The Eurasia Proceedings of
Educational & Social Sciences (EPESS)
ISSN: 2587-1730

The Eurasia Proceedings of Educational & Social Sciences (EPESS), 2018

Volume 9, Pages 354-358

ICEMST 2018: International Conference on Education in Mathematics, Science and Technology

Teaching Computer Science in the Universities in Third World Countries: Challenges

Julius Beneoluchi ODILI
Department of Mathematical Sciences, Faculty of Natural and Applied Sciences, Anchor University

Adzhar NORAZIAH
Faculty of Computer Systems and Software Engineering, Universiti Malaysia Pahang

Radzi AMBAR
Centre of Excellence, Universiti Malaysia Pahang

Mohd Helmy ABD WAHAB
Faculty of Electrical and Electrical Engineering, Universiti Tun Hussein Onn Malaysia

Fakheraldin MAI
Faculty of Electrical and Electrical Engineering, Universiti Tun Hussein Onn Malaysia

Abstract: That Computer Science is fast becoming the moderating disciples in modern education worldwide is not an overstatement. There is virtually no academic or professional discipline that computer science has not influenced in the last three decades. This paper presents the challenges of teaching Computer Science in tertiary institutions in a third world country. Using the Anchor University Lagos as its locale, the paper investigates the challenges being faced by students and teachers, alike, in the teaching of Computer Science. After a comprehensive survey of different cadre of staff and students, the paper asserts that under-funding, insufficient teacher-training facilities, lack of basic educational technology facilities remains some of the primary barriers to effective and efficient teaching cum learning of Computer Science in many developing countries. To address this situations a number of cost-effective recommendations were made to address this problem. Some of which are the need for adequate budgetary provisions to the teaching and learning of computer Science, need for adequate teacher motivation, improvisation of needed facilities and industry cum improved teacher-training syllabus.

Keywords: Teaching, Computer science, Universities, Challenges etc

Introduction

Among the several developments of the 20th century, arguably, Computer Science stands out, especially with the invention of the internet technology. Computer Science has evolved to be a component part of virtually every discipline ranging from medicine (Folkman, 2013), pharmacy (McCoy et al., 2012), administration, education, engineering (J. B. Odili, 2013) to transportation (Odili & Kahar, 2016). Computer Science has helped to enhance these disciplines: making them more accessible to the generality of users and practitioners, enhancing their quality, their communication and use etc.(Odili, Kahar, & Anwar, 2015)

In the light of the benefits of Computer Science to human growth and development all over the world, research efforts aimed at enhancing the teaching and learning of computer science should, therefore, be a step in the right direction. The teaching of Computer Science in Nigerian school system was introduced in 1987 by the then Minister for Education Prof Jibril Aminu during the 32nd ministerial council meeting of the National Council on Education (Yusuf, 2005). This initiative was given impetus by the formation of the National Committee on Computer Education in the same year by the Federal Government of Nigeria (Council, 1996). The National

Committee on Computer Education.aims at formulation of a dynamic policy on computer education as well as the mass mobilization for computer literacy among Nigeria, Furthermore, the National Committee on Computer Education was empowered to devise clear-cut strategies, terminologies and policy direction for the Federal and State Governments in introducing computer education (Council, 1996).

As a follow up on the initaitaive of the then Minister of Education, when drawing up the National Policy on Education in 2004, computer education was given a pride of place as a technical cum vocational education that leads to the acquisition of practical and applied skills. The relevant portionsof the Nigerian National Policy on Science and Technology aims at developing mass awareness to embrace all aspects of science and technology through: The objectives of science and technology documentwas to realize the national objective

(a) Increased public awareness in science and technology.

(b) The direction of the national science and technology efforts along nationally- defined goals such as self-reliance.

(c) The promotion the outcome of science and technology individual and group efforts into practical goods and services.

(d) The increase and maintenance of indigenous science-based research and development.

(e) The motivation and creation of tangible output in science and technology as a formidable basis for national development (Yusuf, 2005).

