An Interactive Algorithmic Procedure for Promoting Individualized Environmental Tutoring

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Introduction

- This work presents an interactive algorithmic procedure (IAP), including 21 activity stages and 4 decision nodes, for promoting individualized environmental tutoring.

- The scheme :

  - is based on a modification of Holland's methodology for   quantifying the distribution of personality types while

  - determining the degree of environmental awareness of young people in order to evaluate their attitudes and beliefs as regards their willingness to be actively engaged with the environment and

  - provide educators valuable information that they may use to formulate proper educational material.

Methodological Framework
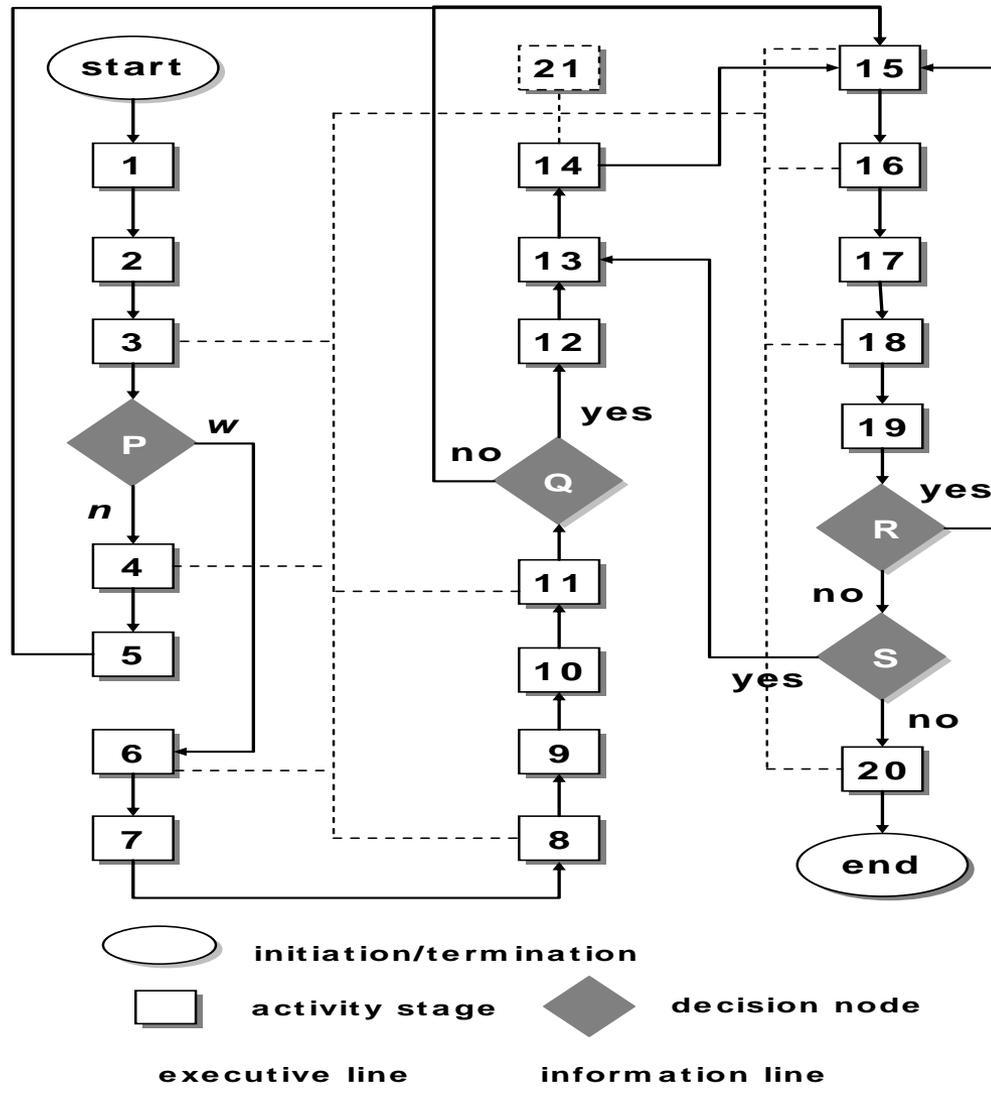
Methodological Framework

