DOCUMENT RESUME

ED 086 713 SP 007 680

TITLE	SODIA: A New Model Elementary Teacher Education Program.
INSTITUTION	Utah State Univ., Logan. Dept. of Elementary Education.
PUB DATE	73
NOTE	118p.
EDRS PRICE	MF-$0.65 HC-$6.58
DESCRIPTORS	Child Development; *Elementary Education; *Field Experience Programs; *Interdisciplinary Approach; *Performance Based Teacher Education; Self Concept
IDENTIFIERS	*Distinguished Achievement Awards Entry; Portal Schools

ABSTRACT

The SODIA program is the 1974 Distinguished Achievement Awards entry from the Elementary Education Department at Utah State University. (SODIA stands for the five levels that students progress through during their 4-year undergraduate program: Self, Others, Disciplines, Implementation, and Associate teachers.) The program is designed to prepare teachers with special skills and competencies in five areas: a) working with children of wide variability in the regular classroom, b) preparing children for the world of work, c) improving a child's self-concept, d) improving the community, and e) learning. SODIA is performance based and field centered, and it utilizes portal schools as partners in the program. The program is also interdisciplinary and interdepartmental. The appendixes present program materials used by the students a) to practice their teaching skills, b) to work with students in the portal schools, and c) to decide if the teaching profession is right for them. (Author/BRB)

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SODIA

A New Model Elementary Teacher Education Program

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Developed By
The Department of Elementary Education
Utah State University
Logan, Utah

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ABSTRACT/INFORMATION FORM -- 1974 DAA Program

Name of Program Submitted: SODIA

Institution (complete name): Utah State University

President: Dr. Glen L. Taggart

Campus Public Information Officer: Mr. J.R. Allred

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Title of the Faculty Member: Head, Department of Elementary Education

Signature: Ronald G Petrie

Title: Head - Elementary Ed. Date: Nov 19, 1973

The SODIA program developed by the Department of Elementary Education at Utah State University is designed to prepare teachers with special skills and competencies in five areas of special emphasis. The areas of special emphasis which run through the program are 1) Working with children of wide variability in the regular classroom 2) Preparing children for the World of Work 3) Improving children's self-concept 4) Community Involvement and 5) Process of Learning.

The acronym SODIA stands for the five levels that students may progress through during their four year undergraduate program. "S" stands for Self and is designed to help students find out whether teacher education is for them. "O" represents Others and is a full time experience in one of the portal schools which give students in training an opportunity to learn about others. "D" represents Disciplines and is the stage of the program where the students practice their skills in teaching subject matter. "I" represents Implementation and is the student teaching phase of the program. "A" stands for Associate Teacher and is an individual contract designed to provide an opportunity for students to improve their competencies in areas of strengths or weaknesses.

The SODIA program is performance based, field-centered and utilizes portal schools as partners in the teacher education program. It is an inter-disciplinary and inter-departmental program utilizing staff from the departments of Psychology, Special Education, and Family and Child Development who work in conjunction with the Department of Elementary Education.

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SUMMARY

The SODIA program is performance based, field-centered and utilizes portal schools as partners in the teacher education program. It is an inter-disciplinary and inter-departmental program utilizing staff from the departments of Psychology, Special Education, and Family and Child Development who work in conjunction with the Department of Elementary Education. These University faculty members work with teachers and principals of the "portal schools" and Edith Bowen Teacher Training Laboratory School in an integrated program. Each of the levels utilizes experiences and training on-site in the public schools.

The staff have developed a series of "threads" which run through the total program which are felt to be probably more important in some respects that the coursework content and methodology. The five major threads found throughout the program are 1) Variability 2) World of Work 3) Community Involvement 4) Self-Concept and 5) Process of Learning.

Students progress through five levels in the four year program.

SODIA PROGRAM OBJECTIVES

The objectives of the SODIA program are:

1. To provide early entry experiences for students so that they may make appropriate decisions about career goals.
2. To provide a series of practicum experiences that are directly related to theories of instruction and teaching.
3. To provide a cooperative education program for teachers utilizing the personnel and resources of the public schools and the University working together.
4. To evaluate students on the basis of performance as well as knowledge.
5. To provide a wide range of instructional experiences for students in training (i.e., teaching at all grade levels in the elementary school during the five levels of the program.)
6. To provide a post-student teaching experience to students in training so that they may improve their competencies in areas of strengths and weaknesses on a voluntary basis.
7. To provide improved instruction for children in the participating portal schools.
8. To improve the quality of supervision of cooperating teachers in the portal schools.
9. To evaluate and adapt a variety of instructional materials developed at other institutions and through commercial sources to the SODIA program.
10. To develop instructional materials, techniques, and processes that are unique to Utah State University.

DEVELOPMENT OF THE PROGRAM

Prior to the adopting of the SODIA program members of the Department of Elementary Education had been studying various innovations in teacher education for a number of years. The Department was actively involved in attempting to secure a Teacher Corps grant and consequently was involved in a variety of workshops, seminars, and meetings related to new programs.

Members of the staff and the department head visited Oregon College of Education to look at the "Comfield" program and to study some innovations in teacher education at Oregon State University. In addition, two other staff members went to the University of Houston at Houston, Texas, the University of Georgia at Athens, the University of Florida, and the Teacher Corps Program at Livingston College in Livingston, Alabama.

Following the visitations the staff was ready to discuss the various programs and decide which things could be adapted to Utah State University.

In the fall of 1971 the Department went on a three day retreat to Park City, Utah to develop and outline a new comprehensive program in elementary teacher education. A series of preliminary questions, concepts, and ideas were outlined by the Department Head and members of the staff prior to the retreat and presented to the staff for their consideration, contemplation, and adoption.

The staff was divided into three groups which had representatives from the various disciplines within the Department as well as the staff of the Edith Bowen Teacher Training Laboratory School.? The various groups were asked to consider such questions as: Should the program be field centered or University centered? Should the program be performance based or traditional in its approach to teacher training? Should community involvement be part of the training program? What should be the entry level for students? Should public school teachers be involved in the training process? What should the content of the program be?

At the retreat members of one group developed an outline of a program and coined the acronym "SODIA" to indicate the various levels the student would go through in order to become certified in elementary education Utah State University. The basic concepts of SODIA were later discussed by the total group and were adopted.

The retreat established that the program would be performance based, field-centered, and utilize the portal school approach to training. The program would start at the freshman level and have individual guidance of students as one of its primary objectives. It was also perceived that students in training would have wide latitude to individualize their program within the basic structure. That is, students would have options in terms of mastery of content and methodology.

Another constraint of the program was financial resources. Some consideration was given to having a fifth year program where students would not be certified until after one year of teaching experience. This concept was rejected because of increased costs to individual students, the College, and to local cooperating school districts. The staff also knew that whatever was done had to be accomplished within the budget allotted to the department for regular operation, and that if the department had to rely upon outside funding to develop or to maintain the program the program would probably be doomed to failure. Some outside funding was solicited from private foundations and federal grants to help get the program off the ground but due to the tight money situation these grants never did materialize and the regular resources of the Department were used exclusively.

As program development proceeded through the 1971-72 school year it became apparent that something was missing in the program. Consequently a sub-committee (made up of the Department Head and two or three other staff members) met evenings once a week to try to outline the operational aspects of the program, the content aspects of the program, and the substance that appeared to be above and beyond the regular psychology and methods courses required for certification. The sub-committee developed and subsequently presented to the total department the concept of a number of "threads" running through the teacher training program which were very important, but which would probably not receive the proper attention unless they were identified and given special emphasis. These threads were: (1) Variability (working with children of wide variability within the regular classroom.) (2) World of Work (to teach children positive attitudes about vocations and careers) (3) Self Concept (to enhance positive self-concepts of children in the classroom setting) (4) Community Involvement (to utilize resources of the community both in and out of the school setting) and (5) the Process of Learning (this includes content of methods courses but goes beyond the traditional approach to include direct work with children as part of the training program.)

Through the entire 1971-72 school year, meetings were held weekly and sometimes daily to work out details of the program. Members of the staff became more and more committed to the concept and accepted the likelihood of carrying a double load for at least one year and possibly two if the program was to become operational. The Department was committed to maintaining the coursework in the former program at the same time the new program was becoming operational. Members agreed that this would be a heavy burden but worth the price in the long run. During 1971-72 the Department purchased materials developed at other universities including Wilkits from Weber State University, SRA Inner

City Simulation Laboratory, Thiokol Inter-Action Laboratory for Teacher Development, Cornfield materials and others. These materials were studied for possible inclusion in the program and placed in a special department curriculum library located at the Edith Bowen Teacher Training Laboratory School. The staff modified and accepted materials that appeared to meet the objectives of the new program. As the planning progressed the staff reached the general concensus that it would not be possible to develop a "pure" performance based program without additional resources inasmuch as the formal and informal evaluation devices and techniques would consume more staff time and resources than were available. As an alternative the basic level of performance which would be expected in all the various areas of the curriculum would be identified as well as the procedures and processes that the student would to through. Ultimately the staff would evaluate the criteria, using professional judgement as opposed to utilizing formalized objective data exclusively. This does not mean to imply that formalized objective data is not being used to evaluate performances wherever possible, rather it recognizes the need for additional special resources to encourage more rapid progress in the direction of performanced based evaluation. The program is still a long way from reaching its maximum potential as it relates to performance based criteria and evaluation but we are continuing to work towards that end.

PERSONNEL INVOLVED

Since the summer of 1971 the entire staff of the Department of Elementary Education has been continually involved in the development of the SODIA program. The staff consisted of the regular instructional staff who were charged with the responsibility of teaching the methods courses and working with student teachers. This staff was comprised of approximately eleven full time staff members. In addition the staff of the Edith Bowen Teacher Training Laboratory School was involved in the planning and implementation of the program. That staff included eight full time teachers and the principal of the laboratory school.

The Department of Elementary Education was the recipient of an EPDA project for the last four years to train teachers and teaching aides to effectively work with children of wide variability in the regular classroom. This project was picked as one of the twelve outstanding projects in the United States by the U.S. Office of Education. The four full time staff members in that project also assisted with the SODIA program development and operation.

Further assistance came from three graduate students who assisted in the development of the project in its first year and four additional graduate students assisted in the development in the second and third years of the program.

Support from Outside the Department of Elementary Education

The Department also received support and assistance from a variety of sources. The Department of Psychology released two of its staff members to work with the Department of Elementary Education on a half time basis to teach Educational Psychology and Human Growth and Development as part of the Sophomore Bloc. The Department of Family and Child Development also provided assistance in the Early Childhood phase of the training program (which is a separate part of the Sophomore Bloc) for students desiring specialized training in Early Childhood Education. In addition, the Department of Special Education assigned one staff member to help in the identification of general content, process, and training given to the students as relating to the preparation for teaching children of wide variability.

The superintendents of Cache County and Logan City Schools participated in the early development of the program and pledged their support and their schools to being "portal schools." A general presentation was made to approximately twenty elementary schools in the Logan, Cache, Box Elder, Ogden, and Weber school districts to solicit their interest in participating with Utah State University as a "portal school." Approximately fifteen schools volunteered to be "portal schools." Four were selected for the pilot study from the Logan City and Cache County school districts during the first year of SODIA (1972). In 1973 three other schools were added to the original list of cooperating "portal" schools.

In-service training to assist teachers to work more effectively with sophomores, juniors, and student teachers was provided. College credit was arranged for teachers who requested it. The staff of the Department of Elementary Education provided the training to the portal school staff. The in-service training program consisted of a regular class held at the school once a week throughout the school year.

The President, Provost, and Vice-Provost of the University participated in the development and have demonstrated their support of the program by visiting the schools, talking to the teachers, the students in training, the principals, and the community at large. The Provost also provided assistance in the way of funds to help evaluate the program.

The Council on Teacher Education at the University (which is composed of representatives from all the Departments involved in teacher education as well as representatives from the State Board of Education) reviewed the program, made suggestions for improvement, suggested evaluation techniques, and gave moral support to the program's implementation.

Personnel Involved in SODIA Program Development and Implementation

Elementary Education Staff Members

Bryce Adkins
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Joan Bowden
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Mona Higbee
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Gail Johnson
Ilone Long
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Ivan Pederson
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Jean Pugmire
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Secretarial Assistance

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Carolyn Barcus, Psychology
Lionel Brady, Special Education
Donald Carter, Family Life
Glendon Casto, Psychology
James Jacobsen, Educational Administration
Christine Muller-Schwarze, Play Therapy
Phyllis Publicover, Special Education
David Stone, Psychology

Teachers and Administrators from:

Logan City Schools:
- Adams Elementary School
- Ellis Elementary School
- Hillcrest Elementary School
- Riverside Elementary School
- Wilson Elementary School
- Woodruff Elementary School

Cache County Schools:
- North Park Elementary School

James C. Blair, Superintendent
Logan City Schools

C. Bryce Draper, Superintendent
Cache County Schools

Special Support and Resources from:

Oral L. Ballam, Dean, College of Education

BUDGET

The Department of Elementary Education expended approximately $6,000 for the program over the last two year period of time. The money was spent for two staff retreats: to develop and refi rogram: for materials developed in other institutions related to competency based instruction: and for purchasing special instructional materials such as the Thiokol Inter-Action Teacher Development Laboratory. SRA Inner City Simulation Lab, and the Weber State Wilkits.

The Department received two small grants to help implement various phases of the program. The Utah State Board of Education funded the Department of Elementary Education for $28,000 to develop self-instructional packages for pre-service and in-service training of teachers relating to the World of Work program. The instructional packages were developed during the 1972-73 school year. The field testing and evaluation of the packages will take place during the 1973-74 school year.

The Utah State Board of Education, the President's Office (through the Provost), the Dean of the College of Education, and the Department of Elementary Education contributed $6800 towards the comprehensive, objective, evaluation of the SODIA program. That program evaluation was started in September of 1973 and will conclude by June 30, 1974. The Department received no other outside funds to implement the program.

The Dean of the College of Education has helped in funding of graduate students and the staffing of auxiliary staff from the departments of Psychology and Educational Administration in the amount of $3900.

DESCRIPTION OF THE PROGRAM

The SODIA program is performance based, field centered and utilizes "portal schools" as partners in the teacher education program. It is an inter-disciplinary and inter-departmental program utilizing staff from the Departments of Psychology, Special Education, and Family and Child Development who work in conjunction with the Department of Elementary Education. University faculty members work with teachers and principals of the portal schools and with the staff of the Edith Bowen Laboratory School in an integrated program. Students may progress through five different levels in the four year program.

Level I Self

Level one represents Self and stands for the "S" in the acronym SODIA. This is normally a freshman level course which emphasizes the student understanding himself in relationship to his ability and desire to teach. Level one students have a minimum of ten hours of observation in elementary schools at various levels. In addition they are exposed (in classwork and counseling) to a variety of other experiences to help them decide whether teaching is really the profession they are interested in pursuing.

Level II Others

Level two is Others (the "O" in SODIA.) In this bloc students receive fifteen hours of credit and are assigned full-time to one of the portal schools. Approximately one-half of each day is spent in classrooms working with children as tutors and aides. The remainder of the day is spent in seminar, which is offered on site. The classwork is inter-disciplinary and interrelated in nature. Students receive credit for Educational Psychology, Human Growth and Development, Foundation Studies in Teaching, and Practicum in Elementary Education.

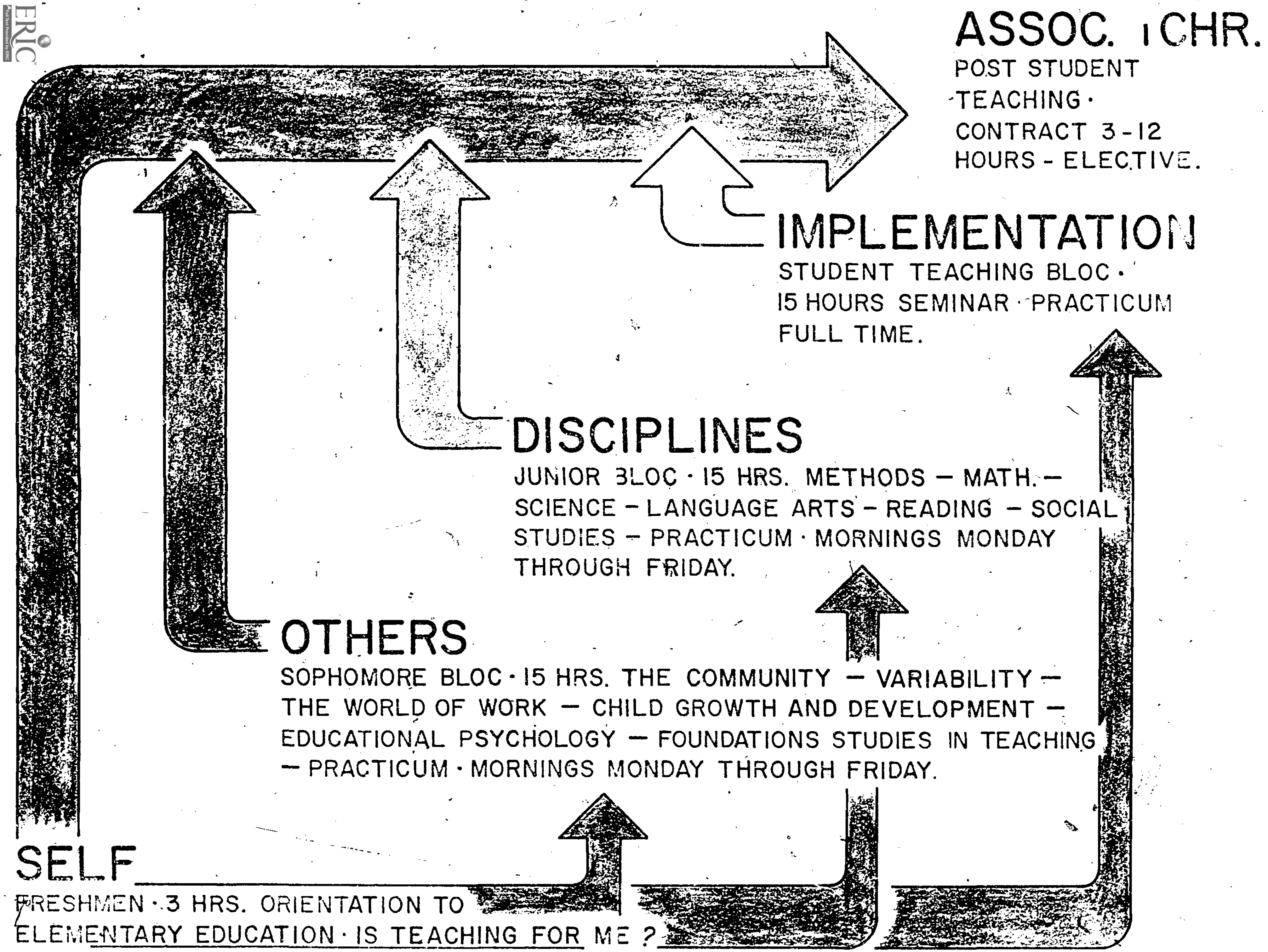
ASSOC. TCHR.
POST STUDENT TEACHING · CONTRACT 3 - 12 HOURS - ELECTIVE.
IMPLEMENTATION
STUDENT TEACHING BLOC · 15 HOURS SEMINAR · PRACTICUM FULL TIME.
DISCIPLINES
JUNIOR BLOC · 15 HRS. METHODS — MATH. — SCIENCE — LANGUAGE ARTS — READING — SOCIAL STUDIES — PRACTICUM · MORNINGS MONDAY THROUGH FRIDAY.
OTHERS
SOPHOMORE BLOC · 15 HRS. THE COMMUNITY — VARIABILITY — THE WORLD OF WORK — CHILD GROWTH AND DEVELOPMENT — EDUCATIONAL PSYCHOLOGY — FOUNDATIONS STUDIES IN TEACHING — PRACTICUM · MORNINGS MONDAY THROUGH FRIDAY.
SELF
FRESHMEN · 3 HRS. ORIENTATION TO ELEMENTARY EDUCATION · IS TEACHING FOR ME ?

DIAGRAM I

Level III Disciplines

Level three is the Disciplines part of the program and represents the "D" in SODIA. Students enrolled in the disciplines bloc receive eighteen hours credit and are assigned to classroom and seminar experiences at the Edith Bowen Teacher Training Laboratory School. Credit is given for methods classes in Reading, Social Studies, Language Arts, Science, and Mathematics. In this bloc students diagnose, prescribe, teach, evaluate, and if necessary re-teach in all of the five subject matter areas. They also develop a wide variety of methods and approaches using diagnostic and prescriptive techniques. A major objective of this level is to help students individualize instruction in the basic subject matter areas.

