

PHYSICS EDUCATION WORKING GROUP

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Context

- ASFAP initiative brought together physicists from Africa and beyond to address critical issues in physics education across the continent.
- A series of meetings held within the physics education group.
- Letters of Intent (LOIs) were submitted.
- Several strategic proposals emerged from discussions and LOIs.

Proposed Initiatives

- Build stronger educational frameworks
- Increase access to resources
- Promote innovation in teaching and research
- Contributing to the growth of physics education and scientific advancement in Africa

Physics Education Goals

- Cultivating Scientific and Technological Literacy
- Developing 21st-Century Skills
- Enhancing Africa's Capacity for Innovation
- Promoting Sustainable Development
- Addressing the STEM Gender Gap
- Supporting Teacher Training and Professional Development
- Fostering International Collaboration and Knowledge Exchange
- Bridging the Gap Between Education and Industry
- Leveraging Technology for Inclusive Education

Physics as a Catalyst for Africa's Future

- ASFAP envisions physics education as a catalyst for Africa's scientific, technological, and economic future
- Physics education to play a transformative role in achieving the continent's long-term goals
- Concerted effort to reform physics education
- Addressing structural challenges
- Ensuring that every African student can engage with and excel in the subject
- Africa is poised to become a global leader in fundamental and applied physics
- Driving innovation and progress for generations to come

