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LOW COST LEARNING SYSTEMS

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PREFACE

This paper summarizes innovative programs in four countries which are having a profound impact on educational thinking in all parts of the world. These programs are showing that effective education can be attained at substantially reduced cost. They also are showing the positive results which are possible when countries reexamine their needs and utilize all available resources to meet them without feeling constrained to follow traditional paths. I have been extremely fortunate to have worked closely and continuously since 1971 with the educators in these countries whose creativity and dedication have broken through conventional wisdom to bring educational opportunities to children and youth previously denied them.

The programs are: (1) Project IMPACT in the Philippines, (2) Proyek PAMONG in Indonesia, (3) Project RIT in Thailand, and (4) Project IEL in Liberia. The project summaries given on pages 4 through 11 do not contain sufficient information for those seriously considering adapting some of the features of these programs. I suggest that the project directors whose names and addresses are given on pages 21 through 23 be contacted directly. I further recommend that those who have the opportunity to visit project schools do so. Only by observing the rich variety of learning experiences available to children in these countries can one appreciate their real potential.

I would like to dedicate this paper to the directors of the Southeast Asian Regional Center for Educational Innovation and Technology all of whom have few peers in seeking workable solutions to the many critical educational problems which exist throughout the world. Their guidance and support have been major ingredients in the success of programs in that region.

Mr. Ly Chan Duc (1969-1974)
Mr. Pham Van Cung (1974-1975)
Dr. Orlando B. Claveria, Officer in Charge (1975-1976)
Dr. Liceria Brilliantes-Soriano (1976-Present)

Among many who deserve mention are two whose vision set the stage for realistic low cost learning systems.

Dr. Narcisso Albarracin
Dr. Robert Jacobs

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LOW COST LEARNING SYSTEMS

A number of Governments are exploring the feasibility of adapting some of the strategies and components of Low Cost Learning (LCL) systems exemplified by IMPACT* in the Philippines, PAMONG in Indonesia, RIT in Thailand, and IEL in Liberia. Bangladesh, for example, is now planning a large-scale six-year program directed toward achieving universal primary education. An innovative component of the overall program will be a 35-school experiment to determine the feasibility of LCL concepts in meeting that Government's major objectives of increased access to primary schools, reduced wastage, improved quality of instruction, more lasting pupil achievement, and reduced costs. Pakistan has made a thorough study of both IMPACT and PAMONG to determine if these systems could be adapted to meet the unique needs and conditions in that country. Lesotho recently began discussions on possible LCL developments. Several large school districts in California, U.S.A., are exploring LCL as a means to maintain effective educational programs under reduced educational budgets.

The LCL concept basically is the maximum utilization of available resources to provide quality education at a substantially reduced per-pupil cost. Resources include teachers, parents, community members, older students and peers, low-cost facilities, reusable instructional materials, and, most of all, a system which facilitates the maximum utilization of all resources to promote student learning. Not only does resource utilization differ among the countries developing LCL systems, but also the purposes which the programs serve differ to some degree. In some the emphasis is on maintaining existing educational effectiveness under the constraints of a reduced

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Although IMPACT is a system on which the staff of the Institute for International Research has worked closely and continuously since 1973, the name IMPACT is more properly that of the system developed in the Philippines. As will be seen, other adaptations and other names have been developed elsewhere. A more-generic term for the concept is now being used: Low Cost Learning (LCL) systems. For clarity, therefore, LCL will be used in the remainder of this paper. Since LCL is a concept rather than a single system, it can be adapted (rather than adopted) to meet the needs, conditions, resources, and constraints that exist in different countries.

budget, in some the purpose is to provide learning opportunities for a substantially larger enrollment without comparable increases in educational budgets, in some the primary intent is increased learning effectiveness without increased overall costs, and in some the goal is improved quality of instruction where teachers are either in short supply or are underqualified. In reality, all users ascribe to most of these goals but give emphasis to one or two.

Background

In August 1972 the Southeast Asian Ministers of Education Organization (SEAMEO) concluded a series of meetings by Technical Working Groups made up of senior educators of the eight countries who were then active members of SEAMEO.[1] These meetings culminated in a document titled "SEAMEO for the 70's" which detailed four areas of educational priority which should be addressed by the Region in the decade to follow. One of the four areas was:

> "Development of an effective and economical delivery system for mass primary education."