Level IV Implementation

Level four is the Implementation stage of the program and represents the "I" in SODIA. Students receive fifteen hours of credit for this level of the program. During this experience the student is again assigned to a portal school (not the same one they were in at Level II.) Here they become part of the professional team as they practice teach much as an intern might practice in a medical model training program.

Level V Associate Teaching

Level five is the Associate Teaching phase of the program and represents the "A" in SODIA. This level is optional for students who are interested in additional experiences in the public schools to either refine, or improve, their professional teaching methods and techniques. A student applying for teaching experience at this level makes an individual contract for 3 - 12 hours of specialized work. An example might be a student who felt inadequate in teaching mathematics at intermediate grade levels. Such a student, upon request could be placed with an "outstanding" mathematics teacher for several hours a day through the quarter and receive up to six hours of credit for such an experience.

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Of the thirty to forty students who have participated as "Associate Teachers" thus far, each case and contract has been quite unique ranging from 3 hours of additional work in tutoring a reading program to 12 hours credit for the equivalent of another student teaching experience in a different type of school organization (i.e., team teaching, rural schools, etc.)

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PREPARING TEACHERS FOR WHAT?

In trying to assess what teachers really need to know, plus the attitudes, competencies, and skills they should have to teach effectively, the staff developed a series of "threads" which run through the total program (which are felt to be probably more important in some respects than the coursework content and methodology previously outlined.) The five major "threads" found throughout the program are: (1) Variability (2) The World of Work (3) Community (4) Self-Concept (5) Process of Learning. (See Diagram 2)

Variability - includes an introduction to exceptionality including working with and studying about children who are disadvantaged, emotionally disturbed, educable mentally retarded, gifted, or have speech and hearing defects, etc. The intent is not to make "experts" out of regular classroom teachers concerning all of these areas, but rather to sensitize them to the differences and problems presented by a wide variety of children in a regular classroom.

World of Work - refers to concept of preparing teachers to provide children (at the elementary level) with an awareness of career education and to develop positive attitudes about a wide variety of career possibilities. The Utah State University Department of Elementary Education received a grant from the state to develop a packaged pre-service and/or in-service training program which may be utilized in other colleges and/or school districts to prepare staff for effective utilization of the statewide World of Work program. The instructional packages will be completed by fall of 1973 and ready for field-testing and evaluation during the 1973-74 school year.

~ SODIA ~
ELEMENTARY EDUCATION
TEACHER TRAINING
MODEL

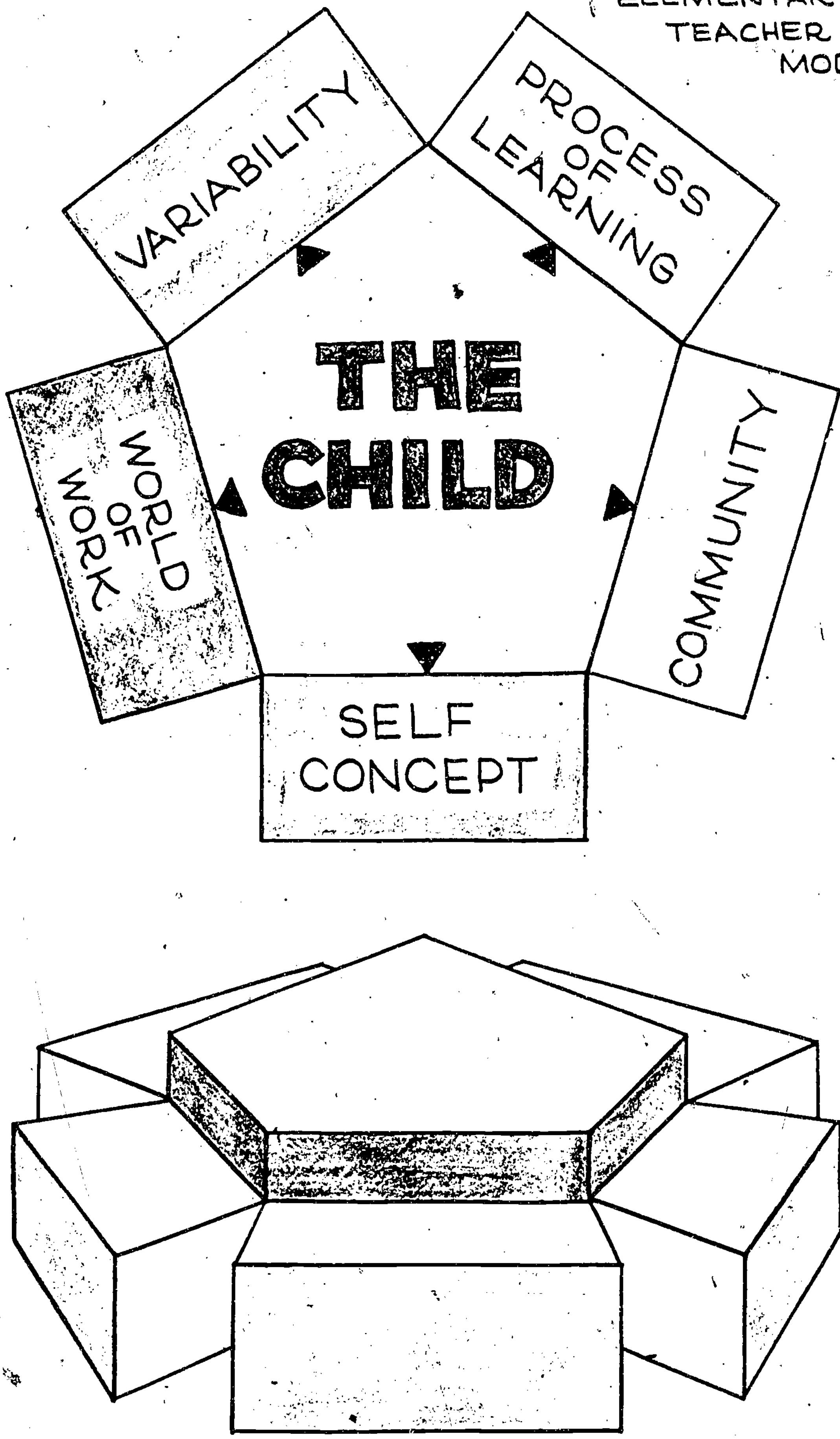

DIAGRAM 2

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Community - includes preparing teachers to work with parents in the home and school setting, making referrals to proper agencies and being involved with other community institutions and resources which support and are related to the school.

Self-Concept - refers to preparing teachers to improve their own self-concept and to do an effective job of helping the child develop a healthy self-concept in the classroom setting. Students in training receive instruction concerning verbal and non-verbal communication, and are sensitized to the needs and feelings of children. The humanization of education is a major goal.

Process of Learning - includes principles and methods from child growth and development as they relate to learning theories, etc. Even though students receive credit for their methods courses during the third level of the program, the introduction in "how-to" teach reading, math, and science, etc., starts at Level I and continues through the student teaching and associate teaching phases of the program. Conversely the credit for Educational Psychology, Human Growth and Development, etc., is given at Level II, but in actual practice is continually reinforced and re-taught throughout other levels of the program.

The preceding diagram is the result of an attempt to represent graphically the interrelationship of the five major program strands at each level. In actual implementation of the model the emphasis on these major strands is not likely to be equal at each level.

The following diagram represents a similar attempt to graphically portray the way in h the levels of the model build on prior experience. (See diagram 3)

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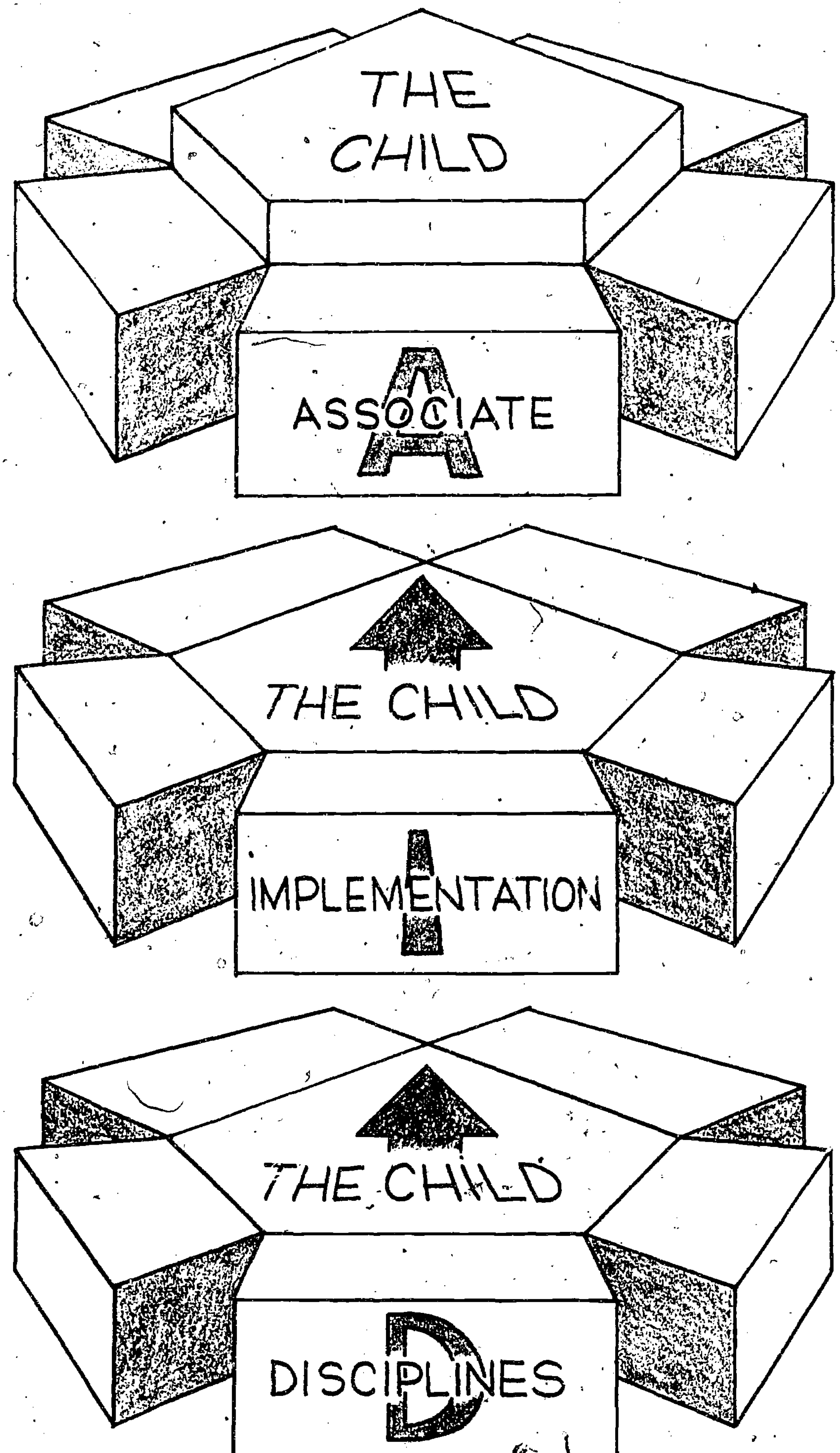
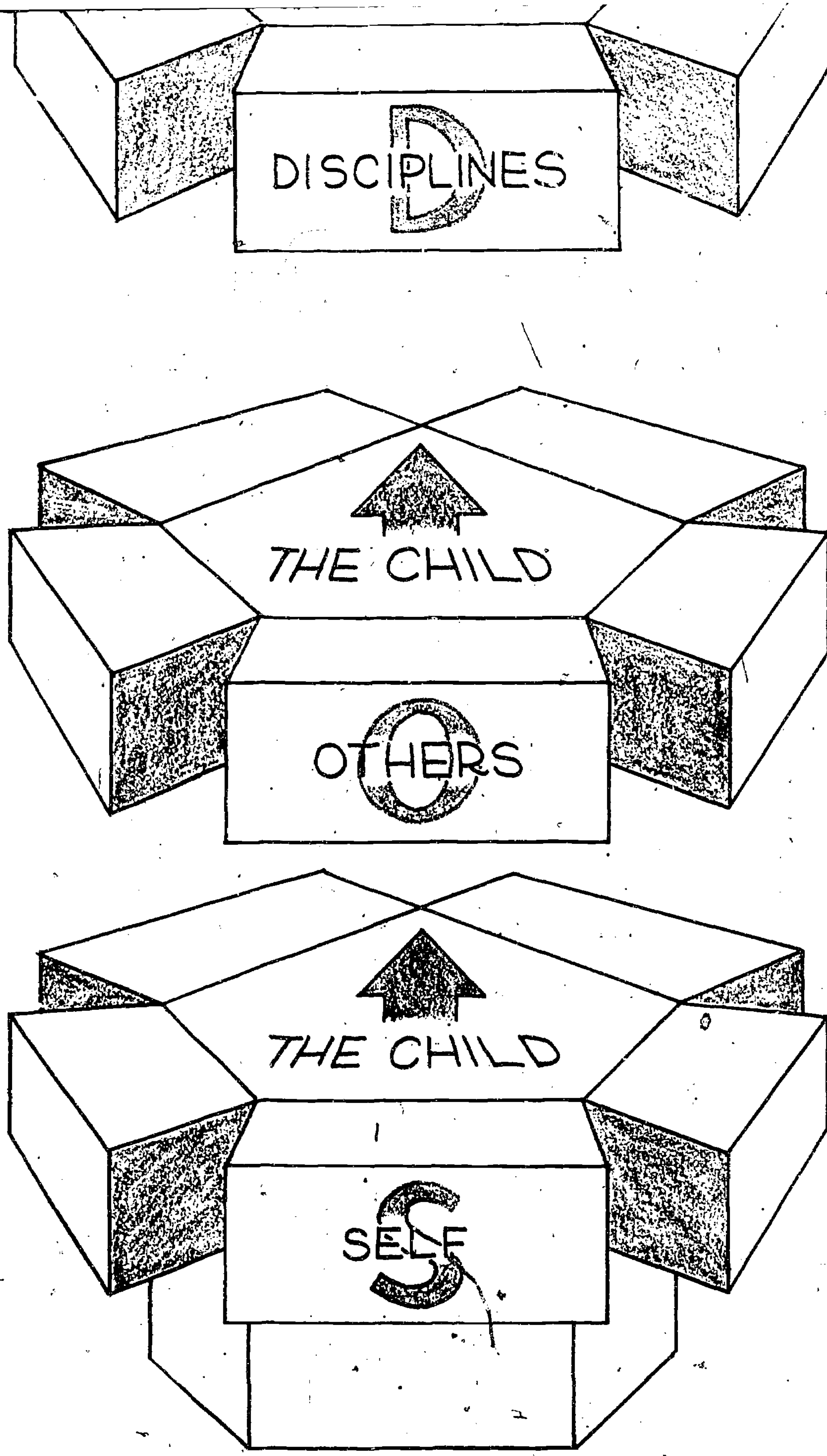

THE CHILD
ASSOCIATE
A
THE CHILD
IMPLEMENTATION
I
THE CHILD
DISCIPLINES
D



~ SODIA ~
ELEMENTARY EDUCATION
TEACHER TRAINING MODEL

DIAGRAM 3

EBA '72

EXAMINING A STRAND AT ONE LEVEL

A variety of learning experiences and activities will be structured within each of the major strands of emphasis at each level. In designing the program structure in this way, the flexibility necessary to continuing appraisal and improvement is assured. Each of the planned experiences and activities can thus be isolated for examination and revision.

The following diagram is meant to be representative of a single area block at one level of program experience. If, for example the diagram is used to represent that part of the "Variability" thread existing in the program at the second ("Others") level of experience. The component part (see Diagram 4) could be thought of as representing such activities as:

A. The proposed mini-course program on Variability completed in relationship to the assignment in working in an elementary school classroom. (Large Block)

B. Completion of an in-depth case study of a pupil of wide variability occuring in the classroom assignment. (Medium Block)

C. Instruction on cultural bias of tests and the effect of the "self fulfilling prophecy" upon the performance of children. (Small Block)

D. Instruction in appreciation for the cultural background and differences of minority group children. (Large Block)

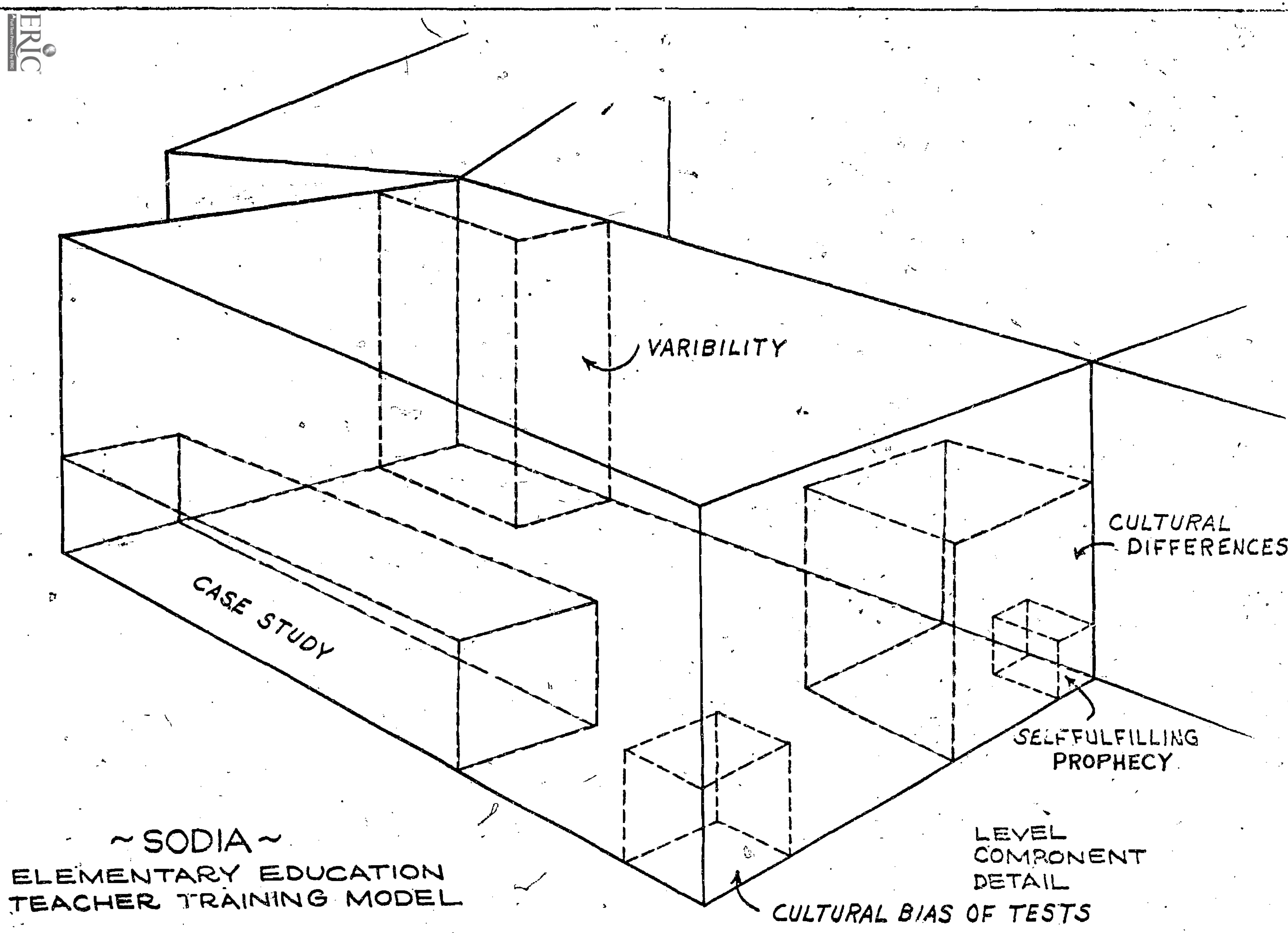


DIAGRAM 4

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The final diagram (Diagram 5) is meant to graphically represent the ways in which the model interrelates as a unified structure. The philosophical framework from which the model was constructed was that developed by Arthur Coombs et al in Perceiving -- Behaving-- Becoming ASCD 1962 Yearbook. In the model we have first attempted to help the student realistically to perceive himself as an individual, in relation to the teaching tasks and to other people. The program then places the student in a variety of situations in which he has experience in behaving as a teacher. Instruction is provided to help the student develop those skills and to learn those things needed to become a successful teacher, and to try his teaching skills in a supervised and guided situation.