Learning Approach and Challenges for Physics Education

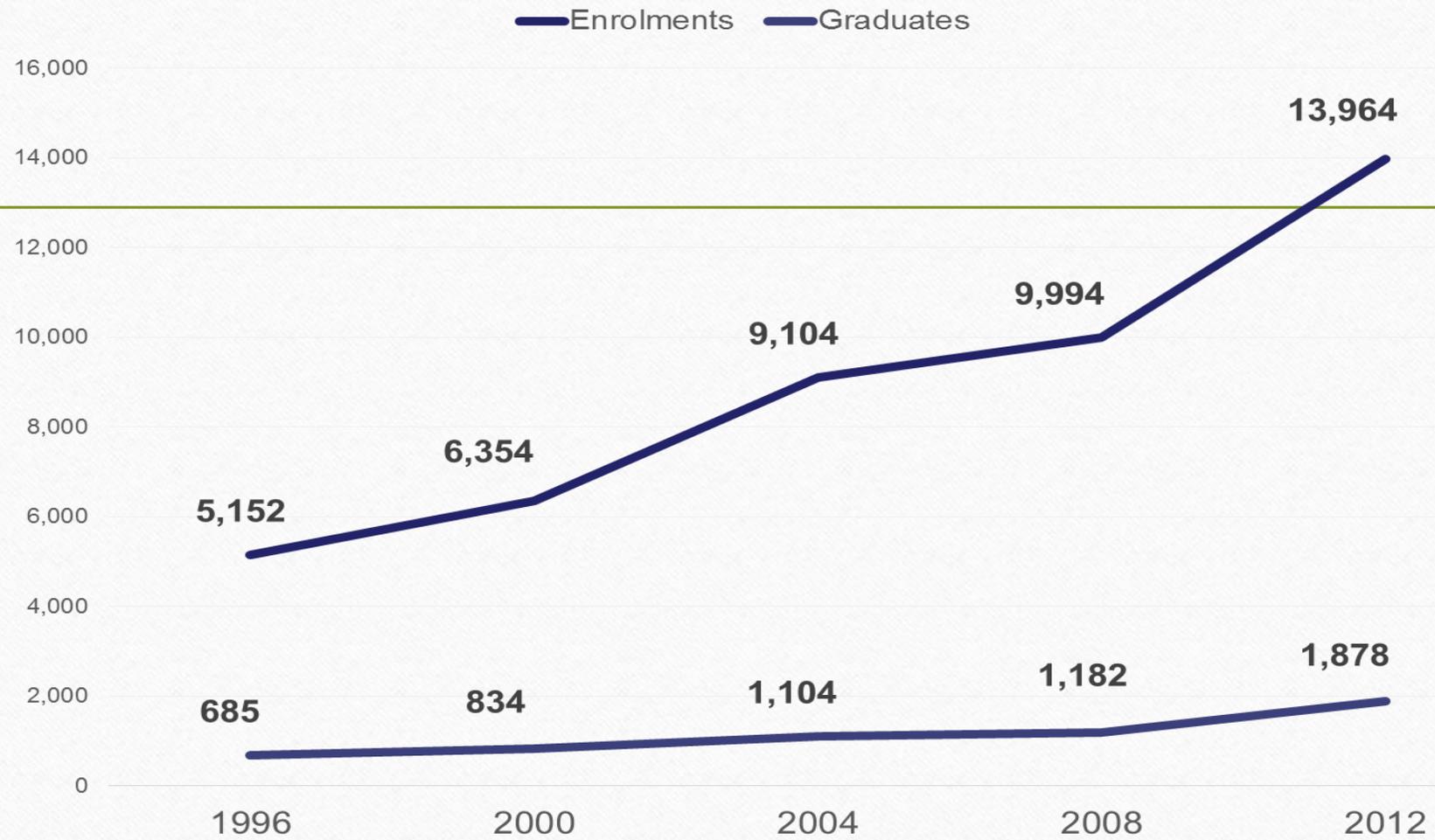
Learning Approach

- Contextualized and Culturally Relevant Pedagogy
- Inquiry-Based Learning and Hands-On Experiments
- Leveraging Technology for Physics Education
- Collaboration and Professional Development for Educators
- Active Learning

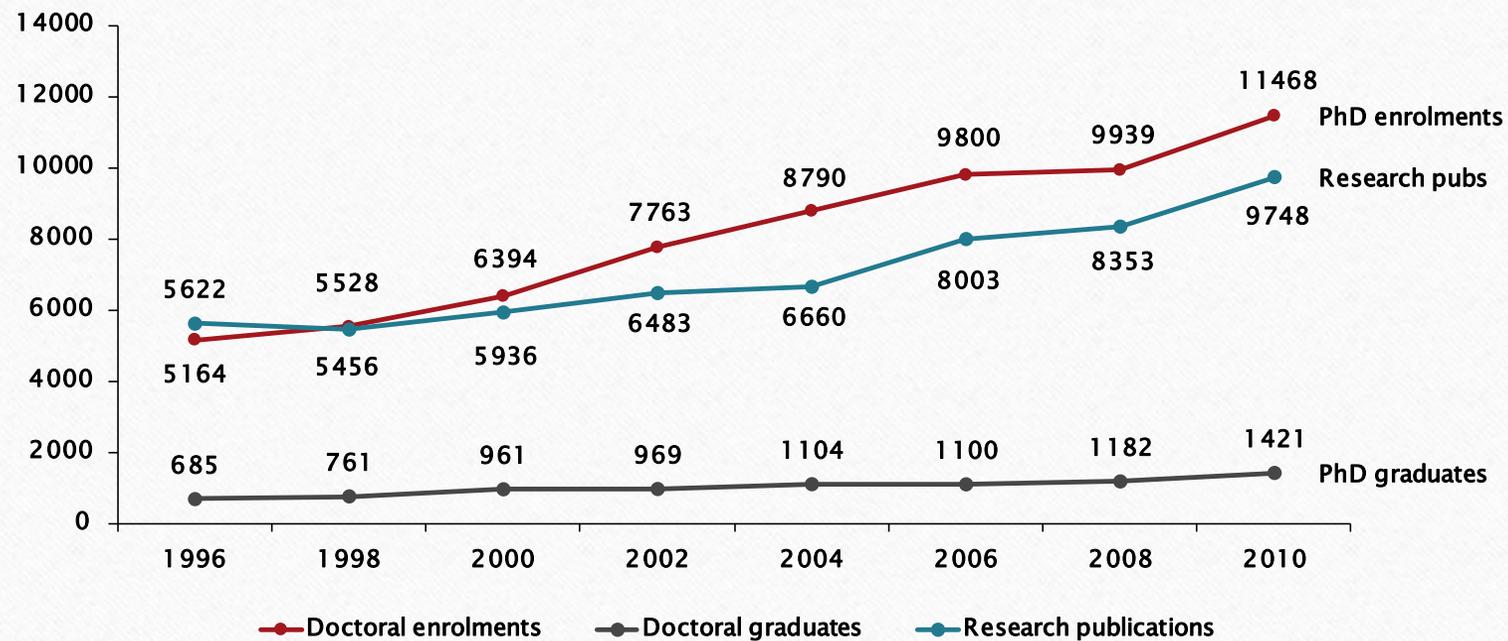
Challenges

- Resource Constraints and Infrastructure Deficits
- Teacher Shortages and Capacity Building
- Gender Disparities in STEM Education
- Curriculum Rigidities and Examination Pressures
- Language Barriers and Cognitive Load
- Inequitable Access to Technology

