

## AWARDS, HONOURS AND ACHIEVEMENTS

- University of Pretoria (UP) Laureate for Education Innovation (Team Award) (2012)
- Honorary PhD (Science Teacher Education), Umeå University, Sweden (2006)
- Journal of Research in Science Teaching: Best paper of the year (with two co-authors) (1999)

## DEFINING MOMENT

Inspired by her students who worked hard in spite of their difficult circumstances, she decided in the early 1980s that what she really wanted to do was to teach physics to students who were committed but who had to overcome enormous disadvantages.

## WHAT PEOPLE MIGHT NOT KNOW

"Perhaps what most people don't realise is that I am a very adventurous person. I like new things, new ideas, new people, new places. I like change and I like innovation."

## ALWAYS A BETTER WAY TO TEACH AND LEARN

A trained physicist, Diane Grayson was inspired at an early stage in her career to become involved in teaching the science she so loved to do. "I am driven by the desire to try and help people fulfil their potential. I think at heart that is what a teacher is," she says.

"When I was given a temporary part-time position as a junior lecturer at the then University of Natal, now University of KwaZulu-Natal (UKZN), the first students I was assigned to teach were medical students." At that time, almost 40 years ago, the University of Natal (part of what later became the UKZN) was reserved for white students only, while the medical school was only for black students. "I remember being incredibly impressed by the students' commitment and diligence, despite how difficult their circumstances were."

Some of those students, she recalls, would miss meals during the week so that they could save a little of their bursary money to send back to their families. "I

was also struck by the fact that they were working against difficult odds in terms of the kind of schooling they had. They were remarkably intelligent and diligent." These young people, she says, drew her to her calling. She decided that she wanted to teach physics to students who were committed and needed a chance in life to allow them to excel.

Her own journey to a lifelong love of physics began as a young girl, inspired by the space race of the 1960s. "Our science teacher had us singing 'space songs' and I remember telling my parents that I wanted to be an astronomer," she recalls. "My father was very supportive of my science dreams and we would have many dinner conversations about science." At school she already found herself stepping into the shoes of a teacher, often helping her fellow pupils understand the science they were learning in the classroom. While pursuing her undergraduate physics and mathematics degree at the then University of Natal in the late 1970s, she continued tutoring other students.

"I had considered becoming a school teacher when I first started at university but I thought the schooling system was oppressive so I didn't want to go back into it," she says. "But I really wanted to teach, so it seemed natural that I would consider teaching at a university by becoming a lecturer." While working on her MSc in plasma physics at the then University of Natal, she was appointed as a temporary junior lecturer. But she really wanted to focus more on improving the teaching and learning of physics and she got her chance when she was awarded a Fulbright fellowship to do her PhD in physics education at the University of Washington.

Since her return to South Africa in 1990 she has worked in numerous ways, including through research, to improve the learning and teaching of not only physics but other sciences and engineering in the country. It concerns her that so much science teaching puts students off science instead of making them excited about it. "Many students don't get good science teaching from people who have a deep understanding of the subject matter, and so their chances of becoming professionals in scientific fields is often taken away from them."



“Every society, particularly in developing countries like South Africa, needs professionals in science-based careers,” she says. “My involvement in physics education was a way for me to pursue the things that I was good at, while at the same time making a significant contribution to national development.”

As the new millennium rolled in, there was great excitement as digital technology and the rise of the Internet were touted as the key to changing education for the better. However, Grayson says technology in science education today is underused, and in places where it is used, there is often a lack of imagination. “It is potentially a very powerful tool in the hands of someone who understands how people learn,” she says. “Computers are often merely used for online quizzes, or searching the Internet, or watching YouTube videos of someone giving a lecture. These, to my mind, are very unimaginative and I am not sure that they actually promote learning.”

## UNDERSTANDING HOW PEOPLE LEARN

She believes that the most important thing when using technology is to understand how people learn. “Cognitive science tells us that people do not learn through passively receiving information, but that they learn by being actively engaged with physical phenomena, with ideas and with other people.”

While the poor use of technology in science education was a major issue for her as programme chair of the local organising committee for the 4th International Union of Pure and Applied Physics (IUPAP) International Conference on Women in Physics (2009 – 2011), she was also well aware of another major issue: “For some reason, of all the sciences, physics is the one that has the lowest proportion of women in it.”

She has dedicated her whole career to promoting good science teaching, that leads to effective learning, both to give more students a better chance to enter science-related professions, and to help more people experience the joy of learning about the universe and everything in it.

“While I don’t do any classroom teaching anymore, I think that my whole being is that of a teacher. All of my work is in some way related to helping people to develop themselves and their abilities and to be the best that they can be.”



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# Legends of South African Science II

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