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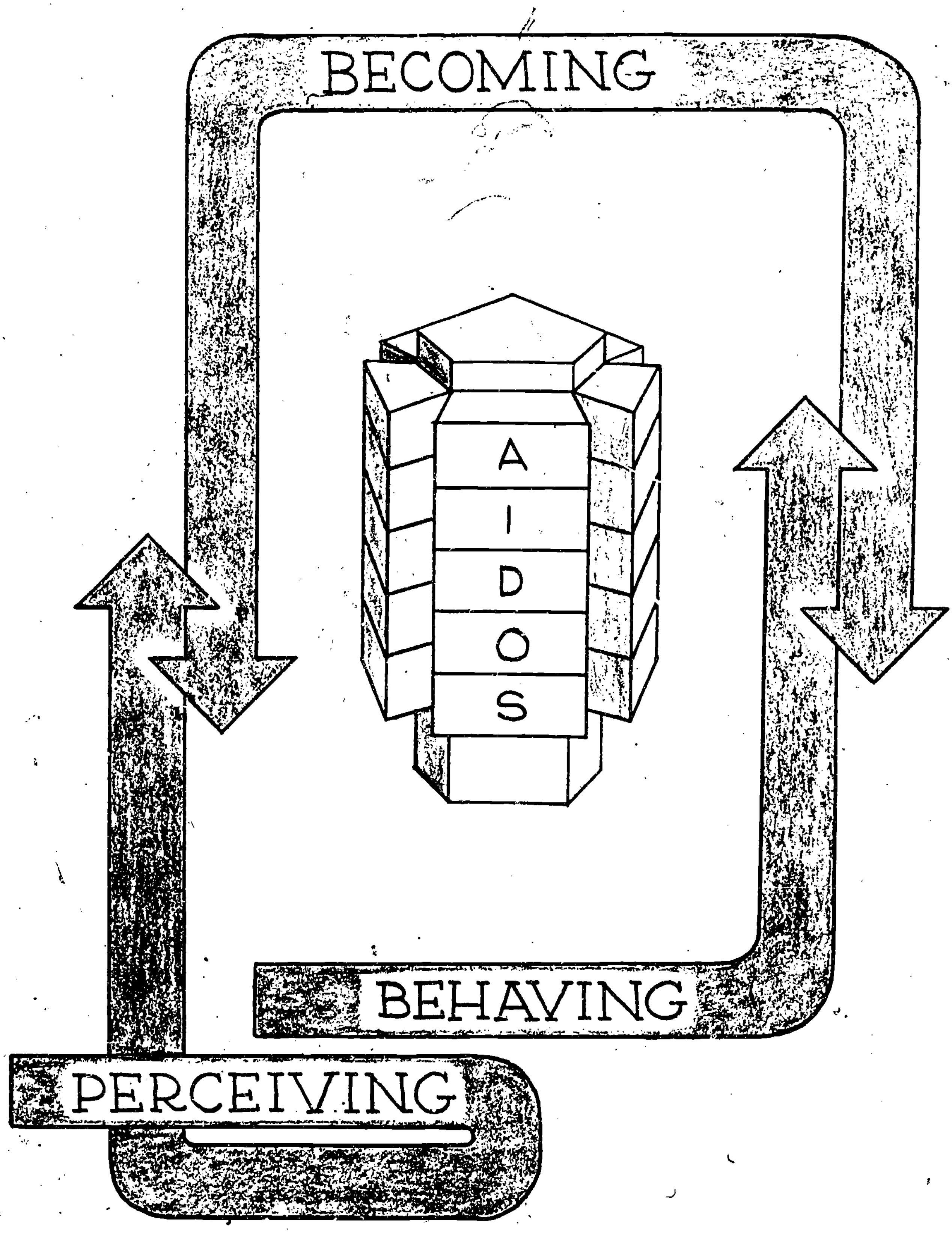

~ SODIA ~
ELEMENTARY EDUCATION
TEACHER TRAINING MODEL
DIAGRAM 5

EBA '72

INSTRUCTIONAL MATERIALS

In attempting to implement the program and to individualize instruction for the students going through the program the Department purchased a wide variety of instructional materials and packages developed at a variety of universitites and through commercial sources. Department members have also created their own materials and packages for use in the various phases of SODIA. Students use the materials independently and/or in conjunction with the regular instruction they receive in the seminars.

Parts of the Thiokol Interaction Laboratory for Teacher Development and SRA Inner-City Simulation Laboratory are used throughout the program. In addition, the program utilizes selected Wilkits developed at Weber State College and a variety of resource books, materials, handouts, etc., are used in all phases of the program. The Department maintains a seperate curriculum library for students to check out these materials at any time.

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EVALUATION

At the end of each quarter, the Department Chairman meets with students at each of the SODIA levels and receives feedback on ways of improving the program. Similar meetings are held with the teachers in each of the portal schools to assess what should be improved, changed, and modified. The program will continue to be modified and revised as new information is gathered and refined.

In addition to the informal evaluation the Department of Elementary Education has received a grant of $6800 to formally evaluate the program beginning in the fall of 1973. This formal evaluation is being funded by the Utah State Board of Education, the Utah State University Provost's Office, the Dean of the College of Education, and the Department of Elementary Education. The evaluation is intended to be broad in scope and utilize a variety of data collection and analysis of technique. Three general types of data are to be collected. They are:

A. Achievement Data - collected from information obtained from standardized achievement tests on students in training and children in the portal schools.

B. Attitudes - collected from information gained from attitude scales administered to students in training.

C. Opinions - collected from opinionaires administered to students in training; cooperating portal school teachers, and portal school administrators.

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Evaluation Procedures

I. Achievement

During the fall quarter of 1973 student teachers will be given the general and elementary sections of the National Teacher Examination (SPRES). Comparison of achievement scores will be made between SODIA program students and national norms and students completing the program through the former elementary teacher education program.

Achievement scores of portal school children who have taken the Iowa Test of Basic Skills and/or the California Achievement Test (full battery) will also be collected. Comparison of achievement scores of portal school children during the 1972-73 school year will be made with the three year average achievement scores of children from the same schools in the 1969-70 through 1971-72 school year in each of the cooperating portal schools.

Attitudes

The Rokeach Dogmatism Scale will be administered to all elementary education student teachers during fall quarter 1973. Comparison of dogmatism mean scores will be made between SODIA program students and students completing their program through enrollment in the former elementary education teacher training program. Comparisons will also be made on the mean dogmatism scores of SODIA program students and teacher education students at Utah State University obtained from two previous research studies.

Opinions

An opinionaire has been constructed to collect a variety of information from cooperating teachers and administrators as to the relative effectiveness of the SODIA program in the portal schools. This opinionaire will be administered at the end of fall term 1973.

Another opinionaire has been constructed to collect opinions of elementary teacher education students in SODIA concerning three domains (cognitive, effective, and skills) in which they have received training and instruction while in the SODIA program. Opinions of the SODIA students and students who have received their instruction in the former program will be compared to see if there is any difference in the perception of the two groups concerning their competencies in the previously stated domains.

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SODIA PROGRAM CONTRIBUTIONS TO THE IMPROVEMENT OF EDUCATION

The SODIA program contributes to the improvement of education in that a series of "threads" have been developed that run through the program (variability, World of Work, community involvement, self-concept, process of learning) which represent a departure from the commonly accepted areas of emphasis in most teacher training programs. We feel that these threads are at the "heart" of the competencies that a teacher should have to be an effective teacher.

The program demonstrates that a new, innovative, comprehensive program can be initiated without large amounts of funding from outside sources. It demonstrates that students in training can receive the equivalent of one full year of supervised experiences in a regular four year undergraduate program. It demonstrates that competency-based materials developed at other institutions and commercial sources can be adapted effectively in an institution away and separate from where they were originally developed. It demonstrates that it is possible to have a comprehensive teacher education program involving a variety of departments working together. It demonstrates that a comprehensive teacher education program can be provided in partnership with public schools.

The SODIA program has been particularly effective in helping students decide at a very early stage of their career whether elementary teaching is something that they want to actively pursue in their college program (freshman year.) In the first year of the program approximately fifty percent of the students who took the first level class (Self) elected not to continue in Elementary Education. This percentage has dropped appreciably in the second year of the program to approximately ten percent of the students deciding on different careers at the end of the freshman experience. An additional ten percent leave Elementary Education at the end of Level II (Others) phase of the program.

The program further provides for a very effective means of combining theory with practicum. Students in training start to work with children in their freshman year and continue to work with children in a classroom situation in their sophomore, junior, and senior years.

Another somewhat intangible contribution of the program is that employers indicate that the graduates of SODIA are equivalent to second or third year experienced teachers in their ability to function and teach effectively.

Another contribution is that the students themselves are extremely enthusiastic over their participation with children at all levels of the program. They feel that they are well prepared upon completion of SODIA.

Another contribution is the improved instruction for children in the portal schools. Almost every classroom has two or three students (Level II - Others: Level IV - Implementation or Level V - Associate Teaching) in training that help provide individual instruction for children. In addition, the cooperating teachers receive continual help in improving their supervisory skills as well as their personal teaching skills.

College staff are no longer perceived as being in the "Ivory Tower" and out of touch, because they are in the schools most of the day, every day, supervising the students, working with cooperating teachers and teaching the seminars. The seminar classes are taught (for the most part) right in the portal schools.

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APPENDIX

ERIC Full Text Provided by ERIC

Examples of Materials Used in Level III - Disciplines

A. Why Teach Elementary School Mathematics
by Dr. Bryce Adkins

B. Numeration Systems
by Dr. Bryce Adkins

C. Objectives for Reading
by Dr. Gail Johnson

TEACHING ELEMENTARY SCHOOL MATHEMATICS

Instructional Module I

OR

WHY TEACH ELEMENTARY SCHOOL MATHEMATICS?

ERIC

SETTING EDUCATIONAL GOALS

IN ELEMENTARY SCHOOL MATHEMATICS

"If we could first know where we are and whither we are tending we could better judge what to do and how to do it."

Abraham Lincoln

Prospectus

Teachers must make many decisions about the relative importance which different knowledge and skills have for the pupils in elementary school classrooms. In mathematics, for example, the teacher who decides that a high level of "mastery" of the basic multiplication facts merits the use of pupil time which might otherwise be spent in studying a unit in geometry has made an important and basic decision about the relative worth of topics commonly taught in elementary school mathematics. Every teacher must frequently make such decisions. Even the teacher who decides to faithfully follow the textbook and not vary from the topics and emphasis reflected in the textbook has made such a basic decision about what his mathematics program should be.

It seems logical to assume that the best decisions as to what mathematics should be taught will be made by those teachers who are knowledgeable about the recommendations of "experts" in the field and about the practices which have been tried in the past and the results of these different practices. Unfortunately there is, and apparently has always been, considerable diversity among the opinions of experts in regards to most areas of elementary school mathematics instruction. Thus the teacher is left with the problem of developing his own philosophy to serve as a basis for making decisions about "What, Why, and How" elementary school mathematics should be taught.

The goal of this instructional unit is to provide the student with information about the ways in which the question, "What arithmetic shall we teach?" has been answered in the past and is being answered in contemporary elementary school classrooms. It is believed that this knowledge will best equip the teacher to anticipate, prepare for, understand and adapt to changes in the elementary school mathematics program which will occur during the teacher's career. This knowledge should also help the teacher to make logical and consistent decisions about the mathematics program he conducts in his classroom.

Terminal Objectives

Upon completion of this module the student will be able to state, either verbally or in writing, his philosophy about the purpose of elementary school mathematics.

Upon completion of this module the student will be able to make rational decisions about the relative merit of different topics in elementary school mathematics. These decisions will be consistent with the philosophy which the student has developed about the purpose of elementary school mathematics.

Upon completion of this module the student will be able to defend his decisions about the relative value of different topics in elementary school mathematics when these decisions are in opposition to the decisions of others.

PRE-ASSESSMENT

Respond to two of the following "problem situations." Record and retain a copy of your response for use in conjunction with the Post-Assessment phase of this module. Your record may consist of a tape recording which you might make of the response you would give to the selected problem situations. This record could also consist of a tape recording of a role playing situation engaged in by a group of your peers, or it could be in the form of a written answer or reaction to the problem situations.

1. Assume you are in your fist year of elementary school teaching and for the first time meeting with a group of parents of pupils in your room in a regularly scheduled "back to school night" sponsored by the P.T.A. One of the parents has expressed his concern over the level of computational skill he believes his child is developing in arithmetic. Although he is not blaming you individually he does believe the mathematics program is not as good as it used to be. You are aware that there is a significant body of evidence that pupils are not developing as high a level of computational skill under "modern mathematics" programs as their predecessors did under a more traditional program. Develop a response which you think should be given in this situation.

2. Assume that your school has recently administered a battery of standardized achievement tests and that the scores in mathematics "computation" have generally been quite low, although the scores in "reasoning" (Or problem solving) were very high. The Principal is talking with you about the need for finding a way to improve the computational skills of pupils in your school and although he has praised you and the other teachers for the good scores in the "reasoning" section of the test you believe he thinks the pupils should have done better in "computation." Develop a response which you believe would help his understand the situation.

3. Assume you are in your fist month of teaching in a fifth grade classroom and you have discovered that most of the pupils in your room do not know their basic addition, subtraction, and multiplication facts. You have in general planned a program which you believe will enable most of the pupils in your room to complete the work in the textbook supplied by your school for mathematics. You are now faced with the decision of whether to embark on a supplementary program aimed at helping the pupils in your room gain "mastery" of the basic facts of whether to continue with your original plan for completing the textbook.

You suspect that if you omit some of the textbook topics the teacher who will have the pupils the next year will disapprove because they will not have had the basic experiences upon which she is to build. On the other hand you are equally fearful that this teacher will talk about you, as she has been about the teacher who was in your room last year, saying that the pupils just didn't learn the basics of arithmetic.

What program do you recommend for best resolving this dilemna? Why do you believe it is best? What problems do you anticipate? What action would you recommend for trying to ameliorate them?

4. Assume you have been appointed to a committee of elementary school teachers in your district who have been charged with the responsibility of recommending an elementary school mathematics textbook series for adoption by the district. After considerable study the field has been narrowed to two series. In many ways, such as artwork, format, quality of paper and binding the two books seem even. One basic difference is apparent, however. In terms of content one series provides a very structured approach that is basically traditional in content and provides many practice exercises for each topic. The other series considers several topics which are not in the first text, but it does not provide as many practice exercises. Thus the basic decisions seems to be one of choosing between a broader experience in mathematics for children or one which provides greater opportunity for developing "mastery" of computational skills.

On the basis that other qualities of the texts are equal, Which series do you favor? Why?

WHAT ARITHMETIC SHALL WE TEACH?[1]

As a result of the nature of teaching, every teacher must frequently make decisions about what he should teach. For example, "Is a question raised by a child of sufficient value to merit abandoning a planned lesson in favor of pursuing an unplanned for topic?" "How important is it that pupils understand a topic in mathematics as opposed to be able to perform accurate computations without understanding?" "Should a fifth grade teacher embark on a program of developing mastery of the basic facts even though it will mean other topics in the textbook will not be considered?" "Is it more important for the pupils to develop understanding of some topics or to cover the textbook?"

Many questions similar to the preceding ones must be answered by the classroom teacher. But, are the answers given the best possible? The best answers are formulated by teachers who have a philosophical base to use as a framework in formulating wise and consistent choices. The preface to the, "Mathematics Curriculum Guide", of the Clark County (Nevada) School District[2] recognizes the importance of this problem through the following statement.

Philosophy

In developing a consistent philosophy to give direction to mathematics instruction for all students in the public schools, it is necessary to consider the following questions:

1. Why should mathematics be taught?

2. What mathematics should be taught when and to whom?

3. How should mathematics be taught?

It is obvious that the answers to questions #2 and #3 depend on the answer to #1; and that the second question has to do with the selection, scope, and sequence of content; and that the last question deals with methodology.

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1. Although the introduction of topics from other branches of mathematics has resulted in more appropriately labeling the contemporary program "mathematics," rather than "arithmetic". The title of a monograph published in 1929 by Guy M. Wilson was chosen for naming this section, in an attempt to emphasize the persisting nature of this problem. (Wilson, Guy M., What Arithmetic Shall We Teach? Houghton Mifflin Co., 1929, 149 pp.)

Question #1 is the "hard" one, because the answer requires that certain assumptions about the nature of man and what constitutes the "good life" be made explicit. For example, if it is assumed that control of the environment by man is desirable, then it logically follows that mathematics should be taught since it enables man to describe and predict physical phenomena. Of course, man exists at a point in time and space, so these assumptions change from time to time and from place to place.

The complete development of such a deductive philosophical system is beyond the scope of these introductory remarks. A simple statement of beliefs must suffice.

Every individual should be limited in his life choices only by his own unique set of "original" equipment, such as physique, intelligence, and health. Insofar as possible, he should be the master, not the slave, of the routines and decisions which shape his life. Education, including mathematics education, is the key to this mastery. In an age of increasing specialization, the elementary school is becoming the last fortress of general education. The mathematics which is taught at this level must be aimed at keeping doors open for children. Whether or not a student elects more mathematics in secondary school, he should leave the elementary school with a powerful tool-mathematical literacy--with which to chip away his piece of the "good life."

(Clark County School District; 1967)

Although the primary purpose of this instructional program in the teaching of elementary school mathematics is to provide the student with a repertoire of evaluational and instructional procedures and skills, the decisions of "Why" and "What" to teach must provide the basis for wise decisions of "How" to teach. The emphasis in this module is upon helping students obtain background information requisite to the formation of a philosophy about teaching elementary school mathematics. Other modules in this program will emphasize "methods of teaching elementary school mathematics.

"IN THE BEGINNING - - - "

At the time of the colonization of America in the first half of the seventeenth century, arithmetic was not considered essential to a boy's education unless he was to enter commercial life or certain trades. The instruction in arithmetic was often given in a separate school, called a writing school, or a reckoning school. When arithmetic was taught in the grammar school it was very rudimentary. Not only was this true, but among the nobility and aristocracy of the educated, arithmetic was looked upon as "common," "vile," "mechanic," because it was the accomplishment of clerks, artisans, tradesman, and others who bore no signs of heraldry." Consequently it was a subject beneath the dignity of a boy unless he was "less capable of learning and fittest to be put to trades."

(Monroe, 1917:5)

With the preceding description Monroe characterizes the rather skimpy nature of the almost non-existent arithmetic program of colonial schools. The careful reader will also note the attitude the more influential citizens of the colonial period had about the importance of knowledge of arithmetic.

Many of the early schoolmasters did not know how to perform arithmetical computations and in many communities it was necessary for those parents who wanted their children to learn to "cipher" to make special arrangements for private tutoring outside of the regular school instruction. Much the same situations as occurs today for those parents who want their elementary school age children to learn to play the piano.

Gradually as commerce began to grow in the colonies the need for people who could cipher also grew. More and more the ability to cipher became a desired skill for the schoolmasters who were employed, and gradually the number of schools increased in which instruction in ciphering was made available for those pupils who-wished to gain these skills.

The reason for arithmetics gradual acceptance during this period of one hundred and fifty or so years seems fairly obvious. There was a need for people who could cipher in order for the colonists to improve the quality of their lives through increased trade. This also led to an equally obvious answer as to what arithmetic should be taught. Pupils were taught those skills necessary to carry on the commerce of the time.

The way in which arithmetic was taught throughout this period is of considerable interest because of its difference from the way in which the subject has been recently taught. Since the method was so generally used over such a long period of time with so little dissatisfaction, there seems reason to question if methods we now accept as satisfactory may not also be seriously questioned in the future.

Throughout this first hundred and fifty years of development of arithmetic as a school subject the method of instruction was predominantly one called "the ciphering book method." The idea of helping a pupil was not part of the colonial day teacher's creed; nor was motivation, except perhaps by punishment, considered necessary. The teacher's role was to maintain order and to "hear" lessons. Throughout most of this period the study of arithmetic was not compulsory. Only those pupils who desired to do so, or parents insisted that they do so, undertook the study and it was only pursued so long as desired. The following account written by a man who was a student taught by the ciphering book method is typical of several such records which exist.