As described above has been implemented in:

- **two high schools of Athens,**
- **an undergraduate program of the University of Piraeus related to industrial management,**
- **a post-graduate course at the same University related to environmental protection systems.**

In Greece, environmental education is included in the curriculum, yet it still depends on the educators' will to be applied.
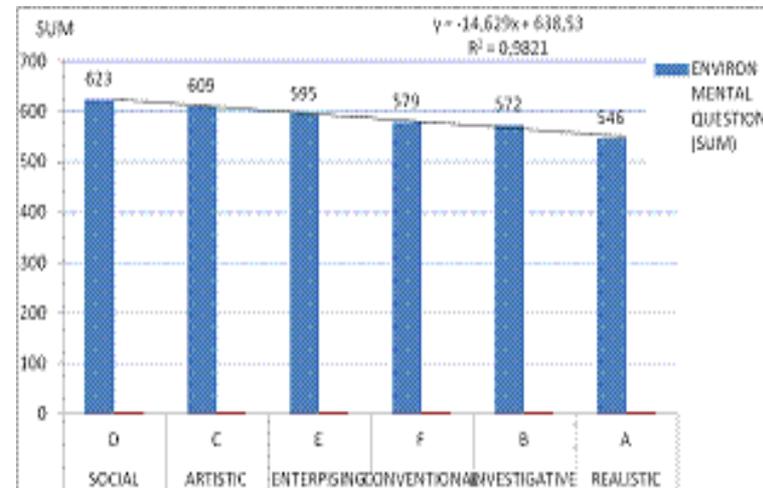
Administration bottlenecks, in addition to the uncertainty teachers are feeling concerning their knowledge background on:

- **environmental issues,**
- **the lack of existence of a suitable educational or training material and**
- **the restriction of the school timetable**

Descriptive Statistics
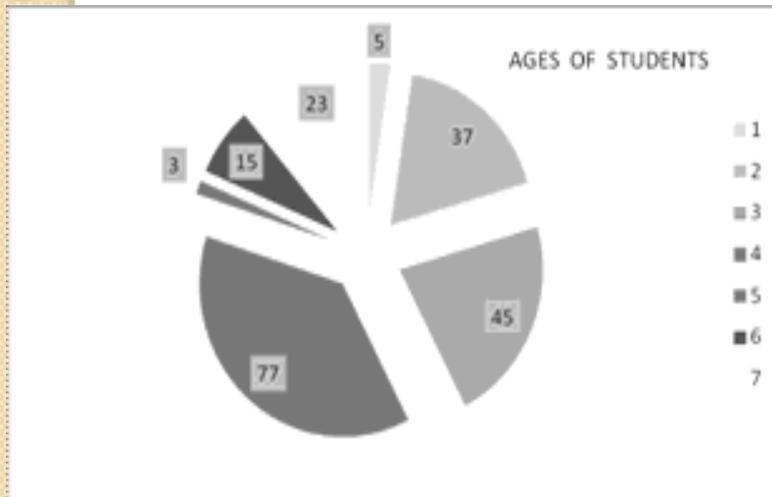
Students' ages chart, where: 1=14; 2=15; 3=16; 4=17; 5=18; 6=22; 7=24 years old

Environmental Question (SUM) of each type.

