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# The Production of Secondary School Personnel: PROJECTED COSTS

An IIME Staff Report

1964

**IIME**

**INSTITUTO DE INVESTIGACIONES Y MEJORAMIENTO EDUCATIVO**  
Interuniversity Program of the University of San Carlos of Guatemala and Michigan State University



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# The Production of Secondary School Personnel: PROJECTED COSTS

An IIME Staff Report

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## **PREFACE**

The Institute for Educational Research and Improvement (IIME) now has obtained substantial amounts of data from various sources. Not the least of these sources is a series of regional conferences and workshops attended by representatives of Central American universities, ministries of education and regional educational organizations. These persons have contributed significantly a wealth of detailed knowledge derived from their long, intimate experience with education in their respective countries.

The present report was presented, in part, at a regional teacher-training workshop held at the Institute, February 18-21, 1964. The five Central American nations' universities and ministries of education were represented, as was the Institute for Educational Research and Improvement. That workshop was an outgrowth of the First Central American Conference on the Training of Secondary School Teachers, sponsored by IIME during July, 1963. The February workshop was a major step in the deliberate process of forging a feasible, effective long-range plan for resolving a major regional problem: the shortage of qualified secondary school teachers. Information from all sources has served to provide a data base essential to the development of a plan of action for the immediate future, calculated to produce secondary school teachers for Central America.

The Central American republics are making a determined effort to free themselves from an anachronistic educational system in which all levels of education remain relatively static. One of the means most strongly indicated for improving that situation is the training of teachers who are fully qualified for service in secondary education. The reason is that secondary education is a key area of the system: it trains the persons who will teach in the elementary schools; it prepares the college-bound student for entry to the university, and it prepares the technicians, secretaries, bookkeepers, etc., who enter the sub-professional labor market. Hence, to produce fully-qualified secondary school teachers would benefit positively all three levels—elementary, secondary, and higher education.

If one considers seriously the problem of an effective plan for training secondary school teachers, it is essential to take all factors into account. The investment will be great, but the people of the region will—in the long run if not the short—be greatly benefited by it. To this end, the governments of the five nations of the region will have to increase their present efforts in this aspect of education. To be sure, any reasonable plan will be more feasible if it is supported by foreign economic assistance extended through grants or loans.

If we aspire to a future in which the basic necessities of the individual are satisfied, we must accept the need to offer the best that we can to our youth. The “best” must include a full education that incorporates the best that contemporary civilization offers, so that Central American youth may be educated with fully qualified teachers equal to the task of creating an environment conducive to comprehensive educational development.

Those aspirations will be given meaningful expression when a concrete plan is projected for training the secondary school teachers that Central America needs. Teachers must be produced both to liquidate the present regional “deficit” of such personnel, and to satisfy the inevitably greater demand for qualified teachers that is being created by a growing population with increasing hopes and aspirations.

The present report is the first serious attempt to come to grips with the questions of “how?” and “how much?” that must be faced in the continuing process of deliberate planning to resolve major educational problems. It is hoped that this report will be of assistance to those who must engage seriously in that planning process. The report is a part of the series derived from IIME’s continuing studies of teacher education in Central America. Credits for the preparation of this staff report are indicated on the title page.

Pablo Lacayo P.  
Guatemala, 1964

## CONTENTS

SUMMARY OF THE REPORT . . . . .	1
THE NEED FOR PERSONNEL . . . . .	2
Assumptions . . . . .	4
Predicted Teacher Deficit 1967 . . . . .	5
Minimum Added Demand 1967-1977 . . . . .	6
Total Requirements for New Teachers . . . . .	7
MAGNITUDE OF THE TRAINING PROGRAM NEEDED . . . . .	8
Assumptions . . . . .	8
Number of Candidates to be Enrolled . . . . .	9
Numbers of Faculty and Staff Required . . . . .	10
THE COST OF PRODUCING 1,077 GRADUATES PER YEAR . . . . .	12
Cost of Operations . . . . .	14
Salaries . . . . .	14
Other Operating Costs . . . . .	15
Total Operating Costs . . . . .	16
Capital Outlay . . . . .	17
Construction . . . . .	17
Equipment . . . . .	18
Total Capital Outlay . . . . .	19
Summary of Costs . . . . .	19
CONCLUSION . . . . .	19
REFERENCE MATERIALS . . . . .	21