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At length, in 1790 or 1791, it was thought that I was old enough to learn to "cypher," and accordingly was permitted to go to school more constantly. I told the master I wanted to learn to cypher. He set me a "sum" in simple addition - five columns of figures and six figures in each column. All the instruction he gave me was, Add the figures in the first column, carry one for every ten, and set the over-plus down under the column. I supposed he meant by the first column the left-hand column, but what he meant by carrying one for every ten was as much a mystery as Samson's riddle was to the Philistiens. I worried my brains for an hour or two, and showed the master the figures I had made. You may judge what the amount was when the columns were added from left to right. The master frowned and repeated his former instruction, Add up the column on the right, carry one for every ten, and set down the remainder.

Two or three afternoons (I did not go to school in the morning) were spent in this way, when I begged to be excused from learning to cypher, and the old gentleman with whom I lived thought it was time wasted: . . . The next winter there was a teacher more communicative and better fitted for his place, and under him some progress was made in arithmetic, and I made a tolerable acquisition in the first four rules, according to Dilworth's Schoolmaster's Assistant, of which the teacher and one of the eldest boys had each a copy. The two following winters, 1794 and 1795, I mastered all the rules and examples in the first part of Dilworth; that is through the various chapters of rule of three, practice, fellowship, interest, etc., to geometrical progressions and permutation.

(Monroe, 1917:44-5)

The ciphering book method of instruction probably began as a necessity due to the absence of textbooks in arithmetic. The method persisted even in those situations where texts were available, however, and the prefaces of early texts in arithmetic indicate they were written to facilitate the ciphering book method rather than to alter it. There is some evidence that in many schools the ciphering book method gave way to the "monitorial method" towards the end of the period of development. Under the monitorial method of instruction the master "heard" the more advanced pupils' lessons and they in turn instructed the younger children.

The objective of this instruction was a knowledge of the rules and their applications- Little real computational skill probably resulted from the limited practice that was provided. Pupils frequently doubted that the master could actually work the exercises and there are some records of wrong answers having been copied into the pupil's ciphering book. Imagine the difficulty the next generation of students must have had in obtaining the same wrong answer that appeared in the master's book, and of the pupil's fear of questioning the answer of the master. Existing copies of old ciphering books and early textbooks indicate that it was common for pupils to work no more than approximately five exercises in addition and subtraction before it was considered they had mastered this area of study. The following quotation provides a better understanding of instruction during this period.

No boy had a printed arithmetic, but every other day a sum or two was set in each manuscript, to be ciphered on the slate, shown up, and if right, copied into the manuscript. Two sums were all that were allowed in subtraction, and this number was probably as many as the good man could set for each boy. This ciphering occupied two hours, or rather consumed two, and the other hour was employed in writing one page in a copy book. Once, when I had done my two sums in subtraction, and set them in my book, and been idle an hour, I ventured to go to the master's desk and ask him to be so good as to set me another sum. His amazement at my audacity was equal to that of the almshouse steward when the half-starved Oliver Twist "asked for more." He looked at me, twitched my manuscript

> toward him, and said, gutturally: "Eh, you gnarly wretch, you are never satisfied." I had never made such a request before, nor did I ever make another afterwards.
>
> (Monroe, 1917:16)

This period of gradual acceptance of arithmetic as a school subject seems to have culminated when laws were passed in both New Hampshire and Massachussetts, in 1789, making the teaching of reading, writing, and arithmetic obligatory. It seems likely that the passage of these laws simply represented the recognition and legalizing of a practice that was by then prevalent. Whether or not this is true the enactment of these laws indicates that arithmetic was then considered necessary to an elementary school education and the subject was accorded a place coordinate with that of reading and writing.

Thus ended the first period in the development of arithmetic as a school subject. A period of approximately one hundred and fifty years during which arithmetic gradually gained acceptance as having a place in the education of all elementary school children. Throughout this period arithmetic was taught because it was needed to enable the commerce of the colonies to grow. The content was selected on the basis of its usefulness in the commerce of the time. The method of instruction was predominantly that of the ciphering book, which gave way at the end of the period to the monitorial approach in which the older pupils served as "monitors" in teaching their younger peers, due to the large number of pupils who were then studying arithmetic.

MENTAL DISCIPLINE
THE FIRST MAJOR CHANGE IN THE TEACHING OF ARITHMETIC

In 1821 the single most influential textbook ever published in elementary school arithmetic came into being. This was Warren Colburn's, First Lessons In Arithmetic on the Plan of Pestalozzi. The title of Colburn's text definitely connects his work with the ideas of the noted Swiss educator Pestalozzi. It was Pestalozzi's belief that arithmetic was the most important means for providing children with the mental training which would result in the power to form clear ideas.

Colburn extended this belief even further and in an address stated, "Arithmetic, when properly taught, is acknowledged by all to be very important as a discipline of the mind; so much so that, even if it had no practical application which should render it valuable on its own account, it would still be well worthwhile to bestow a considerable portion of time on it for this purpose alone. This is a very important consideration, though a secondary one compared with its practical utility."

The publication of Colburn's text heralded a new era in elementary school instruction. One in which the theory of formal mental discipline was to dominate. The advocates of mental discipline believed it was possible to strengthen the mind through strenuous mental exercise just as it is possible to strengthen the muscles of the arms by lifting weights. The primary purpose of school instruction inall areas of the curriculum became one of "disciplining" the mind.

It was common during this period of time to have two periods of arithmetic instruction each day, one of which was devoted to non-paper and pencil or oral arithmetic, often termed "intellectual arithmetic." Monroe (Monroe, 1917:91), provides a glimpse of the thinking of the time in a quotation from Davies text, "Intellectual Arithmetic."

> It is the object of this book to train and develop the mind by means of the science of numbers. Numbers are the instruments here employed to strengthen the memory, to cultivate the faculty of abstraction and to sharpen and develop the reasoning powers.

The Mental Discipline movement reached its peak about the middle of the nineteenth century, with estimates made in 1850 of the amount of time elementary schools spent in the study of arithmetic ranging as high as 50%. (Monroe 1917:132) This trend made no further signigicant gains until its fairly rapid demise during the final decade of the 19th century.

During the period of mental descipline the reason for teaching arithmetic in the elementary schools was drastically changed from one of social utility to one of strengthening the mental powers. The change in purpose resulted in signigicant changes in both the content and the methods of instruction. Topics which had little if any real usefulness, such as finding the cube root of numbers, were included because of their assumed value as a discipline for the minds of students. The methods of instruction became more dependent upon the use of textbooks, with intellectual or oral arithmetic being given equal emphasis with the more traditional work using paper and pencil. Class or group instruction replaced the individual instruc-

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tion that was common under the ciphering book method. Greater emphasis was placed upon practice and the development of computational skill.

THE REACTION AGAINST MENTAL DISCIPLINE

Several important influences during the last decade of the 19th century resulted in the rapid demise of the mental discipline movement. Among these were; (a) the Herbartian movement in America, (b) a psychological movement, and (c) a general reaction against the overemphasis on the study of arithmetic and mental discipline as a dominant force in education.

Herbart was a German educator who had been influential in Europe for many years before his theories gained recognition in the United States. In fact it was nearly fifty years after his death that the Herbartian Society was first formed in this country. The principle of apperception, accredited to Herbart, was emphasized by his followers in America. In essence the principle is that new experiences are given meaning and interpreted by means of ideas which have been obtained from past experience and which are present in the consciousness at the time. The placement of emphasis upon the content of a subject was fundamentally opposed to the disciplinary concept of education. The Herbartians emphasized history and literature as subjects in the elementary school. The enthusiastic support given to the work of Herbart swept over the United States and did much to counteract the mental discipline movement.

During this same period William James published his book, <u>Principles of Psychology</u>, in which he reported plausible experimental evidence to support the contention of his contemporaries that one's native ability to remember can not be trained by specific exercises.

Concommitant with the Herbartian movement and the research performed by William James and replicated by other was a general reaction against the disciplinary value of arithmetic. Both educators and the general public became actively critical of the public schools and the arithmetic program. Investigations were commonly made of the schools. The committee which examined 167 districts in New Haven County, Connecticut summarized their opinion of arithmetic by stating, "Arithmetic has thus become a science of difficult trifles and intricate fooleries peculiar to the common school, and remarkable chiefly for sterility and ill-adaptedness to any useful purpose." (Monroe, 1917:127)

Primarily the rebellion against mental discipline took the form of criticism without constructive suggestions for improviing the school program. The most important contribution to fill this void was made by John Dewey. It was Dewey's thesis that the environment presents problems which are solved by measurement, i.e. through the use of number and number relationships. To this belief Dewey added his more general educational principle that the process of education is most efficient when the child is placed in an environment which requires physical activity. To teach, according to this thesis, both the teacher and the text would provide situations which required measurement and the relating of quantities.

The reaction against formal discipline was followed by a counter reaction in which the disciplinary function of arithmetic was again recognized and given equal status with its utilitarian function. It became common to refer to the science and art of mathematics. The science of numbers dealing with their so-called cultural value and the art of numbers referring to their utilitarian value.

In a "Special Report on Arithmetic" the Committee of Ten reflected the tenor of opinion of the time in both recognizing the "disciplinary" value of arithmetic and in making a plea for change. In their plea they stated,

> The opinion is widely prevalent that even if the subjects are totally forgotten, a valuable mental discipline is acquired by the efforts made to master them. While the Conference admits that, considered in itself, this discipline has a certain value, it feels that such a discipline is greatly inferior to that which may be gained by a different class of exercises, and bears the same relation to a really improving discipline that lifting exercises in an ill-ventilated room bear to games in the open air. The movements of a race horse afford a better model of improving exercise than those of the ox in a tread-mill. The pupil who solves a difficult problem in broderage may have the pleasant consciousness of having overcome a difficulty, but he cannot feel that he is mentally improved by the efforts he has made. To attain this end he must feel at every step that he has a new command of principles to be applied to future problems. This end can best gained by comparitively easy problems, involving interesting combinations of ideas.

(Report of the Committee of Ten, 1894:108)

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THE RETURN TO SOCIAL UTILITY ARITHMETIC

Although the disciplinary value of arithmetic was still conceded at the beginning of the twentieth centery, emphasis had shifted from justifying the study of a topic on the basis that it provided good mental exercise. The literature of the period was replete with suggestions for topics which should be dropped from the arithmetic curriculum. In a monograph titled, "What Arithmetic Shall we Teach?" Guy Wilson reflected the consensus of expert opinion of the time regarding the purpose of the elementary school program. Wilson writes, (Wilson, 1926:1-2)

> While not denying the cultural and disciplinary value of arithmetic--in common with any subject systematically studied and well taught--it is assumed that arithmetic in the grades is justified only on the basis of its utility in the common affairs of life. We learn the multiplication table, not to sharpen the wits nor to comprehend a beautiful system, but to figure our bills, our taxes, or the interest on a note. What ever arithmetic is given in the grades beyond the essentials required by social utility consumes time that could be used more profitably in other ways.

Several of the noted educators of the early 1900's commented on the purpose of arithmetic instruction and emphasized their belief through statements which ridiculed earlier programs. Thorndike in a very thorough criticism of the arithmetic program paid special note to problems that were presented in the earlier texts. In listing several examples he apparently was unable to resist contributing sarcastic comments about some of the problems as he wrote, (Thorndike, 1921:4-5)

> The older methods permitted the teacher to set any problem that was a problem, regardless of whether it would ever occur as a real problem in a real world. The following are samples of problems accepted as satisfactory by textbooks and teachers twenty years ago:
>
> > Suppose a pie to be exactly round and 10½ miles in diameter. If it were cut into 6 equal pieces, how long would the curved edge of each piece be?
> >
> > Such problems as the above could occur in real life only in an insane asylum.
> >
> > There are ten columns of spelling words in Susie's lesson and 32 words in a column. How many words are in her lesson?
> >
> > This was perhaps not unreal, since a school that would give such problems might also assign 320 words for a single spelling lesson!
>
> Consider the perfectly fantastic and futile nature of this problem for a problem's sake:
>
> > A man 6 feet high weighs 175 pounds. How tall is his wife, who weighs 125 pounds and is of similar build?

The newer methods set a higher standard in the selection and construction of problems, requiring not only that they give the pupil an opportunity to think and to apply arithmetical knowledge, but also that they teach him to think and to apply arithmetic to situations such as life may offer, in useful and reasonable ways, and so to esteem arithmetic not only as a good game for the mind, but also as a substantial helper in life's work.

During the "social utility" period the purpose for providing instruction in arithmetic was simply that of providing the child with the knowledge and skills which he would need to live a productive and satisfying life as an adult. Content was selcted on the basis of the needs of contemporary adult society as determined by several surveys made of adult usage of arithmetic at that time.

The method of instruction was dominated by the textbook, with considerable emphasis being placed upon practice of the algorithus and memorization of the basic facts.

During the 1920's there was considerable concern over the grade placement of various topics in arithmetic. This concern resulted in considerable diversity in the grade level at which different topics were introduced. "To discover the best possible order of presentation of the different topics in arithmetic, to discover the phase of a child's psychological growth at which a given arithmetic process may be most advantageously introduced, the Committee of Seven of the Superintendents' and Principals' Association of Northern Illinois . . . launched an elaborate investigation to extend over several years." (Washburne, 1928)

The investigation was begun in the autumn of 1926.

A member of the Committee of Seven, reporting on the results of their five year program of research involving about three hundred schools, stated the following reason for their extensive investigation.

Arithmetic is a difficult subject for many children. We provide a generous amount of time for it; we give it a favored place in the daily program; we are improving our technics of teaching and testing; we are reducing the content by eliminating topics of less social value and unwildy examples with large number and unusual fractions. But the output of our teaching in terms of information, understanding, and skills are uncertain. The carry-over of the study of such topics as long division, the four processes with fractions, multiplication and division of decimals and percentage are meager and unstable.

Can one reason be that some of the topics are improperly placed in the course of study. Are they being taught before the children ~~are~~ intellectually ready for them and before they have acquired proficiency in the foundations drills and understandings? Do children learn some topics more readily and retain them better if they are taught and practiced later? Is there a period in a child's development when he is ripe for a process and beyond which there is no advantage in postponement?

The committee reported their findings in a table of minimum and optimum mental ages for the study of topics in arithmetic. The minimum mental age was established as that level at which 80 percent of the total number of examples in the retention test were solved correctly by 75 percent of the mental age group. The optimum mental age was established as the age "at which the curve definitely flattened, indicating that there was little to be gained by postponement."

The results of the research of the Committee of Seven did much to influence the reassignment of many topics in arithmetic to placement in later grade levels than those in which these topics had previously been presented.

Another faction known as the "Child Usage" group, became active during the 1930's. While they do not seem to have been expecially influential they are of interest because they are typical of the extremist groups which seem to accompany nearly every trend that occurs in education. This group recommended going a step beyond the idea of teaching children the arithmetic that it was supposed they would need as adults. The Child Usage proponents believed children should only be taught that arithmetic which they needed as children. It was believed that if as adults they had addtional needs for arithmetic, they could as adults then learn those skills which they would need. L. P. Benezet, wrote the following statement, which is typical of the beliefs of the Child Usage group. (Benezet, 1935)

> In the first place, it seems to me that we waste much time in the elementary schools, wrestling with stuff that ought to be omitted or postponed until the children are in need of studying it. If I had my way, I would omit arithmetic from the first six grades. I would allow the children to practice making change with imitation money, if you wish, but outside of making change, where does an eleven-year old child ever have to use arithmetic?
>
> I feel that it is all nonsense to take eight years to get children through the ordinary arithmetic assignment of the elementary schools. What possible needs has a ten-year old child for knowledge of long division? The whole subject of arithmetic could be post-poned until the seventh year of school and it could be mastered in two years' study by any normal child.

A growing concern for the child's readiness for arithmetic and a general confusion as to when instruction should begin continued through the late thirtys and the 1940's. Brownell pinpointed the source and nature of the basic disagreement when he noted research in general showed: (Brownell, 1938)

> Children upon entering Grade I already possess an equipment of number knowledge far larger than we supposed ten years ago. On the average, they can enumerate objects and count by rote to 20 or 25; they can use some of the simpler addition and a few subtraction combinations; they even understand a little about the meaning of fractions. On the other hand, their

abilities operate clumsily and uneconomically, representing, as they do, low-order or immature procedures.

What are the implications of these studies? One interpretation is that, since children, on their own, have learned so much about numbers, they should be allowed to continue on their own for another year or two at least. A second interpretation is that the possession of so large a stock of usable number ideas and skills is proof positive of readiness for direct teaching. The two interpretations point in diametrically opposite directions. The second interpretation requires the immediate introduction of 'systematic' instruction; the first, the postponement of such instruction.

Brownell noted that the disagreement about the nature and extent of arithmetic instruction that should be given in the primary grades had only increased during the next three years as he wrote in 1941;

(Brownell, 1941)

Few problems relating to the elementary school curriculum are as troublesome as are those associated with the kind and amount of arithmetic to be taught in the primary grades. These problems are essentially new problems; they did not exist, or at least they were not generally recognized, a quarter century ago when practices with regard to primary number were relatively more uniform. The last two decades have witnessed a decided break from tradition, but as yet no satisfactory solution has been found. Instead, there is such variety of practice as to amount almost to confusion.

The extent of this confusion is readily noted if one but compares different course of study offerings in primary arithmetic. For example, one school expects children to learn the addition combinations with sums to 10 in Grade I; another defers systematic instruction on these facts to Grade II; still another postpone such instruction to Grade III. Needless to say, were other arithmetical topics included in these comparisons, the variations suggested in the case of a single topic would be greatly enhanced.

Several factors led to the confusion about the nature and extent of primary arithmetic experience which should be provided. First, research indicated clearly that anticipated results were not being obtained from the arithmetic instructional program. A second factor was the spread of the educational philosophy epitomized in the phrase "the child-centered school." It became popular for teachers to make such statements as, "I teach children, not arithmetic," and "I teach the whole child," as a way of indicating their concern for the total development of the child and not just his intellectual development. A third factor was a change in the psychology of learning theory. The fourth cause of this confusion was a difference in opinion as to why arithmetic should be taught. According to one view arithmetic was a tool subject meant to equip children to deal effectively with the quantitative problems they would need to solve as adults. According to the second view arithmetic is primarily a mathematical system in which the crucial element in learning is understanding of the system and its operation. Such divergent views necessarily resulted in elementary school mathematics programs which were quite dissimilar.

MODERN MATHEMATICS

The year 1958 is most frequently cited as the beginning of the modern mathematics, since it was in the fall of that year that the Russians placed their first satellite in orbit. Some mathematicians object to the identification of this act with the beginning of this significant change in Elementary School Mathematics. Certainly several new programs were in existence prior to this date, it was however the orbitting of the Russian Satellite which caused Congress to provide money for the purpose of making improvements in the math and science instructional programs which had been recommended by mathematicians and scientists.

Again the question of which mathematics topics to teach in the Elementary School came into focus. A phenomenon commonly called the "Knowledge explosion" now complicates this task immeasurably. For the first time in the history of mankind, changes are occuring at such a rapid rate that we can no longer presume to predict those mathematical demands which society will place on today's elementary school pupils when they become adults.

Goodlad provides the following estimate of the growth of mankind's knowledge, the dates of the last two "doublings" are the estimates of other writers but are fairly typical of several such estimates which have been made. Goodlad suggests that if we consider man's total knowledge at the Birth of Christ to represent one unit of knowledge then knowledge can be estimated to have grown in the following pattern. (Goodlad, 1963)

Units of Knowledge	Date
1	Birth of Christ
2	1750
4	1900
8	1950
16	1960
32	1965
64	1967

The modern elementary school mathematics program represents the combined efforts of many able mathematicians and educators to provide the best possible preparation for pupils who will live their adult lives in a world whose nature and requirements are unforseeable. It was immediately preceded by a period during which the content of the elementary school mathematics program was severely limited. Thus modern mathematics programs incorporate more mathematics content than was the case during the 1930's and 1940's.

Emphasis is placed upon understanding, in an attempt to provide a sound base upon which today's pupils can build later mathematical learning, as their adult needs may dictate. Change in pupil attitude toward mathematics is another major goal of modern mathematics programs. It is hoped that today's pupils will develop more confidence towards their ability to solve mathematical problems and less of a feeling of reverence for the computational procedures (algorithms) and the idea that problems can only be solved in one way.

