

M. Djurovic:

Science for education, education for science

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**Will SCIENCE continue to surge forward,
bringing new insights, and perhaps
further threats as well?**

(M.Rees)

Possible benefits:

- solving many health problems
(bioengineering, further genome treats, nanotechnology, bioengineering, robotic, artificial intelligence, new materials...)
- solving food problems:
(bioengineering, genetics, new land)
- solving energy problems:
(fusion, fission, renewables, energy efficiency)
- solving population problem:
(education, better living conditions)

Possible threats in 21 century

(based on existing and new knowledge)

Nuclear power,
Microbiology and genetic,
Engineering viruses
Laboratory errors,
Technological blindness,
Climate changes,
Effect of GH gasses,
Population growth,
Extreme experiments

Science education is important because:

1, Traditional role of science in schooling, namely the identification, motivation and initial preparation of those students who will go for further studies for careers in professional fields that directly involve science and technology.

A sufficient supply of these individuals is vital for economy of all countries and the health of their citizens.

They will be guaranty that in 21th century industrial and economic development would be in socially and environmentally sustainable way.

2. Sustainable technological development and many other societal applications of science require the support of technologically and scientifically educated, not only informed, citizens.

3. Changes as the result of the application of digital technologies that are the most rapid, the most widespread, and the most pervasive influence that science has ever had on human society.

4. All citizens should be scientifically and technologically educated such to be aware of risks and threats of a possible misuse the science and technology can produced.