At that time only one-half the children in Southeast Asia were able to complete a six-year primary education, and additional funds were not available to expand the conventional systems to achieve the goal of mass primary education. The needs addressed by the universal primary education program in Bangladesh are similar to those expressed by educators in the Southest Asian region.

A major responsibility for exploring alternative delivery systems was assigned to INNOTECH.[2], the Regional Center for Educational Innovation

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1. Active SEAMEO member countries in 1972 were Indonesia, Khmer, Laos, Malaysia, Philippines, Singapore, Thailand, and Viet Nam.

2. INNOTECH is a SEAMEO center, staffed by educators from throughout Southeast Asia, and charged with a major responsibility to identify problems, seek prototype solutions, and assist member countries in adapating solutions to their needs. INNOTECH was begun in Singapore in 1969, moved to Saigon in 1973, to Bangkok in 1975, and to Manila in 1976.

and Technology. The Center, then in Singapore, convened a Regional Seminar on Effective and Economical Delivery of Mass Primary Education in February 1973. Educators from throughout Southeast Asia and invited participants from many other countries deliberated for a full week on alternative approaches to the problem. Although no single solution emerged at that time, the conferees recommended that the INNOTECH professional staff actively pursue the leads provided by the Seminar in seeking more definitive strategies.

The first tentative outline of the approach which was to become IMPACT appeared in the April 1973 INNOTECH Newsletter under the title "No More Schools?"[1] The INNOTECH staff prepared a research plan for presentation to the INNOTECH Governing Board which met in Vung Tau, Vietnam, in June of that year. The Board members from Indonesia and the Philippines agreed upon joint projects with INNOTECH. The Project Directors and Deputies for the projects in the two countries worked with the INNOTECH staff in Saigon in November and December and prepared jointly an Initial Planning Document. The projects initially were identical in approach but, as will be seen below, became adapted to the different conditions and needs of the two countries. Different acronyms for project titles also were adopted, further illustrating the unique adaptations of the basic concept to meet specific needs. Project IMPACT is used in the Philippines, and Proyek PAMONG in Indonesia.[2] IMPACT (and now LCL) have come to be used, however, as more generic titles for the overall approach. The separate lines of development clearly illustrate that LCL is a concept adaptable to a variety of conditions and that it is not a single defined system which must be adopted in toto. It is this rationale which is used in designing effective LCL systems that are adapted, reshaped, and developed to more clearly meet the needs of individual countries. The short descriptions

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1. Nichols, D.G. No More Schools? INNOTECH Newsletter, Singapore, May 1973, 1, 8.

2. IMPACT is an ancronym for Instructional Management by Parents, Community and Teachers. PAMONG is an Indonesian acronym for Pendidikan Anak oleh Masyarakat, Orang Tua, dan Guru-Guru. The word "pamong" has the meaning of "guidance," and the translated acronym is Children's Education by the Community, Parents and Teachers.

which follow are of programs in four countries only and are used as a background for discussions on the development of appropriate strategies and approaches in meeting the needs of other countries.

Philippines

Development of IMPACT materials and procedures was begun in January 1974, and tryouts were initiated at the 4th-grade level in five small rural schools on the island of Cebu in June of that year. Three years later IMPACT was in all grades and the system was extended to three additional schools on the island of Mactan and to one large school in Sapang Palay, Central Luzon. The demonstration and evaluation year at all three sites was 1978-1979.

The problem addressed by IMPACT in the Philippines was that expressed earlier by SEAMEO, i.e., only one-half of school age children were completing a primary education. Because funds were not available for a linear expansion of the normal system to meet these needs, the Government of the Philippines envisioned IMPACT as a possible alternative which could substantially reduce per-pupil costs to perhaps as much as by one-half of that of conventional education. Authorities in the Philippines, in reviewing the sources of educational costs, determined that costs associated with teachers accounted for more than 80 percent of the total educational budget. This is the primary reason why IMPACT has striven for a system with student-teacher ratios of 100:1 and more. One rationale which served the project well in designing the system was a clear warning to the IMPACT staff "not to equate learning with teaching." This rationale has served well in developing a variety of effective learning activities. These procedures make minimal demands upon teacher time for tasks that can be done effectively by others. Teachers are employed so that their professional influence can reach the maximum number of children in interactions where the impact of a professional adult is most beneficial.