There is beginning evidence, resulting from standardized achievement tests, which indicates that modern mathmatics programs are resulting in increased achievement in the skills of mathematical reasoning or problem solving. Unfortunately, there is also evidence which indicates that pupils have not developed computational skills as well under modern mathematics programs as they did under the programs we consider to be traditional. Teaching for mathematical understanding tends to be both a difficult and a time consuming practice. Although most writers of modern programs would agree that there is a place for practice in computation, the increased time necessary to teaching for understanding has not left as much time for practice as was formerly the case.

It seems reasonable to believe the pupils of today's elementary schools will, as adults, line in a world in which machines will do much of the computation and where it will be more important to know when to multiply and divide in solving problems than to be skillful in multiplication and division without knowing when it should be done.

Changes which have occured in elementary school mathematics instruction serve to illustrate Heraclitus' statement that "There is nothing permanent except change." There seems to be no reason to believe this will not continue to be the case. Elementary School teachers will need to continue in their search for ways to improve the elementary school mathematics program. Such changes, if they are to be improvements, must be based on a sound philosophy of why mathematics should be taught in the elementary school.

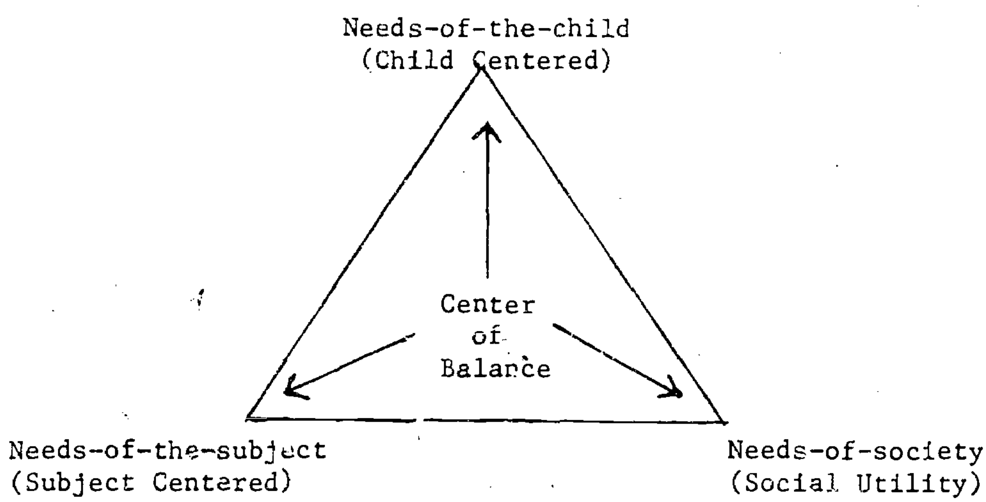
Glennon provides the following model for evaluating proposals for an elementary school mathematics program. Its use may provide you with assistance in constructing initial answers to the questions of: (Glennon, 1963:9)

"Why teach mathematics in the Elementary School?"

"What mathematics should be taught in the Elementary School?"

"Many educators have presented the problem of balance as that of finding a middle ground between two curriculum theories: the mathematical and the social utility (the pure and the applied) with the mathematical at one end of a line segment and the social utility at the other end. There are in fact <u>three</u> curriculum theories -- the third one being the psychological theory. Hence the interrelationships among the three theories are more accurately represented by a triangle. All three theories evaluating the worth of new proposals.

"Each is commonly known by other names. The psychological theory is known as the needs-of-the-individual theory, the theory of felt-needs, and the expressed-needs theory. The social theory is known as the needs-of-society theory, the sociological theory, the social-utility theory, and instrumentalism. The theory which stresses the structure of the subject is known generally as the needs-of-the-subject theory, or the logical organization theory; and in mathematics in particular it is known as the pure-game or structural, or meaning theory of arithmetic . . ."



While Glennon's preceding model is useful in providing a framework for objectively looking at changes which have occured or which are being recommended for the elementary school mathematics curriculum, it is only a tool for identifying such changes. It does not answer the question raised by Herbert Spencer over a hundred years ago, "What Knowledge is of most worth?" This question remains one to be answered by individual teachers. As Glennon so aptly notes, (Glennon, 1963;23)

> One of the educator's easiest tasks is to change the curriculum; one of his most difficult tasks is to improve the curriculum. Change requires little professional training in educational philosophy, educational psychology, or in the subject matter to be taught. Improvement, however, demands a high degree of each. Change is concerned only with answering the question: "Can the child learn a given topic?" Improvement is concerned with the infinitely more profound question: "Ought the child learn a particular topic?" Change can be implemented through a monolithic, authoritarian decision; improvement must call upon the combined judgement of the best minds in the several disciplines that impinge upon the school curriculum.

OVERVIEW

In reviewing the historical antecedents of contemporary elementary school mathematics programs it becomes apparent that several rather extensive changes have occurred. Some significant changes have occurred in each of the following areas.

Time allotted to the study of arithmetic

During colonial days arithmetic was not commonly taught in the elementary schools and when it was provided instruction in arithmetic was on an individual-elective basis. By 1850 this situation had changed to the point that as much as half of the elementary school time was spent in the study of arithmetic, usually during two class periods a day. At the present time approximately 16-18% of elementary school time is typically spent in the study of arithmetic.

Content

The predominant influence in selection of the content to be studied in elementary school mathematics has been that of "social utility." During the middle of the 19th century this was temporarily changed to selection on the basis of difficulty, with the primary influence being the idea that the more difficult a topic was the better "discipline" it provided for the mind. At the present time many well informed individuals are saying we are in a period of such rapid change that an analysis of adult needs for arithmetic skills no longer provides an appropriate basis for predicting the needs today's elementary school pupils will have when they become adults. They suggest, instead, that a program aimed at developing understanding of basic mathematical concepts and an attitude towards mathematics as something you do and not something you learn will provide a better base for pupils to meet the changing needs they will have as adults.

Instructional Method

In terms of total number of years utilized, the dominant method of instruction of elementary school mathematics has been the ciphering book method. This gave way to the monitorial method and more recently to a program of total class (textbook centered) instruction. In the last several years the most commonly accepted theory has been one of individualized instruction. In terms of actual practice in elementary school mathematics this has meant a program of self-paced, self-directed study with the teachers frequently spending much of their time in the task of record keeping. "Experts" in the teaching of elementary school mathematics are recommending the use of "the mathematics laboratory" approach, but as yet this method has not become a significant factor in the total instructional program.

Organization of content

During colonial days arithmetic was taught on a "topic" basis and once a child had completed the study of a topic, such as addition, he would not normally return to review and extend his initial learning. This method gave way to the spiral organization which is still dominant as an organizational pattern. Under the spiral pattern pupils study a topic, move to other topics and then return at a later time to review, reinforce, and extend their learning of the original topic.

Grade placement of topics has been of major concern at different times in the past and was probably strongest during the period of the "Child-centered" curriculum (1930's). There is reason to believe in the idea of "readiness" for mathematics and a reaction to the present emphasis on mathematics content is likely to result in a renewal of teacher concern for readiness.

POST-ASSESSMENT

This instructional module is designed to help you develop your knowledge and a basic philosophy about "why" and "what" elementary school mathematics should be taught. This knowledge and philosophy should enable you to perform more adequately in a variety of decision making situations. The following examples are typical of situations in which a teacher may be expected to perform. Your performance will be judged adequate if you can respond in these and/or similar situations in a sensible, reasoned, and consistent manner which reflects the development of a basic philosophy about the purposes of elementary school mathematics instruction.

You need not respond to all of the following. They are typical of the kinds of situations you will be in as an elementary school teacher. They are provided here to help you think through your philosophy about elementary school mathematics.

Respond to any two of the following problem situations. Record your response in writing or with a tape recorder. If you wish, a tape recording may be made of you and a group of your peers in a role playing situation centering about one of the problem situations.

Arrange a time for you and your "methods" professor to go over your pre-assessment and post-assessment responses together and to discuss the philosophy you have begun to develop.

1. Assume you are in your first year of elementary school teaching and for the first time meeting with a group of parents of pupils in your room in a regularly scheduled "back to school night" sponsored by the P.T.A. One of the parents has expressed his concern over the level of computational skill he believes his child is developing in arithmetic. Although he is not blaming you individually he does believe the mathematics program is not as good as it used to be. You are aware that there is a significant body of evidence that pupils are not developing as high a level of computational skill under "modern mathematics" programs as their predecessors did under a more traditional program. Develop a response which you think should be given in this situation.

2. Assume that your school has recently administered a battery of standardized achievement tests and that the scores in mathematics computation have generally been quite low, although the scores in "reasoning" (or problem solving) were very high. The Principal is talking with you about the need for finding a way to improve the computational skills of pupils in your school and although he has praised you and the other teachers for the good scores in the "reasoning" section of the test you believe he thinks the pupils should have done better in "computation." Develop a response which you believe would help him understand the situation.

3. Assume you are in your first month of teaching in a fifth grade classroom and you have discovered that most of the pupils in your room do not know their basic addition, subtraction, and multiplication facts. You have in general planned a program which you believe will enable most of the pupils in your room to complete the work in the textbook supplied by your school for mathematics. You are now faced with the decision of whether to embark on a supplementary program aimed at helping the pupils in your room gain "mastery" of the basic facts or whether to continue with your original plan for completing the textbook.

You suspect that if you omit some of the textbook topics the teacher who will have the pupils the next year will disapprove because they will not have had the basic experiences upon which she is to build. On the other hand you are equally fearful that this teacher will talk about you, as she has been about the teacher who was in your room last year, saying that the pupils just didn't learn the basics of arithmetic.

What program do you recommend for best resolving this dilemna? Why do you believe it is best? What problems do you anticipate? What action would you recommend for trying to ameliorate them?

4. Assume you have been appointed to a committee of elementary school teachers in your district who have been charged with the responsibility of recommending an elementary school mathematics textbook series for adoption by the district. After considerable study the field has been narrowed to two series. In many ways, such as artwork, format, quality of paper and binding the two books seem even. One basic difference is apparent, however. In terms of content one series provides a very structured approach that is basically traditional in content and provides many practice exercises for each topic. The other series considers several topics which are not in the first text, but it does not provide as many practice exercises. Thus the basic decisions seems to be onw of choosing between a broader experience in mathematics for children or one which provides greater opportunity for developing "mastery" of computational skills.

On the basis that other qualities of the texts are equal, which series do you favor? Why?

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NUMERATION SYSTEMS

Prospectus

One of the threads of understanding which permeates much of the arithmetic commonly studied in the elementary grades is that of place value, or positional notation. Pupils who do not have a basic understanding of our numeration system can not understand much of the work that is set for them in elementary school mathematics. It is the purpose of this instructional package to help you review the concepts of positional notation and to provide you with information about techniques for assisting pupils to develop an understanding of our numeration system. The system of "Roman Numerals" will also be considered in this package as another type of system commonly studied in elementary school mathematics. Study of numeration systems which lack the place value feature provides a source of contrast to ease the task of identifying the important features of a place value numeration system.

A slide-tape presentation is housed in the Jr. Bloc office for the use of students who wish (or need) more extensive instruction in working with non-decimal number systems.

Instructional Objectives

1. Upon completion of this instructional module students who are provided the set of symbols utilized in the Roman Numeral system of notation and the values represented by these symbols will be able to write the Roman Numeral equivalents of arabic numerals and/or the arabic equivalents of Roman Numerals.

2. Upon completion of this instructional module students will be able to suggest and demonstrate at least three different techniques and/or materials for representing to pupils the basic concepts of our place value numeration system.

3. Upon completion of this instructional module students will be able to describe the concept of "varying levels of concreteness-abstractness of physical models" commonly used by elementary school teachers in demonstrating concepts in mathematics and to suggest procedures for increasing the teacher's effectiveness in working with pupils who do not understand the physical model being used.

4. Upon completion of this module the students will be able to work with 90% or better accuracy the following types of exercises involving non-decimal bases and positional value notation systems.

    A. Enumeration of sets of objects using other bases than ten.
    B. Conversion of base ten numerals to represent the same number in another base.
    C. Conversion of numerals in non-decimal bases to represent the same number in base ten.
    D. Addition of two and three digit numbers in other bases than ten.
    E. Subtraction of two and three digit numbers in other bases than ten.

ERIC

F. Multiplication of two and three digit number in other bases than ten.
G. Division of multi-digit whole numbers by one and two digit divisors in other bases than ten.

5. Upon completion of this module students will be able to describe a way of constructing inexpensive abacuses in classroom size quantities.

6. Upon completion of this module students will be able to demonstrate on the abacus the addition and subtraction of two and three digit numbers involving regrouping.

7. Upon completion of this module students will be able to state the inconsistencies which are present in our commonly used set of number names and to generalize from this knowledge a recommendation for teaching children to count.

8. Upon completion of this module students will be able to utilize the technique of "expanded notation" and will be able to discuss the use of this technique in teaching concepts of regrouping to elementary school pupils.

If you believe you already have the knowledge and skills listed above, it is recommended that you take the following pre-test. Your performance on this test should provide you with information about your achievement and any areas in which you may need to do additional work. Answers to the pre-test exercises are on the page following the test, so you may score your own performance.

Students who believe they have attained the necessary knowledge and skills to complete the tasks of the pre-test with 90% or greater accuracy should arrange to take a post-test for this unit. Arrangements for the post-test should be made with the secretary in the Jr. Bloc office. The post-test will be very much like the pre-test and may be repeated in a different test form if a score of 90% is not attained. The post-test exists in only two forms, thus only one repetition will be permitted.

PRE-TEST

Numeration Systems

1. Complete the following exercises based upon knowledge of the Roman Numeral system of notation. The value of the Roman Numeral Symbols are provided.

I = 1	X = 10	C = 100	M = 1,000
V = 5	L = 50	D = 500	

A. Express the following quantities using Roman Numerals

1492 = ________ 899 = ________

1974 = ________ 1,500,961 = ________

B. Express the following quantities using our numeration system.

XLV = ________ MMCDXLVI = ________

MDCCLXXIV= ________ DCV = ________

2. Assume you wish to provide initial instruction to a group of primary grade pupils on the concept of "carrying" (regrouping) in addition of two digit numbers. Suggest at least three techniques and/or materials which you would recommend for helping these pupils understand the "carrying" concept. State which of the techniques and/or materials is most concrete. Describe the way in which you would utilize your knowledge about the relative concreteness of these materials and/or techniques which you have listed.

3. Work the following exercises as directed.

X X X X X X X X X X X X X X X X X X X X X X X X X X X

A. Enumerate (tell how many) the "X's" in the above row in each of the following bases.

________four ________six ________eight

B. Work the following exercises in base six, record your answers in base six,

$$\begin{array}{r} 14_{six} \\ +\ 35_{six} \\ 13_{six} \\ \hline \end{array} \qquad \begin{array}{r} 204_{six} \\ -\ 153_{six} \\ \hline \end{array} \qquad \begin{array}{r} 35_{six} \\ \times\ 24_{six} \\ \hline \end{array}$$

$$43_{six} \overline{)\ 1215_{six}}$$

C. Convert the following numerals to represent the same number (quantity) using another number base, as directed in each of the following items.

43_{six} = __________ ten 78_{ten} = __________ six

132_{four} = __________ ten 95_{ten} = __________ four

4. Construct a simple abacus using materials which you have available to you. Demonstrate the completion of the following two exercises using this abacus.

A. $\begin{array}{r} 187 \\ +\ 95 \\ \hline \end{array}$ B. $\begin{array}{r} 123 \\ -\ 86 \\ \hline \end{array}$

5. Describe the inconsistencies which exist in our set of number names. Describe the effect this inconsistency has upon children learning to count. Suggest an instructional procedure which avoids this problem.

6. Use the technique of expanded notation doing the computation required in the following two exercises.

A. $\begin{array}{r} 89 \\ +\ 36 \\ \hline \end{array}$ B. $\begin{array}{r} 186 \\ -\ 159 \\ \hline \end{array}$

ANSWERS TO PRE-TEST

1. A. MCDXCII — DCCCXCIX

   MCMLXXIV — $\overline{\mathrm{MD}}$CMLXI

   B. 45 — 2456

   1776 — 605

2. The following material and/or techniques are appropriate. You may have listed others.

   A. Grouped objects, such as bundles of popsicle sticks.

   B. An abacus - either one with movable beads or a place value chart type using a sheet of paper and movable markers.

   C. Expanded notation

3. A. 123_{four} — 43_{six} — 33_{eight}

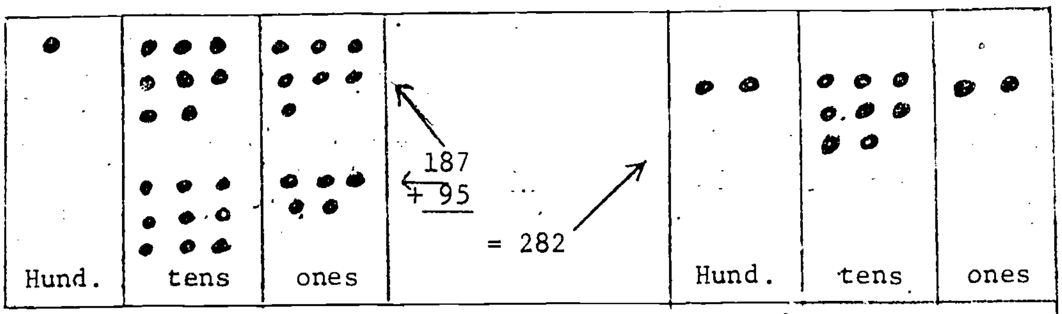
   B. 110_{six} — 11_{six} — 1412_{six}

   $15 \text{ r } 2_{six}$

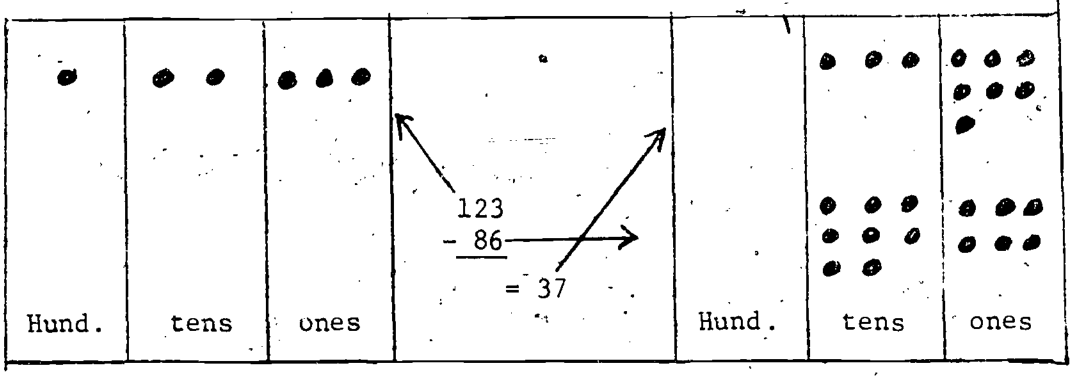
   C. 27_{ten} — 210_{six}

   30_{ten} — 1133_{four}

4. A.



   B.



5. Our number names are as a system inconsistent in the second decade (from ten to 19). This inconsistency results in children having difficulty learning to count (say the number names in sequence) from 10 to 20. Most authors have suggested the children not be shown the "system" of counting until they have learned to count to 20 or 30 by "Rote".

6.
$$\begin{array}{r} 89 \\ +\underline{36} \end{array} \; = \; \begin{array}{rr} 8 \text{ tens} & 9 \text{ ones} \\ + \; \underline{3 \text{ tens}} & \underline{6 \text{ ones}} \\ 11 \text{ tens} & 15 \text{ ones} = 125 \end{array}$$

$$\begin{array}{r} \cancel{1}86 \\ -\underline{159} \end{array} \; = \; \begin{array}{rrr} 1 \text{ hundred} & {}^{7}\cancel{8} \text{ tens} & 16 \text{ ones} \\ - \; \underline{1 \text{ hundred}} & \underline{5 \text{ tens}} & \underline{9 \text{ ones}} \\ 0 \text{ hundred} & 2 \text{ tens} & 7 \text{ ones} = 27 \end{array}$$

INSTRUCTIONAL UNIT

NUMERATION SYSTEMS

"Necessity is the mother of invention."

