DOCUMENT RESUME

ED 086 236 IR 000 090

TITLE	Solo Works; Newsletter Number Twenty-Three.
INSTITUTION	Pittsburgh Univ., Pa. Project Solo.
SPONS AGENCY	National Science Foundation, Washington, D.C.
PUB DATE	30 Nov 73
NOTE	3p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Computer Assisted Instruction; *Elementary School Mathematics; Grade 8; Grade 9; Grade 10; *Mathematics; Mathematics Curriculum; *Mathematics Education; Mathematics Instruction; Newsletters; *Secondary School Mathematics
IDENTIFIERS	Project Solo

ABSTRACT

The first section of this issue briefly reviews the initial phase of Project Solo--an attempt to develop new approaches to mathematics education. Some limitations of the project are also discussed. Following this, the relation of such computer-based activities to math education is presented, including the researchers' belief that in grades 8 through 10 such experiences can be used to synthesize the first six or seven years of primary math education, to show students the significant practical applications of mathematics and, having given them this exposure, to motivate them to study more advanced, abstract math in order to become capable of more powerful practical applications. The last section of the newsletter describes the project's top-down approach, whereby the math which is to be learned is determined by the research activities and skills which students need, and briefly overviews the five courses currently being developed. (PB)

SOLO WORKS

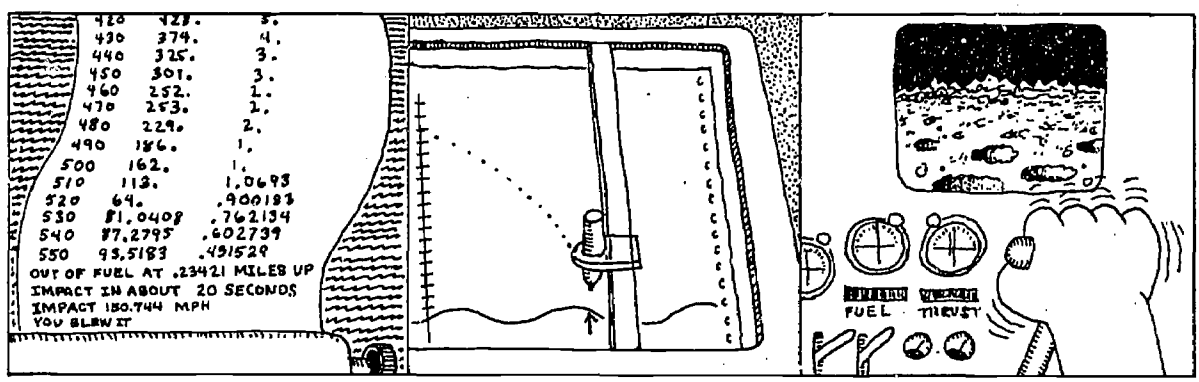
Project Solo, University of Pittsburgh, Pittsburgh, Pa. 15260

Newsletter #23 November 30, 1973

Soloworks: A New Name and Some New Ideas From Project Solo

As most of our readers know, Project Solo is an experimental program concerned with exploring the potential of computers in the hands of high school teachers and students. The project tested its ideas during 1970-72 in three large public schools in Pittsburgh where several hundred students learned to use computers in "solo" mode. These students (and their teachers) did some very impressive work; their output* gave good evidence that the computer is a tool which can help deepen one's understanding of almost any subject.

One of the limitations of computing we discovered during these experiments is the way in which teletype I/O can be an obstacle to "natural" understanding, especially for some of the most interesting parts of mathematics. This is particularly true when one wants to obtain a real feel for the power of mathematics by relating it to science, engineering, the arts, and other disciplines in significant ways.



Some preliminary experiments have convinced us that expanding the world of computer peripherals (illustrated above for a lunar landing simulation) will make powerful mathematical ideas transparent for lots of students. Developing such peripherals, and coming up with good ideas on how to use them is the basic concern of the new Soloworks project. **

*Information about reprints of Project Solo curriculum modules is given on the last page of this newsletter.

**The official name of the new project is "A Computer-Based High School Mathematics Laboratory". It is supported in part by NSF Grant EC-38063.

(412) 624-6461

The name Soloworks is meant to conjure up images of both a place and a philosophy. The place is a lab at the University of Pittsburgh where a small group consisting of project staff, high school teachers, and high school students are working together to develop and test these ideas. This lab is meant to be the prototype of larger math-lab centers to be placed in either conventional high schools, or in central learning centers that serve several high schools.

"Soloworks" is also a statement of philosophy, affirming our belief that any student can be brought into the world of solo-mode learning by an intelligent use of technology. A detailed analysis of what this implies, and a game-plan for making it work will be described in Newsletter #26 ("Heuristic Strategies for Using Computers to Enrich Education".

Relation to Math Education

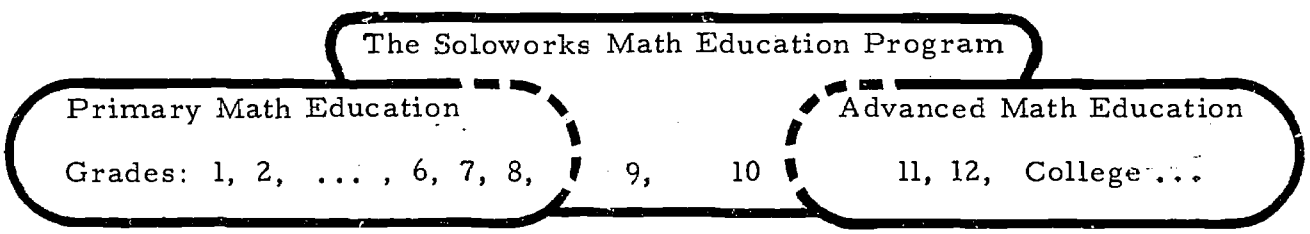
Soloworks is officially a project to develop new approaches to high school mathematics education. Our work is turning out to be quite interdisciplinary, however, drawing upon important ideas from many other fields, particularly computing, science, electronics, engineering, music, and the performing and visual arts. The age level of students with whom we are working falls in the 11-17 bracket, with most of the youngsters in grades 8, 9, and 10.

