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ABSTRACT

The report contains: (1) a literature review on correspondence education in the United States; (2) a summary of a study of home-based computer-assisted instruction for gifted students conducted by the Institute for Mathematical Studies in the Social Sciences (IMSSS); and (3) an extensive cross-referenced annotated bibliography surveying the instructional uses of computers, television, and other media. Subsections of the literature review include: enrollment trends, completion rates and factors, student profiles, comparisons of correspondence work to residence work, methods of presenting and conducting correspondence courses, and a partially annotated bibliography of cited references. The IMSSS study involved a selected number of highly gifted 10-14 year old students (with IQ scores of at least 165 and a wide range of outside activities) from eight school districts surrounding Stanford University. The students participated in home-based teletypewriter courses in mathematical logic and related parts of mathematics, including programing courses, and an introductory Russian course. The high dropout rate of the gifted group was characteristic of high dropout rates of home-study courses. Further home-study evaluation is needed in course structure, the use of predictive student trajectories, and the costs of various technologies to alter the high dropout rates. (EA)

STUDY OF NEEDS AND TECHNOLOGICAL OPPORTUNITIES IN HOME-BASED EDUCATION

(Final Report)

by

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INTRODUCTION

There are three major sections of this report. Section I is a review of the vast literature on correspondence education in the United States. Section II is a report of our own work in computer-assisted instruction in the home; the details have been included because work in this field is relatively limited thus far. The final section is an extensive cross-referenced annotated bibliography surveying the instructional uses of computers, television, and other media.

We have organized the literature review under six main subsections. The first subsection discusses the increasing numbers of correspondence students and shows the trends over the years. The second subsection concerns the tendency of many correspondence students to not complete the courses they have begun, and cites literature in which attempts have been made to relate completion rates to personal or course factors. We have summarized literature about characteristics of correspondence students in the student profile subsection under the subheadings of age, sex, occupation, education, geography, subject areas, reasons for taking correspondence courses, and data relating the individual factors. In the fourth and fifth subsections we cite literature comparing correspondence work to residence work and comparing different methods of presenting and conducting correspondence courses. Following the literature review is a partially annotated bibliography containing only the references cited in the review; its purpose is to provide easy access to statistics such as the kind and number of students used in a particular study.

We have restricted our survey of correspondence study to correspondence study within the United States, and within this limitation we have not attempted to include every available reference but rather a representative sample of the available material. We have excluded many studies on correspondence courses in the military and correspondence courses for overseas dependents; we have also excluded correspondence study in hospitals and agricultural extension courses.

Section II is a preliminary report of a home-based computer-assisted instruction (CAI) experiment. In the fall of of 1973 the Institute for Mathematical Studies in the Social Sciences (IMSSS) began an experimental home-based CAI program for gifted junior high school students.[1] The students were able to receive courses in elementary and college logic, computer programming, and foreign languages via teletypewriters placed in their homes and linked by the home telephone line to the IMSSS computer. With the exception of proctor help, which was available by telephone during certain limited hours, the students were entirely dependent on the computer for course instruction and the presentation and correction of problems and exercises.

Section III is a cross-referenced annotated bibliography covering the home-based instructional uses of computers, television, and other media. This section was designed to aid in a search for recent references (1970 to the present) concerning a particular aspect of educational media. Again, we have not included every work on instructional

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[1]Partial support for this work was provided by National Science Foundation Grant NSF-EC-43997.

media but rather a representative sample as well as many bibliographies which may be pursued by the interested reader. There are three subsections in Section III. The first subsection is the annotated bibliography, which has been divided into five groups with the following group headings: computers in education, television and videotape, multimedia, nontraditional study, and reference materials. Since very few references can be described in exactly one way, we constructed a list of descriptors. The second subsection assigns to each reference a list of the descriptors appropriate to it; the third subsection assigns to each descriptor the appropriate references. Further explanation and discussion of Section III immediately precedes the bibliography.

We had originally intended to include a separate section on the technical analysis of various technologies and also a section on economic analysis of various technologies. The technical analysis of various technologies is fairly well covered in the annotated bibliography contained in Section III of the present report. Representative samples of the use of radio, television, and computers for home-based instruction are given, and in Section I there is, as we have said, an extensive survey of the traditional means of instruction in the home, namely, correspondence study.

In contrast, we have been disappointed in the extent to which we have been able to identify in the literature any economic analysis of the various technologies for home-based instruction. From a variety of considerations, it is clear that ordinary correspondence courses are at the present time the cheapest means of delivery of instruction, but, as far as we were able to determine, there has as yet been no extensive

analysis of the costs of the other technologies. Costs, of course, represent the simplest kind of question. There is, as far as we can see, absolutely no literature on the attempt to construct education production functions for the various technologies that can be used for the delivery of home instruction. Moreover, the data for making such an analysis are not yet really available. We return to this subject in our section on conclusions and recommendations.

I. LITERATURE REVIEW OF CORRESPONDENCE STUDY

Usage

Enrollment in correspondence schools in the United States has climbed from under 500,000 in 1910 to over 3,000,000 in 1970; this increase is illustrated in Figure 1, which shows findings of a 1972 survey of home study enrollment (Bolina, 1972).

Insert Figure 1 about here

Kempfer (1973) estimates the current total correspondent student body to be 5,018,630. A summary of his data is shown in Table 1; he

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Insert Table 1 about here

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arrived at the estimate of over 5,000,000 based on an analysis of incomplete responses and projections of other known factors. The student-body figure includes enrollments in a previous year for courses often requiring as long as three years to complete. The largest single user of correspondence instruction is the federal government, especially the armed forces, which enroll almost 2,000,000 students annually.