## TABLES

1. Personnel Ratios . . . . .	11
2. Full-time University-Level Personnel Needed to Staff Teacher Training Programs . . . . .	13
3. Salary Scale and Average Salaries . . . . .	15
4. Cost of Operation Attributable to Salaries: Per 1,000 Students . . . . .	15
5. Summary of Projected Annual Costs of Producing Secondary School Personnel . . . . .	19

## SUMMARY OF THE REPORT

The point of departure for this report is the need to graduate drastically increased numbers of qualified secondary school teachers in the five Central American republics: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. This report is an attempt to determine the costs that will be incurred in the conduct of a regional teacher training program adequate to the need. Costs are estimated for a *minimum* program, not an ideal program, hence projections are conservative. The following facts and projected costs are established:

1. There will be a deficit of 5,096 qualified teachers by 1967.
2. Each year after 1967, there will be a need for an *additional* 439 qualified teachers to accommodate the enrollment increases due *only* to population growth; this figure (439) does not provide for an increase in the proportion of school-age youngsters who might enter secondary education.
3. In order to eliminate the personnel deficit by 1977 and to prepare the number of teachers required for expanding enrollments, the seven university-level teacher training institutions in Central America must graduate not less than 1,077 qualified teachers each year beginning in 1967.
4. In order to graduate 1,077 new teachers per year, the institutions must enroll not less than 6,000 full-time degree candidates.
5. The annual operational cost for educating these university-level students in a four academic-year program will be approximately \$809 per student.
6. In order to provide safe and sanitary buildings for the program, an additional annual cost of \$61 per full-time student will be incurred.
7. The estimated annual cost of equipping the educational buildings is \$21 per full-time student.
8. The total annual cost for preparing the 1,077 graduates is estimated to be \$891 per full-time student.
9. The total annual cost for Central America is estimated to be \$5,888,481.

The calculations presented in this study presuppose a preparatory program comprised of four academic years, completed by most students in four calendar years.

The same plan of studies, however, could be completed in only three calendar years, if the teacher trainee were to pursue his studies full time, twelve months of each year instead of the usual eight or nine. If a plan of three calendar years' duration were adopted in Central America, the number of students that would need to be enrolled full time to produce 1,077 graduates per year would be less, and there would be a corresponding reduction in annual costs.

To adapt these cost analyses to a plan of three calendar years, therefore, the following statements should be substituted for those now appearing as items 4 and 9 above:

4. In order to graduate annually 1,077 new teachers, the preparatory institutions will need to maintain a full time enrollment of 5,091 students.
9. The estimated total annual cost of the program in Central America is \$4,536,081.

## THE NEED FOR PERSONNEL

From the most recent study of secondary school needs in Central America,<sup>1</sup> several facts are now clear.

1. The number of secondary school enrollees is increasing at the rate of approximately 10,900 pupils per year.<sup>2</sup>
2. If a qualified teacher is to be provided for each 31 of these new pupils, the teacher training institutions in Central America must graduate no less than 351 new teachers each year.

$$\text{Calculation: } \frac{10,876}{31} = 350.84$$

3. However, the seven institutions graduated only 704 teachers between 1950 and 1962,<sup>3</sup> an annual average of 54.

$$\text{Calculation: } \frac{704}{13} = 54.15$$

4. Unless the number of graduates is increased, there will

<sup>1</sup>Paul G. Orr and Karl T. Hereford, *Necesidades de Personal en la Educacion Media* (Guatemala: IIME, 1963), p. 20.

<sup>2</sup>*Ibid.*, Table I, p. 5.

<sup>3</sup>*Ibid.*, Table V, p. 18.

accrue to Central America a growing deficit of 297 qualified teachers each year in the future.

$$\text{Calculation: } 351 - 54 = 297$$

5. In other words, the seven institutions must increase the number of graduates by 297 per year simply to take care of the growth of enrollment. This represents an increase in graduates of approximately six times the present rate.
6. Although the task of preparing teachers for the anticipated number of *new* pupils is great, the *basic* problem is even more serious. Referring still to the tables presented in *Necesidades de Personal en la Educacion Media*, these additional facts are pertinent:
  - a. Of the estimated 8,002 persons now employed as full- or part-time secondary school teachers,<sup>4</sup> only 840 are fully qualified by level and extent of training to teach in the secondary schools. In other words, in 1964, the overwhelming majority of teachers themselves are not qualified to impart instruction to secondary school students.
  - b. A minimum of 5,010 qualified full-time secondary school teachers is needed in 1964 to provide adequate instruction for each 31 students now enrolled.

$$\text{Calculation: } \frac{155,323}{31} = 5,010.42$$

- c. There is a present deficit (1964) of 4,170 fully qualified teachers.

$$\text{Calculation: } 5,010 \text{ (required)} - 840 \text{ (available)} = 4,170$$

If the seven teacher training institutions were to try—during a period of ten years—to eliminate the present

<sup>4</sup>*Ibid.*, Tables I, III, pp. 5, 10.

