The Impact of ICT on Teaching and Learning in Tertiary Institutions: A Case Study of Wisconsin International University College, Ghana

Felix Quaye
Sikkim Manipal University Accra, Ghana
felix.quaye@wiuc-ghana.edu.gh

Wolali Ametepe- Lecturer
Faculty of Computing and Information Technology (CIT) Department of Business Computing
Wisconsin International University College-Ghana P.O. BOX LG 751, ACCRA-LEGON
E-mail of the corresponding author: wametepe@wiuc-ghana.edu.gh/ametepef@gmail.com

Nana Kofi Annan
Head of IT Department
Faculty of Computing and Information Technology (CIT) Department of Business Computing
Wisconsin International University College-Ghana P.O. BOX LG 751, ACCRA-LEGON
nk.annan@wiuc-ghana.edu.gh

Abstract
The frightening effect of the increasing spate of poor teaching and learning in recent times underscores management of tertiary institutions, lecturers and students concern for the integration of ICT into tertiary institutions. The study specifically aimed at evaluating the benefit of various ICT tools used by tertiary institutions and examines the challenges tertiary institutions face in terms of implementing ICT in teaching and learning. Another objective is to determine the role of lectures, administrators and students in integrating ICT into tertiary institutions. The research was conducted on lecturer's administrators and students of Wisconsin International university College, Ghana and information was gathered through administration of structured questionnaires. Three null hypotheses were postulated and tested at 0.05 level of significance. Results from the study indicated that there is a positively high impact of ICT on teaching and learning in tertiary institutions in the sense that, broadband is a major factor in increasing collaboration between teachers; Interactive whiteboards make a difference to aspects of classroom interaction. motivate both lecturer students to use ICT.The findings also presented challenges, where students need to access computers in an easy way; recurrent technical problems; and the use of software applications require skills that have to be gotten. It was then recommended based on the findings of the study that, policy makers should include new competencies in the curricula and in assessment schemes, implement new forms of continuous professional development in a workplace environment and also
Keywords: Information system in education, Teaching and Learning, Important of ICT.

INTRODUCTION
In the beginning of the implementation of ICT there were optimistic beliefs about profound changes in teaching and learning practices, among both educational researchers and policy-makers. Although there have been several development projects, experiment and pilot studies on using ICT in tertiary institution, the studies about long-term and unending effect of ICT is still few (Kozma, 2003; Venetzky & Davies, 2001). Although 15-20 year experience in classroom and tertiary institution practices, as well as research evidence show that something changes in education when ICT is used (Bayraktar, 2000-2001; Korte Husing,2007; Kozma, 2003) but the content, the direction and the depth of the change still under discussion and remain issues for investigation.

The effects of ICT have often regarded as a positive change, and as if change always improvement. However, 'change' and 'improvement' are not synonyms, and the changes, when using ICT, are not merely beneficial or expected; similarly as Rogers (1995) depicts unexpected consequences of innovations. In this study, the theme was investigated by using different points of view of the main actors in tertiary institution, i.e. lecturers and students. In addition, various research methods were applied based on how well they met the research topic and objects.

This study refers to the ecological approach, which compares tertiary institution to an ecological system "to holistically capture the dynamic nature of technology use in tertiary institution settings" (Zhao, Lei & Frank, 2006). The concept 'affordance' (Gibson, 1979) which has an ecological background; Basalla (1987)the investigated the history of technology by using ecology as a metaphor. Later on Nardi and O'Day (1999) investigated the new forms of technology with an ecological framework. The need and importance of investigating 'tertiary institution', ICT holistically, and the approach is a fruitful too for understanding the

dissemination of technology.

The significance of education in the growth of every country cannot be underestimated. Tertiary education especially universities have over the years become the core of every economy's growth. However, people have become disturbed about the falling standards of tertiary education in the country. One of the contributing factors is poor teaching.

Teaching is core the success of education and the role of information and communications technology in adding teaching in the tertiary education is very significant.

There has always been debate among educators on how the technology should be used and what improvements in teaching could be expected. Initially microchip or integrated circuit (IC) computers were used to teach programming but the development of the microprocessor in the early 1970s saw the introduction of affordable microcomputers into tertiary institutions at a rapid rate. Computers and applications of technology become more pervasive in society which led to a concern about the need for computing skills in everyday life.