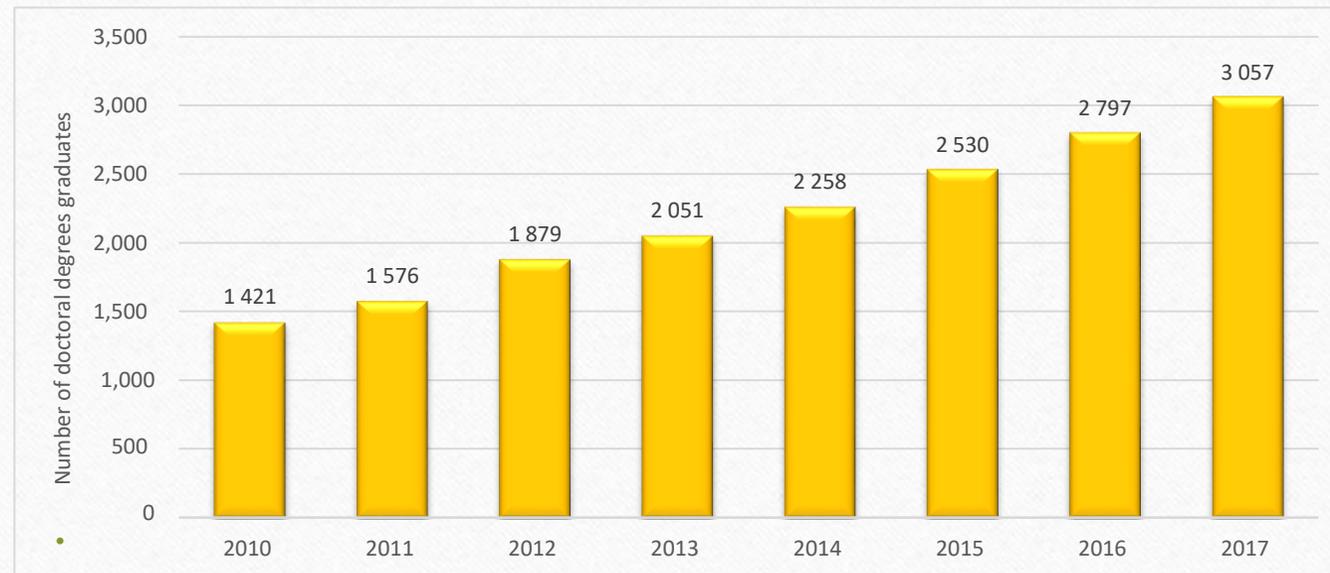
PhD enrolments and graduates in SA: 1996-2012 [Source: DHET (2013)]



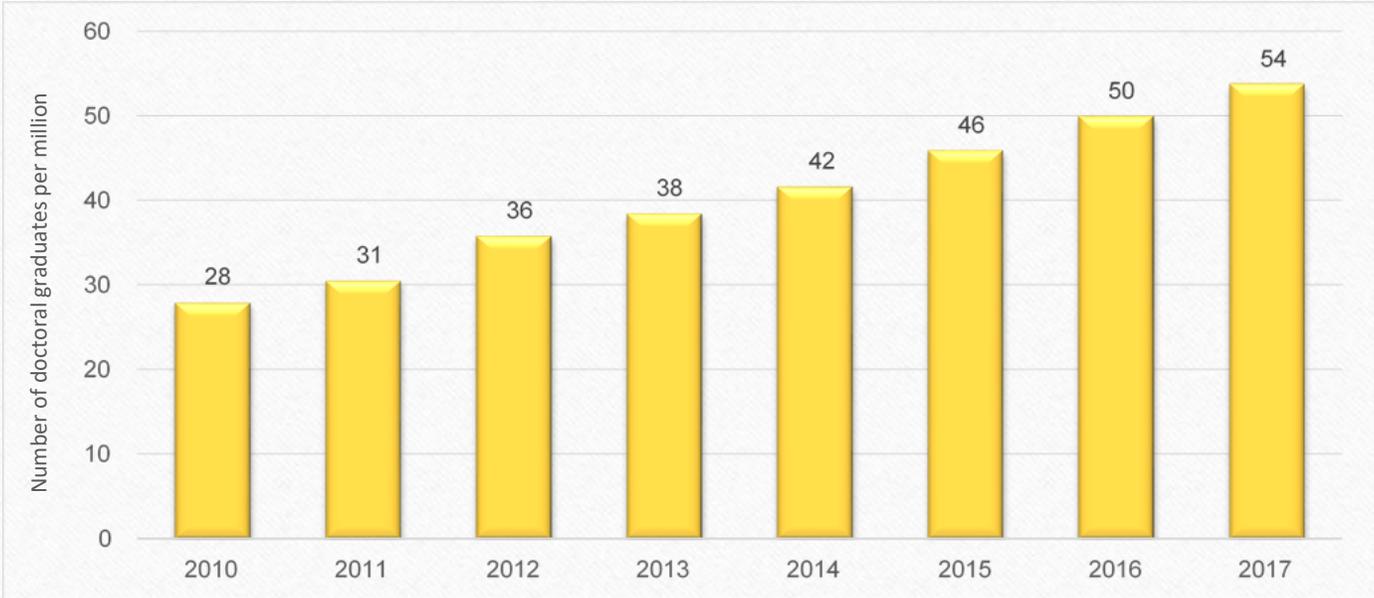
Doctoral enrolments, doctoral graduates and research publications in SA



