


Tanzanian experience of In-service Teacher Training in Astronomy through the NASE program

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Abstract. We provide our first experience of Astronomy training as an in-service training of teachers of Science in Primary schools, and teachers of Geography, Physics and Mathematics in Secondary Schools necessitated due to lack of Astronomy specific training in their teacher training programs. The hands-on training was conducted in collaboration with the IAU Commission 46 Working Group program of Network of Astronomy Schools Education (NASE). Experiences from both face to face and virtual sessions conducted during the Covid19 period and in preparation of a major African solar eclipse, are discussed.

1. Introduction

Astronomy is taught only as the topic of Solar System in Primary schools and in the Geography subject in Secondary Schools; and as Astronomy topic in the Physics syllabus in Secondary schools, [various \(1996\)](#). During training, students are exposed to astronomy only through Physics courses such as Cosmology and Relativity and Astrophysics courses which are available in only a few Universities. Hence basic astronomy knowledge and concepts are not understood, while practical knowledge is lacking. These teachers have to teach Astronomy topics with a handicap with the content handled cursorily. More recent textbooks ([B. McDowell \(2010\)](#), [Bwisa & Simiyu \(2014\)](#)) have a more descriptive and illustrated Astronomy chapter, but it is used for memorization. The challenge of changing from Kiswahili to English during transition from Primary to Secondary schools adds to the problem, with only basic Astronomy lexicon being available in Kiswahili.

The advent into Tanzania of the IAU Commission 46 Working Group program of Network for Astronomy School Education (NASE) into this picture has been a most relevant to assist us to bring more effective hands-on training in Astronomy as an in-service training to help teachers to teach it better.

2. Astronomy training programs conducted in Tanzania

Several communications with NASE coordinator Dr Rosa M Ros resulted in the first NASE training in Tanzania with a two-week intensive in-service residential NASE teacher training, including night time sky observations, was conducted in December 2019, with permissions of the government authorities.

Teachers from within a semi-rural Ubungo suburb of Dar es Salaam city were selected purposively through recommendations of Heads of schools and acceptance by the teachers to show motivation. A total of 30 teachers balanced between Secondary schools and their respective nearby Primary schools were selected so as to provide mutual support when required after the training.



Figure 1. Need to innovate: Instead of a tripod, the telescope is taped to a football swiveled on a short cylinder

NASE facilitators from neighbouring Uganda and Zambia and NASE expert Rosa M Ros were assisted by local tutors from three Universities and neighbouring schools to initiate training of tutors (ToT) by assisting in teaching of the NASE the workshops. Local materials for hands-on demonstrations were gathered for hands-on activities and local language explanations were provided where needed.

The first NASE training snowballed into further Astronomy training, with the second NASE training held in June 2020 as a preparation of the Solar Eclipse of 21 June. This was conducted online due to Covid intrusion, but that also enabled additional participation of teachers from more distant schools. Practical demonstrations were shown online. Translation of the training material into Kiswahili was begun at this stage. An award of 10 telescopes to Tanzania by the Open Astronomy Schools (OAS) project provided another practical training opportunity in September 2020.

The OAS telescope kits were assembled by the teachers highlighting its optics concepts, followed by practical use to align with distant objects and finally observe the Moon. Lack of expensive telescope mounts such as a tripod resulted in an innovation where the small telescope was taped to a large ball on an open cylinder for viewing in all directions and hold the telescope steady (Fig. 1).

Enthusiastic comments were received from teachers with more than 90% of the teachers finding the training to be enlightening and beneficial. The number of topics and hands-on activities were found to be overburdening during the two-week program. Construction of models and finding alternative locally available material was challenging.

3. Conclusion

The IAU-NASE Astronomy training program has been extremely useful for introduce Astronomy directly to the teachers and get better understanding of its concepts and applications using hands-on training. Local resource people are available for further practice so as to continue with this training using guidance from NASE experts.

References

- various *et al.* 1996, *Physics for Secondary Schools. Book Four*. Tanzania Institute of Education, 1995, DUP (1996) LTD, ISBN 9976-60-261-8
- McDowell, B. 2010, *Physics Students' Book for Forms 3 and 4*. Tanzania Institute of Education, 2010, Pearson Education Limited, ISBN 978 1 4058 4211 2
- Bwisa, J.-W., & Simiyu, S.-S. 2014, *Physics for Secondary Schools, Form 3*. Oxford University Press, 2014, ISBN 978 9976 4 0579 8