2. DEFINING TERTIARY EDUCATION

Tertiary education broadly refers to all post-secondary education, including but not limited to universities. Universities are clearly a key part of all tertiary systems, but the diverse and growing set of public and private tertiary institutions in every country colleges, technical training institutes, community colleges, nursing schools, research laboratories, centers of excellence, distance learning centers, and many more forms a network of institutions that support the production of the higher-order capacity necessary for development.

Among the various definitions given to tertiary education and information and communication technology by various researchers including the following;

2.1 GENERAL USE OF ICT

The greatest impact is found in relation to lecturers who are experienced users and who from the start had already come far with the integration of ICT in their teaching. Lecturers who perceive a highly positive impact of ICT use ICT in the most project-oriented, collaborative and experimental way (Ramboll Management, 2006). With ICT, the lecturer tends to become more of an advisor, critical dialogue partner and leader for specific subject domains (ITU, 2004).

The impact of ICT is highly dependent on how it is used. The impact of a specific ICT application or device depends on the capacity of the lecturer to exploit it efficiently for pedagogical purposes. Factors beyond the lecturer's control influence ICT uptake, e.g. .institutional cultures, leadership, the curriculum and assessment (Ramboll Management, 2005 and 2006). Lecturers do not yet exploit the creative potential of ICT and engage students more actively in the production of knowledge. Lecturers' use of ICT for communication with and between students is still in its infancy. ICT is not fully utilized to create learning environments where students are more actively engaged in the creation of knowledge rather than just being passive consumers. The researcher also found more transformative use of ICT where it was used within a curriculum context, more "built in" than "bolt on". Here again simple distinction between "built in" or "bolt on" does not tell the whole story: There are three aspects that need to be separated according to the experience of the Dutch Inspectorate gained within the ERNIST ICT tertiary institution portraits:

1.The affordances of technology: Does it possess characteristics that enable transformation?

2. The relationship of the technology use with the curriculum.

3. The pedagogy that lecturers use. There have been many examples where the use of the technology was innovative, interesting and transformative, but completely 'bolt on'. In other cases the use of simple technology was really 'built in' but in a traditional pedagogy.

The ICT Test Bed evaluation by Underwood (2006) provides further evidence that lecturers use ICT to support existing pedagogies: "New technologies that provide a good fit with existing practices, such as interactive whiteboards are first to be embedded ,but others like video conferencing, digital video and virtual learning environments are now being incorporated, providing evidence. of ongoing learning by the workforce. Training needs to continue to support innovative pedagogy."

2.2 LECTURER & ICT USAGE

The integration of ICT can help revitalize lecturers and students by reducing the amount of effort they used to put in either teaching or learning. This can help to improve and develop the quality of education by providing curricular support in difficult subject areas. To achieve these objectives, lecturers need to be involved in collaborative projects and development of intervention change strategies, which would include teaching partnerships with ICT as a tool. Lecturers' attitudes are major predictors of the use of new technologies in instructional settings. Lecturers' attitudes toward ICT shape not only their own ICT experiences, but also the experiences of the students they teach.

According to Zhao and Cziko (2001) three conditions are necessary for lecturers to introduce ICT into

their classrooms: lecturers should believe in the effectiveness of technology, lecturers should believe that the use of technology will not cause any disturbances, and finally lecturers should believe that they have control over technology. Demetriadis et al (2003) reached similar conclusions in their research study: "Training efforts are generally welcomed by lecturers but consistent support and extensive training is necessary in order for them to consider themselves able to integrate ICT in their teaching methodologies" According to Rogers (1995) one of the major factors affecting people's attitudes toward a new technology is related to the features of the technology itself. Rogers's points out five basic features of technology that affect its acceptance and subsequent adoption: relative advantage, compatibility, complexity, observability, and trialibility. Thus a new technology will be increasingly diffused if potential adopters perceive that the innovation:

2.3 LECTURER PERSPECTIVE AND THE USE OF ICT.

The individual lecturer is usually the one who makes the decisions on practical's concerning technology. It is obvious that lecturers use such tools, and one of the cases investigated is briefly presented. The computer-supported collaboration in Lansimaki Tertiary institution practices that support their beliefs about "good learning "and tools that fit easily into the existing conceptual and social organization of classroom. As Marx, Bluemenfeld, Krajcik and Soloway (1998) noticed, the use of technology tools mainly maintains the existing Culture, and they have little potential for transforming lecturers' work, or the nature of teaching and learning in classrooms. In the studies of Hakkarainen et al. (2001) and Moseley et al. (1999), it was found that there was a relationship between lecturers' pedagogical conceptions and the type of instructional use of ICT. Lecturers who intensively used ICT emphasized the importance of using ICT for facilitating students' participation in progressive inquiry,collaborativelearning,andthelearners'activeengagementintheknowledge formation process ,but as Lin (2001) says the relationship between lecturers 'conceptions and practice, are complex, not clear or simple.