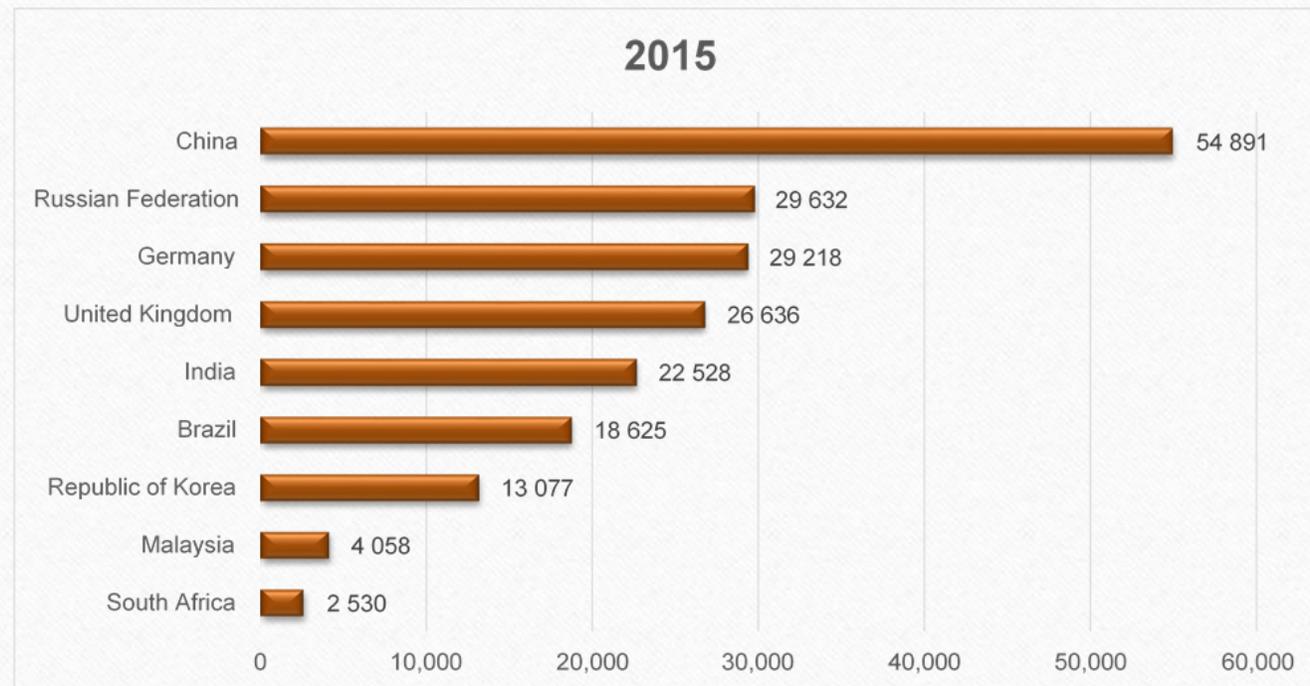
Number of doctoral degree graduates in South African universities, 2010 – 2017
(Source: *Statistics on Post-School Education and Training in South Africa, 2017*)



