teacher-centeredness to student-centeredness has greatly impacted on the adoption and use of e-learning (Kahiigi, Ekenberg, Hansson, Tusubira and Danielson, 2008a).

Alu (2011) stipulate that e-learning can be synchronous or asynchronous. Synchronous e-learning is the learning which is occurring or existing at the same time or having the period of all learners. Every learner is expected to be at the computer at the same time receiving instructions. It can be regarded as time delivery of learning. Synchronous e-learning takes a variety of forms, for example: multi cast and real time collaborating conferencing using Multi-user dimension Object Oriented system (MOO) or internet Relay Chat (IRC). The basic one involves chat sessions where employees log on at the same time to discussing training topics. A more complex type involves learners. This offers learners from different locations to log into the training at a particular time; an instructor facilitates the discussion through showing of slides or writing on a white board that is seen on the computer screens of learners. This offers learner the opportunity to ask questions as the learning progress. The question asked could be verbally. Synchronous e-learning makes learners to feel that they are part of the learning society as interaction among students and instructors is done at the same time. However, e-learning within the synchronous situation does not allow for the flexibility (Alu, 2011).

Asynchronous e-learning according to Rosenberg (2001) is learning that is "pre-coded" or is available, prepared and kept and can be used when the learner is in need of it. It is not simultaneous. Learners are free to fix their time (Alu, 2011). This type of e-learning is delivery on demand learning and this gives the learner more control over the learning process and content. According to Hall (1997), Asynchronous e-learning are of different types, ranging from the less sophisticated power point slides posted on the website to more sophisticated ones which allow learners involvement (interactive). These include electronic mail, on-line simulation with graphics, animation video and audio components. Zhang (2003) identifies Asynchronous variety as public electronic bulletin boards/news groups or collaborative system for discussions, downloading materials for learning, knowledge repositories via the internet - company intranets that distributes training to its employees; - the use of on-line data bases and websites to develop information and pursue research. Finally, e-learning is not a strait jacket package. It leads itself to various adaptations to suit specific needs and collaborations and it can be used to teach all subjects (Alu, 2011).
E-Learning, Pedagogy and Collaborative learning
E-Learning and collaborative/co-constructive pedagogies interact. The dynamics of classrooms change when e-Learning is part of the regular learning environment. Collaboratively, interactive pedagogies that also foster co-operations appeared to lead to effective learning and better teacher/student relationships. Technology in classrooms become an important tool when teachers intentionally use them in relation to adequate and protected pedagogical practices preventing access in schools to mobile technologies or firewall. Some sites do not teach effective and critical uses of these technologies that students have already access to outside of school. Virtual worlds and gaming have potentials in compulsory education. They are already used widely in medical schools, aviation institutes and other tertiary learning environments, and are increasingly being used in business as part of research and development, as well as employee induction. In any focus on classrooms, what teachers do have an impact on how well-disposed students are to learning. For instance, teachers' classroom motivating practices include both their design of the classroom learning environment and their direct interpersonal relationships with individual students (Hardré and Sullivan, 2009).

The material existence of the classroom and what happens in them are induced by the arrangements within them. This is important to consider when the emphasis today is on active construction of knowledge by the learners (Chism, 2006). This implies educationally productive levels of collaboration – both among students and with teachers, and links closely to the kinds of pedagogies, Bishop and Berryman (2006) suggest that supported Maori students' learning, and which are fore grounded in Ka Hikitia (Ministry of Education, 2008).

Fig 1 Technological Pedagogical Content Knowledge (TPACK)

Student-Centered Learning
Student-centred learning and teaching methods train teachers on the modules to be developed by directing the central point of activity from the teacher to the learners. These methods include learning actively, in which students solve problems, answer questions, develop questions of their own, discuss, explain, debate, or brainwave during classes; interactive learning, in which students work together in teams to solve problems to assure both individual accountability and positive interdependence; and inductive teaching and learning, in which students are initially presented with challenges (questions or problems) and learn the course material mindful of addressing the challenges.

The Transformational effect of e-learning
Doherty and Hilberg (2007) examined the effectiveness of pedagogy on student achievement. Pedagogical standard was used as their dependent variable, and standardized tests as the independent variable. The study was carried out at different times with different participants. The reason for the studies was to find out the effectiveness of pedagogy standards on raising student achievement. The result showed that learner-centered pedagogy is effective in producing increased achievement. Also, teachers’ use of the standards of effective pedagogy predicted student performance on year-end standardized tests.

