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Thoughts on Philosophy and Science Curriculum

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Introduction

Before making curricular decisions, science educators should study diverse schools of philosophy, explore their implications and adopt that philosophy which best meets the needs of the students and community for which the curriculum is designed. The curriculum developed should provide the understanding, skills and attitudes necessary to fulfill the philosophical goals selected. In this paper, four schools of philosophy are explored and their implications to science education are discussed. In all cases, the curriculum designed should promote the recommended principles of the psychology of teaching and learning. Each philosophy proposed assumes an active rather than passive involvement of students.

Experimentalism

Change is the key word in the philosophical school of thought of experimentalism. Experimentalism recognizes the dynamic nature of the world in which we live. An experimentalist curriculum is developed in response to a changing world in which new social problems continually arise. Experimentalism focuses on the collective interaction between humans and the material world. Selected implications for the science curriculum would involve the following:

1. Students would identify social problems inside as well as outside the school environment.

2. Students would draw upon the scientific knowledge relevant to the solution of these problem areas.

3. A variety of materials and reference sources would be needed to gather data in proposing solutions. Instruction would go beyond a textbook.

4. Alternative solutions to problems would be proposed and subjected to criticism and revision.

5. Collective efforts and committee work would be necessary in arriving at solutions to problem areas.

Existentialism

Existentialism stresses the present time or current moment as being of primary importance. Reliance upon others for making decisions is inappropriate since the present moment is different for each individual. Each

individual needs to make personal decisions based on a wide variety of options. Decisions made may lead to failure, happiness, success, frustration and even alienation. Implications to the science curriculum would include the following:

1. Students would have ample opportunity to study a wide variety of philosophies pertaining to the development of a system of values applicable to personal decision making.

2. For many students, topics concerning consumerism and career planning may be appropriate, since they have immediate survival application.

3. Students would draw upon the scientific knowledge relevant to their personal value system.

4. A free classroom environment would be necessary for making personal choices and decisions. Conformity behavior would be frowned upon.

5. Students would be taught to live with the consequences of their individual deeds and acts.

Realism

Realism emphasizes the belief that individuals can know their environment as it truly exists. Most phenomena, although variable, possesses characteristics of uniformity and predictability in the view of the realist. Implications to the science curriculum would include:

1. The curriculum would emphasize content and scientific principles which have stability and are not subject to continuous change and modification.

2. Students would be taught to describe phenomena in quantifiable terms. Mathematical analysis would be an integral part of the science instruction.

3. Learning activities would be accented and place heavy emphasis upon use of sight, hearing, smell, taste and touch.

4. Students would stress the application of the scientific method in formulating and testing hypotheses.

5. Stress would be placed upon measurement and record keeping in interpreting the environment.

Idealism

Idealism emphasizes the inability of individuals to perceive holistic reality. A person's ideas or perceptions about phenomena is of major importance. Thus, mind is more important than matter. What is directly perceived in the environment is not of singular significance. Ultimate reality is believed to go beyond what can be perceived by the senses. Implications of idealism to the science classroom are as follows:

1. Total intellectual development of students would be highly important. This does not mean that the physical, emotional and social development of the individuals would be minimized.

2. Students would look for purpose beyond what is normally perceived and experienced. Activities would involve the search for values and universal standards for individuals to live by. Classes emphasizing quality general education would be important to all students.

3. In the science classroom the moral and ethical problems associated with scientific research would be explored.

Summary

Each philosophy discussed provides a psychological framework within which to teach and learn. All provide opportunities for different but relevant types of problem solving. Meaning and psychological stimulation is not derived from the content but from its philosophical application. The philosophy selected will depend upon the educational goals of the community, school or classroom involved.

Selected References

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Starting a Science Center?

Starting a Science Center? is a 34-page booklet prepared for the Association of Science-Technology Centers by Victor J. Danilov, director of the Museum of Science and Industry in Chicago. The publication is designed primarily to assist those who are attempting to start a contemporary science and technology center; however, most of the comments also apply to other manifestations of the science center concept. Over 40 photographs of existing institutions and their contents illustrate many of the options that potential science center organizers will want to consider in terms of buildings, exhibits, and educational programs. Tables present comparative data on building size, budget, exhibit space, and staff size of representative institutions. Helpful suggestions are given in the many facets to be considered when starting a science center. Available from Association of Science-Technology Centers, 2100 Pennsylvania Avenue, N.W., Washington, D.C. 20037. Price: $2.50 for ASTC members; $5.00 for nonmembers. Add $1.00 per order for postage.