From the foregoing discussion, it is obvious that the teaching cum learning of computer science in Nigeria has spanned over three decades. It is, therefore pertinent to examine the present state of affairs in this direction after over thirty years of governmental investment, encouargement support, hence this study

The rest of this paper is organized in the following ways: section two presents the research instrument and locale; section three examines the research findings and discusses the results obtained; section four draws conclusion on the study. These are followed by the acknowledgement of support for the study and references

Research Instrument And Locale

This research is carried out with the aid of structured and unstructured questionnaires aimed at obtaining relevant responses from the respondents. The questionnaires were administered to students and staff of Anchor University, Ayobo, Lagos, Nigeria. It must be observed that 50% out of the distributed 100 questionnaires were returned. The low returned could be a demonstration of the lack of knowledge of the subject matter or mere carelessness. It is also possible that failure to return some of the questionnaires may be due to the fact that due to the tight schedules of some computer science lecturers arising from serious shortage of staff in the field, the respondents did not complete the questionnaires,

Research Findings and Discussion of Results

In view of the enormous contributions of Computer Scıence to human development, this study with the aim of enhancing opportunities in the teaching and learning of Computer Science in tertiary institutions investigated the challenges being faced in teaching of Computer Science. Statistics from the respondents are presented in Table 1:

Table 1. Challenges in learning computer science

Questions	Percentage
Inadequate Teachıng Staff	12
Inadequate Facılıtıes	36
Obsolete Textbooks	10
Irregular Internet Availability	42
Bleak Job Prospect	06
Market Saturation	06
Defient Computer Curriculum	08
Low Morale	14
İnsufficient Teacher-Training Facilities	18

As this table reveals, majority of the respondents (42%) place the irregular internet availability as the primary issue as far as the teaching and learning of Computer Science is concerned. In Anchor University, Lagos, for instance internet availability to students, including the students of Computer Science has recently been increased from three to five hours per student, per day. In as much as this gesture from the University authority is commendable, the staff and students respondents of the University still believe that more needs to be done. The situation may be worse in some remotely-located Universities in many third-world counties around the world,

Similarly, the next major issue to be addressed if the teaching of Computer Science in the Universities in third world countries is to be enhanced, according to 36% of the respondents, is the provision of computer facilities to students. In some developed countries, such as Finland, all undergraduate ICT students are provided with laptops as soon as they register in Universities. This enables the students from indigent backgrounds to have access to their own laptops anytime of the day. Such a gesture goes a long way towards computer proficiency since the students can use their computer systems in the needed practice needed to enhance learning.

Furthermore,18% of the respondents believe that the teacher- training facilities in the University system is inadequate. A situation where University Lecturers are not provided with at least a desktop computer in their various offices leaves much to be desired, especially when one considers the meagre pay of Lecturers in most third world countries. The monthly salary of a fresh PhD Lecturer in Computer Science may not be sufficient to purchase a new laptop. In such a situation, the Lecturer is forced to frequently visit the University Computer Laboratory which may not contain the relevant software in order to make use of computers for his classwork preparation and personal development. The output from such a Lecturer, no doubt, will be suspect.

Also, 14% of the respondents argue that low morale is a major issue in the teaching and learning of computer science. The reason for the low morale is not far-fetched. A situation where students are grappling with ever-increasing tuition and other fees in the University system coupled with inadequate staffing and sparsely-equipped laboratories, teaching and learning cannot be exciting. As such low morale replaces the enthusiasm needed for excellence.

Not to be ignored is the issue of obsolete textbooks that adorn many computer science sections of many University Libraries raised by 10% of the respondents. One wonders the need of physical textbooks these days of e-books and journals. Not only are these books obsolete, it is no more environmentally-friendly to be churning out printed textbooks in modern times in view of the enormous environmental hazards caused by industrial revolution.

Finally, 6% of the respondents believe that job prospect for future computer scientists is bleak and that the computer science job market is saturated. While these respondents are entitled to their opinions, the authors do not share this view. However, in view of the earlier outcome of this research investigation, one can sympathize with the opinion of these respondents. The culmination of the earlier issues results in poor learning environment cum learning outcome which produces poor quality graduates which may not be unemployable. The judgement of these 6% therefore underscores the need for this research enterprise. Technology holds the future of the world's development and this technology revolves around the computer revolution. If the teaching of computer science is not given its due attention then bleak may the future of technology and job creation, the world over.