The figure of 8,002 was obtained as follows:

1. Divide the number of students in 1963 by the number of teachers in 1963:

$$\text{Calculation: } \frac{142,444}{7,339} = 19.41 \text{ students per teacher, 1963}$$

2. Assuming that the same ratio between students and teachers exists in 1964, and using projected 1964 enrollment of students, the figure of 8,002 teachers in 1964 is projected.

$$\text{Calculation: } \frac{155,323 \text{ (projected enrollment, 1964)}}{19.41 \text{ (1963 student-teacher ratio)}} = 8,002$$

deficit of qualified teachers, they would need to graduate not less than 417 teachers each year.

$$\text{Calculation: } \frac{4,170}{10} = 417$$

The teacher training institutions therefore must face this two-fold task: (1) produce new secondary school teachers in order to eliminate the present deficit, and (2) produce additional new teachers in order to accommodate increasing numbers of secondary school students.

#### Assumptions

In order to estimate the number of graduates required annually to provide a qualified teacher for each 31 high school students in Central America in the future, several basic assumptions are made.

These are:

1. It will not be possible in less than three years to increase markedly the number of graduates from teacher-training institutions; therefore, the year 1967 is chosen as the *base* year from which to project the number of needed graduates.
2. It is assumed that the present rate of growth of student population in the secondary schools (approximately 10,900 per year) will remain constant. (However, if the educational system is improved in the next decade, the rate at which students enroll in the secondary schools will very likely increase; hence, the projections for needed new teachers should be considered to be *minimal*.)
3. It is assumed that the ratio of one full-time qualified teacher for each 31 students represents an adequate, if not fully desirable, goal.
4. It is assumed that the universities and university-level normal schools themselves will make all appropriate efforts to prepare the required number of new graduates.
5. It is further assumed that the five countries included in this study will in fact undertake to solve this problem with appropriate political, legal and financial action.

In the calculations that follow, two determinations are made. These are: (1) the number of graduates required to eliminate the deficit of qualified teachers which will exist in 1967, and (2) the number of graduates required to attend the increase in enrollment anticipated between 1967 and 1977.

#### Predicted Teacher Deficit 1967

In 1967, it is estimated, 189,024 students will be enrolled in the secondary schools.<sup>5</sup> To provide adequate instruction for each 31 of these students, 6,098 qualified, full-time instructors should be engaged.

In the same year, however, there will be only 1,002 qualified teachers (786 by count in 1963, plus an accrual of an estimated 216 graduates between 1964 and 1967).<sup>6</sup>

In 1967, therefore, there will be a deficit of 5,096 qualified teachers.

*Calculation:*  $6,098 - 1,002 = 5,096$

To eliminate this deficit in ten years, new qualified teachers must be graduated at a rate sufficient to increase the number of teachers employed by not less than 510 ( $5,096 \text{ deficit} \div 10 \text{ years}$ ) per year, beginning in 1967. Two factors make it necessary that the annual number of graduates must exceed the number to be added to the teaching force. These factors are:

1. It must be anticipated that some qualified graduates will not remain in the profession, due to illness, death, change of employment, or other valid reason. Consequently, provision must be made to graduate a number of new teachers each year to replace those teachers who will leave the profession. The "replacement rate" applied here is 5 percent, an arbitrary but reasonable figure; 5 percent of 510 is 26. Hence, the annual graduating class must provide 26 replacements.
2. For each five (and preferably four) new qualified teachers, there should be one fully-qualified *professional service* person (administrator, counselor, librarian, etc.). The training

<sup>5</sup>*Ibid.*, Tables I, II, pp. 5, 7.

<sup>6</sup>*Ibid.*

of these persons logically should take place at the graduate level. The most likely candidates for professional service positions will be the secondary school teachers themselves. Consequently, for each five graduates who will enter classrooms, an additional graduate must be produced to replace the qualified teacher who will join the ranks of professional service personnel.