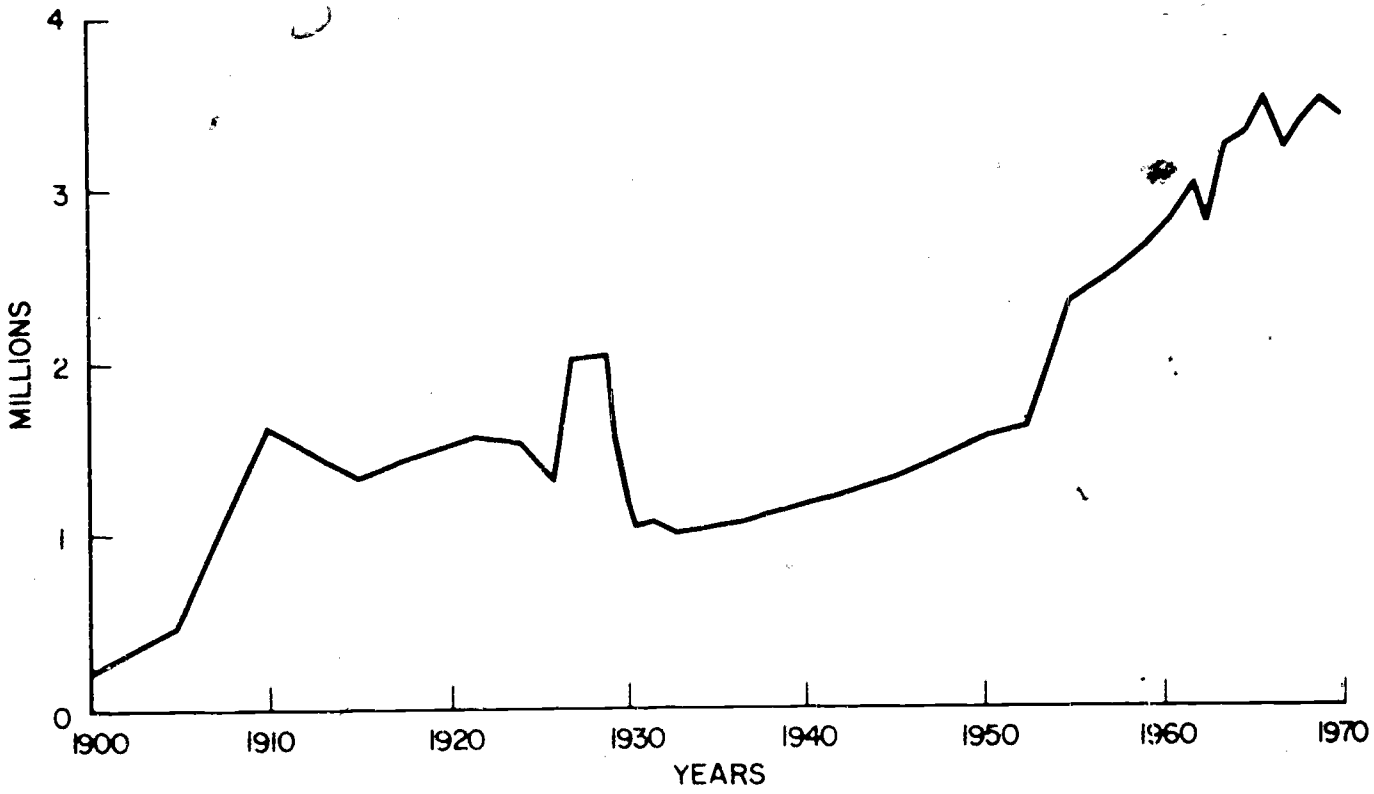

Fig. 1. Total enrollment in correspondence schools in the United States, 1900-1970 (Bolina, 1972).

TABLE 1

Size of Enrollment and Student Body in Correspondence Education, by Type of School, 1970 (Kempfer, 1973)

	Student body	Enrollment
Private schools	1,850,197	790,492
NHSC members	(1,630,128)	(649,913)
Nonmembers	(220,069)	(140,579)
Federal and military	2,185,701	1,851,493
Colleges and universities	312,592	234,212
Religious	323,720	307,717
Business and industry	68,891	43,671
Total: All schools	4,741,101	3,227,585

Estimates of total enrollment by the National Home Study Council (1967) are higher; they estimated that 5,270,913 students were enrolled in United States correspondence courses in 1966. They also estimated that over 8,000,000 students throughout the world are studying by correspondence. In 1966, the National Home Study Council (1966) surveyed major free-world correspondence schools outside the United States. Sixty-three schools in 29 countries reported a total student body of 2,277,524 with 1,142,633 enrolling during 1965 in 12,903 courses of study.

Completion

Completion rates. Studies of completion rates--that is, the percentage of students who complete correspondence courses--indicate that, with few exceptions, completion rates have been and still are relatively low. Before citing the data we need to give two cautionary notes about interpretation. Kempter (1973) noted that dropout data is limited in usefulness because many students enroll in a course with no intention of completing it. They are only interested in a particular segment of a course but must enroll in the entire course to receive that segment. MacKenzie (1968) mentions another problem, which is that individual suppliers have different criteria for course completion: some say that the course is completed if a certain percentage of the lessons has been completed, some say that all the lessons must be completed, and some say that all the lessons and the final examination must be completed. Most of the studies we found did not indicate which criterion was being applied, so the figures we cite may not be strictly comparable.

Bittner and Mallory (1933) surveyed 25 state university extension divisions in the South, West, and Midwest; their results are shown in Table 2. They found completion rates ranging from 40 percent at the

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Insert Table 2 about here

University of Oklahoma to 86 percent at the University of North Dakota; the overall completion rate was 61 percent. They also measured something they called "success rate," which was defined to include students who completed at least 70 percent of the required work and students who were transferred to residence work; the overall success rate was 75 percent. Kennen (1940) studied private schools in the United States--in particular, the International Correspondence Schools (I.C.S.) and the Women's Institute (W.I.)--and found a much lower completion rate of 20 percent. Tempest (1965) studied the home-study completion rates at the University of Utah; he found a completion rate of 56.5 percent and a so-called "net completion rate" of 70.6 percent. The net completion rate was based on the formula: number completed divided by the difference of the total count and the number who returned no assignments. Ball (1966) selected a random sample of 1,000 persons registering for correspondence courses at the University of Washington, Seattle, and found a completion rate of 40 percent. As a comparison, we will from time to time in this paper cite a study of apprentices in the construction industry (McCauley, 1962). The results of McCauley's survey of apprentice dropouts from 1952 through 1960 are similar to the findings concerning correspondence dropouts; the completion rates did not rise over the years. The completion rate in 1952 was 53.4 percent and the

TABLE 2

Completion Rates in 25 State University Extension Divisions

(Bittner & Mallory, 1933)