3.Methodology

This study used primary sources in a form of "consumer survey" questionnaire in obtaining the perceptions of bank customers (mostly individual customers) and interviews of bank's staffs. An extensive review of the available literature provided the foundations for further investigation. The study collected data from secondary sources such as the Internet, articles, databases, and books, and were analyzed and interpreted. In the rare situations when official statistics are available, the recentness of the data determined its usefulness.

4. Result and discussion.

4.1 The Impact of ICT tools used in tertiary institutions

From the quantitative analysis, it was proven that there was a relationship between the use of ICT and teaching and learning. From the literature review, there is a consensus that use of Information and Communication Technology will enhance the quality of teaching and learning process (Paul, 2002; Papert, 1987; Voogt & Pelgrum, 2005; Watson, 2001; Well-Strand, 1991). Lecturers who perceive a highly positive impact of ICT use ICT in the most project-oriented, collaborative and experimental way (Ramboll Management, 2006). With ICT, the lecturer tends to become more of an advisor, critical dialogue partner and leader for specific subject domains (ITU, 2004). Lecturers do not yet exploit the creative potential of ICT and engage students more actively in the production of knowledge. Lecturers' use of ICT for communication with and between students is still in its infancy.

4.2 How challenges of ICT usage affect Teaching and learning

In analyzing the challenging factors, it can be seen that all the respondents were in agreement of the challenges faced in integrating ICT into tertiary institutions. This implies that majority of the respondents believe that the cost of ICT tool is a great challenge. In other words, the tertiary institution's management does not provide all the ICT tools because they think they are expensive even though students are charged to pay for them. Again, most of the respondents believe that the reason why ICT tools are not fully used is because the faculty members do not have the technical know-how to use the tools just as how Lamer and Timberlake (1995) found that lecturers were worried about showing their students that they did not know how to use the equipment, and that it was the lecturers who experienced this kind of anxiety who were less willing and /or able to make use of computers in their teaching. In addition, students' attitude and expectation of their lecturers' competence in ICT are likely to contribute to this lecturer anxiety Donegan, (1999). This notion of lecturers experiencing a fear of ICT is also supported by Russell and Bradley (1997), who refer to a 'cyber phobia' that exists in some lecturers which can be a genuine concern for them, and that these concerns deserve serious attention

Figure 5.1 Distribution Gender
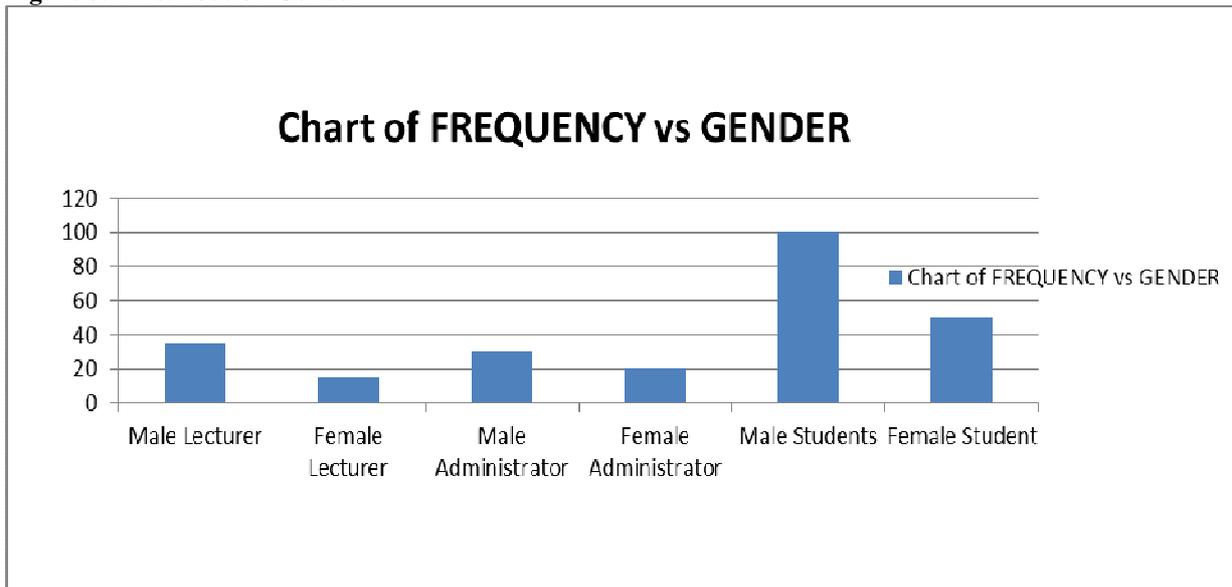
Source: Field data, 2014