The calculations are as follows:

a. To reduce the present deficit of 5,096 qualified teachers, in ten years:	510 graduates per year
b. To replace up to 5 percent of those who do not continue in the profession:	26 graduates
c. To replace the one in five who will enter graduate study to become professional service personnel:	102 graduates
Total:	<u>638 graduates</u> per year

Therefore, it is estimated that the teacher-training institutions must graduate not less than 638 qualified teachers each year, beginning in 1967, merely in order to provide—by 1977—the number of qualified teachers that will be needed in 1967. This estimate is based exclusively upon the enrollment projected for 1967. It does not provide for increases in enrollment beyond that date; the requirements imposed by increases beyond 1967 are discussed in the next section.

#### Minimum Added Demand 1967-1977

At the present rate of increase of 10,876 students per year,<sup>7</sup> at least 351 graduates must also be provided each year to place a qualified full-time teacher with each 31 new pupils.

In addition, replacements of up to 5 percent must be provided for the persons among these graduates who will not continue in the profession, and also for those teachers who will enter graduate study to become professional service personnel.

<sup>7</sup>*Ibid.*, Table I, p. 5.

With these facts in mind, one can determine the number of graduates that must be produced annually to provide for increased enrollments beyond 1967. The calculations are:

a. For each 31 of 10,876 new pupils:	351 graduates per year
b. For replacement of 5 percent of those who do not continue in the profession:	18 graduates
c. For replacement of the one in five who will enter graduate study to become professional service personnel:	70 graduates
Total:	<u>439</u> graduates per year

#### Total Requirements for New Teachers

On the basis of these two sets of calculations, it is estimated that—each year, 1967-1976—the institutions of higher education in Central America must graduate (1) 638 teachers to eliminate the deficit that is anticipated for 1967, plus (2) no less than 439 qualified teachers to provide for the growth in secondary school enrollment.

Therefore, the number of graduates required annually is 638 plus 439, or 1,077. The teacher training institutions in Central America have as their task: *to graduate not less than 1,077 qualified teachers each year beginning in 1967.*

Of the 1,077 graduates to be produced each year in Central America, the requirements for each country are as follows:<sup>8</sup>

Country	Number of Graduates (annual): 1967-1976
Costa Rica	202
El Salvador	201
Guatemala	328
Honduras	159
Nicaragua	129
Central America	1,077

<sup>8</sup>*Ibid.*, Table VII, p. 18. Table VII presents the number of graduates needed through 1970.

## MAGNITUDE OF THE TRAINING PROGRAM NEEDED

The combined annual graduating class of the Central American teacher-training institutions must number 1,077. The next question is: how many freshmen must be enrolled each year in order to produce 1,077 graduates several years thereafter. It is clear that not all beginning students will "survive" until graduation; there will be depletion due to medical, emotional, and economic causes as well as depletion due to academic difficulties.

### Assumptions

Several assumptions are necessary in order to arrive at estimates. It is assumed here that:

1. The teacher-training program will be an adequately supported, full-time, four-year program (i.e., 8 semesters or 12 quarters), but may be completed, on a 12-month schedule, in less than four calendar years.
2. Approximately 45 percent of the freshmen will "survive" to be graduated four academic years later; hence the graduating class will comprise approximately one-sixth or 16.6 percent of total enrollment in the four-year curriculum.

The second of these assumptions is not based upon Central American experience, for there has been little experience applicable to the problem and scant data is available for reference. Most programs of higher education in Central America are essentially part-time operations; as a result, in some of the teacher-training institutions, the graduates represent only 3 percent of the total enrollment. It remains to be seen what results full-time institutions in Central America might achieve.

The two normal schools in the area (Honduras and El Salvador) now graduate larger percentages of their enrollment; however, (a) neither school offers a four-year program and (b) virtually all their students are elementary school teachers on leave of absence, with full salaries plus economic assistance; hence the applicability of their experience is doubtful.

The number and value of scholarships and other economic aid, of course, will be an important factor affecting the "drop-out" rate

of the new full-time programs. A forthcoming study<sup>9</sup> suggests that the greatest proportion of those programs' drop-outs will come from families (a) whose monthly income is less than \$300 and (b) in which the parents themselves—and particularly the mother—have less than a secondary education.

At any rate, the assumption that the graduating class will comprise one-sixth of total enrollment appears to be a prudent estimate, assuming that support for the programs will provide the economic inducements required to retain students on a full-time basis. If the assumption should prove to have been unduly conservative, and if *more* than one-sixth manage to graduate, the extra graduates will be needed in any case to provide teachers for what is hoped to be an increase in the proportion of youngsters entering secondary schools.