Tareq Saeed and Kalyankar (2014) investigated the effect of E-Learning Approach on Students'
Achievement in Fraction Math Course Level 5 at Yemen's Public Primary School in India. The study used (30) students studying a course using e-learning approach. An experimental design approach was used. The students' achievement was examined between two groups. The results shown that there is a significant increase in achievement, The E-learning has achieved efficiency greater than traditional learning in (Remembering, understanding and application) skills. They recommended that there should be an authoring unit for e-learning of different courses with different experts.

Judith (2010) examined the use of the Learned-Centered Psychological Principles (LCPs) for improving the academic engagement and learning of middle school students. The study used survey data from 2,200 middle school students from diverse communities across the United States; the findings indicated many important motivational benefits of learner-centered practices for young adolescents. Specifically, students reported more positive forms of motivation and greater academic engagement when they perceived their teachers were using learner-centered practices that involve caring, establishing higher order thinking, honoring student voices, and adapting instruction to individual needs. The study recommended that creating a learner-centered middle school classroom should be encouraged.

THEORETICAL FRAMEWORK
Constructivist Theory
This theory was propounded by Jerome Bruner (1966). The major theme in this theory is that learning is an active process were the learners construct new ideas, models or concepts based upon their current or past knowledge. The learner chooses and transforms information, constructs hypotheses, and makes decisions, relying on a cognitive structure to do so. The cognitive structure provides meaning and organisation to experiences and allows the person to go beyond the information available. Based on the instructions, the instructor (teacher) should try and encourage students to determine principles by themselves. The instructor and student should partake in an active dialog. The task of the instructor is to relay the information to be learned into the best form appropriate to the learner's current state of understanding. Constructivism aids the policy of learner-centered pedagogy more than the behaviorist and cognitive theories. The behaviorist and cognitive theories suggest that student's individuality is better but constructivism emphasizes comprehensive learner-connectedness. "Prince and Felder (2007) suggest that exploring, manipulating, and asking complex questions improve student cache of new information". "Hsieh and Sun (2007) argue that aligning a strategy with the constructivist view include learner interactions". The constructivist theory asserts that learners receive knowledge as a result of self-direction and connection with their surroundings (Kumar, 2006). Self-directed learning reduces the student dependency on teachers even though teachers supervise the instructions.

Koohang (2009) advances a model based on constructivism learning theory in e-learning
environments. The three categories involved in this model for elements of Constructivism are

1. The Design of Learning Activities
2. Learning Assessment
3. Instructor's Roles

Constructivist pedagogy training supports teacher competence and student success. The standard features of learner-centered pedagogy include collaborative learning, connecting new ideas to previous knowledge, higher-order thinking, and conversations in teacher-directed small groups (Froyd, 2007). Learner-centered pedagogy encourages democratic learning attitudes. The teacher-centered approach elevates the teacher as the sole provider and evaluator of instructional tasks. Learner-centered pedagogy exposes students to democratic learning arrangements. In a learner-centered environment, students work in small groups, choose a variety of tasks, share work, and learn social and leadership skills. Teachers help students to set and check learning goals.

Computer technology underscores the learner-centered rule of constructivism. Computers arouse the student's desire to learn through enjoyment. Most computers support collaborative learning with clear sounds and vivid graphics. Many researchers endorsed the computer as a constructivist learning-tool. Overhead projectors, radios, televisions, and videocassette recorders are also important in learner-centered premises (Bruce, 1998). Little groups used overhead projectors and other traditionally teaching control technology to present reports. This reduces teacher dominance and inspires technology-based instructions. Clear procedures support technology infusion in the regular classroom. Collaborative management activity in computer-aided instruction prevents time-wasting (Hsie and Sun, 2006). "The student-focused features of constructivism guide culturally diverse learning groups in cooperative learning communities (Cartledge and Kourea, 2008)". In this study, the constructivist theory, research-based instructional practices and management inspired the framework for studying influence of E-learning policy pedagogy on student centered collaborative learning and development.

Fig 2 Constructivism Elements and E-Learning Design of Learning Activities
III. METHODOLOGY

This study employed survey research method involving the use of a self-designed questionnaire in data generation. Three higher institutions in Enugu state were selected for this study namely: University of Nigeria Enugu Campus (UNEC), Enugu State University of Science and Technology (ESUT) and Institute of Management and Technology (IMT). Population of study was infinite, hence a sample size of 246 respondents were selected using Topman’s formula for an infinite population as opined by Nwbuokei (1986), with 95% degree of freedom at 5% error tolerance. Two hundred and forty-six questionnaires were administered, 230 copies were duly completed and returned while 16 copies were not duly completed and returned. The returned questionnaire were analyzed, summarized, and interpreted accordingly with the aid of inferential statistical techniques. Hypotheses one and three were tested using linear regression while hypotheses two was tested using Pearson Moment Correlation statistical test at 5% level of significance using SPSS version.

