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An Analysis of Female Lecturers' Participation In Civil Engineering Research And Development Activities At One Polytechnic In Zimbabwe

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Abstract
This study sought to explore female lecturers' participation in civil engineering research and development activities at one polytechnic in Zimbabwe. Case study design was chosen for this study to make predictions, narration of events, comparisons and drawing of conclusions. The female lecturers were purposively sampled to participate in the study. For data triangulation purposes male lecturers from the same department were randomly selected to take part in the study. In data generation the researcher was the chief tool aided by questionnaire with open-ended items and personal interviews. The generated qualitative data was manually analyzed according to emerging themes. The findings of the study revealed that female lecturers' participation in research and development activities is of paramount importance as it enables them to show case their innovative skills in civil engineering. It was further noted that the institution in its quest to involve female lecturers in civil engineering research and development activities some challenges such as low self-esteem, lack of confidence and inadequate support are encountered. In general it can be concluded that at the institution under study, to a larger extent female lecturers have managed to participate actively in civil engineering research and development activities, despite various challenges encountered during the process. Civil Engineering lecturers' sensitization on the importance of females' participation in research and development activities through the provision of adequate support is recommended.

Keywords: Female lecturer, participation, research and development activities and civil engineering

1. Introduction

Gender equality and equity has been an issue in a number of countries and studies reveal that gender differences have been a research focus for number of years (Sperandio 2011). Studies in various countries, like Australia (Tessens, et al. 2011), Greece (Kyriakoussis & Saiti 2006), California (Wickham 2007), the Solomon Islands (Akao, 2008), Turkey (Celikten, 2005), Uganda (Sperandio & Kagoda 2010), Papa New Guinea (Vali 2010) and Zimbabwe (Nani, 2011) show an under-representation of females in different capacities at all levels of the education system, including polytechnic institutions. The under-representation of females in different spheres of the economic raises issues of sustainable development, social justice and equity and also a loss of experience and talent to countries and their communities (Sperandio 2011).

The economic development in a country is increasingly dependent on its human resources, while the importance of, for example, raw materials and proximity to rich markets is declining in an era of globalisation (Thulstrup & Koswara 2001). Hence the need for the developed and developing nations to have a well trained workforce in order to improve their socio-economic status. Today most, competitive technologies are research based (Thulstrup 1996) and knowledge is relevant in science (civil engineering) and technology fields is a necessity, for the development of new technologies and modification of the existing ones. All should be under taken by a human resource base of females and males in a society which perpetuates certain behaviours among females and males through socialization (Mapfumo, et al. 2002). Gender socialization starts at birth and it is a process of learning cultural roles according to one's sex (UNICEF 2007); as people learn to behave in a certain way, as dictated by societal beliefs, values and attitudes. Bem (1981) highlighted that humans learn about what it means

to be male and female from the culture in which they live. Social traditions and cultural beliefs may make it unacceptable for a female to make decisions for herself or participating in activities with males of her age.

According to Amadi and Role (2013) social traditional environment, creates barriers that rob females of their human identity and social rights. Gender stereotyping is prevalent in different settings including the home, school and workplace. Control of females' lives, as well as roles, they perform are some of the cultural barriers impeding them access to education (Begum & Iqbal 2007). This is better exemplified by the treatment of the females in issues such as science and technology (Mapfumo, et al. 2002); where males are believed to be born with certain natural abilities, aptitudes or talents that are different from those of females.

Although the reasons for gender inequalities vary somewhat across national, cultural and occupational contexts, the studies also reveal that females' careers are influenced by gender stereotypes, gender differences in family responsibilities and inadequate workplace structures and public policies (Vali 2010). The disadvantaged polytechnic female civil engineering lecturers run the risk of being neglected and eventually failing if the higher and tertiary education, science and technology development system falls short in addressing their needs. Thus females have internalized negative beliefs about themselves; they perceive themselves as unequal and inferior to males (UNICEF 2004). Traditionally females were seen as nurturers and mainly as providing support for males who work to provide for the family. However, the liberation struggle ushered in new platforms in which no one was supposed to be discriminated against in terms of sex, ethnicity and religious affiliation in all spheres of life (Chibaya & Gudhlanga 2001). Zimbabwe's commitment to social justice is more pronounced through the signing, ratification and acceding to several Sub-Saharan Africa and international declarations and protocols to enable the creation of a favourable environment for the attainment of gender equity, equality and empowerment (Mawere 2013).

Gender equality, equity and female empowerment are core development objectives, fundamental for the realisation of human rights and key to effective and sustainable development outcomes (United States International Agency for Development 2012). The position of females from time immemorial in the structure of societies in Africa has never been considered as the same pedestrian as that of males. Hence most countries the world over are calling for gender equity, equality and empowerment in political structures and career opportunities. However in most instances females remain marginalised in political, workplaces and career decision-making structures in these countries.