Conclusions and Recommendations

From the ongoing discussions, it is obvious that more needs to be done in order to sustain the gains the world have derived from the use of computers is to be sustained and improved upon. In the light of this, this study recommends that more computer resource persons should be recruited, not only as computer science lecturers but also as computer laboratory technicians. This way, students will have better access to experts both in the theoretical and practical sessions both in the laboratories and lecture theatres.

Moreover, more teaching aids are needed in universities all over the third world countries so as to make the teaching of computers easier and enhance better understanding. The more real-to-life the teaching and learning of computer becomes, the easier it will become for skill transfer from the experts to the learners. Closely related to this is the need to create more laboratory sessions in the teaching of computer science than what we have presently in virtually all third world countries.

To solve the problem of unemployment, it is recommended that careful industry-academia collaboration is required in curricula development for computer science teaching and learning. There is no need spending so much time in loading the learners with complex computer science theories that have little or no relevance in the computer industries.

Besides, the need for adequate remuneration and other incentives for Computer Science lecturers cannot be over-emphasized. A well-motivated teacher is an indispensable asset to any educational system. Also, the need for teacher-training and retraining is a requirement for greater computer revolution only being dreamt about now. Staff training and development have been found to be invaluable to enhance productivity (J. Odili, 2013).

Further, students should be given a one-to-one sessions both in the laboratories and lecture theatres. Not all learners learn at the same pace, hence the need for this approach. This way, students are trained to be self-reliant job creators rather than job-seekers.

Finally, there is the urgent need for regular internet supply to all staff and students and staff of computer science in order to build up their capacity. Practice, they say, makes for perfection. A situation where internet access is rationed on hourly-basis among staff and students cannot enhance productivity. Everything valuable costs time and money. The need for adequate investment in internet provision cum teaching of computer science is hereby advocated.

Acknowledgement

The authors are grateful to the Department of Mathematical Sciences, Faculty of Natural and Applied Sciences, Anchor University, Lagos for their support. Our gratitude also to the Faculty of Computer Systems and Software Engineering, Universiti Malaysia Pahang, Kuantan 26300, Malaysia and the Universiti Tun Hussein Onn, Johor, Malaysia for additional support

References

Council, N. R. (1996). *National science education standards*: National Academies Press.

Folkman, S. (2013). Stress: appraisal and coping *Encyclopedia of behavioral medicine* (pp. 1913-1915): Springer.

McCoy, D., Pitsillidis, A., Jordan, G., Weaver, N., Kreibich, C., Krebs, B., . . . Levchenko, K. (2012). *Pharmaleaks: Understanding the business of online pharmaceutical affiliate programs.* Paper presented at the Proceedings of the 21st USENIX conference on Security symposium.

Odili, J. (2013). Staff development programs and job performance: Implications for productivity in Lagos state ministry of education. *Journal of Business Administration and Management Sciences Research, 2*(12), 330-334.

Odili, J. B. (2013). Application of ant colony optimization to solving the traveling salesman's problem. *Science Journal of Electrical & Electronic Engineering, 2013*, 175-177.

Odili, J. B., & Kahar, M. N. M. (2016). Solving the Traveling Salesman's Problem Using the African Buffalo Optimization. *Computational Intelligence and Neuroscience, 2016*(2916), 1-12.

Odili, J. B., Kahar, M. N. M., & Anwar, S. (2015). African buffalo optimization: a swarm-intelligence technique. *Procedia Computer Science, 76*, 443-448.

Yusuf, M. O. (2005). Information and Communication Technology and Education: Analysing the Nigerian National Policy for Information Technology. *International education journal*, *6*(3), 316-321.

Author Information

Julius Beneoluchi Odili
Anchor University, Lagos
1-4, Ayobo Road, Ipaja, Lagos
Odili_julest@yahoo.conm

Adzhar Noraziah
Universiti Malaysia Pahang,
Gambang, Kuantan 26300, Malaysia

Radzi Ambar
Universiti Tun Hussein Onn, Malaysia
Batu Pahat, Johor, Malaysia

Mohd Helmy Abd Wahab
Universiti Tun Hussein Onn, Malaysia
Batu Pahat, Johor, Malaysia

Mai Fakheraldin
Faculty of Electrical and Electrical Engineering, Universiti Tun Hussein Onn Malaysia