Institution	Date	Enrollments	Success rate %	Completion rate %	Mortality rate %	Corrected completion rate, %	Corrected mortality rate, %
Alabama	1929-30	400[a]		84.5	15.5		
Arizona	1929-30	642		52	48	55	45
Arkansas	b	1,093	85	78	22	83.5	45
California	1928-29			51	49		
	1929-30			65	35		
Chicago	1930	1,113	71	69	31	75	25
Colorado	1929-31	781	94	66	34	88	12
		2,300	70	54	46	64	36
		1,324	90	72	28	90.2	9.8
Florida	1929-30	1,413	68.97	68.2	31.8	75.3	24.7
Georgia	1929-30	1,867		64	36		
Indiana	1926	115	66.4	59.1	40.9	61.8	38.2
	1926-27	450	73	57.5	42.5	61	39
Kansas	b	930	70	42	58	67	33
Kentucky	1928-29	3,311		64.5	35.5		
Louisiana	b	786	66	57	43	66	34
Minnesota	1925-26			54	46		
	1926-27			56	44		
	1927-28			51.4	48.6		
	1928-29			50	50		
	1929-30			53.5	46.5		
	1929-30	163	68	44.15	55.85	54	46
Missouri	1930	1,000	80.5	65	35	76	24
Nebraska	b	924	75	61	39	72	28
North Carolina	1930	3,401		74	26		
	b	181	89	86	14	89	11
Oklahoma	b	1,670	46	40	60	47	53
Oregon	1929	2,002	68	52	48	61	39
South Dakota	1926-30	1,735		61	39		
	1928-29		85	69	31	85	15
Tennessee	1929-30	100[a]		65	35		
	b	c		74	26		
		400[a]	82	71.5	28.5	82.4	17.8
Texas	1927-28	d		57	43		
	1928-29	d		54	46		
	1929-30	d		57	43		
	1930[e]	492	76	58	42	70	30

(Table 2, continued)

Institution	Date	Enrollments	Success rate %	Completion rate %	Mortality rate %	Corrected completion rate, %	Corrected mortality rate, %
Utah	1929-30	899		55	45		
Washington U.	b			75	25		
Wash. State College		642		45.6	54.4	56.6	43.4
Wisconsin[e]	1927-28	7,073		49.9	50.1		
	1928-29	4,568		62.5	37.5		
	1929-30	5,018		60.6	39.4		
Total		45,812					
Averages			75	61	39	71	30

[a]Students for respective years.

[b]Alphabetical or numerical sampling over a period of years.

[c]Enrollments.

[d]Semester hours 8,964, 8,749, 8,589 for the respective years.

[e]Computed from eliminations.

completion rate in 1960 was 48.8 percent, with values close to 50 percent in the intermediate years.

Personal factors as they relate to completion. Personal factors of students including age, sex, intelligence and aptitude, educational level, study habits, work in first few weeks of course, reasons for taking the course, and reasons for dropping the course have been examined to see if any relation could be found between them and completion. Kennan's (1940) data revealed no relation between age and completion among students studying at I.C.S. and W.I.; the ages having the highest relative completion rates in order are approximately: 50 years, 19 years, and 30 years. Ritter (1965) studied 10 years of correspondence courses (1954-1963) at the State College of Iowa; he median age of students completing correspondence courses ranged from a low of 32.4 years in 1961-62 to a high of 48.2 years in 1954-55. There were no tendencies for the median age of those completing the courses to increase or decrease over the years. Ball (1966) and Donehower (1968), on the other hand, found that age was positively associated with completion. Ball found that only 34 percent of the students 34 years and under completed their courses while 57 percent of the students 35 years and over completed them; Donehower found that the mean age for completing was 32.9 years and the mean age for withdrawing was 30.9 years.

Concerning sex and completion, Smith (1935), in his large sample of 5,700 students from the years 1925 through 1932, found that more women complete correspondence courses then men. Ritter (1965) found that approximately 70 percent of the students completing courses were married women, 23 pefcent were unmarried women, and the rest (7 percent)

were men of unknown marital status. Ball (1966), looking at the statistics in a different way, found that 33.4 percent of the males who enrolled, and 47.8 percent of the females, completed their courses.

Childs (1963) in a survey of supervised correspondence courses concluded that whether intelligence or aptitude are important factors in determining which students will finish a course is unclear from the available evidence. She says that pupils who register for correspondence courses are, in general, above average in ability and that there may be a slight but not pronounced tendency for those of greater ability to complete the courses they begin. There is also, according to Childs, some evidence that pupils who are rated higher by their supervisors on personal characteristics that may affect success in correspondence study are somewhat more likely to complete their courses than are pupils who are rated lower.

The work of Smith (1935) and Donehower (1968) suggests that adults with higher educational training complete their courses more frequently than do those with less formal schooling. The same relation was found by Ball (1966) thirty years later; the higher the level of education, the higher the percentage of students completing their courses. Hughes (1955) questioned 249 correspondence students at the University of Florida and found that prior college experience and prior correspondence study experience both had a statistically significant positive effect on completion rates. Hughes also investigated the relation of study habits to completion but found no difference in successful and unsuccessful students with regard to study habits.

Many studies have indicated that students who complete the first assignments of a course soon after receiving them are more likely to complete the course. James and Wedemeyer (1959), for example, interviewed 55 adults and 125 high school students taking correspondence courses through the Extension Division of the University of Wisconsin. All except 4 students who did not complete their courses quit before completing the first third or fourth of their assignments; James and Wedemeyer concluded that if a student hands in the first third or fourth of his course work, he will probably complete the course. Similarly, Donehower (1968) found that students who submit lessons soon after enrolling are much more likely to complete the course, and Ball (1966) found that students who complete a course are most likely to do so in the first 12 months. Preiffer's (1970) data indicates that students who completed the first lesson have a high probability of completing the course. A student in a one-hour course who submitted one lesson had an 85 percent chance of completing the course, and a student in a two- or three-hour course who submitted one lesson had a 70 percent chance of completing the course. Students in the Glatter and Wedell (1971) survey of correspondence in Britain had the highest incidences of dropout in the early stages of a course. Correspondingly, dropouts are more frequent during the early stages of apprenticeship (McCauley, 1962); approximately a third of all dropouts are reported during the first 25 percent of the term, with the remainder of the losses being spread rather evenly over the latter 75 percent of the apprenticeship.

Donehower (1968) found no correlation between living distance to the correspondence center and time to complete, but he did find a

small correlation between living distance to the center and whether the course is completed.

Kennan (1940) did not find strong relationships between reasons for taking a correspondence course and probability of completion. The mean percent of lessons completed for those taking courses definitely associated with their occupation was not appreciably higher than that for groups showing no such association. There was a slight tendency for people who are studying courses for avocational or cultural reasons to complete a larger portion of their courses than people who study for vocational reasons. There is also a slight tendency for people with the objective of transferring to a new occupation to study more persistently than those who are seeking only to improve their present work. Hughes (1955) found that students who desired teacher certification had a 79.5 percent completion rate, those seeking college credit for degrees had a 62.2 percent completion rate, and those seeking general vocational-professional improvement had a 55.1 percent completion rate. He also found that the necessity for meeting a deadline had a statistically significant positive effect on the completion rates. Ball (1966), too, found that students taking courses for teacher certification had the highest completion rate--61.7 percent. Those taking the course for university credit had a 38.0 percent completion rate, those taking the course for general interest had a 29.3 percent completion rate, and all others combined had a 26.2 percent completion rate.

Several studies (Bittner & Mallory, 1933; Fairing, 1950; James & Wedemeyer, 1959; Hartsell, 1971; Kennan, 1940; Sloan, 1966) have

questioned dropouts concerning their reasons for dropping out or for their disinterest. Data from these studies are presented in Table 3;

Insert Table 3 about here

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we have sometimes combined categories or changed the wording slightly from the original to fit the results into a common table.

The main reasons given for dropping out have remained stable over the years: lack of time; complaints about the course itself, e.g., the work is too boring, too difficult, or has too little human contact; and change of plans such as rescheduling the course to residence work or beginning a new occupation that does not require the course. Other problems have been illness, financial problems, and lack of library facilities or other materials.

Glatter and Wedell (1971) surveyed part-time students in general and concluded that correspondence study is not more affected by dropouts than part-time study. Thirteen percent of their sample of 960 students whose main method of study was correspondence dropped out, while 12 percent of their sample of 840 students using the part-time oral method did so. The three most common reasons for dropping out for part-time students were similar to reasons given by the correspondence dropouts: the strain of combining study with work was too great; there was a change in career plans so the course was no longer required; and the demands of the students' domestic responsibilities had increased. A similar comparison was made by Kennan as early as 1940 with similar results. He compared the percentage of correspondence students who dropped out for reasons other than dissatisfaction with the course to

TABLE 3

Reasons Given for Dropping Course or for Disinterest in Course

Author	Bittner	Bittner	Kennan	Fairing	James & Wedemeyer	Hartsell	Sloan	Sloan
Year	1933	1933	1940	1950	1959	1964[d]	1966	1966
Number of subjects	324[a]	324[a]	167[b]	248[a]	55		135[a]	135[a]
Question	Why dropped course	Specific criticism	Why dropped course	Why dropped course	Why dropped course	Why dis-interested	Why dropped course	Why dis-interested
Course unsatisfactory	13[c]		39	64	3[c]			
Work boring or tedious	14	12				√	12	14
Too difficult	16	52			6	√	7	15
Unsatisfactory instructor	10	3					2	13
Poorly organized		15						
Lack of human contact		4					4	14
Not practical	2							
Other	11	39					3	
Subtotal	66	125	39	64			38	56
Change of plan	135[c]		27	64[c]	9[c]			
Rescheduled to residence work				33	5		7	5
Entered Armed Forces							3	1
Change in vocation	20							
Course no longer needed	34			21			2	
Other	1							
Subtotal	190		27	118			12	6

(Table 3, continued)

Author	Bittner	Bittner	Kennan	Fairing	James & Wedemeyer	Hartsell	Sloan	Sloan
Year	1933	1933	1940	1950	1959	1964[d]	1966	1966
Number of subjects	324[a]	324[a]	167[b]	248[a]	55		135[a]	135[a]
Question	Why dropped course	Specific criticism	Why dropped course	Why dropped course	Why dropped course	Why disinterested	Why dropped course	Why disinterested
Miscellaneous responses								
Illness, death, moved	56		7	41	8		9	3
Not enough time	117	31	24	120	18	√	113	73
No library facilities or other necessary materials		6	21				3	7
Financial problems	1		8					
Never intended to finish	4						1	
Other	9		19	7	3		5	9
No response					2			19
TOTAL	443	162	145	350	55		171	173

[a] A student could give more than one response.

[b] Twenty-two of these 167 students claimed they were still studying after three years.

[c] This number does not include those in the subcategories below.

[d] Data were gathered in 1964.

the corresponding percentage of dropouts from nine colleges, and concluded that the percentage of dissatisfied correspondence school dropouts is not much greater than the percentage of dissatisfied college dropouts.

Course factors as they relate to completion rates. Some investigators have tried to find characteristics of the courses themselves that influence completion rates. Ball (1966) found that the type of course has a definite influence on number of completions; the highest percentage of completions (62 percent) was for education courses and the lowest (24.3 percent) was for business administration. Bradt (1956), from his study of 5,000 USAFI correspondents, and James and Wedemeyer (1959), from their study of the University of Wisconsin Extension Division correspondents, concluded that courses with goals stated clearly are more likely to be completed. Kennan (1940) found that persons who pay cash for their courses complete a much larger portion of their courses than persons who pay on the installment plan. Persons who are more or less supervised by public school administrators or teachers are also more likely to be persistent in their work than others. However, according to Kennan, sending progress reports to employers upon request of the enrollee has little effect on completion. The quality of marks given by the correspondence instructor has a significant effect on the continuance of enrollee interest in study, but course length does not. Finally, although courses range in length from two to over two hundred lessons, Kennan found only a slight relationship between length of course and persistence of study.

Spencer (1965) examined 3,303 correspondence course completions at the Correspondence Instruction Department of Pennsylvania State University during the period of July 1, 1962 through June 30, 1963. He was interested in studying the relationship to completion of some of the personal factors described above combined with the course factor of number of credits. He found that 91.7 percent of all college-credit completions were in the 3-credit courses, and 71.1 percent of all non-credit completions were in 2-unit courses. He feels that all correspondence courses should be of these two lengths. Men constituted 72.8 percent of all completions in the 3-credit courses, and 99.5 percent of all completions in the 2-unit courses. The mean completion time in months was not proportional to the number of credits a course provided. Men and women who had higher educational levels earned higher grades in 3-unit courses, but the educational level of students completing 2-unit courses had no effect on their grades. Older women in the 3-credit courses earned higher grades, but this was not true for men. Women completing 3-credit courses have a slightly higher educational level, are slightly older, take less time, and earn higher grades than men. Men completing both 3-credit and 2-unit courses used more time to complete courses in which they earned lower grades. More time for lower grades did not hold true for women in the 3-credit courses.