Table 5.2 above as part of its content represents the gender of respondents. From the table, it can be seen that 83.33% of the lecturers are male whiles 16.67 % are females. For administrators 25% of them are male and 75% are females. Male students stand at 62.86% and females represent 37.14 % of the sample population. This implies that out of the 100 sample size, there are more male then females.

Figure 5.2 Distribution of lecturers
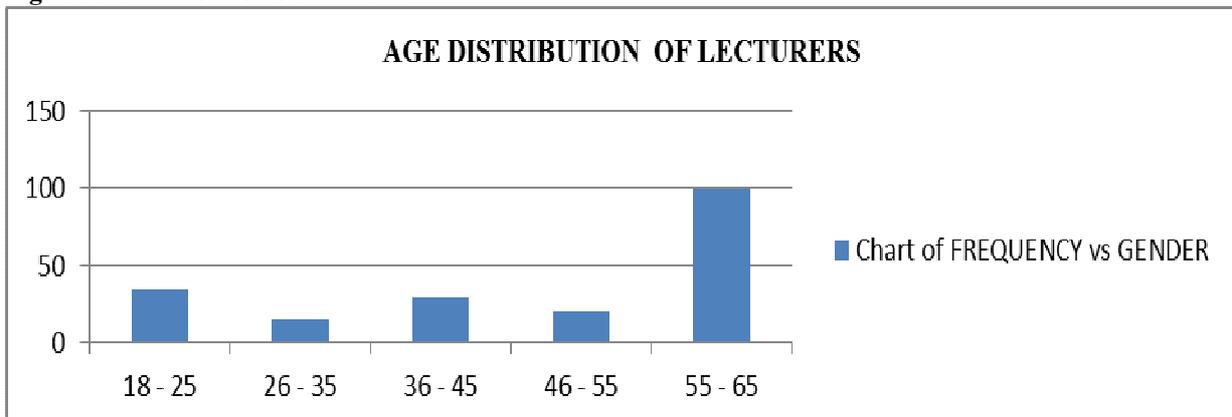
The aforementioned table also presents the age distribution of the respondents and it can be seen that 10% be of the respondents from lecturers are between the ages of 18 and 25 years, 40are between 26 and 35 years, 33.33% are between 36 and 45 years and 16.67% are between 46 and 55 years.
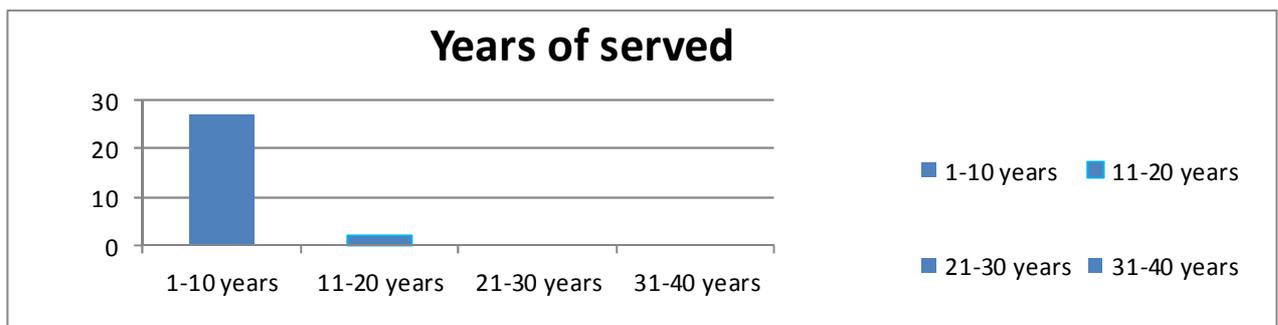