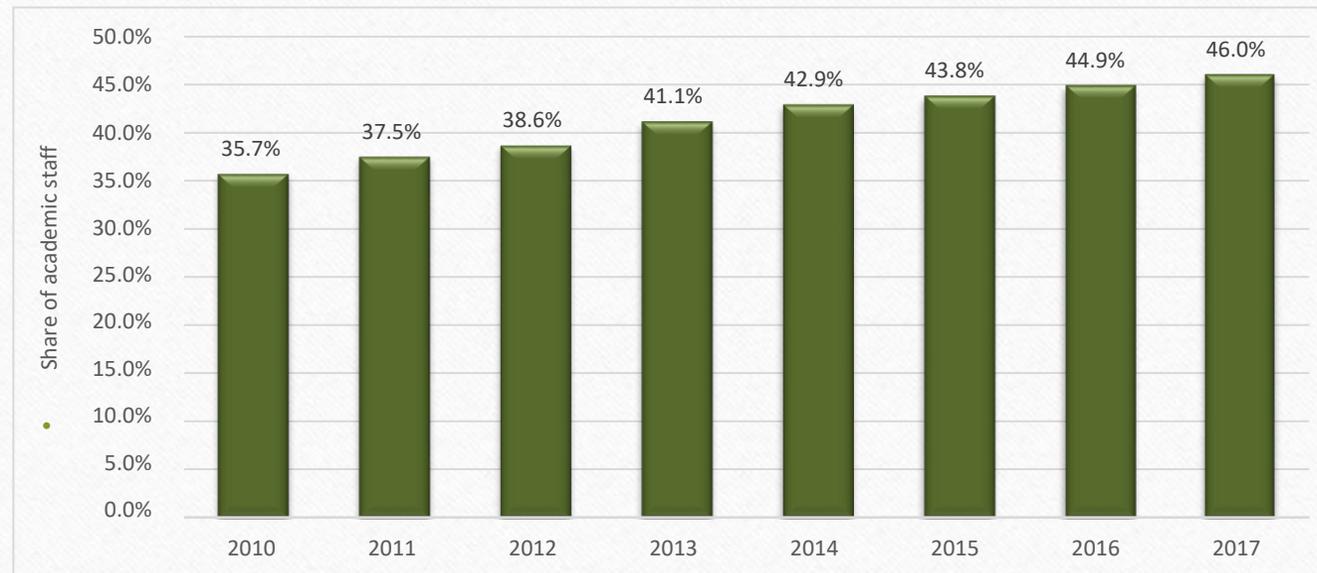
Number of doctoral degree graduates per million of population per year, 2010 – 2017
(Source: DHET, 2017)



Number of doctoral degree graduates by country, 2015 (Source: UNESCO Institute for Statistics)



Share of academic staff with a PHD in South African universities, 2010 – 2017
(Source: DHET HEMIS database, 2010-2017)



Physics Education on an International Level

- Leveraging Global Best Practices in Physics Education
- Fostering International Collaboration and Research Partnerships
- Addressing Global Challenges through Physics Education
- Promoting Mobility and Knowledge Exchange
- Aligning with Global Standards in Physics Education
- Enhancing Digital Learning and Open Science Initiatives
- Supporting Teacher Development through Global Professional Networks
- Encouraging International Recognition of African Contributions to Physics
- Facilitating Global Engagement in Space and High-Energy Physics
- Addressing the Global STEM Gender Gap

Africa as a Global Contributor to Physics Education

- Africa is an active participant in the global physics community
- Contributing to and benefiting from international advancements in science and education
- Encouraging the mobility of students and researchers
- Positioning Africa as a key player in the global scientific arena
- Contribute to solving global challenges through the power of physics

Tackling Challenges for a Stronger Physics Education Ecosystem

- Physics Laboratories in High Schools
- Importance of Laboratories in Physics Education
- Current Challenges Facing High School Physics Laboratories in Africa
- Recommendations for Improving Physics Laboratories in High Schools
- The Role of Laboratories in Promoting Careers in Physics

EXISTING INTERVENTIONS

SAIP Teacher Development Project



SAIP Teacher Development Project Accreditation

- Accredited by South African Council for Educators (SACE)
- Continuous Professional Development (CPD) Points
- Career enhancement

Beyond Capacity Building – reverse the African Science Diaspora

African School of Fundamental Physics and Applications



South Africa 2010



Ghana 2012



Senegal 2014

The students progress successfully.

Where are the students now?

..... For some ... The African Science Diaspora



Rwanda 2016



Thank You