#### Number of Candidates to be Enrolled

The following projections are based upon the two assumptions specified above and upon the enrollment projections in *Necesidades*:

1. In order to produce 1,077 graduates each year, not less than 6,600 full-time students (or their equivalent in full- and part-time students) must be enrolled in the four-year program of study. This assumes that the graduates will comprise roughly one-sixth of the total enrollment.
2. The total of approximately 6,600 students would be distributed by academic year approximately as follows:<sup>10</sup>

Freshman	36.4%
Sophomore	25.3
Junior	20.6
Senior	17.7
Total:	<u>100.0%</u>

3. The enrollment for each country and for the region would approximate the following:

<sup>9</sup>The study of "drop-outs" at the University of Costa Rica, by Dr. Mario Romero; a forthcoming IIME publication.

<sup>10</sup>*Ibid.*

Academic Year	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua	Central America
1	586	448	729	354	289	2,406
2	407	311	507	246	201	1,672
3	331	253	412	200	164	1,360
4	285	218	354	172	140	1,169
Total	1,609	1,230	2,002	972	794	6,807
Graduates per year	262	201	326	159	129	1,077

### Numbers of Faculty and Staff Required

In order to determine the number of personnel required by the higher institutions to prepare and graduate 1,077 qualified teachers annually, a theoretical model for an enrollment of 1,000 full-time students was constructed and used in the calculations.

The 1,000 full-time students would be engaged in these studies:<sup>11</sup>

1. general studies;
2. a teaching major (an area of specialization later to be taught in a secondary school);
3. basic courses in the professional study of education; and
4. an appropriate period of supervised teaching under the direction of a "master teacher."

In order to provide the courses and related services required for the preparation of 1,000 full-time students, 119 positions were deemed to be minimal.<sup>12</sup>

- 50 Professors (general studies, subject-matter areas, education)
- 13 Teaching Assistants
  - 1 Administrator
  - 1 Assistant Administrator
  - 2 Counselors
  - 1 Coordinator: graduate placement and follow-up

<sup>11</sup>Emma Gamboa and Felix Hernandez Andriano, *Formacion de Profesores de Educacion Media* (Guatemala: IIME, 1963), p. 12-15.

<sup>12</sup>*Informe de Comite de Finanzas de Segunda Conferencia Centroamericana sobre la Preparacion de Profesores de Educacion Media* (Unpublished Manuscript). IIME, 1964.

- 1 Coordinator: audio-visual material
- 1 Coordinator: development of instructional material
- 1 Coordinator: experimental programs
- 1 Coordinator: practice teaching
- 4 Supervisors of practice teaching
- 1 Business Officer
- 1 Research Specialist
- 1 Librarian
- 1 Office Machine Operator
- 19 Secretaries, for Professors, Administrators, Coordinators, Counselors, etc.
- 6 Assistants: materials development, audio-visual aids
- 3 Research Assistants
- 3 Continuing Education Assistants
- 3 Assistant Librarians
- 5 Custodial Service Personnel

The above enumeration of personnel is designed to attend to an enrollment of 1,000 full-time students. These personnel requirements are expressed in Table 1 as ratios (e.g., one professor for each twenty university-level students). Using the ratios, it is possible to estimate—with reasonable accuracy—the personnel that would be required to attend a larger or smaller number of students.

TABLE 1  
PERSONNEL RATIOS

<i>Type of Full-Time Position</i>	<i>Ratio</i>
Professor	1 for every 20 students
Administrator	1 for every 16 professors
Coordinator of Instruction	1 for every 12 professors
Academic Aide	1 for every 8 professors
Librarian	1 for every 50 professors
Secretary	1 for every 2.5 professors
Office Clerk	1 for every 3 professors
Administrative Assistant	1 for every 10 professors
Research Assistant	1 for every 10 professors
Custodian	1 for every 10 professors

This estimate has been made for the anticipated enrollments in the projected teacher-training programs; Table 2 is a summary of the estimated personnel requirements.

The estimates in Table 2 make it clear that the teacher training institutions will face a formidable recruitment and staff development task. They will need, for example, 330 full-time professors in order to offer instruction to the future secondary school teachers; at present, higher education in Central America does not have that many *full-time* professors in *all* fields of study combined. Nevertheless, as is indicated in Table 2, the institutions will have to engage 426 full-time professional persons (professors included) between 1964 and 1967 in order to be able to start producing the required number of graduates in 1967.