Figure 5.3 **Distribution of Years Served**

Lecturers who served in WIUC between 1-10 years stands at 70% whiles the rest 30% served between 11-20 years as against 80%betweemn1-10 years and the rest 20% between 11-20 years for administrators.

www.iiste.org

IISTE

Table 5. 1: Lecturers respond to ICT usage in WIUC

Radio cassette recorder	0	0	0	39
Video camera	0	0	0	30
Learning management system	25	5	0	30
Website interactive tools	27	3	0	30
intranet	20	5	5	30
Grade records software	27	3	0	30
Television /video conferencing	0	0	30	30
Internet / web environment	25	5	0	30
Multimedia computers	25	5	0	30
Projectors	22	5	3	30
V1	Frequently	Sometime	Never	30
	1	2	3	Total number

6. CONCLUSION

Technology has the potential to draw out teachers from the isolation of classrooms as well as students and administrators. Some lecturers have through indifference or intellectual incompetence or through circumstances, such as lack of time and lack of opportunities because of remote locations, lack of resources, etc. They have accepted a role confining their professional practice to lecture rooms. Their isolation them from participating in activities that could have improved their own practice. They also had no impact on or contribution to the larger educational community. To these lecturers, technology offers both the tools and opportunities to draw a personal road map that would bring them a better practice and to becoming an active contributor to growth of new knowledge.

The research endeavor might have made a considerable stride in the understanding of the impact of ICT on teacher preparation towards producing a new caliber teachers whose professional ability are very essential in a developing economy. Finally, teacher training institutions, professional development tertiary institutions, professional societies and public educational agencies must continue to identify study and disseminate examples of effective technology integration that answer professional development needs.

7. RECOMMENDATION

The purpose of this paper was to find out the impact of information communication technology on teaching and learning in tertiary institutions. Based on the findings of the study, the following are recommended to policy makers and tertiary institutions.

7.1 Policy Makers

a) Plan for transformation and for ICT: support the transformation process and management of change, of which ICT is an enabler and amplifier. The key word is transformation. If the organizational and institutional context does not support new working methods, educational practices will not change. Taking into account that most teachers embrace new technologies in a step by step process, systematically but slowly any change should be supplemented by process management and connected to realistic vision.

b) Include new competencies in the curricula and in assessment schemes: Most of the reviewed studies show that ICT impact on competency development specially team work, independent learning and higher order thinking skills – that are not yet recognized by any education system. These competencies should be formally included in the curricula and ways of assessing them explored. They are important outcomes of a new and changed educational context.

c) Motivate and reward teachers to use ICT: As the survey has shown, in addition to access the infrastructure and content and having the requisite skills, teachers' motivation is a critical factor in ICT adoption, and this is often neglected. Policies in this area should include measures raising the confidence levels of teachers, sufficient on-site support, appropriate in-service and initial teacher training in ICT, but also means of incentivizing recognizing and rewarding the use of ICT (such as appraisal schemes, making good ICT use part of career paths or time benefits for teachers engaged in ICT related projects.

8. REFERENCES

Baker, E. L., Gearhart, M., & Herman, J. L.(1994).Evaluating the Apple classrooms of tomorrow. In J. E. L. Baker and H.F. O'Neil (Ed.), Technology assessment in education and training .Hillsdale, NJ: Lawrence Erlbaum.

Becker, H.J.,Ravitz, J L., & wong, Y.T (1999), Tearcher and Teacher-Directed Student Use of Computers and Software. (Teaching, Learning and Computing: 1998 ry National Survey).

Bloom, B.S. (Ed.). (1964). Taxonomy of educational objectives : the classification of educational goals / by a committee of college and tertiary institution examiners. London: Longman.

Bork, A. (1980).Preparing student-computer dialogs: Advice to teachers. In R. Taylor (Ed.), The computer in the tertiary institution: Tutor, tool, tutee (pp. 15-52). New York: Teachers College Press, Columbia Tertiary institution.

Brown, A.L. (1994). The advancement of learning. Educational Researcher, 23(4), 4-12.

Bruner, J.S. (1962). On Knowing : essays for the left hand. Press.