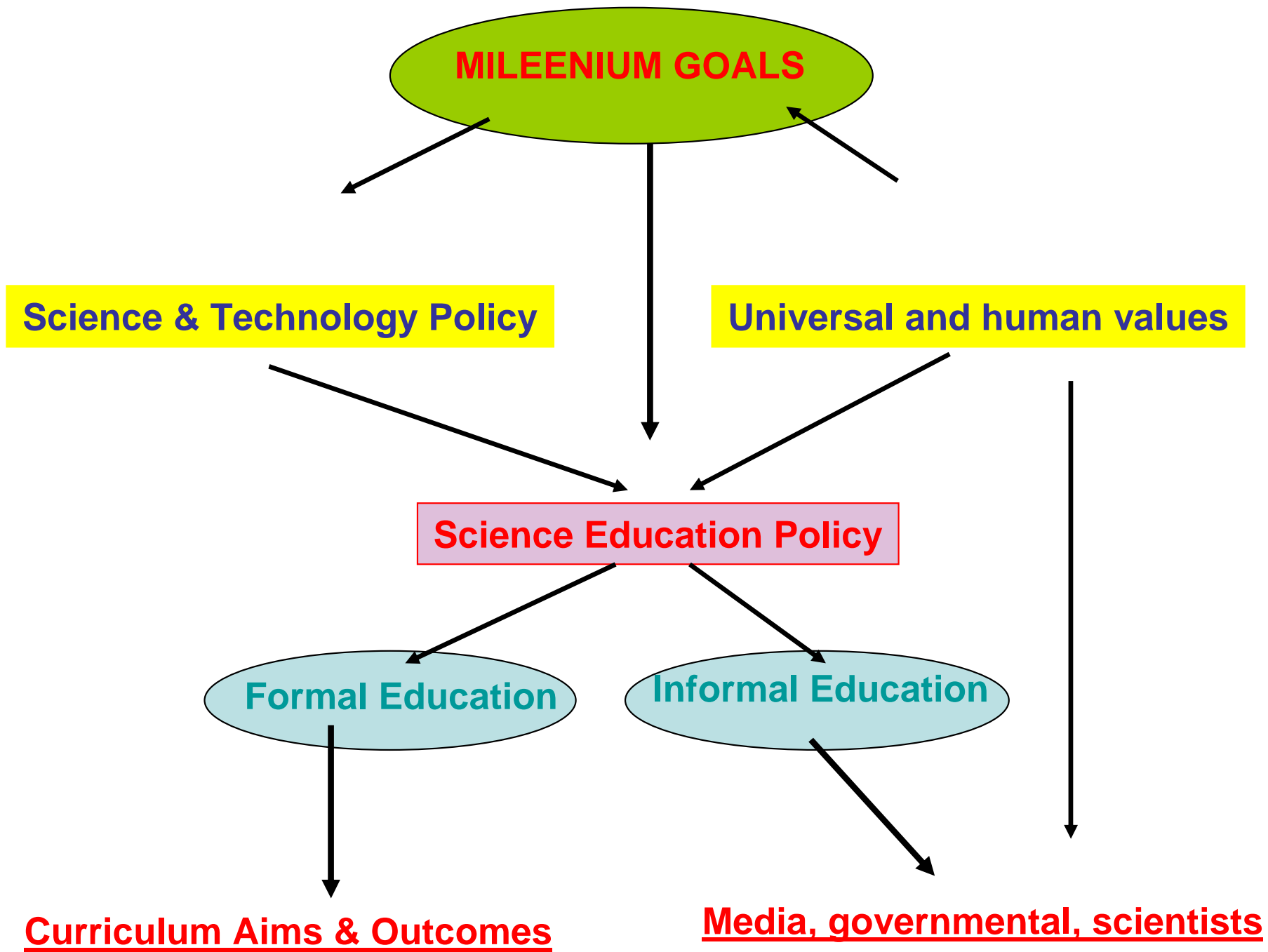
Status

In many countries the supply of scientists is serious problem, especially when requirement of young people for this professions is concerned. This problem needs urgently to be addressed.

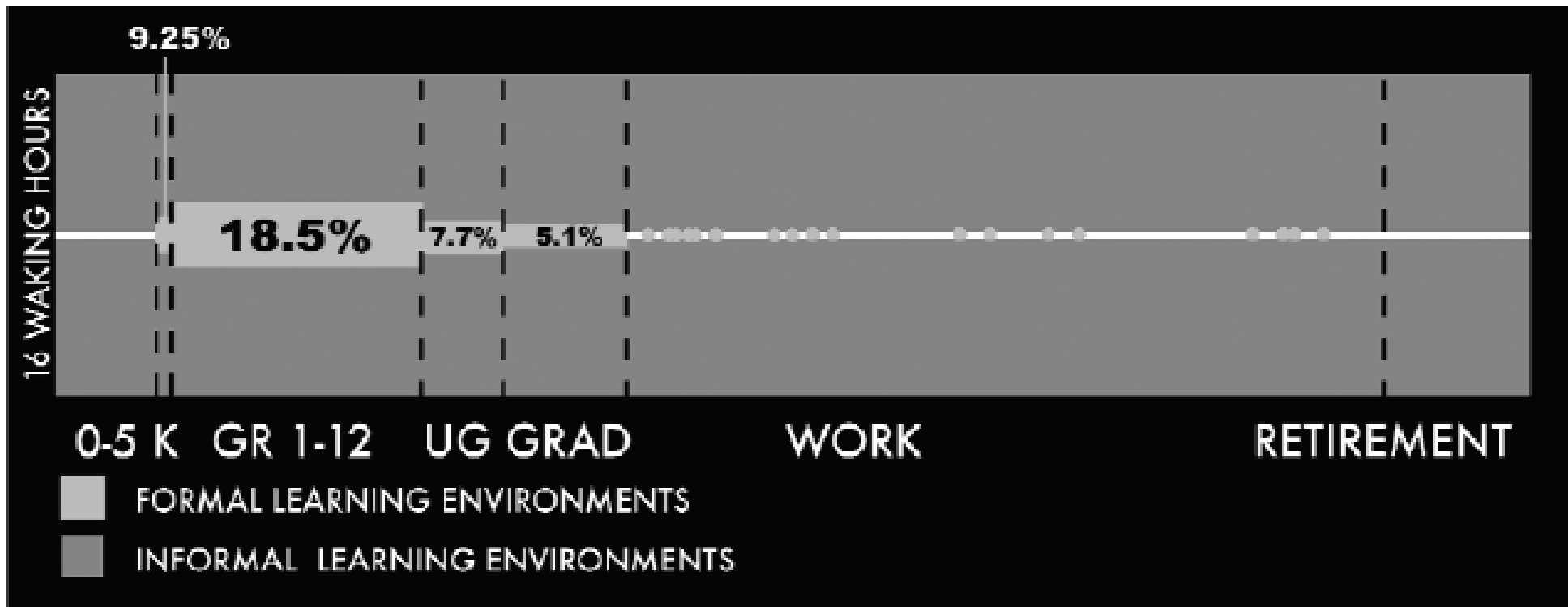
Scientific education of citizens is far from being achieved at present not only in developing countries.

