

FURTHERING THE SUSTAINABLE DEVELOPMENT GOALS IN AFRICA BY EXPOSING YOUNG CHILDREN TO THE BEAUTY, EXCITEMENT AND PERSPECTIVE OF ASTROPHYSICS

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Following the recommendation of a virtual United Nations Dialogue held during UNGA75, this letter of intent suggests that ASFAP incorporates the use of physics in the education of very young children aged between 4 and 10, particularly those in underprivileged communities into its strategy.

WHY VERY YOUNG CHILDREN?

There are three reasons:

1. Early educational interventions during the young formative years are crucial in stimulating child development (OECD, 2006, Worth & Grollman, 2003, Rocard 2007).
2. There is an enormous untapped potential and talent in underprivileged communities. Such communities are frequently alienated from society at large and this alienation begins at childhood. According to a UNICEF report (UNICEF 2006), *“The opportunity to help disadvantaged children have a more equal start in schooling is in the earliest years when the basis for their cognitive, social and emotional development is being formed”*.
3. Educating very young children from underprivileged communities is highly cost effective (Schweinhart et al 2005), but needs a special approach. The Early Years Learning Framework for Australia (Commonwealth of Australia 2009) states, *“When early childhood educators respect the diversity of family and communities...they are able to foster children’s motivation to learn”* and further *“Poor math trajectories in low-socioeconomic status children begin early... Studies suggest that early interest can be influenced”* (Arnold and Doctoroff: 2003). A series of important studies by Nobel prize winner James Heckman and his group emphasizes the cost effectiveness of early educational intervention in underprivileged communities with pre-school activities that motivate very young children (Cunha, Heckman et al: 2006), Heckman and Masterov (2007), and Heckman (2000,2008).

WHY EMPHASISE ASTROPHYSICS?

The excitement of astrophysics is an important vehicles for capturing the imagination of very young children, helping to stimulate their ethical value systems and introducing them to science and engineering. There are several reasons for this.

1. Consideration of the vastness and beauty of the Universe and of our place within it provides a special perspective that can help broaden the mind and stimulate a sense of global citizenship.
2. The ability of space and astronomy to interest and **motivate** young children can be used to stimulate education in a broad holistic sense. Space-based themes can be encapsulated in stories to further language skills and to pose and solve problems that develop numerical skills.
3. Astronomy provides a seductive introduction to science and technology. Many scientists and engineers trace their first interest in science to exposure as very young children to the fascinating Universe.
4. Exposure to intriguing aspects of space can “light a spark” in a young child that several years later causes them to embark on a scientific or technical career.

WHY PBD-UNAWWE?

Based on the rationale presented above, Universe Awareness (UNAWWE) was initiated in 2005 to exploit scientific, educational and social dimensions of astronomy for the education of young children. Now renamed Pale Blue Dot – Universe Awareness (PBD-UNAWWE) has been conducted in more than 60 countries and is a flagship project of the International Astronomical Union Office for Astronomy for Development in Cape Town. It is directed at children between 4 and 10 years, aims to broaden children's minds, awaken their imagination and curiosity in science and encourage respect, tolerance and global citizenship. A major goal of PBD-UNAWWE is to stimulate children to develop into curious, tolerant and internationally oriented adults (Ödman et al. 2006, Ödman 2007, 2011).

The main ingredients of PBD-UNAWWE are:

- Provision of an international network for astronomy as an educational tool for motivating very young children.
- Development of country-specific educational resources,
- Organisation and stimulation of training for teachers,
- Development and implementation of a consistent evaluation framework.

A virtual United Nations Dialogue held during the 75th UN General Assembly was devoted to Astronomy for Development. A highlight was the participation by the South African Foreign Minister, H.E. Grace Naledi Pandor, who gave an inspirational keynote address. The GA75 Dialogue concluded with the unanimous adoption of a motion that advancement of the SDGs should include the following goal:

“Before they are 10 years old, every child should be introduced to the inspiring notion that we all inhabit a tiny planet in a vast wonderful Universe, illustrated by the iconic pictures of our earth taken from space. This will help them realise that we all belong to a common humanity (SDG 4.7), who must respect and protect our planet (SDG 13) and advance the cause of peace (SDG16)”

For these various reasons, PBD-UNAWWE, supplemented by exciting aspects of other branches of physics beyond astrophysics, could be an important component of ASFAP, in partnership with the IAU OAD in Cape Town and its African regional offices.

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