A simple way to describe where we are in terms of the rest of math education is to say that:

(1) We think the first six or seven years* of primary math education can be seized upon, brought together, and combined with higher math content to really do things in Junior-Senior High,

(2) After two or three years of doing such important things with math, most students will be in an excellent position to start dealing with (and appreciating) the power of advanced mathematical abstractions.

To say the above in another way, our experience with beginning high school students has convinced us that this is the right time to make mathematics come alive, and that the structure of advanced math, science, and engineering education (grades 11 on up) could become a whole new ball game for youngsters who do important things with math at an early age. We think it is fair to say that our thrust is aimed at a critical transitional period in math education.



* These numbers could change radically for children in a primary curriculum of the type being developed by Seymour Papert at MIT.

The Soloworks Labs

The kind of math to be studied in the Soloworks curriculum is going to be (mainly) determined by what we call a "top-down" approach. This means that we will start by defining both research activities and skills; these in turn will determine the mathematics to be studied. This approach results in a very different structure than that obtained by defining content first, and then looking for applications. We think the top-down approach will get around the sterility sometimes induced by behavioral objectives that "logically" build on each other in linear fashion.

Our original intent was to develop four lab courses (roughly corresponding to one semester each). A new lab (logical design) seems to be forcing itself on us, giving five courses. The five labs are called Computer Lab, Dynamics Lab, Logical Design Lab, Synthesis Lab, and Modelling/Simulation Lab. Each Lab will focus on the achievement of major skills, and on the pursuit of research projects. The organization of each lab will be something like the following:

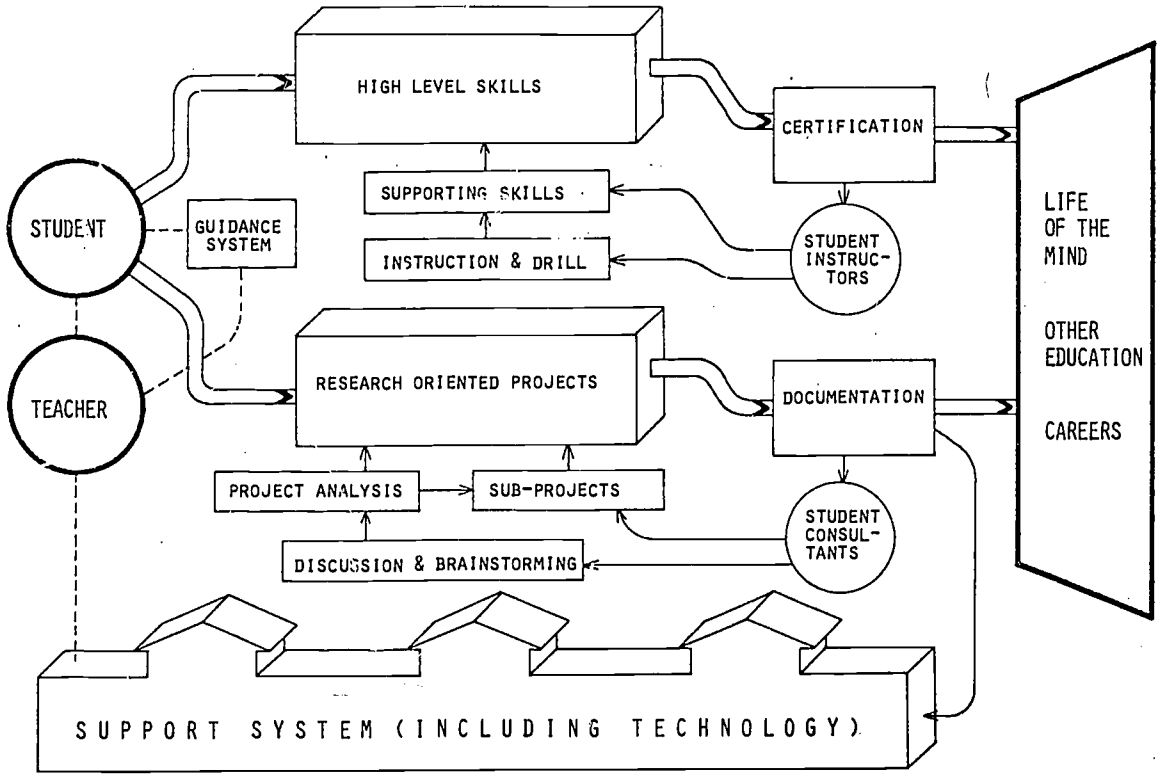


Figure 1. Organization of the Soloworks Labs

As can be seen, the role of the teacher in such a system is more one of facilitator than lecturer. This is why a technologically based support system is needed. Newsletter #24 will discuss some of the technology we are considering for each lab, and give some examples of the skills and projects involved