Correlation Analysis

- The most friendly type to environment is type D (**Social**), followed closely by type C (**Artistic**), type E (**Enterprising**), type F (**Conventional**), type B (**Investigative**), whereas type A (**Realistic**) appears the least predisposed.
- We have associated the type of personality of each respondent, as it is deduced from his/her answers, with his/her personal beliefs, as they are derived from his/her ranking of types:
- **the internal consistency of the first type selected is 43%, whereas the internal consistency between the first and second choice is 81%.**

The representative case

In the simple case, where the concept/corpus is 'recycle', the corresponding assignments for the personality types:

(i)   realistic

(ii)   social

(iii) enterprising

(iv)   conventional

Realistic Type's Environmental Issue

- Defining 'sorting at source' as the separation/ classification of solid waste, according to type of material, at the location where the waste is generated

- make a list of actions that should be accomplished in a mid-class household for effective sorting, temporarily storing and transfer to the nearest collection points, which should be localized on a map of your region.

Social Type's Environmental Issue

- Determining ways of increasing 'environmental sensitization' of the public

- make a list of actions that a municipal service or a non-governmental organization might use in order to be more effective towards this direction in general and especially in the domain of materials recycling.

Enterprising Type's Environmental Issue

- Defining 'corporate environmental responsibility' for an industrial enterprise of your choice

- make a list of actions that should be accomplished by a typical plant of this kind

- put emphasis on the recyclability of materials to be used and the energy saving that might be achieved.

Conventional Type's Environmental Issue

Bearing in mind that the five stages of recycling are:

- primary storing at source

- collection

- secondary sorting at collection centers

- compaction/baling

- transportation/ storing to corresponding processing/recovery industrial units

- make a list of actions that should be undertaken at the interfaces between these stages, so that the whole procedure is functioning satisfactorily.

Investigative and Artistic Type's Environmental Issue

- **Comment** on the effects of international cooperation on minimizing the ozone hole and its environmental impact during the next decade

- take into account that around **2000** the maximum concentration had been reached, and this environmental damage seems now to be stabilized with a tendency to be decreased

- the CFCs **(already banned on a global scale)** are decomposed very slowly; how the lessons learnt from this coordinated world-wide action could be applied to other cases (e.g., green house effect due to CO_2 accumulation leading to global warming).

Investigative and Artistic Type's Environmental Issue

- Comment on the passage *"The forests are disappearing, the rivers are running dry, the wild life is exterminated, the climate is spoiled, and the earth becomes poorer and uglier every day"* found in the play 'Uncle Vanya – Scenes from Country Life in Four Arts' by Anton Chekhov,

- where Doctor Astrov (the *alter ego* of the author, who was also a doctor) expresses his ecological feelings, and compare the present (2011) situation, from the environmental point of view, with that of the last decade of the 19th century when the play was written (1896).

Investigative and Artistic Type's Environmental Issue

- Comment on the impression made to the audience by listening to the widely known waltz "The Blue Danube" by Johann Strauss II

- as a soundtrack to a documentary film describing this river in its present (2011) situation, as regards the relevant environmental parameters/indicators (color, clearness, flow rate) in contrast with the situation when the original work was written (1866).

Investigative and Artistic Type's Environmental Issue

- Comment on the chemical knowledge required to understand the creation/expansion of the ozone hole by analyzing the parameters contributing to

- $2O_3 \leftrightarrow 3O_2$ equilibrium in the stratosphere, and propose further measures to be taken on a world-wide basis in order to accelerate the extinction of this environmental damage.

Discussion

- **Social** is the first type of personality that is sensitive to environmental issues.
- The social type is friendly and responsible, he enjoys team work, he prefers educational activities, he cares for the public benefit and he tries to maximize social welfare.
- After all, the environment is a public good and its protection relies on willingness of the citizens.
- The second type of personality that is sensitive to environmental issues is the **artistic** one.
- This type develops positive feelings about the environment, is creative and unconventional. For this type, clean environment is a source of inspiration and creativity.

In conclusion

- We have proved the functionality of the Interactive Algorithmic Procedure (IAP) we developed in order to promote individualized environmental tutoring in schools of secondary and tertiary education.

- We have indicated that at least two personality types, the investigative and the artistic (after Holland), should be divided into sub-categories in order to establish more effective interactive links with the students that belong to these sub-categories.

- In accordance of these findings, we prepared paradigmatic assignments to serve as prototypes.