IV PRESENTATION AND ANALYSIS OF DATA

<table>
<thead>
<tr>
<th>Table 1: Coded Responses on E-learning and Student Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/No</td>
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<tr>
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<td>1</td>
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</tbody>
</table>
Students achieve their goals through E-learning which provides learning opportunities.


According to Table (1), based on aggregate response 428(93%) indicated strongly agree and agree, 8(2%) indicated undecided, while 24(5%) indicated disagree and strongly disagree. This implies that E-learning has effect on students' achievement.

**H₀₁**: E-learning has a significant effect on students' achievement.

<table>
<thead>
<tr>
<th>Particulars</th>
<th>R</th>
<th>R²</th>
<th>Adj.R²</th>
<th>DW</th>
<th>Standard Coefficient Beta</th>
<th>T-Value</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-learning</td>
<td>0.969a</td>
<td>0.939</td>
<td>0.938</td>
<td>0.797</td>
<td>0.969</td>
<td>59.071</td>
<td>3489.332</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**Source: SPSSWIN Version 15**

R= Correlation Coefficient or Beta  
R²=Coefficient of Determination  
Adj.R²=Adjusted Coefficient or Determination  
DW= Durbin Watson (d) test statistics  
T-Value= Student t-test statistics  
F=test statistics

The result indicated that E-learning has a positive effect on Students' achievement as t = 59.071 which is above the rule of thumb positivity of 2 and Coefficient of E-learning (0.423). The variations from the model as indicated from the coefficient of determination (R²) value of 0.939. Also, the result shows that E-learning has a positive significant effect on Students' achievement as indicated by R value of 0.969 which is the same with the value of Beta 0.969.

Table 3: Coded Responses on Learner-Centered Pedagogy and Students' Performance

<table>
<thead>
<tr>
<th>S/No</th>
<th>Questionnaire Item</th>
<th>S.Agree/Agree</th>
<th>Undecided</th>
<th>Disagree/S.Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Freq</td>
<td>%</td>
<td>Freq</td>
</tr>
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</table>

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Learner-centered pedagogy is the central to student success. The impact on learners' performance is highly dependent on the pedagogical orientation that teachers adopted. According to Table (3), based on aggregate response 420 (91%) indicated strongly agree and agree, 13 (3%) indicated undecided while 27 (6%) indicated disagree and strongly disagree. This implies that there is a significant relationship between learner-centered pedagogy and students' performance.

**H_{a2}:** There is a significant relationship between learner-centered pedagogy and students' performance.

### Table 4: Descriptive Statistics of the relationship between Learner-Centered Pedagogy and Students' Performance

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>learner-centered pedagogy</td>
<td>4.2652</td>
<td>.94111</td>
<td>230</td>
</tr>
<tr>
<td>students' performance</td>
<td>4.3826</td>
<td>.77721</td>
<td>230</td>
</tr>
</tbody>
</table>

**Source:** SPSSWIN Version 15

### Table 5: Correlation between Learner-Centered Pedagogy and Students' Performance

<table>
<thead>
<tr>
<th></th>
<th>learner-centered pedagogy</th>
<th>Students' performance</th>
</tr>
</thead>
</table>

**Source:** Field Work, 2018.
learner-centered pedagogy | Pearson Correlation | 1 | .929(**)  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>230</td>
<td>230</td>
<td></td>
</tr>
</tbody>
</table>

Students’ Performance | Pearson Correlation | .929(**) | 1  
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>230</td>
<td>230</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSSWIN Version 15

Table (4) shows the descriptive statistics of the relationship between learner-centred pedagogy and students’ performance, with a mean of 4.2652 and a standard deviation of .94111 for learner-centred pedagogy and a mean response of 4.3826 and a standard deviation of .77721 for students' performance. By careful observation of standard deviation values, it can be seen that there is about the same variability of data points amongst the independent and dependent variables.

Table (5) is the Pearson correlation matrix of the relationship between learner-centred pedagogy and students' performance showing the significant values, the number of cases and correlations coefficient. The correlation coefficient shows 0.929, this value indicated that the correlation is significant at 0.05 level (2tailed) and means a positive relationship between learner-centred pedagogy and students' performance \( (r = 0.929) \). However, the computed correlation coefficient is greater than the table value of \( r = 0.113 \) with 228 degrees of freedom \( (df = n-2) \) at alpha level for a two-tailed test \( (r = 0.929, p < 0.05) \). This result indicated a significant positive relationship between learner-centred pedagogy and students' performance.