According to Mutekwe, et al. (2012) in Zimbabwean context, there are challenges of incorporating gender and empowerment discourse into mainstream political and occupational landscape. As Zimbabwe is striving to achieve total democracy there is need for full realization that among the myriad of exploitative structures such as fighting ideological impediment to the females' liberty to participate actively in the previous male dominated occupational structures such as civil engineering. The equitable distribution and creation of science and technology is necessary prerequisite for the development and improvement of the human wellbeing (Aderemi, et al. 2013). However, the participation of females in civil engineering has been and still low around the world (Kishore 2008). Generally females are under-represented in almost every area of recognised scientific activity (McCarthy 2003) though participation is increasing in the 21st century (British Council 2001).

In 1999, the Presidential Commission of Inquiry into Education and Training in Zimbabwe presented its findings noting, among other things, that gender disparities persisted at all levels of education (Nziramasanga 1999). As a follow up, the Government of Zimbabwe launched the National Gender Policy in March 2004 whose goal *inter alia,* was "to eliminate all negative economic, social and political policies, cultural and religious practices that impede equality and equity of sexes" (National Gender Policy 2004:3). However, in spite of the existence of policies and measures there appears to be little impact in practice. For example, at Mutare Polytechnic, there are fewer female lecturers than males are participating in civil engineering research and development activities. This has prompted researchers to conduct a study guided by the following research question: To what extent are female lecturers participating in civil engineering research and development activities at the institution? The study had the following sub-questions:

- Of what importance is the participation of female lecturers in civil engineering research and development activities?

- What challenges are encountered by female lecturers when participating in civil engineering research and development activities?

2. Methodology

A case study design was used to generate rich and relevant information, since researchers sought to explore female lecturers' participation in civil engineering research and development activities at the institution under study. According to Yin (2009) a case study design should be considered as an option when the phenomenon under investigation cannot be separated from its context. It was important to have a clear comprehension of work environment of female civil engineering lecturers, which could give insight into the work experiences and life patterns of female lecturers (Sperandio 2011). The researchers were immersed and closer to the social worlds of the informants which enabled the patterns to be viewed holistically (Stake 2005). It provided an in-depth analysis which, in turn, yielded richness and completeness of the findings (Yin 2003). This design enabled the researchers to understand what informants were thinking and feeling, as well as how they communicated, verbally and non-verbally (Easterby-Smith, et al. 2008).

Since the study focused on the participation of female lecturers in research and development activities purposeful sampling was used to select the three (3) 'information-rich female lecturers' as informants from the Civil Engineering Department to share their experiences in the area under study (Kombo & Tromp 2006). For triangulation purposes the researchers randomly selected male civil engineering lecturers to be part of the study. This gave the researchers basis to assume that the informants were knowledgeable on the topic under study, hence there were high chances of them providing authentic information. The selection of the informants was based more on the potential of learning more from them than on the representativeness of the target population (Stake 2005).

For this study the researchers were the primary tools for data generation, implying that they were at the centre of research activities and this enabled them to subjectively select events that were investigated. As a primary tool of data generation the researchers solicited data through open-ended questionnaire and personal interviews. The informants were interviewed individually at the work places. Yin (2009) emphasizes the importance of operating on two levels at the same time when conducting interviews, which requires "the need to satisfy the needs of your line of inquiry while simultaneously putting forth 'friendly' and 'non-threatening' questions in your open-ended interviews" (p.107). The open-ended questions enable the interviewer to probe further, giving the interviewees a chance to qualify their responses (Dhliwayo & Keogh 2002). The informants were offered the opportunity to construct reality and to think about situations which produces more understanding (Yin 2009). The personal interviews provided the researchers with an opportunity to inquire about informants' feelings, motives and interpretations of the events (Singleton & Straits 2010). The responses given during the interviews were recorded by means of both field notes and tape recording. In designing the questions researchers were guided by the insights from gender neutral approach and literature on the topic as well as the demands of the research questions. The findings were coded and 'analyzed by hand' according to emerging themes (Cresswell 2012).

3. Data analysis and discussion

Civil engineering lecturers both females and males through day-to-day interactions were asked to highlight the importance of female lecturers' participation in research and development activities at the institution. Since the respondents are adults and professionals, it is very probable that apart from their interest and intellectual acumen, which may predispose them to participate in research and development activities, there might be other importance, which may influence them to participate in research and development activities. The importance attached to the female lecturers' participation in civil engineering research and development activities is therefore discussed in this section.

In an interview with one of the female lecturers it was acknowledged that, *"Our participation in research and development activities enable us to put into practice the knowledge and skills acquired during training thereby improving our level of competence in civil engineering."*

This concurs with Andoh, et al. (2012) who highlighted that the low participation of females in education generally and science in particular hinders the rapid actualisation of international goals and aspirations. Females' participation in science and technology positively correlates with several national and international goals and aspirations, some of which include economic productivity, social development, social equity and sustainable development (Abbe & Momodu 1999).