Student Profiles

Profiles for correspondence students have been developed including such characteristics as age, sex, occupation, educational level, geography, opinions about correspondence courses, and popular subject areas.

Age. Kempfer (1973) presents the following two age distributions (Figures 2 and 3), one from Noffsinger's 1926 data and one from

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Insert Figures 2 and 3 about here

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his own 1956 data, which show that age distrubution has changed remarkably little over the years. The median correspondent student age in 1956 was 26.5 years, and in 1926 it was 26 years. Other studies support these figures. Rowbotham (1965) found the heaviest enrollment of students in the University of California Extension Division (26 percent of the sample) occurred in the 21- to 25-year category. In 1967, the median age of a sample of 340 people taking home-study electronics training was 25.9 years; the largest group (35.2 percent of the total) was 18 through 24 years of age, and the second largest group (32.0 percent of the total) was 25 through 34 years of age (Home Study Review, 1967). Donehower (1968) found 33.15 percent of his sample of Nevada University students were 20 through 24 years of age and 16 percent (the second largest group) were 25 through 29 years of age. Clark (1966) constructed a student profile of the student body of the International Correspondence School based on a statistical study of the more than 70,000 students who enrolled with I.C.S. during 1965. Twenty-nine percent of the students fell into the 20- through 24-year age range; 56 percent were older than 24 years, and 39 percent were younger than 20 years. The age spread of students differed significantly between men and women. Only 8 percent of the men were younger than 20 years, but 27 percent of the women were under 20. Fifty-three percent of the men

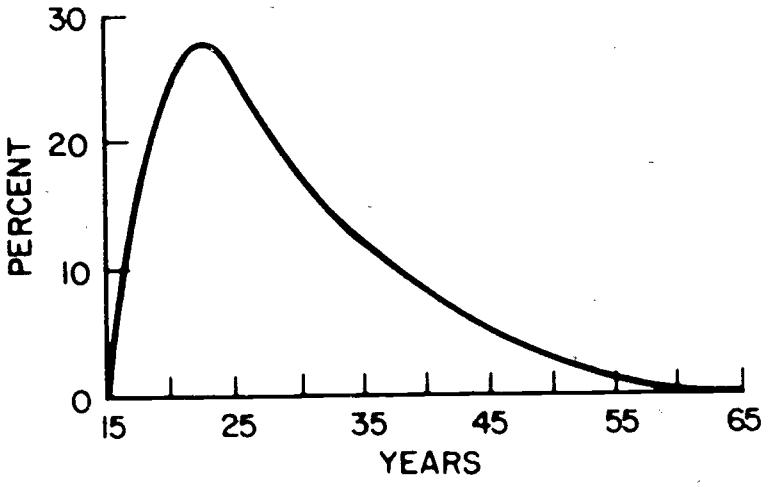

Fig. 2. Age distribution of private home-study students, 1926 (Kempfer, 1973).

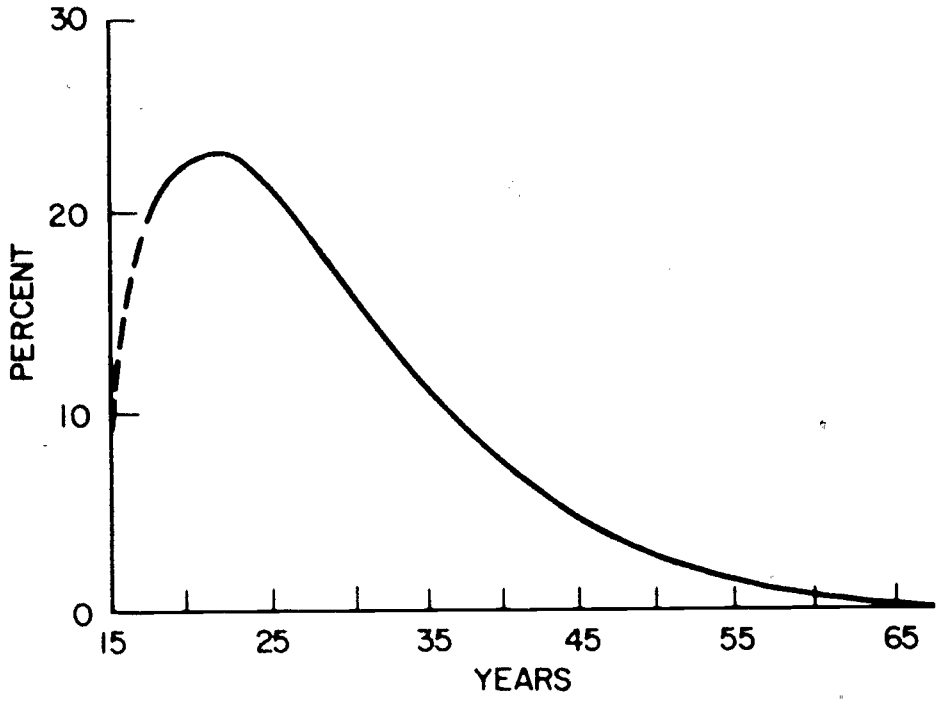

Fig. 5. Age distribution of private home-study students, 1965 (Crumpton, 1970).

were in the 20- through 29-year age bracket, while only 40 percent of the women fell within this age group.

Sex. Most reports find a greater number of men than women enrolled in correspondence courses. Rossi and Johnstone (1965), in their large survey of adult correspondence students, found predominantly men taking correwpondence courses. Clark (1966) found a much higher percentage (91 percent) of males enrolled in I.C.S. schools than women, but he notes that there is probably a higher proportion of women in the entire home-study field than the figures indicate, because many students are enrolled in high school, business, art, and writing courses, which are very popular with women. There was a slightly higher proportion of females (54.7 percent) in Donehower's (1968) sample, but only 23 percent of Kempfer's (1973) sample were females. Two reports from the University of California (MacKenzie, 1968; Rowbotham, 1965) indicate that sex and age must be considered together. Rowbotham found that up to and including age 35, there are more men than women; after age 35, there are more women. Similarly, MacKenzie reported that 54 percent of the students under age 35 are male, and beyond that age female students outnumber men.

Occupation. Noffsinger (1926) found that most correspondence students came from the middle and lower-middle economic groups, and most of them came from business (34.4 percent) and industry (22.9 percent). Many were in the trades and industries or were semiskilled workers aspiring to acquire the skills necessary to enter the skilled trades and business. More recent studies show a different picture. Clark (1966) writes that, as technical needs changed, the bulk of the student body

shifted from unskilled workers to skilled workers, and later from skilled workers in the blue-collar group to white-collar workers. In 1965, 30 percent of his large sample of I.C.S. students were employed in professional and managerial, sales, and clerical and service occupations. Ball (1966) found that the three largest occupational categories in his sample of University of Wisconsin correspondence students were students with no other position (31.3 percent), nonprofessionals (30.4 percent), and teachers (18.9 percent); 27.6 percent of the sample were using correspondence to supplement day courses, and 29.2 percent were using correspondence to continue their university education while working at other occupations. The six largest groups in Fairbanks' (1968) sample of 1,040 Oregon State correspondence students were teachers, college students with no other position, high school students, others studying high school courses, armed forces students, and homemakers. Kempfer (1973) presents the following table (Table 4) comparing the

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Insert Table 4 about here

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occupational distribution of home-study students in 1926 and 1956. His figures do not show the trend of a shift toward more professionals indicated by the preceding studies.

Education. Noffsinger (1926) found that 61 percent of his sample had at least a high school education; 46 percent completed high school, 14 percent completed four years of college, and 1 percent had some graduate training. The Rossi and Johnson (1965) survey showed that the median number of years of schooling among adult correspondence students was 12.2, which was identical to that for the total sample of

TABLE 4

Occupational Distribution of Private Home Study Students as Reported by Two Researchers (Kempfer, 1973)

Noffsinger (1926)		Kempfer (1956)[a]	
Occupation	% of students	Occupation	% of students
Agriculture	5.0	Farmers, farm managers, foremen and laborers	3.4
Business	34.3	(Business)	(19.6)
		Clerical and kindred workers	11.5
		Sales workers	4.8
		Managers, officials, and proprietors except farm	3.3
Professions	9.3	Professional, technical, and kindred workers	7.0
Industry	22.9	(Industry)	(30.3)
		Craftsmen, foremen, and kindred workers	18.5
		Operatives and kindred workers	11.8
Unclassified	28.4	(Unclassified)	(38.9)
		Private household workers	2.1
		Service workers	8.5
		Laborers, except farm and mine	7.3
		Unknown	21.0

[a]Data gathered in 1956.

adult participants. Participants from the lowest and highest educational brackets use the correspondence method less than those from the middle range of the educational continuum. In Rowbotham's (1965) sample, 42 percent of the enrollees had some college training, while 35 percent held a bachelor's degree or better. Twenty-five percent had been previously enrolled in other correspondence courses. Clark (1966) found that 68 percent of his I.C.S. sample had at least a high school education, a figure which increased from 50 percent in 1955; similarly the number of students with some college training increased from 10 percent in 1955 to 20 percent in 1955. In Ball's (1966) sample, 35.5 percent had three to four years of college, while 20.8 percent were using correspondence courses to extend their education past high school.

Geography. Noffsinger (1926) reported that the most popular locations for correspondence study were communities with populations from 2,500 to 100,000, where there was a degree of competition in semi-skilled vocations but where the community was not large enough economically to provide agencies for this kind of training. Forty years later Rossi and Johnson (1965) arrived at the same general conclusions. They found that adult learners from small to medium-sized communities were more liekly to pursue correspondence study than their urban counterparts. Forty-four percent of adult correspondence students live in areas with populations under 50,000, while only 29 percent of all adult learners live in similar areas. The results support the suggestion that correspondence instruction is useful to those geographically isolated from resident learning. Clark (1966), however, argues that the notion that most private home-study students are located in rural or small-town

areas--remote from other educational facilities--was not born out by his profile study of I.C.S. students. Instead, the distribution of his sample paralleled population density almost exactly; for example, the three largest states in terms of population, California, New York, and Pennsylvania, also had the largest I.C.S. student population.

Subject areas. Schwin (1929) surveyed correspondence students at the University of Colorado; in 1929 the courses most often selected were freshman- or sophomore-level courses with education and English being the most popular subject areas. Smith (1935) found advanced English composition, applied English grammar, and elementary English composition popular at all grade levels; advanced English composition held first or second place in all but two of the age groups, and applied English was only slightly less popular. The following chart (Figure 4) summarizes data of I.C.S. student enrollment by general

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Insert Figure 4 about here

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subject area (Clark, 1966). Clark relates the chart to home study in general in 1966 as follows. The largest percentages of I.C.S. students were enrolled in business and high school courses, and these were certainly two of the most popular areas of study throughout industry. (In fact, several large private home-study schools offered only these areas of study or emphasized them in their promotion.) However, more I.C.S. students (32.2 percent) were enrolled in engineering or related programs than in any other single field of endeavor, and this was not representative of the field. Most of the other correspondence schools did not offer engineering courses, and those that did offer such courses enrolled