Much of mankind's progress has resulted from the inventions he has made in response to need. This is undoubtedly true of man's systems for handling problems of a numerical nature. Historians tell us that man's first procedures for keeping track of quantities were of a "one-to-one correspondence" nature (mapping of sets). For example, if a primitive man had need to keep track of the number of sheep in a flock he might place a pebble on a piece of leather in such a way that there was one pebble for each member of his flock of sheep. The sides of the leather piece were then gathered together and tied to form a crude pouch containing the set of pebbles. In this way the herdsman could determine if all of his sheep were in the flock by matching the pebbles "one-to-one" with the sheep. Knots in a leather thong and notches in a branch were also commonly used materials for keeping track of quantities.

As man began to trade and prosper his need to express larger quantities in more efficient ways also grew. In response to this growth several different written systems of numeration were developed. Among the distinctive systems were the additive systems of Egyptian Hieroglyphics. The multiplicative system of the Chinese and the additive and subtractive Roman Numeral system. None of these incorporated the place value idea which makes our numeration system distinctive. A review of the Roman Numeral system is presented herein to provide a basis for comparison of our place value system with a non-place-value system. It has been selected because Roman Numerals are commonly presented in elementary school mathematics textbooks and they provide as good an example of a contrasting system as any other.

Roman Numeral System

It seems probable that the Roman Numeral system was originally an additive system which consisted of the symbols:

I = 1 X = 10 C = 100 M = 1,000

If this were the case then originally all quantities were represented by recording enough of the symbols so the sum of their values was equal to the quantity which was to be represented. Under this system the year 1776 would be represented as MCCCCCCCXXXXXXXIIIIII.

The Roman Numeral system which is used today incorporates two major improvements which are designed to lessen the number of symbols required in writing most numerals.

The first major change was the addition of some intermediate (or halfway) symbols. These are:

V = 5 L = 50 D = 500

The second major change was development of the "subtractive principle" which is, "When a power of ten symbol (1, 10, 100, etc.) stands to the left of the next higher power of ten symbol or to the left of the next higher "halfway" symbol the smaller value is to be subtracted from the larger values." Thus:

IV = 4	XL = 40	CD = 400
IX = 9	XC = 90	CM - 900

The subtractive principle cannot be correctly utilized in any other situations. For example, 49 can <u>not</u> properly be represented as IL since I can only be subtracted from the next larger "halfway" or the next larger power of ten numbers (V and X).

Larger quantities can be expressed with Roman Numerals through use of the convention of drawing a line over a Roman Numeral to increase the value represented by 1,000 times (e.g. C = 100 and $\overline{C}$ = 100,000 or X = 10, $\overline{X}$ = 10,000.)

Complete the following practive exercises as a way of establishing your knowledge about the Roman Numeral system. This kind of information is seldom used in our society and is thus likely to be forgotten. Therefore your knowledge of the value of the symbols will not be included as part of the post-test for this unit. You should complete these exercises, however, so as to have a better basis for analyzing at our place value system and identifying the advantages of such systems.

Write the Arabic numeral equivalent for each of the following:

1. MDCCLXXVI = ________________
2. CDLXIV = ________________
3. DCCXLVIII = ________________
4. XCIX = ________________
5. $\overline{M}$ = ________________
6. $\overline{CCC}$DXLIX = ________________

Write the Roman Numeral equivalent for each of the following:

7. 86 = ________________
8. 459 = ________________
9. 399 = ________________
10. 1,375 = ________________
11. 3,492 = ________________
12. 2,001,005 = ________________

Answers:

1) 1776	4) 99	7) LXXXVI	10) MCCCLXXV
2) 464	5) 1,000,000	8) CDLIX	11) MMMCDXCII
3) 748	6) 300,549	9) CCCXCIX	12) $\overline{MM}$MV

Some shortcomings of the Roman Numeral system become readily apparent when one attempts to perform fairly simple and common computations using these numerals and our commonly taught algorithms (methods of performing computation). Work the following exercises which are provided to demonstrate the clumsiness of the Roman Numeral system in computation.

ADD	SUBTRACT	MULTIPLY	DIVIDE
CCCLXV	DCCCXLIII	XLVIII	VIII) CCXCVI
MCXLIX	- CDXVIII	XXXIX	
365	843	48	8) 296
+ 1149	- 498	x 39	

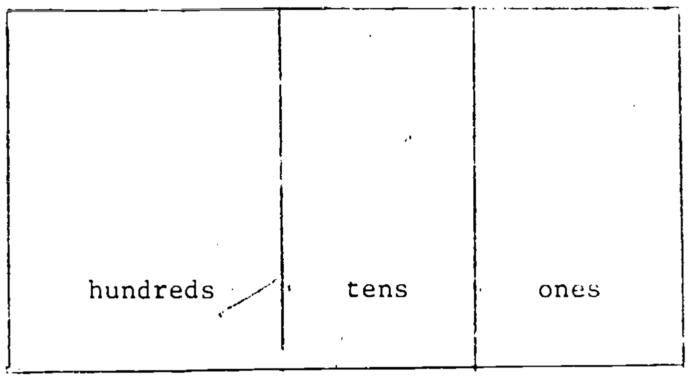
Invention of the Abacus

It was the difficulty of computation occasioned by non-place value numeration systems which probably led to one of the most significant inventions of mankind, the Abacus. Some writers believe the name abacus is derived from a Semitic word "abq," which means dust. The first abacuses (or abaci) were simply areas smoothed in the dust or sand with the hand. A stick or a finger was then used to separate the smoothed area into columns. Computation was performed as a process of serial addition or subtraction by making marks to represent the groups of hundreds, tens and ones on this crude from of abacus.

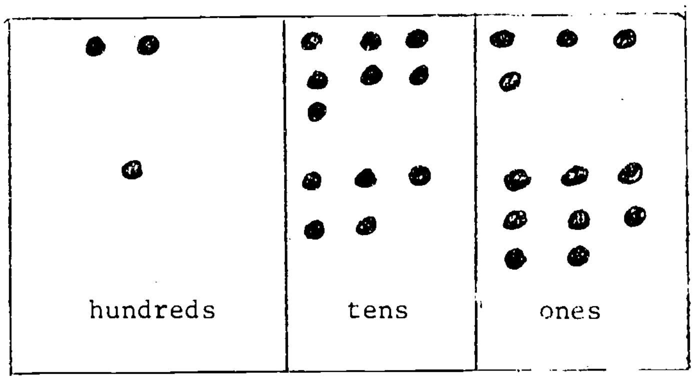
Several words in common usage today stem from the use of the abacus and tend to reflect the importance this invention has had in man's development. One form of abacus is a table in which grooves have been cut. Pebbles are placed within the appropriate area of this abacus to represent the groups of hundreds, tens, and ones. These pebbles or calculi provide the basis for our word calculate. The bench itself, or counter, provides the term we still use to designate the table in stores over which merchandise is sold. Bookkeepers sometimes refer to casting an account, in reference to the earlier process of casting stones on the abacus. The Germans called their counter "Rechenpfennige" or calculating pennies, the boards themselves they called "Rechenbanck" or simply "banck" from which we derive our words bank, banker, and bankrupt. The term bankrupt means literally a broken abacus, in recognition of the fact that the abacuses of dishonest or impoverished merchants were actually broken so they could no longer carry out their business.

As a calculating device the abacus is quite efficient. Several contests have been held matching calculating machines against abaci, with skillful, trained, experienced operators using each. The results generally failed to prove either to be significantly superior. Such skill in the use of an abacus, however, takes about six or seven years of intensive training and practice.

In the classroom the abacus provides a valuable instructional tool for providing a physical model to use in presenting the concepts of regrouping in addition and subtraction. While sturdy and attractive abaci are commercially available, a simple but satisfactory abacus can be easily and economically constructed in classroom quantities by duplicating sheets of paper so they have the following characteristics:

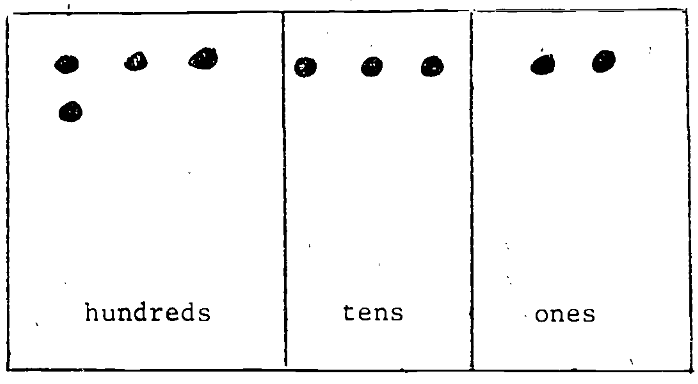


Seeds, buttons, small pebbles, or other available objects can be placed within the areas of these abacuses to represent the quantities to be added. The diagram below represents the initial placement of counters on such an abacus to represent the addition situation 274 + 158 = ?



$$\begin{array}{r} 274 \\ +\ \underline{158} \end{array}$$

To complete this exercise a group of ten "ones" is counted in the one's column, these ten markers are removed from the abacus and this group of ten is recorded by placing a single marker in the ten's column. The markers in the ten's column are then counted. Since there are more than nine groups of ten represented in that column, a group of ten "tens" is removed from the abacus, that quantity is represented by placing a marker in the hundred's column. The representation below shows the appearance of the abacus upon completion of this exercise.



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The answer would then be read as "432."

Place value numeration systems incorporate features which arose from the invention of the abacus and which were non-existent in other more ancient numeration systems. In the abacus a stone could represent a set of a hundred, or of ten, or of one, depending upon the column in which it was placed, (or its position.) The same idea is true of our numeration system the digit 3 can represent 3 ones, or 3 tens, or 3 hundreds, depending upon its position within the numeral.

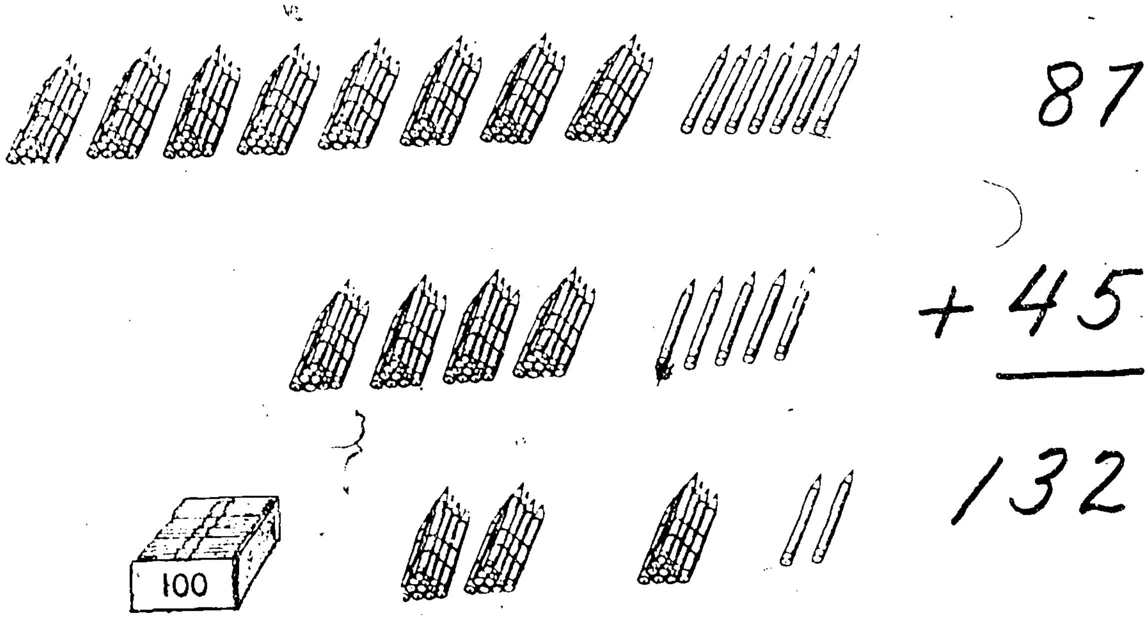
Development of a place value system of writing numerals did require the invention of a symbol to represent the abacus column in which there was no marker. This invention was, of course, the zero which plays such an important role in our numeration system. No one knows for sure where this invention occurred. Historians long believed it stemmed from Arabia and referred to our system as the Arabic numeration system. Evidence was then found which indicated that the Arabs may have copied the idea from the Hindus and the name of the system was commonly referred to as the Hindu-Arabic system. In more recent years the historians have come to believe the Hindus may have borrowed the concept from the Babylonians. Of course we have no way of knowing if the Babylonians were the original inventors or if they in turn copied the idea from an earlier source. Thus, largely out of custom, our system is most frequently referred to as the Arabic numeration system and informed persons recognize that as yet there is no proof as to where the underlying ideas originated.

At one time the professional literature in the teaching of elementary school mathematics reflected a major controversy as to the number of beads that should be on each wire of an abacus used for teaching and whether the beads in the different columns should be of different colors, sizes, and shapes. The best response to use in guiding the construction or purchase of abacuses for classroom use seems to be the idea that the abacus is used in the classroom to provide logical intermediate step between the grouping of objects and the representation of grouped objects with numerals. Thus the purpose is to help pupils recognize that the numeral 3 can represent different size groups according to its position. We do not write the numeral 3 in a different color or size to represent 3 tens or 3 hundreds than to represent 3 ones. Thus to introduce the factors of color and size would probably introduce ideas which confuse the basic purpose to be served by the abacus as an instructional tool. The largest number of beads which seems to be useful on each wire of an abacus is 18. In some subtraction exercises, such as 388 - 199 = ?, as many as 18 beads are required to do the regrouping that is to be shown in representing the "borrowing" process.

Grouping by Powers of Ten

While the abacus provides an effective device for helping many children develop an understanding of the "borrowing" and "carrying" (regrouping) processes, it is not the most direct (least sophisticated) way of presenting the grouping idea that is requisite to an understanding of our numeration system. The use of objects themselves provides the simplest and most direct approach to teaching the basic concepts of place value. While seeds, pebbles, bottle caps, and other kinds of markers can be grouped: popsicle sticks seem to be the best material for this purpose, because of the ease with which they can be grouped with elastic bands to form sets of ten and sets of ten-tens (or hundreds). Such sets can be quickly regrouped by children in manipulating the materials in working addition and subtraction exercises. Use of these sticks provides an inexpensive and commonly accessible material for presenting the idea of positional value in a visual and tactile form. (Popsicle sticks are referred to as slap stix by some handicraft shops and may be purchased at stores in the American Handicrafts chain for approximately $1.50 per thousand and at about 25% less per thousand in cases of ten thousand. Some ice cream manufacturers will sell these sticks at even lower prices. There is an American Handicrafts store in Salt Lake City.

In representing the process of addition through the use of sets of bundled sticks the regrouping of sets, represented by carrying in addition, is actually done. For example, in adding "87 + 45 = ?", 87 is represented by 8 bundles of ten sticks and 7 single sticks. In similar manner 45 is represented by 4 bundles of ten sticks and 5 single sticks. In performing this regrouping operation the single sticks are placed together and since there are more than nine single sticks a group of ten sticks is made and placed with the other groups of ten sticks, 2 single sticks remain. Since there are more than nine bundles or ten sticks a large bundle of ten-tens, or a hundred sticks in made and three bundles of ten sticks are left. Upon completion of the regrouping the sticks will be organized in one bundle of one hundred (ten-tens), three bundles of ten and two single sticks. The following diagram is provided to clarify regrouping process that occurs in working this exercise.



Although these concepts of regrouping sets of objects and using the abacus have long been recommended as ways of helping pupils understand the basic principles which underlie computation with our place value numberation system, pupils commonly did not develop the necessary understanding. Perhaps in an effort to assure better teaching of the ideas of place value, authors of some elementary school textbooks and of textbooks for training of elementary school teachers have introduced the idea of working problems in other bases than ten. Such an approach does have the advantage of "forcing" people to take a fresh look at the ideas which underlie a place value numberation system, since exercises in arithmetic in other number bases cannot be worked through utilization of the memorized (sometimes almost magical) steps that enables most adults to work similar exercises with base ten numerals.

The following exercises in a base six are provided to enable you to consider anew the concepts of positional notation. It is recommended that you use groups of objects, pictures of groups of objects and an abacus in working these exercises as a way of experiencing first hand the value these tools can have for pupils. Another technique that is a little more abstract than the abacus, which you may wish to experiment with as an intermediate step between working the exercises through manipulation of objects and using only written numerals and traditional algorithms is expanded notation. (denominate notation) An example is shown below. These several techniques vary in their abstractness. A good philosophical base for thinking about much of elementary school mathematics instruction is that computation can be performed in many ways from the least sophisticated manipulation of concrete materials to a highly sophisticated form of mental arithmetic. Pupils who are having difficulty with arithmetic concepts tend generally to be working at too abstract a level. It is the teacher's task to determine the level at which the child needs to work and to help the child progress to the most sophisticated level he can achieve at his level of maturation.

Expanded Notation

187	1 hundred 8 tens 7 ones
+254	+2 hundreds 5 tens 4 ones
441	3 hundreds 13 tens 11 ones when regrouped = 441

The ideas of numerals being the names for numbers and that many numerals (many names) exist for every number are important ones. 3 hundreds 13 tens 11 ones is just as correct an answer to the addition exercise as is 441. Most people prefer to use the name 441 because it is more efficient , that is, it is easier to say, to write, and to think about. The use of expanded notation does provide a good intermediate step in progressing from the manipulations of objects to the more common written form of the usually taught addition algorithm. Thus, you may find expanded notation to be a valuable technique in working the following exercises in bases other than ten, just as pupils often find expanded notation a valuable tool for understanding the concept of regrouping.

Enumeration

The set of counting numbers are commonly used in two ways. The ordinal use of counting numbers is to indicate a position within a set. Common ordinal uses of numbers is in numbering houses or in numbering rooms within a building. In general the ideas of first, second, third, etc. are ordinal uses of numbers, though numbers do not have to be in that form to be used ordinally. The idea of "ordinal" use of numbers can be remembered as the "order" property of numbers.

The other common use of numbers is the cardinal usage. This is the use of numbers to express the idea of quantity. The cardinality of a set is the number property or number of elements in the set. The cardinal use of numbers is probably the more common of the two.

The cardinality of a set of objects is commonly expressed with a numeral or by writing or speaking the number name as a word. The set of written numerals form a consistent pattern. This pattern is also a logical representation of the grouping which occurs in organizing sets of objects as was done with the popsicle sticks in the preceding illustrations. The names assigned to these numerals do not reflect complete consistency. Study of the following chart should illustrate these inconsistencies.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

The numerals in the above chart are consistent and this consistency continues throughout the set, no matter how far it might be extended. There is, however, an inconsistency in naming the numerals which tends to distract from pupils' discernment of the basic pattern of our numeration system. This inconsistency exists in the second decade of number names: "eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, eighteen, nineteen, twenty." One facet of the inconsistency occurs in that the "teens" do not start until 13 (which means three and ten, fourteen meaning four and ten, etc.). To be consistent the numerals should be named "oneteen, two-teen, threeteen, fourteen, fiveteen, sixteen, seventeen, etc." On considering the names of the numbers beyond "twenty" (which is, (perhaps, a contraction of twain tens) it appears that the number of groups of ten is then named first and the number of ones remaining is consistently stated last. For example, forty-six, (four-tens and six-ones) fifty-six, sixty-six. seventy-six, etc. Thus another facet of the inconsistency occuring in the names for the numbers from ten to twenty becomes identifiable. That is, to be completely consistent the names for the second decade of numbers should more logically be onety-one, onety-two, onety-three, onety-four. . . . onety-nine, twenty, etc.

It seems quite unlikely that the names for the numbers are going to be changed to make them more consistent. The student is justified then in wondering of what value knowledge of this inconsistency has for a teacher. This information seems valuable in two ways. First, children who are learning to count often have considerable difficulty in learning the number names to twenty. Commonly children learn to count to ten fairly quickly and then reach a plateau in their learning before seeming to make "miraculous" progress in counting. It is, of course, this lack of consistency within the set of names for the numbers 10 - 20, which causes the children problems. It is this inconsistency that causes many writers to suggest that children be taught to count to twenty or thirty by rote, before they are shown the system (pattern) of our number names.

Secondly, it may very well be that this inconsistency in number names gets in the way of the child recognizing the relationship which exists between the written numerals and the groupings of objects which the numeral represents. (the place value idea). In any event, teachers need to be aware of the importance the place value concept has to understanding much of what is taught in elementary school arithmetic and to consequently emphasize the relationship between the numerals and the related collections of objects which they represent.

