

Description and effect of a Physics kit and easy experiments used in a developing country

". . . I know from both experience and research that the teacher is at the heart of student learning and school improvement by virtue of being the classroom authority and gatekeeper for change. Thus the preparation, induction, and career development of teachers remain the Archimedian lever for both short- and long-term improvement of public schools." Cuban (2003)

This comment is made when the Finland's exemplary K-12 system were looked at closely after they achieved the first place in PISA(20??). This was done in a 20 year time period where as recently as the 1970s, Finland required that children attend school for just six years and the education system was nothing special. However, new laws supported by substantial government spending created, a system that graduates nearly every young person from vocational or high school, and sends nearly half of them on to higher education. At every level, the schooling is rigorous, and free.

The "key" for this achievement lays in the high quality of Finnish teachers, according to Pekka Himanen, 31, a renowned scholar with a PhD in philosophy (earned at age 20) who is a kind of guru of information-age Finland. "You need to have a college-level degree to run a kindergarten. You need a master's-level degree to teach at a primary school. Many of the best students want to be teachers. This is linked to the fact that we really believe we live in an information age, so it is respected to be in such a key information profession as teaching." There are three reasons for their achievement according to one of the headmasters in Finland namely "teachers, teachers and teachers".

For example, schools that participate in the ZENNEX project have Somerset Micro Science kits, and all of the high schools sampled in Butterworth had some science teaching equipment. In the 21 schools visited, only five seemed to have attempted to use the science teaching equipment. The equipment was found to be gathering dust or neatly stored in boxes that had never been opened in 16 of those schools. Similarly, visits to three Masifunde Project schools in the Free State Province during 2000, and at a school where the author taught, revealed an assortment of unused science teaching equipment. All schools had some expired chemicals and broken or poorly maintained physics equipment some of which teachers could not identify. Muwanga-Zake, 2001

Is Science Education in a crisis? Some of the problems in South Africa

Johnnie W. F. Muwanga-Zake
Centre for the Advancement of Science and Mathematics Education
(CASME), Rhodes University - East London Campus

Science in Africa.

In our research while we construct a holistic professional development model, we found one element

Teachers in the rural areas seldom have a laboratory and very often do not have a specific classroom assigned to them. Consequently they have to move around the school grounds depending on where they have to teach next. Therefore, we included a science kit as one of the elements of a distance education professional development program. The science kit was the size of a “lunch box” to make it easy to carry from class to class. The “lunch box” contained basic physics equipment related to the content of study material, including bulbs, batteries, magnets, iron filings, a slinky and a tuning fork.

In addition the science kit was included to stimulate the development of the teachers’ conceptual understanding and their experimental skills through the performance of experiments. The teachers could also use the science kit in their classrooms to explain concepts, which would contribute to development of skills in their teaching practice.

In the past, I taught sound as an abstract concept but now I am able to teach it using the apparatus. The tuning fork helps me a lot to demonstrate the propagation of sound. The slinky also helps me to explain sound as a longitudinal wave. The pupils are able to see that energy can be transported through the slinky. They are able to see the compressions and rarefactions.

As recently as the 1970s, Finland required that children attend school for just six years and the education system here was nothing special. But new laws supported by substantial government spending created, in barely 20 years, a system that graduates nearly every young person from vocational or high school, and sends nearly half of them on to higher education. At every level, the schooling is rigorous, and free.

"The key," said Pekka Himanen, 31, a renowned scholar with a PhD in philosophy (earned at age 20) who is a kind of guru of information-age Finland, "isn't how much is invested, it's the people.

The principal of the Arabia Comprehensive School, Kaisu Karkkainen, 49, has the same answer when asked the reasons for Finland's educational accomplishments. "Three reasons," she said over a tasty lunch of chicken, rice and green salad in her school's cafeteria: "Teachers, teachers and teachers."

KKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKK

Finland's exemplary K-12 system appears to reaffirm veteran educator Larry Cuban's (2003) sage comment:

I commented on Cuban's observation in "Teachers: the Archimedean Lever for Elevating Public-Schools," [Hake (2005b)] and "The Archimedean Lever" [Hake (2005c)].

Thanks to Paul Hickman, chair of the American Association of Physics Teachers (AAPT) Teacher Preparation Committee for informing me of Kaiser's Washington Post article.

References

Cuban, L. 2003. "Why Is It So Hard To Get Good Schools?" Teachers College Press.