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Women in Physics in Zimbabwe: The Struggle Continues

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Abstract. Gender imbalance impedes the participation of women in physics. The number of women in physics in Zimbabwe remains very low relative to men. The few women who graduate with BSc degrees in physics change professions or fields of study owing to the country's economic hardships. This paper provides enrollment statistics of undergraduate physics students at five institutions in the country. Some institutions have kept track of their alumni, including a female physicist working as physics lecturer in Zimbabwe and female physicists working in geophysics and medical physics.

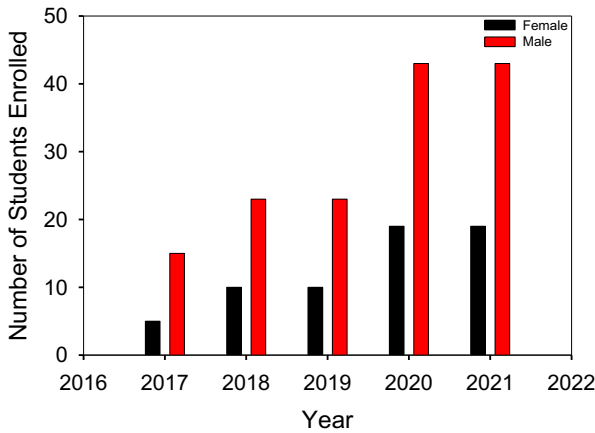
INTRODUCTION

Gender imbalance impedes the participation of women in physics. The number of women in physics in Zimbabwe remains very low relative to men. The few women who graduate with BSc degrees in physics change professions or fields of study owing to the country's economic hardships and inconsiderateness. Those who undertake postgraduate studies in physics seldom return to Zimbabwe; they instead seek greener pastures elsewhere. The most popular career aspiration among women who plan to major in physics is research scientist; however very few opportunities for employment exist in the country [1].

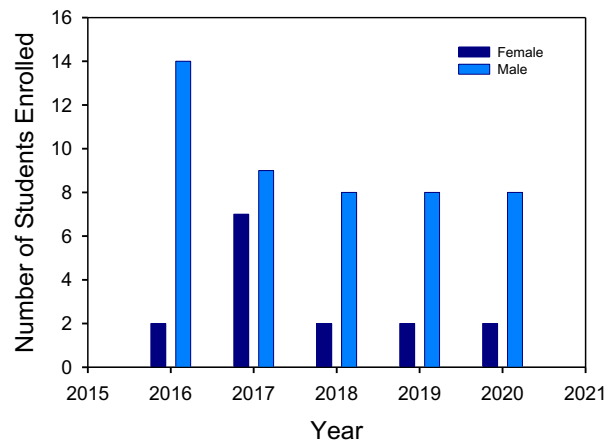
Female physicist representation is very low compared with male physicists in industry (e.g., the mining and telecommunication sector), and the exclusion of female physicists from the most challenging and well-paying careers instills a low level of self-efficacy in female physicists [2]. Female candidates with higher qualifications than male candidates have at times not been considered for a position in industry because of their gender. Some female physicists in Zimbabwe have reported being passed over for opportunities because male managers view them as a threat. In addition, reports of male counterparts having a condescending attitude towards women indicate the presence of stereotypes about who can succeed in the physics profession. Consequently, female scholars often have a negative perception of physics careers despite encouragement to apply. Further, very low representation of female experts in most industrial sectors leads to very few role models, discouraging female students from entering the field.

THE SURVEY

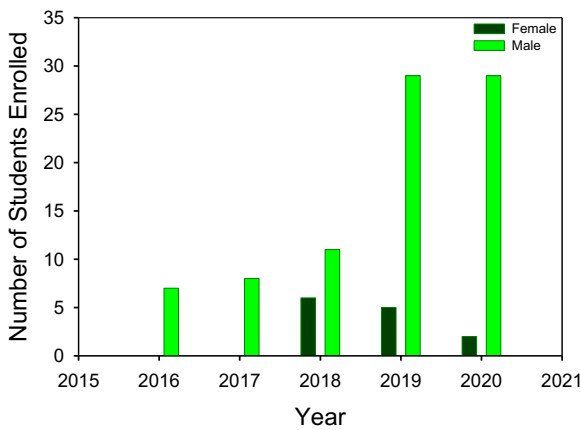
Zimbabwe has five state-owned institutions that award physics degrees: the University of Zimbabwe (UZ), the National University of Science and Technology (NUST), Midlands State University (MSU), Chinhoyi University of Technology (CUT), and Bindura University of Science Education. We gathered information on female enrollment statistics from the physics departments at four of the institutions, using data from the registrar's office of each university (Fig. 1). Generally, the total number of female students enrolled in the country per year has never exceeded 30, possibly due to economic hardships, gender discrimination, and lack of career guidance.