A short description of IMPACT in the Philippines:

> Learning is self or group paced, and progress is measured by achievement rather than by year in school.

The curriculum is integrated so that learning is not separated into subjects and so that learning in one subject can support and reinforce that in others.

Learning is modular, a module being a cohesive learning segment directed toward a specific set of educational objectives.

For the first 2 1/2 years of school, children learn in groups of 8-10 students and are taught by older primary students who have learned simple and specific teaching steps. The process is termed "programmed teaching" because the steps followed by the older student "teachers" have been programmed for effective learning. Teaching is done under the constant guidance and supervision of professional teachers.

Learning in the second semester of grade three is termed "transition learning" because children at this level are under the guidance of an older student in developing the peer-group learning skills which they will use extensively in the last three school years.

Students in the last three years learn primarily in peer groups, taking turns leading the group following steps outlined in a leader's guide.

Self study is used by the more able students who study enriched advanced modules while the less able review the basic modules used in peer groups. Self instruction is also used in the home by children who must be absent for a period. Those returning from extended absences are given remedial help by peers and may be reassigned to a new peer group progressing less rapidly.

Individual progress is evaluated by a series of modular and review post tests. Results are used both to remediate learning difficulties and to advance students to higher levels.

The older students who assist at the lower levels do so for only one hour each day.

Secondary school students take turns staying in their home village one day each month helping the primary school teacher by tutoring the less able, helping peer groups having learning difficulties, following up after post tests to explain identified learning deficiencies, etc. They are unpaid and are given school credit for community service.

A community aide serves in each school to maintain records and the learning materials library and to give and score post tests.

Community members and parents serve on school steering committies and assist by instructing student groups in specialized local skills and crafts.

> The teacher's responsibility is to organize and supervise the many learning activities and to monitor individual progress so that remedial help can be provided those having difficulty. More time is thus available to the teacher to give individual attention even though student-teacher ratios have been increased substantially. Also, the teacher has greater opportunity to provide an adult model in social situations than was previously possible given the restriction of conventional classrooms.

Three definitive cost-effectiveness studies of IMPACT have been made.[1] The consistent conclusion has been that costs are, indeed, reduced by 50 percent and that student achievements are equal to or better than those of youngsters in conventional schools. There is little wonder why the LCL concept is being reviewed favorably by educators of many countries.

Indonesia

Proyek PAMONG also was begun in January 1974, and early school tryouts started in September of that year near Solo in Central Java. The demonstration year for all grades coincided with that of IMPACT: 1978-1979.

The problems for which an alternative was sought in Indonesia included the relatively small proportion of children completing a primary education, the large proportion of drop outs after the 3rd grade, and the lack of opportunity for continuing education for children who were unable to complete primary school. One constraint on the design of this alternative was the difficulty in transferring teachers from schools with normal student-teacher ratios in order to attain higher and more cost-effective ratios. As will be seen, this constraint was used as a resource by the Indonesian planners to meet the educational needs of out-of-school youth.

1a. Tullao, Tereso S., Jr.(de la Salle University) Initial cost estimates of IMPACT technology andtraditional schooling. Manila: INNOTECH, 1978..

1b. McMaster, James (Canberra College of Advanced Education) Cost-effectiveness analysis of Project IMPACT for the Philippines. Manila: INNOTECH, 1978.

1c. INNOTECH. An evaluative study of Project IMPACT. Manila: INNOTECH, 1978.

A short description of PAMONG in Indonesia:

Learning during the first two years, as in IMPACT, is in small groups under the leadership of older students acting as programmed teachers.

Transition learning covers the full third year and is guided by a single teacher. Indonesia considers this year to be critical for children who are to enter the more self-directed peer learning of the upper three years.

Community steering committees give guidance to the administration of PAMONG. Members of the community with special skill are paid small amounts to develop and conduct formal learning classes in their specialties.

Modular and review post tests are consistently used as in other LCL projects.

