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Variation in the Gender Composition in Tertiary Physics Education of Seven Sri Lankan Universities

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Abstract. The numbers of male and female candidates admitted to physical science streams in all universities in Sri Lanka were respectively 6,023 and 1,807 in 2017; 5,787 and 1,772 in 2018; and 5,707 and 1,729 in 2019. Thus, the male-to-female ratio was maintained at 3.3:1. In the physics departments of all Sri Lankan universities, as of 2021, there were 85 male and 32 female faculty members in the permanent cadre, with 84% of all members holding a PhD degree. However, it is relatively difficult for female academics to achieve research-based merit promotions to senior faculty grades such as associate professor and professor. This trend has essentially remained unchanged over the past several years, although the chi square test suggests that gender is not a factor in obtaining a PhD among the staff at all universities ($p = .633$). The proportion of males among all staff members is approximately 0.659 ($p = .082$). Since the 95% confidence interval is 0.639–0.806, there is a high chance that the female-to-male ratio will be approximately 1:2.

SRI LANKAN NATIONAL CURRICULUM

According to the Sri Lankan national curriculum, primary education lasts for 5 years (grades 1–5), junior/secondary lasts for 4 years (grades 6–9), and senior secondary lasts for 2 years (grades 10 and 11) in preparation for the General Certificate of Education–Ordinary Level (GCE O-Level) [1, 2]. Students must pass the GCE O-Level national examination to enter college, and they must also study for another 2 years (grades 12 and 13) to sit for the nationally conducted, highly competitive GCE-Advanced Level (GCE-AL) examination for admission to universities. Throughout the school years, from grades 1 to 13, the ratio of male to female students is approximately 1:1.

There are five major fields of study at the secondary school level for students to choose from, and they should study three subjects for 2 years at this level before taking the GCE-AL examination. The major fields of study are (a) physical science (combined maths, physics, and chemistry), (b) biological science (biology, physics, and chemistry), (c) engineering technology and biosystems technology, (d) commerce and accounting, and (e) arts.

According to statistics from 2017, in the GCE-AL classes (secondary level) in schools, girls outnumbered boys in the biological sciences (7:3), while the ratio of girls to boys was approximately 3:5 in the physical sciences [3, 4].

ADMISSIONS TO STATE UNIVERSITIES

According to the University Grants Commission, the government agency in charge of university admissions and disbursement of government funds, the gender breakdown of candidates qualified to enter the universities during the 2015–2016 to 2018–2019 academic years was approximately 35% female and 65% male [3, 5]. In comparison, the breakdown among candidates actually admitted to physical science streams in all the universities was 30% female and 70% male during this period. Owing to the very limited number of places available in state universities, only about one-third of the qualified candidates gained admission to universities.

In general, during the 2017–2020 period, more than twice as many female students admitted to universities entered the biological science stream relative to those entering the physical science stream [6]; however, the percentage of female students majoring in physics increased. This trend of more female students studying physics appeared to continue into 2021 [7].

UNIVERSITY EDUCATION IN PHYSICS RELATED AREAS

In Sri Lanka, students selected from the physical science stream following the GCE-AL examination can be admitted to the Faculties of Engineering and Science. In the Faculties of Science they may pursue a 4-year degree (BSc) in physics or a 3-year degree (BSc) in physical science with physics as a subject. Other options include specialized subject areas such as engineering physics, mathematics, computer science and information technology, electronics, geology, and materials science, among others.

POSTGRADUATE EDUCATION IN PHYSICS

Most Sri Lankan universities offer postgraduate degree programs in physical sciences at the master's level (MSc, MPhil) and doctoral level (PhD) in areas of specialization such as physics of materials, renewable energy, atmospheric physics, geophysics, nanoscience and technology, medical physics, environmental science, and so on. Among postgraduate students, the proportion of female students is relatively lower than that of male students (35% versus 65%, respectively). However, many students opt to pursue doctoral studies in a developed country, such as the United States, European countries, Australia, or Japan, after obtaining their B.Sc. degree in Sri Lanka. Among these students, only a few ultimately return to Sri Lanka and join its university system after obtaining their PhD. Very few career opportunities exist for individuals with a physics-related PhD in the industrial and private sectors in Sri Lanka.

Table 1 shows that the physics departments of nine Sri Lankan universities together have 85 male and 32 female faculty members in the permanent cadre in 2021, with 84% holding a PhD degree in a physics-related discipline. The faculty includes senior professors, professors, senior lecturers, and lecturers. Only 37.6% of the faculty is female, however, which is much lower relative to other science disciplines such as biology (~ 70%) and chemistry (~ 50%).

The proportion of males among all staff members is approximately 0.659 ($p = .082$). Since the 95% confidence interval is 0.639–0.806, there is a high chance that the female-to-male ratio is approximately 1:2.

However, a detailed analysis shows that the female-to-male ratio by faculty category declines with seniority. Women account for 0% of senior professors, 21% of professors and associate professors, 40% of senior lecturers, and 80% of lecturers. This finding again reflects the difficulty that female academics encounter in achieving research-based merit promotions to senior grades in Physics. This trend has essentially remained unchanged 2015 to 2021.

TABLE 1. The gender analysis of permanent physics faculty members at Universities in Sri Lanka in 2021.

University	No. of Physics Faculty Members		
	Male	Female	Total
University of Sri Jayewardenepura	11	6	17
University of Colombo	16	1	17
University of Peradeniya	13	6	19
University of Kelaniya	11	3	14
University of Jaffna	7	1	8
Eastern University	3	3	6
The Open University	9	6	15
Wayamba University	6	2	8
University of Ruhuna	9	4	13
Total	85	32	117

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