Table 6: Coded Responses on Collaborative Learning and Development

<table>
<thead>
<tr>
<th>S/No</th>
<th>Questionnaire Item</th>
<th>S. Agree/ Agree</th>
<th>Undecided</th>
<th>Disagree/ S. Disagree</th>
<th>Total (Freq)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Freq</td>
<td>%</td>
<td>Freq</td>
<td>%</td>
</tr>
<tr>
<td>1</td>
<td>Collaborative learning shows a greater motivation and commitment to acquire new knowledge and consolidate others.</td>
<td>219</td>
<td>95%</td>
<td>4</td>
<td>2%</td>
</tr>
</tbody>
</table>
Students develop new competence by bringing in different ideals which is achieved through collaborative learning.

<table>
<thead>
<tr>
<th>Particulars</th>
<th>R</th>
<th>R²</th>
<th>Adj.R²</th>
<th>DW</th>
<th>Standard Coefficient</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaborative learning</td>
<td>0.857a</td>
<td>0.735</td>
<td>0.734</td>
<td>0.169</td>
<td>0.857</td>
<td>25.147</td>
<td>632.350 0.000</td>
</tr>
</tbody>
</table>

Source: SPSSWIN Version 15
R = Correlation Coefficient or Beta
R² = Coefficient of Determination
Adj.R² = Adjusted Coefficient or Determination
DW = Durbin Watson (d) test statistics
T-Value= Student t-test statistics
F =test statistics

The result indicated that collaborative learning has a significant positive effect on development as $t = 25.147$ which is above the rule of thumb positivity of 2 and coefficient of collaborative learning (1.786). The variations from the model are clarified by the model as indicated from the coefficient of the determination ($R^2$) value of 0.735. Also, the result shows that collaborative learning has a significant positive effect on development as indicated by R value of 0.857 which is positive as shown by beta value of 0.857.

V SUMMARY AND DISCUSSION OF FINDINGS
The result based on inferential statistics reveals the following;
E-learning had a positive effect on students’ achievement (R value of 0.969; \( t = 59.071; P < 0.05 \)). The same result was obtained by Tareq Saeed and Kalyankar (2014) in their study the effect of E-Learning Approach on Students' Achievement in Fraction Math Course Level 5 at Yemen's Public Primary School. The result showed that E-learning has achieved efficiency greater than traditional learning in (Remembering, understanding and application) skills.

There was a significant positives relationship between Learner-centered pedagogy and students' performance (R value of 0.929; \( P < 0.05 \)). The same result was obtained by Doherty and Hilberg (2007) in their work the effectiveness of pedagogy on student achievement. The result showed that learner-centered pedagogy is effective in producing increased achievement. Also, teachers' use of the standards of effective pedagogy predicted student performance on year-end standardized tests.

Collaborative learning had a positive effect on development (R value of 0.857; \( t = 25.147; P < 0.05 \)). The same result was obtained by Michael and Hameed (2017) in their study the effect of collaborative learning styles on students' performance in a mobile learning environment. The result showed that there were significant gains regarding the variations between pretest and posttest scores of students in the mobile learning experience, and think-aloud-pair problem-solving technique is the most effective collaborative learning style. All the collaborative learning styles are also more effective for learning in a mobile learning environment compared to non-collaborative learning style

**CONCLUSION**

The full utilisation of educational system of teaching and learning and the use of modern information communication technologies (ICT) needs the teachers, students and other educational staff to be involved. Students normally respond positively to the new innovation, and the Lecturers considered themselves successful in their quest to create more learner-centered classrooms while achieving their course objectives. This paper presented students-centered model for designing e-learning activities based on constructivism learning theory within e-learning environments. It requires active participation and collaborative of knowledge by introducing real world activities. Through exploration, students are encouraged to develop their own goals and objectives in solving problems. They are required to put in their own previous knowledge in solving problems in their environment.

**RECOMMENDATIONS**

Based on the findings and the conclusions, the following recommendations were made;

For e-learning to be operative, appropriate measure should be given to maintenance of facilities, provision of stable internet to support easy and fast learning and teaching processes.

Basic knowledge on how to operate the computer and its peripheral devices should be given to both
the staff and students of the schools and institutions.

Electricity is a basic component need to run a computer and its peripheral devices, so Government should assist in financing the higher institutions to a stable electric power.

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