A unique aspect of the project is the new roles for those teachers who can be released from schools by the higher student-teacher ratios of PAMONG. They act as supervisors of out-of-school learning activities. Learning posts are established in several locations within each village where youth can report regularly to meet with the teacher, select modules for self study, take post tests, and receive professional support for their learning. These posts are provided with modules and are set up in homes or community buildings.

Although out-of-school learners take longer than those in school, they are able to complete the primary school curriculum and receive the normal certification of graduation.

Another PAMONG component which is just beginning is the adaptation of the system to small remote multigrade schools in which a very few teachers are responsible for all grade levels. A portion of the school itself is to be set aside for out-of-school learners.

PAMONG has been expanded from the initial four schools in Central Java to five more on the island of Bali. The learning post component also is being utilized extensively in Malang, East Java. Plans have been made and funding secured for a large-scale expansion which will increase the number of schools on Bali to 25 and the number of learning posts to 450. There also will be a developmental tryout in 10 remote schools in Central Kalimantan. The Government of Indonesia plans to have 200,000 students enrolled in the PAMONG system by mid 1984.

Thailand

Project RIT (Reduced Instructional Time), another LCL project, was begun under the auspices of INNOTECH in Vietnam as an alternative approach to finding cost-effective means for mass primary education. With the change of governments in that country, RIT was reestablished in Lopburi, Thailand.

The main goal of the Royal Thai Government is to develop an alternative which will be effective for educating children in rural and remote poverty areas. Teachers are in short supply in these schools because they often prefer to live in more populated communities. All efforts of the Government have been unable to alleviate this condition. New graduates from teacher training institutions are usually given these assignments, but many are able to relocate themselves elsewhere. The purpose of RIT in Thailand, therefore, is not primarily one of attempting to achieve higher student-teacher ratios; it is one of providing a means for effective learning in schools where these ratios already exist.

Project RIT is not as yet an LCL system in the same sense that IMPACT and PAMONG are. It has been an experiment to find more effective instructional procedures for reducing the time required for student learning and the time required of teachers in providing instruction and guidance. The rationale has been that, once effective time-reducing procedures are developed and evaluated, systems encompassing both schools and classrooms can be designed to take advantage of the reduced time. Such a system is now being planned by the project staff and the Ministry of Education. Essential characteristics are:

> A few teachers in multigrade schools are to be responsible for 60 to 80 children each even though formal class structure is maintained. The number of teachers in a normal six-class school is reduced from six to four. The reduction of learning times summarized below makes it possible for only two teachers to be responsible for the four upper grades while two will still be required for the lower two grades.
>
> Children learn by self-instruction, in peer pairs, and in peer groups. Often homework is assigned for several students to learn together.

A teacher will work with one class demonstrating and giving assignments while other classes are learning without direct interaction with the teacher. Student monitors are assigned these classes to insure that children keep on task.

After a class has completed its learning sequence in the absence of a teacher, a new session is held with the teacher to review, test, and remediate.

The learning materials and procedures used in RIT are so varied that they will not be described here. However, it would be provident of interested countries to visit RIT sites to gain insights into the richness of the learning experiences available to RIT children.

Initial experimental comparisons were made of several approaches in the learning of diverse content in all grades. Teacher time has been reduced by 20-30% at grade 1, by 30-40 % at grade 2, and by 50-90% at grades 3 through 6. These reductions have enabled the staff to plan the system outlined above. The project is now in a progressive development phase in which one new grade level is included each year. Grades 1 and 2 are complete, and evaluation data are available. Rural RIT students included in the experiment are achieving at a level comparable to that of students in urban schools, a condition that has never existed in Thailand before RIT. Youngsters in the small mutigrade schools in which one teacher is responsible for two grades demonstrate positive learning differences that are highly significant compared to those in similar schools operating under the conventional system. Further, students who have been in RIT for two years are out-performing those who have been in the project for only one year, an indication of continued learning growth.

Next year RIT will be expanded for grades 1 through 3 from the present five experimental schools to 23 schools clustered in four rural areas throughout the country. The phased development schedule being followed by RIT will include one new grade each year so that progress will parallel that of the Royal Thai Government in the preparation of a new curriculum for primary schools. By 1983 the full six grades of primary school will thus be covered by RIT learning in all regions of Thailand.

Liberia

Project IEL (Improved Efficiency of Learning) is the newest outgrowth and adaptation of the LCL concept and is located in Gbarnga, Liberia. The problems in that small West African country are not dissimilar to those of many countries of Asia. A large number of children do not have access to schools, and only a small proportion of those who do are able to complete their primary education. This problem is further exacerbated by the fact that only 25% of teachers have as much as two years of pre-service training. The remaining 75% are only secondary school graduates or less and have received no teacher training.

A World Bank study estimated that, even with maximum use of available resources, the proportion of qualified teachers would not exceed 35% over the next ten years. The Government of Liberia in its effort to find an alternative which could improve the learning of children even with underqualified teachers, sent a delegation of senior educators to observe PAMONG in Indonesia and IMPACT in the Philippines. They were impressed by the possibilities of these LCL projects to be adapted for use in their country. While IEL has many of the characteristics of IMPACT/PAMONG it is uniquely Liberian. Not only are student-teacher ratios to be increased so that more children can have an opportunity for primary education, but also teaching-learning procedures are being developed which are appropriate for use by the underqualified teachers with limited backgrounds.

A short description of IEL in Liberia:

> Student-teacher ratios in grades 1 to 3 will be approximately 60:1, and those for grades 4 to 6 will be 100:1. Because there is a larger enrollment in the earlier grades, the projected overall ratio is 69:1.
>
> The underqualified teachers in the early grades will be programmed teachers, much as are the older students in IMPACT/PAMONG. However, these teachers in Liberia will be responsible for conducting short programmed teaching sessions with small groups while monitoring and supervising non-teaching learning activities of others in their classes. They will rotate groups for program-

med teaching in 15 to 20 minute intervals while other groups engage in review and practice activities, many of which are predesigned and self-managed games.

Learning among the older students will be essentially identical to that of other LCL systems, i.e., in small peer groups with students taking turns in leading their group. Self study also will be possible for both enrichment and home learning.

Peer and cross-age tutoring will be used for short periods each day to assist those having the most learning difficulties.

One aspect of IEL which is difficult to describe is the way in which materials and procedures have been sharpened and simplified over those of earlier projects. This result is not so much an adaptation to the conditions found in Liberia as it is a result of IIR's extensive experience with the three previously described projects. Fourteen programmed teaching programs, for example, have been refined to a concise four. In addition, the number of pages of learning materials have been reduced to almost one-half.

The project office in Gbarnga was staffed in September 1979 and materials for grades one through three currently are undergoing formative tryouts in a project laboratory school. System tryouts in five schools will be conducted in the 1981 and 1982 school years, and the project will undergo an experimental evaluation in 10 schools in 1983. The Government of Liberia plans to expand to an additional 90 schools if evaluation results show IEL to be a viable alternative.

Possible Approaches for Adapting LCL

As has been seen, the LCL concept adapts well to a variety of needs and conditions. New adaptations in other countries without doubt will produce systems which are specific to each nation's needs, utilize the resources available within local communities and schools, and are compatible with extant traditions and culture.

Clearly, it would be impossible to suggest at this time a definitive system design for an LCL system in a new setting. Such a design should be a targeted goal of initial project planning in any country contemplating LCL adaptatation. Therefore, this section will only explore some possible alternatives and will give examples of the use of explicit rationales in

evaluating some characteristics of present LCL systems for use in new situations. In doing so it will be necessary to make some assumptions, many of which may prove to be incorrect and inappropriate to conditions in a new country. In reading this section, therefore, we ask that you attend more to the process of designing components based upon explicit rationales than to the components themselves.

1. Cross-age tutoring

Rationale: The use of older pupils in the teaching of younger ones makes maximum use of a resource readily available in all schools. As has been shown in IMPACT and many other programs, young children often learn very effectively from those slightly older that themselves. Ideas can often be explained more easily by one child to another. Children are not necessarily born teachers, however, and they need to be provided with effective teaching strategies and be thoroughly trained in their use. This kind of teaching can be in small groups or in one-to-one tutorials. Utilization of cross-age tutoring frees the professional teacher from many repetitive instructional tasks so that more children can learn under the guidance of a single teacher and so that more time can be given to the important teacher responsibilities of identifying and remediating learning difficulties. This latter responsibility is difficult to fulfill in conventional large classes because of the need to tailor instruction to the "average" student and to insist that all students progress at the same rate.