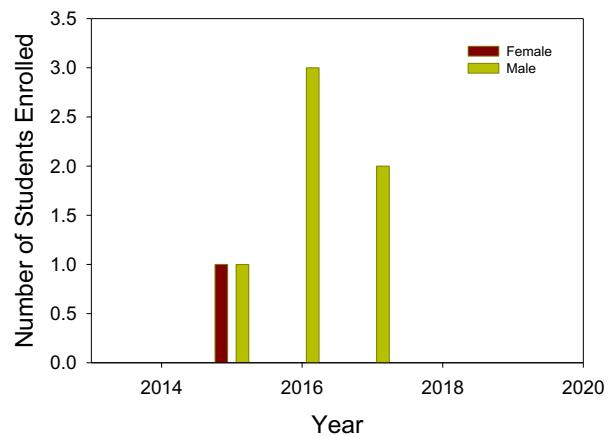
(a)



(b)



(c)



(d)

FIGURE 1. Enrollment of male and female students at (a) UZ from 2017 to 2021, (b) NUST from 2016 to 2020, (c) MSU from 2016 to 2020, and (d) CUT from 2015 to 2017.

UZ was established in 1952. Figure 1a shows a comparison of the numbers of female and male students enrolled in the physics-anchored programs within the Department of Space Science and Applied Physics (previously the Department of Physics) over the past 5 years. The statistics show that the number of female students has almost doubled over this period. The department has noted that the BSc honors in medical physics program attracts more female students. The department has also kept track of their alumni over the years. A total of six women are working in industry and as academic staff at various institutions.

NUST was established in 1991. As shown by the university's enrollment of female students (Figure 1b), the number of women enrolled has generally remained low for the past 5 years. Two alumni are part of the university's academic staff, and one is employed at a geophysics consulting firm. Two female alumni who specialized in medical physics are currently working at the Radiation Protection Authority of Zimbabwe. Most alumni have sought postgraduate education regionally and abroad, where they eventually seek permanent employment.

MSU was established in 2000. The institution's female enrollment data for the past five years (Figure 1c) show that the number of women being enrolled has generally decreased since 2018. To improve the enrollment of female students, among other objectives, MSU rebranded the BSc honors in physics degree program to BSc honors in applied physics and instrumentation. However, more than 5 years later, enrolment figures did not on average increase.

CUT was established in 2001. The university's enrollment of female students from 2015 to 2017 is shown in Figure 1d. Only one woman was enrolled between 2015 and 2018. The degree program was permanently ended owing to a lack of students enrolling in the program.

RECOMMENDATIONS

Scholarships and bursaries at the A-level (i.e., the level at which subject-based qualifications lead to university, further study, training, or work [3]) and at the undergraduate level will raise female enrollment numbers. Stakeholders, including the government, must be encouraged to fund studies for female students in science. The involvement of external auditors in recruiting appropriate personnel is recommended to reduce gender discrimination. Career guidance to enable women to be knowledgeable about possible physics careers is highly recommended. Women who have established careers in physics should be actively involved in activities such as talk shows and public lectures on the various physics study areas and mentorship programs. Success in introductory physics courses is essential for students to advance to higher levels of physics studies. This success influences the attitudes that girls and women develop towards physics; when a person is well prepared, feels confident, and does well in introductory physics, they may be inclined to study physics further. It is therefore important to ensure that introductory physics courses are made more engaging for females. This will create a more inclusive environment and encourage more women to pursue physics careers.

CONCLUSION

Women's interest in physics has been consistently very low over the years in Zimbabwe. The women in physics in Zimbabwe have a mammoth task before them. Much effort is needed to establish a working group of the few established women in the field of physics and to gain the support of male counterparts.

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