Performing Computations with a Place Value Numeration System

The concept of number is an abstract one. People have frequent contact with sets of objects, and would recognize immediately the idea of a set of three children. While each of these sets can be visualized, the idea of three (the number) is itself an abstract concept. People cannot see the number three except as it relates to a set of objects. The symbol which is written to represent this idea of three, "3" is a numeral. It, of course can be seen but the number three cannot. The numeral "3" or the written name "three" have the same relationship to the number three that the word "cow" has to a real cow. That is, they are symbols which represent the idea. A more appropriate example is probably that of the word "love" since the idea which this written symbol represents is an abstract one. While you can see love expressed, you cannot see love in the same way that it is possible to see a cow. The numeral "3" is also used to represent an abstract idea. Three cannot be seen except as it relates to a given set of objects.

It is probable that this abstract nature of number lends significantly to the difficulty many people have with arithmetic. To make number concepts and number operations easier to think about teachers are encouraged to use sets of objects and/or pictures of sets of objects to represent physically the abstract idea of number.

In the operation of counting we are performing on an abstract level a similar kind of operation to that which is frequently done in counting a set of pennies. Most people tend to count pennies by placing them in stacks of ten and then organizing the stacks of ten into groups of ten-tens or hundreds. The numeral that is written in our place value system shows a direct relationship to the grouping of objects that occurs in such a counting process. The numeral 236 would represent a grouping of pennies that contains 2 collections of ten stacks of ten, 3 stacks of ten, and

6 single ones. It is this simple concept which provides the basis for understanding most of the operations which are done in arithmetic. Because the concept provides the basis for understanding the arithmetic operations it is an extremely important one for children to gain. Work in non-decimal base numbers is frequently suggested to help children and teachers to focus their attention on this concept in a setting that is different from that in which they have their existing rote skill in computation.

The use of sets of objects, such as bundles of popsicle sticks or stacks of poker chips, can provide a "physical model" for the arithmetic operations which are usually taught on an abstract level. Pictorial representations of the manipulation of sets of objects provide some assistance in understanding operations with numbers. However, the use of pictures is usually inferior to the actual manipulation of objects themselves as a way of helping pupils gain understanding. Because of the restrictions of the printed page, pictures are used in this module. These pictures, representing the manipulation of sets of objects, are contained in the slide tape presentation, "Number Base," housed in the Jr. Bloc office.

Practice exercises in other number bases

1. Complete the number chart started below in a base six.

1	2	3	4	5	10
11	12	___	___	___	___
___	___	___	___	___	___
___	___	___	___	___	___
___	___	___	___	___	___
___	___	___	___	55	___

2. Use a base six and our numerals to record the number of letters in this sentence.

3. The exercises below are written in base six. Perform the indicated operations and record the answers in base six. The first one has been correctly completed.

a. $23_{six} + 34_{six} = 101_{six}$

b. $45_{six} + 14_{six}$

c. $405_{six} + 251_{six}$

d. $53_{six} - 24_{six}$

e. $204_{six} - 155_{six}$

f. $52_{six} \times 4_{six}$

g. $34_{six} \times 25_{six}$

h. $3_{six} \overline{)\,434_{six}}$

i. $12_{six} \overline{)\,4,152_{six}}$

4. Count the "x's" below using our numerals and a base six.

```
xxxxxx   xxxxxx   xxxxxx   xxxxxx   xxxxxx   xxxxxx
xxxxxx   xxxxxx   xxxxxx   xxxxxx   xxxxxx   xxxxxx
xxxxxx   xxxxxx   xxxxxx   xxxxxx   xxxxxx   xxxxxx
xxxxxx   xxxxxx   xxxxxx   xxxxxx   xxxxxx   xxxxxx
xxxxxx   xxxxxx   xxxxxx   xxxxxx   xxxxxx   xxxxxx
xxxxxx   xxxxxx   xxxxxx   xxxxxx   xxxxxx   xxxxxx
```

5. Count, in base two, the "x's" below.

```
xx    xx    xx    xx
xx    xx    xx    xx

xx    xx    xx    xx
xx    xx    xx    xx
```

6. Count the number of "x's" below in a base 3.

```
xxx      xxx      xxx      xxx
xxx      xxx      xxx      xxx
xxx      xxx      xxx      xxx

xxx      xxx      xxx      xxx
xxx      xxx      xxx      xxx
xxx      xxx      xxx      xxx

xxx      xxx      xxx      xxx
xxx      xxx      xxx      xxx
xxx      xxx      xxx      xxx
```

7. Count, to the bases 4, 5, and 8, the number of "x's" below.

x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x

Counted to base 4 = _____; to base 5 = _____; to base 8 = _____

8. Change the following numbers to represent the same quantity in another base, 10.

A. Base 3 numeral 201 equals __________ in base ten.

B. Base 8 numeral 1,627 equals __________ in base ten.

9. Change the following numerals to represent the same number in other bases.

A. Base 10 number 69 equals what base 5 number? __________

B. Base 10 number 28 equals what base 2 number? __________

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Work the following examples as directed. Check each example by changing the terms of the problem to the base ten, reworking, checking the answer in base ten against the original answer changed to a base ten equivalent.

10. Base Four

a. $\begin{array}{r} 12_{four} \\ \times\ \underline{10_{four}} \end{array}$ b. $\begin{array}{r} 33_{four} \\ \times\ \underline{22_{four}} \end{array}$ c. $10_{four}\overline{)\,33_{four}}$

d. $13_{four}\overline{)\,221_{four}}$

11. Work the following items as directed. Assume they are written using a base of seven. Check the work in each example by checking with base seven numbers with usual.

a. $\begin{array}{r} 36_{seven} \\ 54_{seven} \\ 23_{seven} \\ +\ \underline{115_{seven}} \end{array}$ b. $\begin{array}{r} 6012_{seven} \\ -\ \underline{235_{seven}} \end{array}$ c. $\begin{array}{r} 46_{seven} \\ \times\ \underline{13_{seven}} \end{array}$ d. $54_{seven}\overline{)\,6524_{seven}}$

If you are dissatisfied with your ability to work arithmetic exercises using non-decimal base numbers, you may wish to review the slide tape presentation, "Number Base," that is kept in the Jr. Bloc office.

Answers to Practice Exercises

1.

1	2	3	4	5	10
11	12	13	14	15	20
21	22	23	24	25	30
31	32	33	34	35	40
41	42	43	44	45	50
51	52	53	54	55	100

2. 145_{six}

3. a. 101_{six} f. 332_{six}

   b. 103_{six} g. 1422_{six}

   c. 1100_{six} h. $131 \text{ R } 1_{six}$

   d. 25_{six} i. $312 \text{ R } 4_{six}$

   e. 5_{six}

4. $1{,}000_{six}$

5. $100{,}000_{two}$

6. $10{,}212_{three}$

7. 212_{four}; 123_{five}; 46_{eight}

8. $A = 19_{ten}$; $B = 919_{ten}$

9. $A = 234_{five}$; $B = 11{,}100_{two}$

10. a. 120_{four}; b. 2112_{four}; c. $3 \text{ R } 3_{four}$; d. $11 \text{ R } 12_{four}$

11. a. 264_{seven}; b. 5444_{seven}; c. 664_{seven}; d. $113 \text{ R } 26_{seven}$

Objectives for Teaching Reading

This course is for students preparing for teaching reading and reading readiness to children in the elementary schools. The course is a combination of lectures, individualized work and/or small group work.

The objectives of the course are stated as behavioral objectives, in this course outline and references and activities are listed where you can study in order to reach the objectives.

Pre-tests will be administered for (1) the total course (if you desire) and (2) separate parts of the course. If you pass these tests with a score of 85% or better, you need to talk with me to determine what you should do. If you do not pass the pre-test, study the references, attend class, and work in the activities listed and when ready, take a post-test. If you pass this test at 80% or better, move on to the next section. If you fail the post-test, conference with me and study further in the areas of weakness.

<u>The objectives of this Course</u>

1. The student will be able to define reading (Gray and McKee's definition) and tell what teachers should do in all four areas of the <u>definition of reading</u>.

2. The student will be able to define the vocabulary terms commonly used in teaching reading.

3. The student will be able to identify the areas of <u>reading readiness</u> and tell what teachers need to do to help children in these areas.

*4. The student will be able to teach auditory and visual discrimination skills to children in the primary grades.

*5. The student will know the symptoms of visual and auditory problems and be able to detect them in children.

6. The student will be able to identify the skills commonly referred to as the initial reading skills. He will also be able to explain how to teach these skills and tell what materials and methods are available to help teach them.

7. The student will be able to diagnose a child's reading problems through the use of an <u>informal reading inventory</u>, and <u>other informal</u> and <u>formal</u> tests.

*8. The student will be able to analyze the results of <u>formal</u> and <u>informal tests</u>, and develop lesson plans for use with children in areas where they need help.

*9. The student will be able to teach his lesson plan and evaluate the effectiveness.

10. The student will be able to explain what the <u>intermediate grade reading skills</u> are and the methods, and materials used to teach them.

11. The student will be able to describe at least six different kinds of materials available to teachers in teaching reading. He will be able to explain their strength and weaknesses.

12. The student will be able to describe the following methods of <u>organizing children</u> for reading instruction, giving the advantages and disadvantages of each: ability grouping, Joplin plan, needs, groups, and staggered time scheduling.

* These items are performanced, based and evaluated by the classroom teacher or the college teacher in the classroom with children.

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Examples of Materials Used in Level II - Others

A. Checklist of Activities

B. Self-Evaluation of Education 301

C. Sophomore Bloc Proficiency Packet
by Dr. Jay Monson

1. Pre-assessment - Student opinionaire

2. Historical backgrounds of the Elementary School

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Check List of Activities

As a student in the Sophomore Bloc

Place a check next to the activity when you have participated in it. This will help you keep track of the variety of your practicum experience.

I. Academic

A. Reading

1. Reading aloud to small groups of children (as it would apply to listening skills).
2. Listening to children read - individual or small groups.
3. Explanation of instructional materials, word cards, workbooks, etc.
4. Helping children develop effective listening habits.
5. Reinforce habits of courtesy and obedience, attentiveness, etc.
6. Check on mastery of specific learning. (Example: 200 Dolch basic words)
7. Hear oral book reports (as teacher outlines).
8. Administer auditory perception training (as teacher outlines)
9. Record stories as told by Kindergarten or First Grade.
10. Work with individual or small groups in actual reading instruction.

B. Language Arts

1. Conduct storytelling time, reading stories.
2. Participate in group discussions as a resource person.
3. Help in creative writing (motivation, visual aides, etc.)
4. Encourage oral and written language development.
5. Direct some language skills games.
6. Help children develop "plays", projects to be given in class, write diaries.
7. Help make puppets, shadow shows, etc.
8. Work with individual or small groups in areas of language arts instruction.

C. Spelling

1. Dictate words to individual students or small groups.

2. Correct spelling exercises.

3. Review and discussion of spelling errors.

4. Conduct spelling activities, games, etc.

5. Work with individual or small groups in teaching spelling lessons.

D. Handwriting, Penmanship Skills

1. Encourage neatness, proper methods of writing (following instructions of classroom teacher and manual).

2. Provide experiences for writing practice which are motivational.

E. Math

1. Prepare instructional materials (games, flash cards, rods, etc.).

2. Give small group or individual help at blackboard.

3. Correct individual work.

4. Provide remedial (if skilled) enrichment work.

5. Conduct drills to master specific skills.

F. Social Studies and Science

1. Assist in reading assignments.

2. Collect materials for experiments, demonstrations.

3. Arrange displays.

4. Research, take notes, report.

5. Locate resource people.

6. Locate references.

7. Conducting experiments

8. Prepare exhibits

9. Illustrate, model, construct.

10. Work with individuals or small groups in social studies assignments.

G. Music

1. Teach skills (ONLY when background studies or talents demonstrate ability).

2. Play piano or some other musical accompaniment.

3. Prepare, locate, display charts, books, etc.

4. Record songs, etc.

H. Art

1. Prepare materials, cut paper, mix paint.

2. Distribute supplies.

3. Explain proper use of tools (scissors, brushes, etc.)

4. Help children individually.

I. Physical Education

1. Help children line up, form circles.

2. Distribute equipment.

3. Explain or demonstrate proper use of equipment.

4. Familiarize children with game rules.

5. Referee games.

6. Lead physical fitness exercises.

7. Keep score.

8. Lead a group in P. E. game or activity.

II. Classroom Management

A. Healthy Physical Environment

1. Help maintain proper ventilation, lighting.

2. Adjust seat and desk heights.

B. Assisting teachers at various duties

1. Cafeteria

2. Hall

3. Bus

4. Playground

C. Management

1. Attendance

2. Lunch count

3. Record Keeping

4. Study groups

5. Library

6. Book inventory

7. Materials inventory

D. Room preparation

1. Bulletin boards

2. Duplicate work sheets

3. Collect supplies

E. Routine

1. Clean-up

a. bookshelves
b. sinks and counters
c. desks, floors
d. storage shelves

III. Audio-Visual Assistance

A. Operation of Equipment

1. Movie equipment

2. Slide projector

3. Listening post

4. Tape recorder

5. Record player

6. Overhead projector

7. Opaque projector

8. Piano

9. Duplicating machines

B. Arrange bulletin boards, displays, children's work, mounting pictures, etc.

IV. General Areas of Work and Study

A. Activities indirectly related to teaching

1. Mark and record pupil progress for teacher's use in pupil evaluation.

2. Blockboard work (only if student is adept at handwriting skills).

3. Gather and arrange materials for future lessons.

4. Assist in operating equipment.

5. Assist student teacher and/or teacher with activities requiring action (such as P.E., Creative Play, Field Trips, etc.)

6. Help with special programs, projects.

7. Make instructional materials (transparencies, picture files, duplicating materials).

8. Supervise some recess periods (free periods) if school policy permits.

9. Research in library for books and materials children can use in specific unit work.

10. Catalogue, alphabetize, file.

11. Enrich program with lectures, experience stories, travelogues, hobbies.

12. Be an active resource person for a special activity.

13. Assist in routine movement of the class from one location to another.

14. Answer questions for children in study periods.

NAME________________________ SELF-EVALUATION OF EDUCATION 301 (soph. Bloc)

Please complete the following form prior to our individual conferences next week. Bring the completed form to the conference.

1. Attendance
   (Should be 100% or only officially excused for an "A")

2. Participation

3. History - Philosophy packet

4. Journal of Experiences as an aide

5. Teaching file (ideas, pictures, etc.)

6. Curriculum Library and Textbook Evaluations

7. Board of Education Meeting

8. Readings (in Professional books)

9. Field Trips

10. Interaction Labs and Simultation Labs

Final Grade you expect to receive for Education 301: __________

Further justification or explanation of above:

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Utah State University

Department of Elementary Education

S. O. D. I. A. TEACHER EDUCATION PROGRAM

January 1973

SOPHOMORE BLOCK PROFICIENCY PACKET

TOPIC: Historical & Philosophical Foundations of American Education

MATERIALS:

Enclosures:

1. Check List
2. Student Opinionnaire
3. Introductory Paper: Historic Backgrounds of the Elementary School
4. Developing your Educational Time Line
5. Topic Outlines for Films

Reference Textbooks: (in Anne Carroll Moore Library)

1. Dropkin, Full, & Schwarcz, Contemporary American Education, Macmillan, 1970.
2. Hughes, James Monroe, Education In America, Harper & Row, 1970.
3. Noll & Kelly, Foundations of Education In America, Harper & Row, 1970.
4. Ryan and Cooper, Those Who Can, Teach, Houghton-Mifflin, 1972.
5. , Problems & Issues in Contemporary Education, Harvard Educational Review and The Teachers College Record, 1968.

INTRODUCTION:

The general purpose of the Proficiency Packet is to help you become acquainted with some of the important developments, ideas, and philosophies in the field of American education. This unit deals largely with cognitive learning--the acquiring of knowledge and information--but it is also intended to stimulate in you some feelings and appreciations about the greatness of American education and for those who have shaped it. It is hoped that your realization that American education is evolving and is dynamic will inspire you to join the mainstream and add your own unique, creative efforts in support of its improvement and greater effectiveness.

The learning activities in this Packet consist largely of reading, viewing films, and briefly recording selected items of information. These activities are carefully selected to provide you with a maximum of accomplishment for the time you are involved. The reading material generally is condensed, to the point, and interestingly written. What duplication may appear serves usually as helpful reinforcement of ideas or information already briefly encountered.

You are encouraged to seek help from fellow students working on the same Packet and from members of the faculty as need arises. It seems it would be a very useful study technique if you arranged a small discussion group with fellow students any time it may be helpful to you, and particularly as you near completion of each problem of the Packet.

CONTENT:

Problem #1. How Has America Provided for the Education of Its People?
Problem #2. What are the Goals of American Education?
Problem #3. What are some Current Practices and Issues in American Education?
Problem #4. What are the philosophies of major contributors to American Education? What is your personal "Philosophy of Education" to this point?

PRE-ASSESSMENT:

A student opinionnaire about ideas in education is in the Packet as Enclosure 2. As soon as you have received the Packet, complete the opinionnaire and turn it in to your sophomore bloc advisor.

BEHAVIORAL OBJECTIVES:

Upon completion of this unit, you will be able to:

1. Demonstrate a knowledge of selected important events, organizations, developments and personalities in American education, as measured by the construction of an education time line.

2. Demonstrate a knowledge of some of the important milestones in the development of goals for American education, as measured by the education time line.

3. Demonstrate a knowledge of some of the current innovations and issues in American education, as measured by reading reaction cards (minimum of five).

4. Demonstrate a knowledge of some of the philosophies of major contributors to American Education, as measured by the education time line. Write your own "Philosophy of Education".

LEARNING EXPERIENCES:

(Don't begin the learning experiences until you have completed and handed in the opinionnaire included in the Packet as Enclosure 2.)

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Problem #1: How has America provided for the education of its people? (Behavioral Objective 1)

Questions for consideration:

a. What are some things Americans have believed about education?

b. How have Americans met their educational problems?

c. Who were (are) some of America's educational statesmen?

Activities: (In recommended sequence)

Read: Introductory paper: Historic Backgrounds of the Elementary School

(All reading materials, unless otherwise indicated, are available in the Moore Library, Edith Bowen School.)

1. Browse through the tables of content for the five-course textbooks. You will be asked to read only selected sections therein. However, you are encouraged to read any additional sections of any or all books. Should you do so, keep a record of your readings and submit to your bloc advisor upon completing the Packet.

2. As you study, select important items and record them appropriately on your Education Time Line (Enclosure 4).

3. View the films listed below:

"Education in America: 17th and 18th Centuries"
"Education in America: the 19th Century"
"Education in America: 20th Century Developments"
"Remarkable Schoolhouse"

A topic outline of each film is in the Packet as Enclosure 5. The topic outline is intended to assist you in viewing the film, in thinking about it, in discussing it, and in relating what you see on the film to your reading.

4. Briefly identify each of the following (use the reference texts). Write a brief explanation of each below, then place it on your time line.

"Old Deluder Law"
"Jefferson's Proposal for Free Schools in Virginia"
"Northwest Ordinance"
"New York Free School Society"
"McGuffey Eclectic Readers"
"Horace Mann and the Massachusetts State Board of Education"
"First State Normal School"
"Massachusetts Law on Compulsory Schooling"
"Organization of the National Teachers' Association"
"U.S. Department (Now Office) of Education"
"Kalamazoo Decision"
"Progressive Education Association"

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"Supreme Court, Brown vs. Board of Education"
"Elementary-Secondary Education Act"
"Religious Instruction in Public Schools"
"Prayers in Public Schools"
"Judicial Standards and Student Discipline"

Problem #2: What are the Goals of American Education? (Behavioral Objective 2)

Questions for consideration:

a. Why be concerned with educational goals?

b. Who determines the educational goals?

c. What educational goals have been identified?

Activities: (In recommended sequence)

5. Continue to record on your Education Time Line (Enclosure 4) pertinent information from the readings listed below.

6. Read Dropkin, Full, & Schwarcz, Contemporary American Education, (Second edition), Section III, pp. 211-213.

7. Hughes, Education in America (3rd edition), Chapter 17, pp. 488-511.

Problem #3: What are some Current Practices, Problems, and Issues in American Education? (Behavioral Objective 3)

Questions for consideration:

a. What are some newer educational practices that show promise?

b. What are the critics saying about American education?

c. What are some important unsolved problems in American Education?