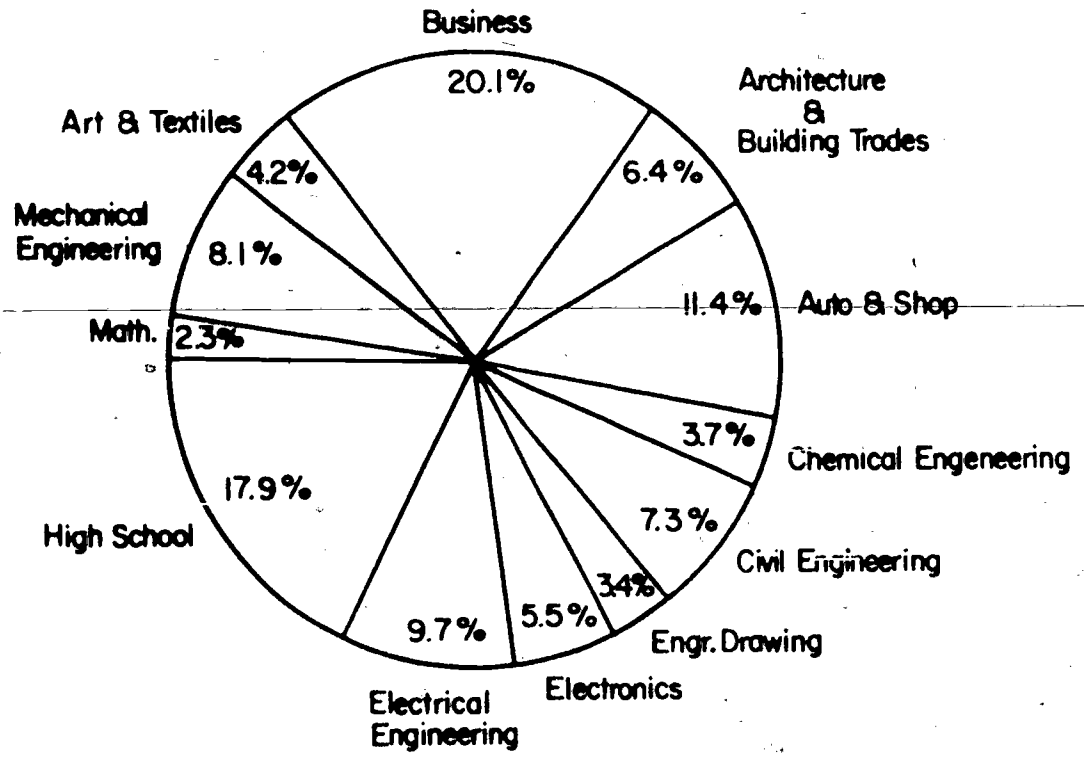

Fig. 4. Enrollments by subject (Clark, 1966).

relatively few students in them. Two other subject areas--art and electronics--deserve special explanation because the chart does not accurately reflect the popularity of the fields. Many students were enrolled in electronics and art courses; most of the largest home-study schools taught electronics, and some offered electronics courses exclusively. Also, several schools, including one of the three largest, taught art. Clark concluded that most private home-study students at the time of his survey were studying in the following fields: business, high school, electronics, engineering, technical and trade areas, and art. The remaining students were studying in special interest fields.

Reasons for taking correspondence courses. Fairbanks (1968) questioned Oregon State University Students about their reasons for taking correspondence courses and their attitude toward them. The majority felt that the role of correspondence study was to provide diploma and degree courses to which one would otherwise lack access; most had favorable attitudes toward correspondence study. Kempfer (1973) correspondingly reported that an analysis of student profiles showed that the greatest number of enrollees wanted to get ahead in the fields in which they were already working; they were using home study for personal advancement. Seventy-one percent were taking vocational courses, 14.9 percent were taking academic courses, 11.1 percent were taking courses in religion, and 2.7 percent were taking recreation and avocational courses.

Interrelations. Donehower (1968) reported some interesting findings concerning the relation of some of the above characteristics of correspondence students to grades. Grade-point averages increase with

level of education. They also increase with age until age 60 when they begin to decline. There was no correlation between sex and grade-point average.

Rossi and Johnstone (1965) compared correspondence students in general in the three tables (Tables 5, 6, and 7) shown below. Figures

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Insert Tables 5, 6, and 7 about here

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are given for the following: those persons participating specifically in correspondence instruction (correspondence students); all those participating in any kind of study program, including correspondence study (all students); and all those interviewed, both students and nonstudents (survey sample). For most categories, correspondence students are comparable to students in general. The notable exceptions are that there is a much higher proportion of men in the correspondence sample, there are more craftsmen and foremen and fewer professional and technical workers in the correspondence sample, and there are fewer correspondence students in large cities and more in small cities and rural areas.

LeMaire (1964) compared males taking correspondence courses to males in the United States population in general and found that male enrollees did not resemble the total male population. Some differences are, for example, the older the persons were, the less apt they were to enroll in correspondence courses; there were twice as many high school graduates who enrolled for correspondence courses as would be expected on the basis of the number of male high school graduates in the total male population; there were nearly twice as many persons who had attended college who enrolled for courses as would be expected on the

TABLE 5

Adult Student Population Distribution

(Rossi & Johnstone, 1965)

Area	Correspondence students[a] %	All students[b] %	Survey sample[c] %
Large city (over 2,000,000)	16	25	23
Medium-sized city (50,000-2,000,000)	40	45	40
Small city (10,000-50,000)	22	13	14
Rural area or small town (under 10,000)	22	16	23

[a] Base: 345

[b] Base: 4,710

[c] Base: 23,840

TABLE 6

Profile of the Typical Adult Student

(Rossi & Johnstone, 1965)

Student characteristic	Correspondence students	All students	Survey sample
Sex			
Male	75%	50%	47%
Female	25%	50%	53%
Age, years			
Median	33.2	36.5	42.8
Base	344	4,678	23,677
Years of formal education			
Median	12.2	12.2	11.5
Base	345	4,681	23,299
Family income			
Median	$5,880	$6,600	$5,410
Base	344	4,637	23,123

TABLE 7

Occupational Distribution of Adult Students in the Labor Force

(Rossi & Johnstone, 1965)

Occupation	Correspondence students[a] %	All students[b] %	Survey sample[c] %
Craftsmen and foremen	36	18	16
Professional and technical workers	18	23	12
Managers, officials, and proprietors	11	12	11
Clerical and office workers	10	15	13
Operatives	10	10	17
Other	15	22	31

[a]Base: 295

[b]Base: 3,321

[c]Base: 14,265

basis of the total male population; and there were fewer enrollees in cities with populations of 25,000 or less and in cities of 500,000 or more than would be expected on the basis of the total population.

Pailsey, Hail, Mick, and Paisley (1972) reported some differences between adult education students and the population in general. Adult education participants are on the average more than six years younger than the "average" American adult. Sex, marital status, race, and religion do not appear to distinguish the adult education participant from the rest of the adult population. However, the well-educated and well-employed groups are overrepresented. Participants are twice as likely as nonparticipants to have attended college and to hold professional or technical jobs.

Correspondence Work versus Residence Work

Not surprisingly, much interest has been shown in comparing student achievement via correspondence with student achievement via residence work. Most studies of this type compare final grades of students taking a course by correspondence with those of matched students taking the same course in residence. Others use standardized tests instead of final exams, and some have compared other measures of success upon completion of the course or a series of courses. We found one study that used students who had taken several courses by correspondence and several in residence and compared their overall grade-point average in each method. Most of the work indicates that students who take courses by correspondence achieve at least as well as students who take courses in residence.