Possible Component: As with projects IMPACT and PAMONG, older children could be trained to teach younger pupils and could follow simple and specific teaching steps contained in programmed teaching modules. Since the more difficult teaching responsibility would be of beginning students in the first grade, programmed teaching at this level could be performed by students in the last grade or level of primary school. Programmed teaching of the second grade could be the responsibility of students who are in their next to last year. Each of the older students could be assigned programmed teaching duties for only one period each day.

Depending upon enrollment patterns, available older primary students could also be assigned monitoring

responsibilities of third grade peer groups during the first semester. In the second semester the older students could serve as tutors to help students in the third grade having specific learning difficulties. In the same way, some of the third graders could give tutorial assistance to the two lower grades.

2. Activities by ability levels

Rationale: In both IMPACT and PAMONG programmed teaching responsibilities initially were assigned only to the most able. It was found that these better students soon felt that they were being overburdened, and some even stayed away from school for a period of time. When these responsibilities were given students of all ability levels, not only did the more able join in, but also it was found that the less able became excellent and highly-motivated "teachers". They followed the programmed teaching lessons faithfully and showed great patience with their younger "students."

Design Component: All students in the upper two grades would be trained as programmed teachers of the lower two grades. It would be necessary, however, to determine whether all levels of the third grade could be trained as tutors of younger students.

Rationale: Placing children in ability-level groups at any age leads to two consequences: (a) high level groups progress rapidly and (b) low level groups progress slowly, require increasing amounts of remedial help, lose self respect, and tend to drop out of schools. There is both an academic and a social need for interaction among all ability levels. However, placing the most able with the least able can be frustrating to both.

Design Component: Organize heterogeneous ability peer groups without including the extremes in the same grouping. One scheme for double grouping has worked quite well in IMPACT. One group includes children at approximately the 1st to the 75th percentile, and the other includes those at approximately the 25th to the 99th.

3. Peer mediated learning

Rationale: When trained and provided with appropriate learning materials, students are capable of interacting in ways that lead to very effective learning. Well

designed peer-mediated procedures are effective both in small groups and in one-to-one tutorials. Even the very young can assist each other if they are shown how. IEL in Liberia, for example, intends that even the first graders spend two-thirds of their time in peer groups for review and practice. If older children can be enlisted as programmed teachers, however, the learning of beginning students should more typically be in organized peer groups under the leadership of the older programmed teachers and the supervision of teachers.

Design Component: Peer-group learning could be the norm for the upper three grades. Specific materials, particularly leaders' guides, should be developed so that such activities would be programmed for more effective learning. Programmed teaching of younger children by older students could be supplemented by peer-group or peer-pair practice and review. Individual deficiencies, identified by the teacher, can be remediated through peer and older-student tutoring. Peer grouping also would provide an excellent means for group projects in science, social studies, and applied arts.

4. Self-instruction

Rationale: Self directed learning is an essential skill throughout life because the most valuable adult learning experiences are truly self directed. Primary schools have a responsibility to develop these skills progressively. Thus, it is an objective as well as a process of learning.

Individualized programmed texts are valuable and effective media but should be utilized sparingly. By definition they are not self-directed, they are program-directed, and do not necessarily lead to the development of self learning habits. Even though programmed texts have been shown time and again to be effective learning tools, excessive use has often led to disinterest and boredom because they tend to minimize personal interaction.

Design Component: Self-instructional materials could be designed for use by the more-able students in enrichment learning and by children who are absent or have to make up school work after absences. Typically no more than one school period per day should be scheduled for use of these materials.

Other forms of self directed learning should receive stress, however, because of the value these kinds of learning habits can have throughout a person's life. These learning experiences could include individual projects, essays and reports, art and crafts, home study, etc.

5. Self-pacing

Rationale: A system can best adapt to individual needs and abilities if it allows children to progress at their own pace. However, there is one objection to this concept and one probable constraint within most countries adapting LCL. The objection is the one voiced above with respect to self-instruction: a system which relies heavily on self-instruction becomes ineffective because of student boredom. It is better, therefore, to sacrifice some of the benefits of self-pacing in favor of the more lively learning interchange which is engendered by peer group learning. The pacing, in that case, would be that of the small group - and is one that still is an improvement over the lock-step progress of larger classes.