Activities: (In recommended sequence)

8. As you study, record selected items on your Education Time Line (Enclosure 4).

9. Read: Ryan, and Cooper, Those Who Can, Teach, pp. 394-420.

10. Read: Dropkin, Full & Schwarcz, Contemporary American Education, pp. 369-371.

11. Read: Hughes, Education in America (3rd Edition), Chapter 21, pp. 599-618.

12. Become familiar with the Saturday Review and the Phi Delta Kappan as they reflect current concern about educational issues and problems. Read any articles which appeal to your interest. These periodicals are in the college library periodical area. Select two articles from these magazines. React to these on 5 x 8 cards.

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13. Become familiar with other periodicals from the following list. Read any articles which appeal to your interest. Select <u>three</u> for "reactions" on 5 x 8 cards.

<u>Selected Periodicals Dealing with Education in USU Library</u>

American Education Research Journal
American School Board Journal
Arithmetic Teacher
Catholic Education Review
Changing Education
Child Education
Childhood Education
Comparative Education Review
Education
Education Digest
Education Quarterly
Education Forum
Educational Horizons
Educational Leadership
Educational Perspectives
Education Record
Educational Review
Educational Technology
Educational Theory
Elementary English
Elementary School Journal
Exceptional Children
Grade Teacher
Harvard Education Review
History of Education Quarterly
The Instructor
Journal of American Indian Education
Journal of Education
Journal of Education and Psychology
Journal of Experimental Education
Journal of Educational Research
Journal of Negro Education
Journal of Reading
Journal of School Health
Journal of Teacher Education
National Elementary Principles
Nation's Schools
P.T.A. Magazine
Peabody Journal of Education
Phi Delta Kappan
The Physical Educator
Psychology in the Schools
The Reading Teacher
Religious Education
Review of Educational Research
Scholastic Educator
School and Community
School and Society
School Arts
School Musician
School Review
School Safety
Science Education
Science Teacher
Social Education
Social Studies
Soviet Education
Society of Education
Studies in Philosophy and Education
Urban Education
The Social Studies
Young Children

<u>Problem #4</u>: What is your personal "Philosophy of Education"? (Behavioral Objective 4)

Questions for consideration:

a. Who are some of the individuals who have influenced education in the past?

b. What is the relationship of philosophy to practice?

c. What is your own educational philosophy? How will it influence what you do with children?

Activities: (In recommended sequence)

14. As you study, record selected items on your Education Time Line (Enclosure 4).

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15. Read: Hughes, Education In America, (3rd Edition), Chapter 8, pp. 192-220.

16. Identify below the following (and place them on your time line).

    a. Comenius

    b. Rousseau

    c. Pestalozzi

    d. Froebel

    e. Herbart

    f. Spencer

    g. Montessori (Ryan, p. 18)

    h. Dewey (Ryan, p. 156)

    i. Skinner

    j. Bruner (Ryan, pp. 92-93)

    k. Silberman

    l. Ashton-Warner (Ryan, p. 68)

    m. Illich (Ryan, p. 472)

    n. Thoreau (Ryan, p. 212)

17. Write your own "Philosophy of Education" as it now is.

Proficiency Assessment:

1. Make an appointment with the advisor to review your Education Time Line.

2. Turn in your selected readings "reaction cards."

3. Write your own "Philosophy of Education" at this time, turn it into your bloc advisor.

4. Complete an opinionnaire on ideas about education. Ask for this at the conclusion of this Packet. It will not be counted as part of the Proficiency Assessment.

Enclosure 1

CHECK LIST

Student's Name ______________________________

	Date	OK	
Obtain SODIA Proficiency Packet	________	________	*
Pre-Assessment - Opinionnaire	________	________	*
Learning Experiences:			
Read Enclosure #3: Historic Backgrounds		________	
Problem #1			
View films	________	________	
Read: In reference texts		________	
Identify: From listing		________	
Start Time Line		________	
Problem #2			
Continue Time Line	________	________	
Read: Dropkin, Full, & Schwarcz		________	
Read: Hughes		________	
Problem #3			
Continue Time Line	________	________	
Read: Dropkin, Full & Schwarcz		________	
Read: Hughes		________	
Study Periodicals, reaction cards		________	
Problem #4			
Continue Time Line	________	________	
Read: Hughes		________	
Identify: From listing		________	
Write Philosophy		________	
Proficiency Assessment			
Approval of Time Line - Bloc Advisor	________	________	*
Reaction Cards	________	________	*
Opinionnaire	________	________	*
Packet Completed (Advisor's Approval)	________	________	*

*Requires authorized endorsement

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Enclosure 2

PRE-ASSESSMENT
Student Opinionnaire

Date of Birth: ____________________
(Mo.) (Day) (Year)

( ) Male
( ) Female
( ) Elementary Education
( ) Secondary Education
( ) Uncertain about becoming a teacher

Directions:

Write your date of birth above, but do not sign your name. Check the appropriate blanks to indicate your status and preference.

The purpose of this pre-assessment scale is to discover your opinion concerning some ideas about education. There are ten ideas, each written at the head of a page with the opinion scale immediately below. Indicate your opinion about the idea by placing an "X" in the space between the two descriptive words at the point which most nearly expresses your opinion. The only right answer is your own opinion. Mark your first impression. Do not take time to try to reason out an answer.

This opinionnaire will not be used for proficiency assessment.

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"AN EDUCATION SYSTEM SERVES THE NEEDS OF THE SOCIETY IN WHICH IT FUNCTIONS."

reasonable	unreasonable
inconsistent	consistent
relevant	irrelevant
safe	dangerous
unacceptable	acceptable
true	false
worthless	valuable
undemocratic	democratic
good	bad
supportive	subversive
undesirable	desirable
old	new
wise	foolish
vague	clear

"EVERY AMERICAN HAS OPPORTUNITY FOR AS MUCH EDUCATION AS WILL BENEFIT HIMSELF OR HIS NATION."

reasonable	-----/-----/-----/-----/-----/-----/----	unreasonable
inconsistent	-----/-----/-----/-----/-----/-----/----	consistent
relevant	-----/-----/-----/-----/-----/-----/----	irrelevant
safe	-----/-----/-----/-----/-----/-----/----	dangerous
unacceptable	-----/-----/-----/-----/-----/-----/----	acceptable
true	-----/-----/-----/-----/-----/-----/----	false
worthless	-----/-----/-----/-----/-----/-----/----	valuable
undemocratic	-----/-----/-----/-----/-----/-----/----	democratic
good	-----/-----/-----/-----/-----/-----/----	bad
supportive	-----/-----/-----/-----/-----/-----/----	subversive
undesirable	-----/-----/-----/-----/-----/-----/----	desirable
old	-----/-----/-----/-----/-----/-----/----	new
wise	-----/-----/-----/-----/-----/-----/----	foolish
vague	-----/-----/-----/-----/-----/-----/----	clear

ERIC Full Text Provided by ERIC

"EDUCATION ATTEMPTS TO PERPETUATE AMERICAN IDEALS AND VALUES."

reasonable	----/-----/-----/-----/-----/-----/----	unreasonable
inconsistent	----/-----/-----/-----/-----/-----/-----	consistent
relevant	----/-----/-----/-----/-----/-----/-----	irrelevant
safe	----/-----/-----/-----/-----/-----/-----	dangerous
unacceptable	----/-----/-----/-----/-----/-----/-----	acceptable
true	----/-----/-----/-----/-----/-----/-----	false
worthless	----/-----/-----/-----/-----/-----/-----	valuable
undemocratic	----/-----/-----/-----/-----/-----/-----	democratic
good	----/-----/-----/-----/-----/-----/-----	bad
supportive	----/-----/-----/-----/-----/-----/-----	subversive
undesirable	----/-----/-----/-----/-----/-----/-----	desirable
old	----/-----/-----/-----/-----/-----/-----	new
wise	----/-----/-----/-----/-----/-----/-----	foolish
vague	----/-----/-----/-----/-----/-----/-----	clear

"EDUCATIONAL ISSUES ARE IMPORTANT TO EDUCATION PROGRESS."

reasonable								unreasonable
inconsistent								consistent
relevant								irrelevant
safe								dangerous
unacceptable								acceptable
true								false
worthless								valuable
undemocratic								democratic
good								bad
supportive								subversive
undesirable								desirable
old								new
wise								foolish
vague								clear

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"THE GOALS OF EDUCATION CHANGE WITH THE CHANGING NATURE OF SOCIETY."

reasonable	unreasonable
inconsistent	consistent
relevant	irrelevant
safe	dangerous
unacceptable	acceptable
true	false
worthless	valuable
undemocratic	democratic
good	bad
supportive	subversive
undesirable	desirable
old	new
wise	foolish
vague	clear

"TEACHER EDUCATION IS CHANGING."

reasonable	----/-----/-----/-----/-----/-----/----	unreasonable
inconsistent	----/-----/-----/-----/-----/-----/----	consistent
relevant	----/-----/-----/-----/-----/-----/----	irrelevant
safe	----/-----/-----/-----/-----/-----/----	dangerous
unacceptable	----/-----/-----/-----/-----/-----/----	acceptable
true	----/-----/-----/-----/-----/-----/----	false
worthless	----/-----/-----/-----/-----/-----/----	valuable
undemocratic	----/-----/-----/-----/-----/-----/----	democratic
good	----/-----/-----/-----/-----/-----/----	bad
supportive	----/-----/-----/-----/-----/-----/----	subversive
undesirable	----/-----/-----/-----/-----/-----/----	desirable
old	----/-----/-----/-----/-----/-----/----	new
wise	----/-----/-----/-----/-----/-----/----	foolish
vague	----/-----/-----/-----/-----/-----/----	clear

"IN A DEMOCRACY THE CONTROL OF EDUCATION IS IN THE HANDS OF THE PEOPLE."

reasonable								unreasonable
inconsistent								consistent
relevant								irrelevant
safe								dangerous
unacceptable								acceptable
true								false
worthless								valuable
undemocratic								democratic
good								bad
supportive								subversive
undesirable								desirable
old								new
wise								foolish
vague								clear

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"ALL PEOPLE ARE INVOLVED IN THE SUPPORT OF PUBLIC EDUCATION."

reasonable								unreasonable
inconsistent								consistent
relevant								irrelevant
safe								dangerous
unacceptable								acceptable
true								false
worthless								valuable
undemocratic								democratic
good								bad
supportive								subversive
undesirable								desirable
old								new
wise								foolish
vague								clear

"WHAT PEOPLE BELIEVE AND ARE WILLING TO WORK FOR IS THE BASIS OF GREAT MOVEMENTS OR REFORMS IN EDUCATION."

reasonable	-----/-----/-----/-----/-----/-----/-----	unreasonable
inconsistent	-----/-----/-----/-----/-----/-----/-----	consistent
relevant	-----/-----/-----/-----/-----/-----/-----	irrelevant
safe	-----/-----/-----/-----/-----/-----/-----	dangerous
unacceptable	-----/-----/-----/-----/-----/-----/-----	acceptable
true	-----/-----/-----/-----/-----/-----/-----	false
worthless	-----/-----/-----/-----/-----/-----/-----	valuable
undemocratic	-----/-----/-----/-----/-----/-----/-----	democratic
good	-----/-----/-----/-----/-----/-----/-----	bad
supportive	-----/-----/-----/-----/-----/-----/-----	subversive
undesirable	-----/-----/-----/-----/-----/-----/-----	desirable
old	-----/-----/-----/-----/-----/-----/-----	new
wise	-----/-----/-----/-----/-----/-----/-----	foolish
vague	-----/-----/-----/-----/-----/-----/-----	clear

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"THE LEARNER HAS A PART IN DETERMINING HIS CURRICULUM."

reasonable	----/-----/-----/-----/-----/-----/----	unreasonable
inconsistent	----/-----/-----/-----/-----/-----/----	consistent
relevant	----/-----/-----/-----/-----/-----/----	irrelevant
safe	----/-----/-----/-----/-----/-----/----	dangerous
unacceptable	----/-----/-----/-----/-----/-----/----	acceptable
true	----/-----/-----/-----/-----/-----/----	false
worthless	----/-----/-----/-----/-----/-----/----	valuable
undemocratic	----/-----/-----/-----/-----/-----/----	democratic
good	----/-----/-----/-----/-----/-----/----	bad
supportive	----/-----/-----/-----/-----/-----/----	subversive
undesirable	----/-----/-----/-----/-----/-----/----	desirable
old	----/-----/-----/-----/-----/-----/----	new
wise	----/-----/-----/-----/-----/-----/----	foolish
vague	----/-----/-----/-----/-----/-----/----	clear

Enclosure 3

HISTORIC BACKGROUNDS OF THE ELEMENTARY SCHOOL

The elementary school has been called the most typical American of our social institutions, democracy's gift to children, and the cornerstone of our system of free public education. Its ancestry can be traced to liberal movements in Europe which were a protest against the established schools because they were not open to the common people.

From the very beginning, the evolution of the common schools in this country has been closely associated with the ideal of human freedom. Self-realization for every individual is the central ideal of our society, the bedrock of our civilization, the American dream. This ideal has run like a brightly colored thread through our literature, our art, and our music. The ideal itself is centuries old, but no other nation has approached it with stronger faith or greater determination, and no other nation has made public education available on so large a scale for the purpose of implementing it. Neither the present status nor the future promise of the elementary school can be fully appreciated without some knowledge of the forces that have operated during the last three hundred years both for and against the development of a democratic program of education in this country.

The elementary school as it exists today represents a heritage of some three centuries of persistent effort by men and women who have struggled against great odds to develop a program of education designed to make our nation both strong and free. The story of the American past does not consist entirely of the exploits of statesmen and military men; the ideas and accomplishments of leaders in the cause of public education have been equally significant in making America what it is today.

Schols tend to reflect the conditions, ideals and motives of the society they serve. Four outstanding periods have dominated the development of the curriculum and structure of the elementary and secondary schools of the United States. They basically are: (1) The Colonial Period--religious motive, 1647-1776; (2) The Period of Nationalism--political motive, 1776-1876; (3) The Period of Expansion and Reform--utilitarian motive; 1876-1929; and (4) The Period of Increased Responsibility--a motive of mass education, 1929-to date.

Boston, in town meeting in 1635, laid the foundations of the Boston Latin School by the adoption of the following order:

> Likewise, it was then generally agreed upon that our brother Philemon Promont shall be entreated to become schoolmaster for the teaching and nurtering of children with us.

A year later Charlestown voted to arrange with William Witherall "To keep a school for a twelvemonth," and fixed his salary at 40 pounds a year. Cambridge, in 1638, established its first school by voting certain lands for "the use of Mr. Nath Eaten as long as he shall be employed" in the work of teaching school. Newbury, the year following, granted to Anthony Somerby "foure akers of upland" and "six akers of salt marsh" as an "encouragement to keep school for one year." (Ellwood P. Gubberley. <u>Public Education in the United States</u>. Cambridge: Houghton-Mifflin Company, 1947, p. 16.)

. . . the school everywhere in America arose as a child of the Church. In the colonies where the parachial-school conception of education became the prevailing type, the school remained under church control until after the founding of our national government. In New England, however, and the New England evolution in time became the prevailing American practice, the school passed through a very interesting development during colonial times from a church into a state school. (Cub ley, p. 73.)

. . . ucation is always influenced by the time and place in which it occurs. Education never exists in a vacuum or in the abstract; it always goes on in a particular society at a particular time in history.

. . . The early settlers who came to America brought a rich cultural heritage to the new World. Among other things they had a fully developed language with a wealth of fine literature. They had a highly developed social organization which included elaborate economic, political, legal, and religious systems. And they had an educational system that extended from the elementary school through the university. When the colonists began the task of setting up schools they did not create new institutions. Rather, they did what men have always done when faced with problems--they drew upon their past experience and established the kinds of schools with which they were familiar.

. . . In the first fifty years of our history as an independent nation, education was shoved into the background, as it has always been in periods of crisis.

Perhaps the most important development in this period was the blossoming of the great ideas that we generally associate with democracy.

Even though the development of a system of schools consistent with the ideals of democracy was delayed until the middle of the nineteenth century, much concrete evidence exists that a real concern for education existed as early as 1776. (Raymond E. Callahan. An Introduction to Education in American Society. New York, Alfred A. Knopf, 1959, pp. 107-122.

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Enclosure 4

DEVELOPING YOUR EDUCATION TIME LINE

Purpose:

The purpose of the Education Time Line is to assist you in recognizing and identifying important happenings in American education and to place them, in summary fashion, in their proper sequence and relationship. The Time Line is intended to help bring order and system to your understanding of historical developments in American education.

Since you select and record the items for your own Time Line, it is assumed it will be a useful educational tool for you personnally, and that you will want to keep it among your educational materials for use as need arises.

Suggestions:

a. Select and record the items for your Time Line as you study the required readings.

b. Since your Time Line space is somewhat limited, you will need to select and record those items that seem of major importance to you.

c. Record Time Line entries in your own handwriting, attempting to be as neat, brief, and precise as possible.

After you have finished your Time Line, make an appointment for a conference with your bloc advisor.

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EDUCATION TIME LINE

(For Student's Personal Notes and Entries)

The COLONIAL PERIOD (1619-1780)

	1650	1700
Problem #1 How Has America Provided For the Education of Its People?		
Problem #2 What Are the Goals of American Education?		
Problem #4 What Are the Philosophies of Major Contributors to American Education?		

The NATIONAL PERIOD (1781-1900)

1750

1800

The TWENTIETH CENTURY (1901-

1850 1900 1950

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Examples of Material Used in Level I - Self

A. Orientation to Elementary Education
by Dr. Jean Pugmire

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"Orientation to Elementary Education"

"Orientation to Elementary Education" is designed to give you more insight into your relationship with other people and a better understanding of "self."

The class will meet as a total group twice a week. In addition to the time spent in class you will be expected to spend a minimum of ten hours in an elementary classroom. Time for your visit to the classroom will be arranged to fit your schedule.

Grades for this class are on a pass, fail, or incomplete basis. Each student will receive a passing grade if he completes all his assignments in an acceptable manner. The class is the beginning of your experience in teacher education and you are establishing your reputation as a potential member of the teaching profession.

As part of your requirements for this class you will be required to keep a diary which will be handed in at specified times. Your diary will contain the following information:

1. Your autobiography -- This will be written in manuscript writing and will be due on or before October 3rd.

2. Self improvement project -- You will choose are area you truely wish to improve in -- it may be in the physical, emotional, social, or intellectual area. The improvement project should be identified by October 3rd and a progress report written each week thereafter.

3. Positive and Negative Experiences -- Each week starting Friday the 28th you are to write two (2) positive and two (2) negative experiences you have had during the week. These are to be written <u>every</u> week. After describing the situation, look deeply at your feelings and how you reacted. After looking carefully at the situation try to think of other ways that you could have reacted.

   "If the experience is too personal to share with the instructor, you may staple or in some other way seal the page. I will respect your privacy, but I want you to examine what happened even though I do not read it.

4. Interviews with Professors -- Between October 1 and October 26 you are to interview the following:

   a. Miss Pugmire
   b. Two (2) professors from whom you are <u>now</u> taking classes. These should be professors you do not already know. A short reaction to your interview should be in your diary when you hand in your diary on October 26th.

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5. Observations in Public Schools -- As part of your class assignment you are to observe a minimum of ten hours. The focus of your observation will be:

   a. Characteristics of children
   b. Room environment
   c. Role of the teacher
   d. Peer interaction
   e. Adult-child interaction

   These areas may be examined separately or you may intergrate them in each summary. There should be one summary for each time you observe.

6. Summaries of Professional readings -- Each student will read and summarize eight articles from professional journals or a combination of books and articles. These may be choosen by the student. The choice should be based on the student's interest and needs. All reading should be completed by November 21.

7. Summary -- This is your evaluation of what you have learned about yourself from your self-improvement project: your positive and negative experiences: your interviews and your observations. It should also include the insight you have gained about the teaching profession from class discussion, observations and reading. Your summary will be due one week before the end of the quarter.

Dates Materials Are Due

October 3	Autobiography Self Improvement Project
October 26	Weekly progress report on self-improvement Two positive and two negative experiences for each week Summary of three interviews with professors. Summary of observations completed by this date. At least half of your professional reading should be completed by this time.
November 21	Progress report on self-improvement project. Positive and negative experiences Summaries of observations Summaries of all professional reading
November 30	Summary

Class will be held during test week at time scheduled in schedule bulletin.

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