Science and technology education needs to be key component in developing digital society.

Awareness of risks and threats the science can bring is very low, even among politicians



Lifelong and life wide learning



Proportion of time spent in formal/informal learning environments across an individual's life (US terminology)

GOAL
Formal education

The primary goal of science education should be to educate students both about the major explanations of material world that science offers and about the way science work as well as on possible misuse of science and technology.

More efforts at innovative curricula and ways of organizing the teaching of science motivation is required.

Emphasis should be concentrated on:

Why working in science is an important cultural, and humanitarian activity as well as on the extensive range of potential careers that the study of science affords, as well as on potential risk and errors which science can produce. The responsibility of scientists has to be stressed.

Requirements:

Development and extending ways in which science is taught as essential for improving student engagement.

This is long term procedure.

Requirements:

The essence of any formal science education are good quality teachers. This requires continuous professional training.

How to achieve?

Informal education

Special care should be paid by governments to invest significantly in science education such to develop items and methods that helps to make scientifically informed and literate citizen.

Raising awareness of the value of public investment in knowledge generation.

Many actors should be involved (Academia, NGO...)

Citizens need to be scientifically educated not just informed

What Academies can do:

- **develop codes**
- **individual members should be involved in public science education (Spanish institute)**
- **communicate more with university on curricula**
- **include young scientists in adequate membership**
- **should initiate discussions on the most appropriate national approach to procedures for investigating allegations of scientific misconduct, whether by means of an independent national body, state or independent institutions**

- *Create a new incentive program* to encourage youth to become scientists, engineers, and tech-savvy entrepreneurs.

- *Stimulating Better Research* what requires much more energy to prepare and support teachers to teach science as inquiry than it does to prepare them to teach science as memorizing “facts” from a textbook;

-*Improving Science Tests.* In this era of increased testing and accountability, it is crucial that we develop and apply the right kind of science tests. Young scientists should be tested for science understanding rather than for mere knowledge of scientific facts.

-*Improving the Teaching of Science at University Level.* Indeed, all students must learn how to learn, so that they can solve new problems and overcome the many challenges that they will encounter in their adult lives. Presumably this means a society that exhibits the creativity, openness, and tolerance that are inherent to science.

-Stimulate Research Leading to Innovation.

Providing tools to utilize research in new products.

Reward;

-Support radical ideas that may disrupt the status quo. Seed venture capital investments in new innovations;

- Encouraging researchers in science and technology to link up with the human and social sciences in multidisciplinary research endeavors

GLOBALISATION



Universalize and harmonize education

Is the Boulogne process good example ?

(hidden : local and regional assessment)

In the process of science education we should not ask:

what is but what can be ?;

this question has to be asked not only on the territorial bases but globally such to encourage to behave like:

THINK LOCALLY WORK GLOBALLY

Which is new paradigm resulted from universalize and globalize of the world and specially needed when education for science and effect of science to education are concerned.

Thank you for the attention