### THE COST OF PRODUCING 1,077 GRADUATES PER YEAR

Costs vary among the five countries of Central America. In this report, average costs were constructed. However, these must be adapted to the economic conditions of each country before they can be applied validly.

In order to estimate the costs of producing 1,077 graduates each year, several steps were taken. Briefly stated, these were:

1. An average salary cost was estimated for each category of personnel described in Table 1. A total cost was determined for a staff adequate to attend the hypothetical enrollment of 1,000 students.
2. The cost of providing minimal but adequate texts, instructional materials and research was added to personnel costs.
3. The cost of physical plant maintenance and operation, and the general costs of providing services to professors, were estimated and added to the total.
4. These costs were then summed and called "cost of operation."
5. An estimate was made of physical plant needs: construction of needed buildings, and original equipment needed for the buildings. This estimate was entitled "capital outlay."

**TABLE 2**  
**FULL-TIME UNIVERSITY-LEVEL PERSONNEL NEEDED**  
**TO STAFF TEACHER TRAINING PROGRAMS**

<i>Personnel</i>	<i>Ratio</i>	<i>Costa Rica</i>	<i>El Salvador</i>	<i>Guatemala</i>	<i>Honduras</i>	<i>Nicaragua</i>	<i>Central America</i>
Professors	1:20 students	80	61	100	49	40	330
Administrators	1:16 professors	5	4	6	3	3	21
Coordinators	1:12 professors	7	5	8	4	3	27
Academic Aides	1:18 professors	10	8	12	6	5	41
Librarians	1:50 professors	2	1	2	1	1	7
Secretaries	1:2.5 professors	32	24	40	20	16	132
Office Clerks	1:3 professors	27	20	33	16	13	109
Administrative Assistants	1:10 professors	8	6	10	5	4	33
Research Assistants	1:10 professors	8	6	10	5	4	33
Custodial Service Personnel	1:10 professors	8	6	10	5	4	33
<b>Total:</b>		<b>187</b>	<b>141</b>	<b>231</b>	<b>114</b>	<b>93</b>	<b>766</b>

6. The estimated Cost of Operation was divided by the number of students in the hypothetical program for 1,000. This produced an "Operating Cost per Student." A "Capital Outlay Cost per Student" was likewise computed.
7. The costs per student were applied to the number of students required to be enrolled in each country (and for the five countries in the region) to estimate the total cost of the preparation program.

### Cost of Operation

#### *Salaries*

The greatest proportion of the total cost of the preparation program is, of course, the salaries of personnel. To formulate these, a series of hypothetical (but presumably reasonable) salary levels was established; a salary level was thus assigned for each position identified in Table 1. Two assumptions were made in arriving at these figures:

1. The salary should be sufficiently high that the professor or other professional person could reasonably be expected to devote his full time to the preparation program.
2. There should be a range of salaries for each type of position in order that salary adjustments might be made for differences in the training, experience and competence of personnel.<sup>13</sup>

With these assumptions in mind, Table 3 was constructed.

To estimate the cost of operation, the average salaries were applied to the personnel requirements of the hypothetical program for 1,000 students. This produced an estimated salary cost of \$647,000 for the 50 professors and 69 other personnel of the hypothetical program, or a cost per student of \$647.

$$\text{Calculation: } \frac{\$647,000}{1,000} = \$647 \text{ per student}$$

These salary estimates are shown in Table 3. Additional elements of the cost of operation were then considered.

<sup>13</sup>*Informe de Comité de Finanzas . . . op. cit. p. 6.*

**TABLE 3**  
**SALARY SCALE AND AVERAGE SALARIES**

<i>Position</i>	<i>Salary Range</i>	<i>Average Salary</i>
Administrator	\$10,000 to \$15,000	\$12,000
Coordinator; Academic Aide	6,000 to 12,000	9,000
Professor	4,000 to 12,000	7,000
Service Assistant	3,600 to 4,800	4,200
Research, Administrative Assistant	2,200 to 3,900	3,000
Office Worker	1,800 to 3,000	2,400
Custodian	900 to 1,500	1,200