Bruner, J.S. (1966). Toward a theory of instruction. Cambridge,Mass: Belknap Press of Harvard Tertiary institution.

Campione, J. C.,Brown, A. L., & Jay, M. (1990). Computers in a community of learners. In E.

DeCorte & M. C. Linn & H. Mandl & L. Verschaffel (Eds.), Computer-based learning environments and problem-solving (pp. 163-188). Berlin : Springer-Verlag.

Carleer, G.J.(1984). Computer literacy in The Netherlands. Computer Education, 8(4), 401-405.

Carnegie Commission on Higher Education. (1977). The fourth revolution: Instructional technology in higher education. New York, NY: McGraw-Hill.

Chambers, J. A., & Sprecher, J. W. (1984). Computer-assisted instructional Software (pp. 6-19). Belmont: Wadsworth Publishing Company.

Clouse, R.W.&Nelson,H.E.(2000). Tertiary institution reform, constructed learning, and educational technology. Journal of Educatioal Technology system, 28(4), 289-303.

Collis,B.(1989). Using ICT to create new educational situations. (pp.19). Paris: UNESCO International congress on Education and Informatics.

Committee on Developments in the Science of Learning (Ed.). (2000). How People Learn: Brain, Mind, Experience, and Tertiary institution. Washington D.C.: National Academy Press.

Coughlin, E.C.,& Lemke, C.(1999). Professional competency continuuum: professional skills for the digital age classroom. USA:Milken Exchange on Education on Educational Technology.

Cradler,J.,& Bridgforth, E (2002). Recent research on the effects of technology on teaching and learning. [online]. WestEd. Retrieved 25/10/2002, 2002, from the World Wide Web: www.wested.org/techpolicy/research.html

Dorup, J.(2004), Experirnce and attitudes towards ICT among first year medical students in Denmark: Longitudinal questionnaire survey, Journal of Medical Internet Research, 6(1): e10. Retrieved March 10, 2006 from : http://www.jmir.org/2004/1/e10/.

DEST. (2002). Raising the standards: A proposal for the development of an ICT competency framework for teachers. Canberra: Department of Education, Science and Training.

Donegan, M. (1999). Computers and Inclusion- Factors for Success. Oxford: ACE (Aiding Communication in Education) Centre Advisory Trust.

Downes, T., Perry, B., & Sherwood, C.(1995). IT in education and teacher education in Australia. Journal of Computer Assisted Learning, 11, 23-34.

Eadie,G. M. (2000). The impact of ICT on tertiary institutions: classroom design and curriculum delivery. : Winston Churchill Memorial Trust.

Fullan, M.(1995). The tertiary institution as a learnning organization: Distant dreams. Theory into practice, 34(4),230-235.

Glaser, B.G., & Strauss, A.L., 1967. The Discovery of Grounded Theory: Strategies for Qualitative Research. New York: Aldine de Gruyter.

Glenn, A. D., & Rakow, S. J. (1985). Computer simulations: effective teaching strategies. The computing Teacher, 12(5), 58-59.

Guglielmo, T. (1998). Computer conferencing systems as seen by a designer of online courses, Educational Technology, 38(3), 36-43.

Hannafin, R. D., & Savenye, W. C. (1993). Technology in the classroom: The teachers new role and resistance to it. Educational Technology, 33(6), 26-31.

Hussein , Y. (1996). The role of the computer in the tertiary institution as perceived by computer using teachers and administrators. Journal of Educational Computing Research, 15(2), 137-155.

Hoffman, B.(2001). What drives succesful technology planning? Journal of ICT for Instrugtor Education,

International Society for Technology in Education.(2000). National Educational Technology Standards for

Teachers.: International Society for Technology in Education.

ICT for Accelerated Development (ICT4AD) policy. Parliament of Ghana (2003)

Losavio, M., Wilson, D., & Elmaghraby, A., 2006. Prevalence, Use and Evidentiary issues of Digital. Evidence of cellular telephone consumer and small – scale digital devices. Journal of Digital Forensic Practice, 1(4), 291 – 296,Parahoo, K., 1997. Nursing Research: Principles,Process, Issues. London: Macmillan.

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
http://www.iiste.org

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: http://www.iiste.org/journals/   All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

Academic conference: http://www.iiste.org/conference/upcoming-conferences-call-for-paper/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar