

Faculty Development A Panacea for Qualitative Science and Engineering Education in Nigeria

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ABSTRACT

The attainment of an effective qualitative science and engineering education (SEE) in Nigeria has been a serious challenge to teaching and learning of science and engineering courses in higher institution in Nigeria. An effective faculty development will address problems such as underprepared students, replacement of old faculty?, lack of integration of technology into teaching and learning process, lack of interdisciplinary collaborations, increasing multi-cultural and multi religious diversity among others.

The research was conducted with the aid of questionnaire administered to 100 respondents from five different Universities in Nigeria involved in effective faculty development. The results obtained were analysed using frequency or cross tables and graphic visualization methods.

The results show that apart from underprepared students and students' cultism related challenges, other challenges can be solved when there is effective faculty development programme in the institution. Thus, proper faculty development will serve as magic bullet for peaceful resolution of the problems incapacitating effective qualitative science and engineering education Nigeria.

Key words: Faculty development, science and engineering education, underprepared students, multi-cultural, interdisciplinary collaborations

INTRODUCTION

Faculty development also refers to as staff development has become an integral part of science and engineering education. Presently, there is a growing awareness of the role of faculty development in science and engineering education in higher institutions in Nigeria. Bland, et al., [1] defined faculty development as a planned programme to prepare institutions and faculty members for their academic roles. However, faculty development requires developing a cadre of professional and competent teachers, educators, researchers and leaders for their new roles and responsibilities in science/engineering education. There are many new roles in teaching and learning both science and engineering education. It has been reported that faculty development has a critical role to play in promoting academic excellence and innovation [2]. Faculty development is quite a difficult task that always requires the support of institutional leadership and cooperate organizations, appropriate resources allocation, and recognition of teaching excellence, which in most cases are absent. In the present day engineering faculty, faculty development should be a process by which engineering faculty work systematically to improve their educational skill, leadership skills, skills necessary to engage in scholarly activities, personal development and skills in designing and implementing a professional development plan. The areas of faculty development include, teaching; instructional design and curriculum development; scholarly activities including writing, conducting research, presentation at conferences etc.; leadership, administration and organization development; personal and professional development [3]. Steinert et al., [4] reported that faculty development mainly consist of formal (or structure) programme such as workshop, seminars, longitudinal programmes and fellowships. The essence of faculty development is for academic success that transcend discipline, rank, social stature and gender. Also, for increased faculty productivity and time management, maintenance

of faculty work – life balance, resolving conflict and personal organization [5]. Hence, there is the need for offering of faculty development programmes and activities in engineering/science faculties.

In order to achieve academic excellence and innovation current faculty development initiatives need to respond to changes in science and engineering education and practice, improve on previous achievement and accomplishment and continue to adapt to the evolving roles of faculty members. The institution should provide the faculty or faculty member at all levels in their careers with tools and opportunities to succeed and flourish. There are frameworks imperative for designing well-tailored faculty development programmes. These frameworks can be used by faculty developers to systematic plan, implement and evaluate staff development programmes. The faculty development programmes include, new faculty development, leadership development, professional development, chair/director development and mentorship opportunities. Mentorship is a major part of faculty development because any strategy for self-improvement will require the support and challenge that an effective mentor do provides. Also, at times in science and engineering practice, learning from experience is considered an approach to faculty development and it is necessary for self-improvement [6].

The focus of this research paper is to investigate whether effective faculty development in institutions of higher learning will address some challenges of qualitative science and engineering education in Nigeria. The objective was to find out the effects of effective faculty development on the following challenges via questionnaire: underprepared students, replacement of old faculty, utilization of part – time and adjunct faculty, increasing multicultural and multireligious diversity, absence of integration of technology into teaching and learning process, lack of emphasis on assessment of student learning outcome, absence of interdisciplinary collaborations, increasing cultism and increasing roles of faculty.

METHODOLOGY

Design and Sample

The study population comprised of 100 faculty members at various levels of lecturing in both science and engineering faculties in five (5) Universities currently engaged in effective faculty development in Nigeria. Twenty (20) faculty members each from a university of which ten (10) each were from either science or engineering faculty of the university were used as the respondents. This selected faculty members were from three (3) private and two (2) government universities.

Instrument

Questionnaire was used for gathering the data required for the evaluation. Relevant research questions were inquired in the questionnaire. The questionnaire was structured in two parts A and B. Part A elicited information on the personal data of the respondents while in Part B, the respondents were asked special kind of survey question that has four possible options that is strongly agree (SA), agree (A), disagree (D) and strongly disagree (SD).

Validity and Reliability

The questionnaire was validated based on frequency of cross tables and graphic visualization methods. The frequency distribution of 100 percentage (%) for the 100 respondents were taken. Bar charts further used for analysis. The summary results as presented in Table 1.

RESULTS AND DISCUSSION

Table 1: Effective faculty development and challenges in science and engineering education

Question	Relative frequency	Decision based on relative frequency
How much can effective faculty development address the following challenges:		
(1) Absence of interdisciplinary collaborations – working on research and teaching project from multidisciplinary perspective	72% (72)	Strongly agree
(2) Replacement of old faculty – faculty members that resigned, retired or dismissed.	78% (78)	Strongly agree
(3) Increasing roles of faculties – development of skills for research grant writing	88% (88)	Strongly agree
designing and offering of courses	74% (74)	Strongly agree
upgrading with the emerging skills in their areas	79% (79)	Strongly agree
participating in interdisciplinary work and research	84% (84)	Strongly agree
(4) Absence of integration of technology into teaching and learning process	76% (76)	Strongly agree
(5) Lack of emphasis on assessment of student learning outcome	68% (68)	Strongly agree
(6) Increasing multicultural and multireligious diversity – students from many languages and religious background.	62% (62)	Agree
(7) Utilization of part – time and adjunct faculty staff	67% (67)	Disagree
(8) Under prepared students - absence of fundamental skills in at least one or more of the three basic areas of reading, writing, english and mathematics.	85% (85)	Strongly disagree
(9) Increasing cultism – students’ involvement in multifaceted cultism activities	72% (72)	Strongly disagree

The results of how much will effective faculty development address some of the challenges of science and engineering education is represented in Table 1. The results in Table 1 can be divided into four sections, these are strongly agree, agree, disagree and strongly disagree. The results show that it was strongly agreed that effective faculty development will greatly address such challenges as absence of interdisciplinary collaborations, replacement of old faculty, increasing roles of faculties, absence of integration of technology into teaching and learning process and lack of emphasis on assessment of student learning outcome. The relative frequency was between 72% and 88% and their decision was strongly agree. Also, the respondents agreed that increasing multicultural and multireligious diversity among students in science and engineering faculties will be addressed to some extent when there is effective faculty development in the institution. The relative frequency was 67% and the decision was agree. This result was in correlation with those reported by Bahar-Ozvaris, et al., [7] and Stes, et.al., [8]. According to these researchers effective faculty development which entails the use experimental learning and reflective practice, provision of feed back, multiple instructional methods within single interventions, individual and group projects; peer support and the development of communities of practice; mentorship; and institutional support, will provide solutions to teaching and learning challenges in institutions.

The challenges of underprepared students entry into institutions with absence of fundamental skills in at least one or more major subject (s) and increasing students’ involvement in multifaceted cultism activities was generally strongly agreed by the respondents that effective faculty development will not address these challenges. This could be as a result of the fact that these are fundamental and societal challenges that requires other means to address. Besides, respondents stated as seen in Table 1, that utilisation of part – time and adjunct staff by institutions will not be addressed by effective faculty development. The relative frequency was 67% and the decision was disagree.

CONCLUSION

The following conclusion can be drawn from this study:

Effective faculty development programmes should be put in place in all science and engineering faculties not only in Nigeria but other underdeveloped and developing countries.

It was stated by respondents from faculty with effective faculty development programmes that apart from underprepared students and students' culture related challenges, others challenges can be reduced to a minimum or eliminated when there is effective faculty development programme.

The challenges of underprepared students entry into institutions and increasing students involvement in multifaceted culture activities should be considered as fundamental and societal problems that faculty development can not address.

REFERENCE

- [1] Bland C J , Schmitz C C , Stritter F T, Henry R C, Aluise J J. (1990) Successful faculty in academic medicine (New York, Springer Publishing)
- [2] Brew A, Boud D. (1998) Preparing for new academic roles: an holistic approach to development. *Int J Acad Dev.*, (2):17–25.
- [3] Amundsen C, Wilson M. (2012) Are we asking the right questions? A conceptual review of the educational development literature in higher education. *Rev Educ Res.* 82:90–126.
- [4] Steinert Y, Mann K, Centeno A, Dolmans D, Spencer J, Gelula M, Prideaux D. (2006) A systematic review of faculty development initiatives designed to improve teaching effectiveness in medical education: BEME Guide No. 8. *Med Teach.*, 28 (6):497–526.
- [5] De Rijdt C, Stes A, van der Vleuten C, Dochy F. (2013) Influencing variables and moderators of transfer of learning to the workplace within the area of staff development in higher education: research review. *Educ Res Rev.* 8:48–74.
- [6] Steinert Y. (2013) Faculty development for teaching improvement: from individual to organizational change. In: Walsh K, editor. *The Oxford textbook of medical education.* Oxford: Oxford University Press. p. 711–721
- [7] Bahar-Ozvaris S, Aslan D, Sahin-Hodoglugil N, Sayek I. (2004) A faculty development program evaluation: from needs assessment to long-term effects, of the teaching skills improvement program. *Teach Learn Med* 16(4):368–374
- [8] Stes A., Min-Leliveld M., Gijbels D., Van Petegem P. (2010) The impact of instructional development in higher education: the state-of-the-art of the research. *Educ Res Rev.* 5:25–49.