**TABLE 4**  
**COST OF OPERATION ATTRIBUTABLE TO SALARIES**  
**PER 1,000 STUDENTS**

<i>Personnel</i>	<i>Average Salary</i>	<i>Total</i>
3 Administrators	\$12,000	\$ 36,000
11 Academic Coordinators, Aides	9,000	99,000
50 Professors	7,000	350,000
15 Service Assistants	4,200	63,000
15 Research and Administrative Assistants	3,000	45,000
20 Office Workers	2,400	48,000
5 Custodians	1,200	6,000
<b>119 TOTAL</b>		<b>\$647,000</b>

***Other Operating Costs***

Estimates were added for the following items of other direct costs:

1. Texts, teaching material and reference materials for students, at the rate of \$25.00 per student per year.
2. Professional staff improvement, at the rate of \$5.00 per student per year.
3. Individual grants for professional research at the rate of

\$15.00 per student per year. This provides an annual average of \$300 per professor for research.

4. An allocation of 14.5 percent of the total operation budget for general operating expenses.

The additional annual cost per student for these services would be \$162, as follows:

Books and materials	\$ 25
Professional improvement	5
Research	15
General operation costs	117
<b>Total</b>	<b>\$162</b>

#### *Total Operating Costs*

The estimated total annual cost of operation per student, therefore, would be \$809: \$647 allocated to salaries (approximately 80 percent), plus \$162 to other operation costs.

For the projected 6,607 students, therefore, the cost of operation may be estimated as follows:

<i>Item</i>	<i>Cost per student</i>	<i>6,607 students</i>
Salaries	\$647	\$4,274,729
Professional Improvement	5	33,035
Books and Supplies	25	165,175
Research	15	99,105
General Operating Expenses	117	773,019
<b>TOTAL</b>	<b>\$809</b>	<b>\$5,345,063</b>

At the rate of \$809 per student, the annual cost of program operation in each country and for the region would be the following:

	<i>Costa Rica</i>	<i>El Salvador</i>	<i>Guatemala</i>	<i>Honduras</i>	<i>Nicaragua</i>	<i>Central America</i>
Cost per Student	\$809	\$809	\$809	\$809	\$809	\$809
Required Enrollment	1,609	1,230	2,002	972	794	6,607
Total Cost of Operation	\$1,301,681	\$995,070	\$1,619,618	\$786,348	\$642,346	\$5,345,063

## Capital Outlay

### Construction

At this writing, studies are not yet complete of physical plant needs among the seven teacher-training institutions. However, the Gamboa-Hernandez report<sup>14</sup> left little doubt that new or additional facilities would be required in each country. Although specific needs are not yet known, it is possible to estimate now the per-student costs for new buildings.

Let it be assumed for the moment that all the existing facilities must be replaced. This is, of course, untrue for the immediate future, but within the life-time of the preparation program, most if not all of the facilities will be replaced.

For a minimum program, approximately 75 square feet of space is required for each student. This space provides classrooms, offices for professors and administrators, auditoria, library facilities, corridors and other service spaces. If 6,607 full-time students are ultimately to be enrolled, the total amount of building space required will be  $6,607 \times 75$ , or 495,525 square feet of enclosed space. If the average figure of \$14.00 per square foot is used, the estimated cost of such space would be  $495,525 \times \$14.00 = \$6,937,350$ . If these funds were available as direct appropriations from the supporting governments, there would be no additional costs to the institutions. If the funds must be borrowed, however, the additional cost of debt service must be included. If the total amount were secured at 5 percent interest, to be repaid over a period of thirty years, the total interest which would accrue (assuming that partial repayment of interest and principal begins immediately) is \$5,202,930. The cost of the facilities (construction plus interest on loans) would then be \$6,937,250 plus \$5,202,930, or a total of \$12,140,180. If repayment of construction loans and interest were made in thirty equal annual payments, the annual cost for new facilities in Central America would be  $\frac{\$12,140,180}{30}$ , or \$404,673. The annual per-student cost of

construction and interest would then be  $\frac{\$404,673}{6,607}$ , or \$61.25 (rounded). Capital outlay costs for construction for the region would be as follows:

<sup>14</sup>Formacion de Profesores de Educacion Media.

	Costa Rica	El Sal- vador	Guate- mala	Hondu- ras	Nica- ragua	Central America
Capital Outlay per Student	\$61.25	\$61.25	\$61.25	\$61.25	\$61.25	\$61.25
Required Enrollment	1,609	1,230	2,002	972	794	6,607
Total Capital Outlay	\$98,550	\$75,336	\$122,621	\$59,534	\$48,632	\$404,673

### *Equipment*

Obviously, the cost of equipping a particular facility can only be determined from the specifications of that facility. Thus the cost of equipping a new educational facility varies. Nevertheless, the average figure of 20 percent of construction costs provides a reasonable general estimate.