In the focus group discussion one male lecturer revealed that, *"The involvement of female civil engineering lecturers in research and development provide them with the opportunity to contribute towards the social,*

economic and technological development of the country by providing solutions to existing problems or new ideas."

On exploring the challenges encountered by female civil engineering lecturers when participating in research and development activities, the following themes which emerged are discussed. An analysis of the staff composition in the department revealed that they were more male civil engineering lecturers (15) than females (3). Thus they are still under-represented in many occupational sectors of the economy especially in the public spheres in areas such as politics, engineering, sciences and technology in general (Jansen 2003). From the generated data the respondents revealed that female lecturers' low self-esteem and lack of confidence are a hindrance to their participation in civil engineering research and development activities at the institution. According to UNESCO (2011) lack of confidence poses a major barrier to self-development for females in science and technology industry.

One female lecturer mentioned that, *"As female lecturers in the department we are not prepared to play a leading role in some of the departmental activities although at times we have better qualification than our male counterparts, we tend to come in handy to support whatever is being done."*

This concurs with Kyriakoussis, et al. (2006) who revealed that females' reluctance to put themselves forward for promotion is attributed to the lack of ambition, among other factors. This shows that although gender socialisation in a patriarchal society creates discrimination between females and males, it takes place in a way that both sexes accept it without force (Chabuya, et al. 2009).

In addition it was revealed by the one male civil engineering lecturer through an interview that, "*Most female lecturers in the department, yes they are actively involved in research and development activities but they do not want to play a leading role.*"

Coleman (1988) in Gyan, et al. (2014) as cited in noted that females are less likely to take up challenging activities due to lack of confidence and a relative hesitancy to take up science related opportunities. This is due to the way female lecturers are socialised, hence the assumption that they cannot take up any leading role in research and development activities in civil engineering the so-called male territory. As a female scientist transverse the male dominated science world, low self-esteem contributes to fear of failure and fears of being labelled incompetent (UNESCO 2011). Mapfumo, et al. (2002) noted that the society perpetuates certain behaviours among males and females through the way they are brought up. Powell and Graves (2003) asserted that when females believe that they are disadvantaged, they may be less likely to express interest in vacant top leadership jobs than equally qualified males. This is further supported by Onsongo (2004) who noted in many communities, traditional perceptions of females as inferior to males continue to prevail as many people invoke the preservation of African culture to justify the subordination of females. Therefore female civil engineering lecturers at times internalise these barriers and this results in a creation of a psychological glass ceiling (Burns 2007).

The findings concur with the informants' sense of self-efficacy as indicated by Nevid (2003) and Hellriegel and Slocum (2004). Other studies, such as those of Mitroussi and Mitroussi (2009) noted that females need to feel well-prepared before playing the leading role in engineering and technology, while Cowie and Crawford (2008) maintained that preparation for leadership roles can help broaden their outlook and self-belief.

Data generated from both female and male lecturers revealed that female lecturers are not getting the much needed support to participate fully in civil engineering research and development activities. One female lecturer highlighted that, *"Yes female lecturers are involved in research and development activities but we are always playing second fiddle to the males in the department, who in most cases are assigned leadership positions by the administration to spearhead most of the projects. Due to their posts can influence most of the decisions pertaining to how things should be done."*

Thus the relegation of females to the background negates the usefulness as a part in the systematic mechanism that yields sustainable development (Ofor & Ben-Chende 2011). This concurs with Eagly and Carl (2003) cited in Botha (2013) who argued that males working in the male dominated environments have better chances for promotion whereas females in those situations may leave their jobs because of male dominance. Therefore females appear to be facing considerable difficulties when advancing in their career in the civil engineering industry (Moshupi 2013).

From the focus group discussion one male lecturer noted that, *"The department has no strategy in place on how female lecturers should be motivated, supported or taken aboard in different activities, for example there is no departmental policy to deal with gender related issues."*

This is against the background that the National Gender Policy (2004) advocates for the elimination of all forms of discrimination against females and males in education and skills training which science and technology. This concurs with Priola and Brannan (2009) findings which associated females' hesitance to actively in professional programmes with insufficient preparation and a lack of training to support those involved in research and development activities. Thus, female lecturers in civil engineering department felt that discrimination was implicit in the organisational structure or in the attitude of those in authority.

4. Conclusion

The findings of the study revealed that female lecturers' participation in research and development activities is of paramount importance as it enables them to show case their innovative skills in civil engineering. It was further noted that female lecturers encountered some challenges when participating in research and development activities in civil engineering. In general it can be concluded that at the institution under study, to a larger extent female lecturers have managed to participate actively in civil engineering research and development activities, despite various challenges encountered during the process.

5. Recommendations

- Lecturers' sensitization on the importance of females' participation in research and development activities in the civil engineering department is recommended.
- The polytechnic under study is recommended to come up with a sound institutional gender policy to direct the participation of both females and males in work related activities.

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