Design Component: Self pacing could be practiced with respect to the use of enrichment materials by some of the more able students, to the assignment of individual projects, etc. It usually is unwise, however, to make self pacing an overall norm for LCL programs.

6. Instructional materials development

Rationale: The development of instructional modules specific to the LCL learning system is optimum for effective student learning. These materials include student learning modules, programmed teaching guides, peer-group leaders booklets, teacher guides, etc., and they are integral components of a total system. A constraint in many countries may be a lack of funds for the development of system-specific learning materials. Complete development, tryout, and revision of new instructional packages is always an expensive undertaking and one which often is impossible without the assistance of external donors. The amount of investment necessary for system development by host country and donor combined may reasonably exceed $5 million U.S. The developmental phase can seldom be completed in less than three to five years, and sufficient professional manpower must be made available throughout this period.

Although instructional modules tailored for use in an LCL learning system is optimum, alternatives may be possible if developmental funds are not available. For example, the key LCL concepts of programmed teaching and peer-mediated learning may be accomplished through the design of supplementary learning and teaching guides and the use of existing texts. It would be necessary, however, to conduct a series of critical studies before having confidence in using this approach. The design components suggested below reflect the maximum possible use of existing materials and texts.

Design Component: Project staff would prepare both programmed teaching guides and peer-mediated learning guides. Teachers, teaching assistants, and students would be trained in their use.

Examples: A programmed teaching guide for use of a teaching assistant or aide could give precise instructions for using materials from existing texts in in the preparation of charts and displays for use by programmed teaching group groups. For each lesson, the guide may indicate specific material to be written on the chalk board. Teaching assistants would have to be trained in these activities.

A second programmed teaching guide could be prepared for use by older children acting as programmed teachers. The guide could be used much as is done in PAMONG/IMPACT/IEL, i.e., in following specific and effective teaching steps, but the materials would be those prepared by the teaching assistant rather than by the research staff.

A leaders' guide for peer groups could detail the most effective learning sequence for use of texts within the group. Children could take turns reading identified passages, doing mathematics problems on the chalk board, etc. The guide would include instructions for maximizing group learning for each lesson, would pose questions or assign exercises for group members, and would give feedback for each question or exercise plus the rationale behind each answer. The process of peer-group learning, thus, could be almost identical to that of other LCL systems, but the basic materials could be the present texts.

If developmental funds are available, however, LCL modules should be developed not only to insure more-effective learning, but also to reduce operational

costs once a system has been developed and is implemented in a large number of schools.

Modules designed specifically for use in an LCL system are more parsimonious in that they contain only the needed material for a given lesson, and students are not distracted by content not relevant to that lesson as they would be when using a textbook. It is also highly probable that students are able to follow more effective learning sequences when they learn from a module than if they must depend upon guides and instructions for the use of conventional textbooks. Module booklets also are more adaptable for self-study uses, particularly for those who may want to study at home during absences or who must make up work missed during such absences.

7. Community members as resources

Rationale: Some of the most unused learning resources in many communities are the community members themselves. Literate persons can assist teachers in a number of ways in support of student learning, including record keeping, tutoring, maintaining order, etc. Illiterate members of a community also can help if they have valuable skills which can be transmitted to school children, and all can assist in making community decisions, improving school facilities, and providing the commitment and cooperation necessary for universal primary education.

Design Component: Teaching assistants. Mention was made earlier about the possibility of using teaching assistants in preparing programmed teaching materials. Other responsibilities which they could undertake in an LCL system would include record keeping, maintaining a library of instructional materials, monitoring group learning activities (particularly those of first and second graders), administering and scoring modular tests, providing remedial help to children having learning difficulties and to those returning to school after extended absences, substituting as programmed teachers when there is an insufficient number of older students, etc.

Parents. Those who should be the most concerned about the learning experiences of children are the parents of those children. Parents should be brought into the decision process at the community level, be informed of needs, and be shown how

they can give needed assistance. If the LCL system can maintain a participatory and committed attitude on the part of parents, many of the previous deficiencies such as absences and dropping out can be ameliorated. As suggested earlier, parents can assist teachers in the schools, help maintain facilities, and provide special skill training. Most of all, however, they can give support to the school by recognizing the importance of education to their children and giving them positive guidance and support. All parents, however poor or untutored, can do these things.

