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Module 11: Implementation and Suggested Readings

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The ADAPT manifesto:

The principal goal of education is to create people who are capable of doing new things, not simply repeating what other generations have done - people who are creators, inventors, and discoverers.

The second goal of education is to form minds which can be critical, can verify, and do not accept everything they are offered. The great danger today is from slogans, collective opinions, ready-made trends, of thought. We have to be able to resist individually, to criticize, to distinguish between what is proven and what is not. So we need students who are active, who learn early to find out by themselves, partly by their own spontaneous activity and partly through materials we set up for them; who learn early to tell what is verifiable and what is simply the first idea to come to them."

Jean Piaget, 1964

Introduction

How useful are the ideas of stages of development and self-regulation in teaching? You are encouraged to try the concepts presented in this workshop in your teaching. Are they useful for you and yours students?

Objectives

To apply the ideas and instructional techniques presented in this workshop to your own teaching.

Procedure:

1. You are encouraged to evaluate the reasoning patterns used by your students. Do the concrete/formal ideas seem useful in explaining student performance?

2. In what ways do the Piagetian notions enable you to anticipate student reasoning difficulties?

3. Review the teaching strategies for self-regulation suggested in Module 10. Try to apply them in your teaching. Do they help improve student reasoning.

4. Design a learning cycle for use in one of your classes. Expect it not to go well. Students tend to resist exploration activities when they are used to teacher-directed work.

5. Try to organize a discussion group with like-minded teaches. It is difficult to stand against a world of rote-learning algorithmic thinking students by yourself. You will need a supportive community if you seriously try to change the way you understand your teaching.

6. Continue to read articles on the development of reasoning to provide for your own intellectual growth with these ideas. To assist you with this we have provided a set of readings and an annotated bibliography.

Articles of Interest:

1. Jean Piaget, "Intellectual Evolution from Adolescence to Adulthood." Human Development, 15, 1 (1972).
2. Robert G. Fuller, Robert Karplus, and Anton E. Lawson, "Can Physics Develop Reasoning?" Physics Today, Vol. 30, No. 2 (1977).
3. Anton E. Lawson and John W. Renner, "Piagetian Theory and Biology Teaching." American Biology Teacher, 37, 411 (1975).
4. Herron, J. D. (1978). Piaget in the classroom: Guidelines for application. Journal of Chemical Education, 55, 165-170. Reprinted in De Educacion Quimica (1979), 4 (4), 173-174.
5. A. B. Arons, "Cultivating the Capacity for Formal Reasoning Objectives and Procedures in an Introductory Physical Science Course, "Am. J. of Phys., 44, 834 (1976).
6. Larry Copes, "Can College Students Reason?" (1975). Contact copes@edmath.org
7. Herron, J. D. (1978). Role of learning and development: Critique of Novak's comparison of Ausubel and Piaget. Science Education, 62, 593-605.

Sources for Workshop and Media Materials:

1. Science Teaching and the Development of Reasoning," Lawrence Hall of Science, University of California, Berkeley, CA 94720.
2. "Workshop on Physics Teaching and the Development of Reasoning." American Association of Physics Teachers, One Physics Ellipse, College Park, MD 20740.

Workshop Epilogue

Straight Scoop on Piagetian Books
By R. G. Fuller

1. David Elkind is my American hero as an interpreter of the work of Jean Piaget. I always recommend you start with him.

1. David Elkind, Childen and Adolescence, Interpretive Essays on Jean Piaget. Oxford University Press, New York, Second Edition, 1974.

2. David Elkind, Child Development and Education, A Piagetian Perspective, Oxford University Press, New York, 1976.
A more advanced book with a good discussion of Piaget's ideas and their educational implications. Mostly in an elementary school setting but easily transformed into a college environment by formal operational faculty.

II. Jean Himself. No Piagetian neophyte can be protected forever from his own writings. I suggest you begin gently.

3. Jean Piaget, To Understand Is To Invent, The Future of Education. Penguin Books, New York, 1976.

A general interst book prepared for common folk. Several excellent quotable sections, e.g. pp. 19-20, pp. 105-106.

4. Barbel Inhelder and Jeat Piaget, The Growth of Logical Thinking from Childhood to Adolescence, Basic Books, New York, 1958.
This is it! Very interesting first half of each chapter. Perhaps skip the last half of each chapter to avoid disequilibration. Back around pp 309 - there are pages that summarize Piaget's ideas on formal thought.

III Others

5. H. G. Furth and M. Wachs, THINKING Goes to School, Oxford University Press, New York, 1974.
The sections, pp. 12-30 and 40-47, provide good practical insights into the applications of Piaget's concepts to teaching. Again the setting is elementary school but is readily generalized to college.

6. P. G. Richmond, An Introduction to Piaget, Basic Books Inc. New York, 1971.
Near the end of this book there is a discussion of applications to education. I thought pp. 106-109 contained ideas for college teaching.

7. Howard E. Gruber and J. Jacques Voneche, The Essential Piaget, An Interpretive Reference and Guide, Basic Books, Inc., New York, 1976.
The heavy weight of Piaget's books. A super compilation of all kinds of Piaget's articles and books. Reading this lifts you out of the neophyte stage of Piagetian development.

8. Brian Rotman, Jean Piaget, Psychologist Of The Real, Cornell University Press, Ithaca, New York, 1977.
This book allows a gradually transition from neophyte to Piagetian amateur. Sets the work of Piaget in the broad perspective of Western culture. After reading this you can answer questions such as this: Asked by a Frenchman, "What is the relationship between Piaget and Popper?' if you care to answer that, read this book.

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Addenda by M. C. Thornton

1. Journal of Research in Science Teaching, Vol. 2, issue 3, 1964.
The entire issue is submitted "***Piaget Rediscovered***": selected papers from a report of the Conference on Cognitive Studies and Curriculum Development, March 1964." Piaget's Development and Learning paper comes from this issue. Also included are articles by Karplus, Duckworth and one by David P. Ausubel called "The Transition fro Concrete to Abstract Cognitive Functioning: Theoretical Issues and Implications for Education."

2. Herbert Ginsburg and Sylvia Opper, ***Piaget's Theory of Intellectual Development, an Introduction.*** Prentice Hall, paperback, 1969.
This is a very basic introduction for teachers. The first chapter gives a biography of Piaget and a good summary of his basic ideas. The last chapter considers implications for education.