The total construction cost of facilities for 6,607 students is estimated to be \$6,937,250. The cost of initial equipment should be approximately one-fifth of that amount, or \$1,387,450. Normally, the life of equipment (exclusive of permanent features of the buildings themselves) is only ten years, whereas the buildings may be used for periods up to fifty or more years. Consequently, payment for equipment normally would not be made through long-term loans.

If the equipment is expected to be replaced every ten years, an allocation should be made in the financial program for payment at the rate of not less than \$138,745 (one-tenth of the total cost per year). The annual cost per student would be:  $\frac{\$138,745}{6,607}$ , or \$20.99.

The annual equipment cost for each country and for the region would be as follows:

Costa Rica	\$ 33,788
El Salvador	25,829
Guatemala	42,041
Honduras	20,412
Nicaragua	16,675
Central America	<u>\$138,745</u>

**Total Capital Outlay**

The total annual costs of capital outlay for 6,607 full-time students would be:

	<u>Per Student</u>	<u>6,607 Students</u>
Construction	\$61.25	\$404,673
Equipment	20.99	138,745
<b>Total</b>	<b>\$82.24</b>	<b>\$543,418</b>

**Summary of Costs**

The approximate cost, per student per year, in order to graduate 1,077 new teachers annually beginning in 1967, would be \$891.24. The summary of costs follows, in Table 5.

TABLE 5  
SUMMARY OF PROJECTED ANNUAL COSTS  
OF PRODUCING SECONDARY SCHOOL PERSONNEL

	<i>Per Enrolled Student</i>	<i>Total for 6,607 Students</i>
<b>Cost of Operation</b>		
Salaries	\$647	\$4,274,729
Professional Improvement	5	33,035
Books and Supplies	25	165,175
Research	15	99,105
General Operation	117	773,019
Sub-total	\$809	\$5,345,063
<b>Capital Outlay</b>		
Construction (\$61.25)	\$ 61	\$ 404,673
Equipment (\$20.99)	21	138,745
Sub-total	\$ 82	\$ 543,418
<b>TOTAL</b>	<b>\$891</b>	<b>\$5,888,481</b>

**CONCLUSION**

Central America needs to train significant numbers of new and fully-qualified secondary school teachers. The numbers of graduates produced annually by seven existing training centers are currently inadequate to that need. Hence a major new program is required.

The "output" required is estimated to be 1,077 new teachers each year. The necessary "input" of freshman teacher-training candidates each year is estimated to be 2,406. With due allowance for depletion ("drop-outs"), it is estimated that the total full-time enrollment should be not less than 6,600. Including professors and supporting staff, the personnel requirements of the training program are estimated to be 766, when a full four-year program is in operation.

The various elements of the cost of operation are estimated to be \$809 per student per year. The various elements of capital outlay and debt service are estimated to be \$82 per student per year. The total annual cost per student, therefore, is projected to be \$891.

A program of this magnitude poses obvious problems: are there enough qualified professors? if not, can they be recruited elsewhere or developed rapidly? can enough degree candidates be attracted into teaching? can the conditions of the profession be made sufficiently attractive to retain them? will the necessary funds be forthcoming? how can the training program be made genuinely regional? Nevertheless, the need is clear and present; hence if educational improvement is to be achieved, the many problems must be met and resolved by deliberate, carefully planned action on the part of responsible leaders in educational agencies and institutions as well as in government. It is believed that this report accurately states the dimensions of the task and its costs.

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# IIME



## INSTITUTO DE INVESTIGACIONES Y MEJORAMIENTO EDUCATIVO

The Institute for Educational Research and Improvement (IIME) is an administrative unit of the University of San Carlos of Guatemala.

Presently, IIME's principal activity is the PROGRAMA INTERUNIVERSITARIO, a program of educational studies conceived and conducted jointly by the University of San Carlos and Michigan State University.

The Institute's programs are conducted in the five Central American republics: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

The Inter-university Program has been incorporated into the plan of regional integration developed by the Central American University Superior Council (CSUCA: Consejo Superior Universitario Centroamericano). The Program includes regional studies in secondary education, higher education, technical education, teacher education, and special education and rehabilitation. The first two years of Program activities were financed by a contract between Michigan State University and the Agency for International Development.