Community members, whether parents or not, can support LCL schools in many of the ways outlined above. It will be one important responsibility of both teachers and administrators to secure the support and participation of each community. This is a need of all schools, whether LCL or not.

8. Teachers

Rationale: It is a misuse of professional teachers to insist that they stand daily before a large class of children imparting knowledge that can better be gained in other ways. And it is a greater misuse because of the time which class lectures demand and take away from a teacher's ability to support learning, socialization, and citizenship in ways that no "non-teacher" mode of instruction can do.

Excerpts from the September 1974 INNOTECH Newsletter[1] are included here as a basic rationale for the role of teachers in LCL systems:

> "Every reader of this Newsletter most probably can recall with great pleasure at least one outstanding teacher who has made a real difference in his or her life. If only there were more such teachers! Quite often we remember teachers of this calibre because they made learning meaningful and rewarding, because they took the time to help slow learners and challenge faster ones, and because they set clear-cut goals and let students know how well they were progressing toward these goals.

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1. Nichols, D.G. Using Non-teacher Instruction to Maximize Teacher Effectiveness. INNOTECH Newsletter, Saigon, September 1974, 2, 12.

". . . It is clearly impossible for countries in our Region to even approach the targets of universal primary education by merely expanding their present educational systems; the money simply is not available, particularly the money needed to train and pay the additional teachers that would be required.

". . . How, then, can we hope to achieve such targets without somehow crippling our ability to give students the benefits which we ourselves have received through outstanding teachers? INNOTECH, in its research and training programs, is finding some tentative answers. . . . These answers concern using non-teacher instruction to maximize teacher effectiveness.

". . . Non-teacher instruction can take many forms . (however) . they share the common characteristic of freeing the teacher from being the single "imparter of learning." Very often . . . they can be more effective than a teacher (at least than the usual teacher) because they are carefully designed for that sole purpose without particular regard for the other functions that a teacher must perform.

"What can non-teacher instruction do? It often can replace the traditional teacher in providing such important aspects of learning as

... clear statements of goals and objectives
... relevance and meaningfulness of what is learned,
... instructions on how best to learn,
... pacing which will allow both slower and faster students to learn at their optimum rates,
... sufficient practice to insure learning,
... opportunity for a student to evaluate his own progress and to take steps to be upgraded (remediated) on those things learned least well.

"What can non-teacher instruction NOT do? It cannot provide the emotional, social, and supportive needs of many learners, and it cannot give the

needed flexibility in response to unanticipated occurrences. Teachers will always be necessary to provide students with

... guidance, support, and encouragement,
... management of educational experiences,
... enrichment,
... evaluation,
... remediation,
... reporting and rewarding progress,
... interaction with parents and community. . . . . "

New countries planning an LCL system will have to examine their specific learning needs and design a system which can make maximum use of those capabilities which teachers have - and which non-teacher modes cannot provide. Socialization, individual attention, providing adult models, management, and other uniquely human qualities should describe the roles of teachers in the LCL system.

Design Component: Teachers in LCL schools can be managers and supervisors, orchestrating a variety of learning experiences. Classroom lectures could be minimized, and teachers could devote the majority of their time to: monitoring the various modes of learning; identifying individual needs and providing supportive help; evaluating the progress of individuals and groups; giving guidance and training to programmed teachers, peer-group leaders, and teaching assistants; meeting with parents and other community members; and generally fulfilling the guidance role that the word "pamong" means in the Indonesian language.

The previous pages have only been an exercise in IEL project design; they are not a definitive design nor do they represent IIR's recommendations. With too many assumptions and too little knowledge of the conditions in a new country it would be far too easy to design a system entirely inappropriate to the needs and resources of that country. One major assumption has had to be: government officials, administrators, teachers, parents, and students will be willing to try out a system contrary to traditional education if it holds any promise of improving quality while increasing enrollments at reduced per-pupil costs. An ancillary to that assumption is that judgements about an LCL system will be suspended until it has been given adequate tryout and evaluation.

Sources of Additional Information

A number of persons and organizations have been working in the development of LCL systems worldwide. Addresses are listed below to assist those interested in adapting LCL concepts in their own countries.

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