Childs (1971), considering the evidence of several studies, concluded that students enrolled for instruction by correspondence study achieve academically as well as students enrolled for instruction by other methods, and that when a difference does exist, it is likely to favor the correspondence study method. Dubin (1968) made an extensive survey of the literature comparing various methods of study. He had to conclude that most studies showed no differences in final examination scores obtained through supervised independent study and any of the following methods: face-to-face instruction, lecturing, discussion method, and lecture-discussion method.

The oldest comparative study we found was one cited by Bittner and Mallory (1933); it was conducted in the first semester of the 1930-1931 school year at the University of Minnesota. The professor of a course in educational psychology taught that subject to 20 students in the classroom and to 35 students through correspondence. He found that the correspondence group had a slightly higher average on the final examination. About the same time Feig (1932) made a comparison of academic achievement and showed that correspondence students performed better than students having the same course in class with the same instructor. Meierhenry (1945) used standardized examinations to compare the vocational education of high school students who studied by correspondence to those who studied in class, but found no differences in performance.

A much larger study was conducted by Childs for her Ph.D. dissertation (1949). She chose 14 subject areas and compared the people who completed these courses by supervised correspondence with people

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who took the same courses in five Nebraska schools chosen at random. When the subjects were matched for IQ and chronological age, the mean scores of the correspondence students on achievement tests exceeded the mean scores of the classroom pupils in 7 subjects, and there was no significant difference between the mean scores in three subjects. When the subjects were matched on IQ and G.E.D. (General Educational Development) scores, the mean score of the correspondence students exceeded the mean score of the classroom students significantly in one course, and not significantly in two courses. According to Childs, the study indicates that the achievement of supervised correspondence students is definitely on a par with regular classroom students.

Newman and Highland (1956) showed that 64 airmen who had available only printed materials without instructor assistance could learn as much as three other groups of 64 airmen who studied (a) with especially competent instructors, (b) with tape recordings and workbooks, or (c) with tape recordings and slides. Farnam (1957) found that 66 university extension course students were significantly superior to 82 resident students in vocabulary test scores and on scores measuring comprehension level. Dysinger (1957), on the other hand, found no significant differences between home and in-class students studying introductory psychology at the University of Wisconsin.

Crissy (1966) examined the effectiveness of training naval officers by correspondence. He used a three-assignment course called "Security of Classified Matter," which was chosen because it contained subject matter vital to Naval interests and because the material was not likely to have been learned in civilian experience. A test was given

immediately upon completion of the course and again four months later. He found that the correspondence group had a significant gain in knowledge and that four months after completion of the course they still retained most of what they had learned. The knowledge of officers who had completed the course was compared with that of officers who had had recent security experience. Officers actually occupying security billets scored no higher than officers who had just completed the course; officers who had recently occupied security billets scored no higher than officers who completed the course four months previously. Officers who had the course plus experience produced significantly higher average test scores than those who had had only training or only experience.

Glatter and Wendell (1971, p. 48) draw the following conclusions based on their survey of correspondence courses in Britain: "It seems therefore that when it comes to taking tests and examinations, students taught by correspondence do as well as and sometimes better than those taught orally. They may also perform better in subsequent oral education if they have been successful in their correspondence studies. We are here, of course, talking about students who have actually got to the stage of sitting the examination or taking the test. Very few of the studies referred to so far even mention dropout, and only one gives the wastage rate from the courses in question."

We located three studies which examine the future success of correspondence students. Childs (1956) made up an experimental group of 79 students who had taken mathematics by supervised correspondence study in high school and had entered the University of Nebraska and

registered for mathematics with no intervening training in this field. Her control group consisted of 79 matched students chosen from the same college mathmatics class. Final grades were used as the measure of achievement. Her work indicated that pupils who have studied mathematics by correspondence in high school are on the average likely to have more success in future mathematics courses than those students of comparable ability who have not had this experience. Kennelly (1962, 1965) conducted two studies to see how well graduates of a correspondence high school perform in college; both studies involved graduates of the American School, a correspondence high school. He asked college registrars to rate the American School graduates as above average, average, or below average. For the second study he also verified that the colleges the graduates were attending did not on the whole have lower academic standards. In 1962, registrars gave ratings of average or above to 81 percent of the American School group; figures for the college population in general indicate that 72 percent perform above average or better. In 1967, 84 percent of the correspondence school graduates received ratings of average or above. Kennely feels that the evidence is compelling that correspondence school graduates are not only adequately prepared for college, but tend to perform as well as or better than their peers.

Thordarson (1965) obtained similar results in a comparison of 400 students attending rural schools studying freshman high school subjects, and students studying the same subjects in regular high schools. The status of both the correspondence and regular high schoool freshmen at the end of the five-and-one-half-month experimental period compared

favorably with the status of freshmen throughout the nation in all of the areas measured. This was especially true of the fields of natural science and mathematical fundamentals, in which the initial status of both groups was above that reached by freshmen in other states by the middle of the year. The progress of correspondence freshmen in social studies during the exprimental period surpassed that of regular high school freshmen during the same period; the difference was significant at the 1 percent level.

The following studies illustrate other kinds of comparisons of correspondence study to residence study. Larson (1932) examined a group of 56 students who had taken both residence and correspondence work at the univers / level; 72 percent of the students attained higher grades in correspondence courses than in residence courses. Corey (1934) compared test results of college freshmen listening to a lecture or reading identically worded materials for the same length of time. For immediate recall, the reading group was significantly superior to the lecture group, and for the recall test 14 days later, the reading group was again superior but not significantly so. Milton (1962) studied long term differences of in-class exposure to a psychology course versus out-of-class self-study with a typed version of the lecture. He found no differences in dropout rates from college, and no differences in the number of students who immediately took the second half of the course, but slight differences in favor of the out-of-class group to enroll in upper division psychology courses. Spencer (1965) found that grades earned by correspondence-study degree students were higher than those earned by resident students at Pennsylvania State

during the 1963 spring term. Johnstone and Rivers (1965) questioned people about whether they would prefer to take a course they were very interested in by correspondence or classroom. Older people were more likely than younger ones to prefer correspondence; in addition, the lower a person's socioeconomic status, the more likely he was to favor correspondence. The latter finding was especially true among women.

Method of Presentation

Several studies have searched for ways of improving correspondence courses by various changes or additions. While the change most often studied is the addition of programmed materials, the effect of programmed materials on learning is as yet unclear. Kempfer (1965) sent questionnaires to 136 universities, private correspondence schools, and federal agencies to see to what extent they were using programmed instruction; 120 replied, and 23 said they were using programmed instruction. Based on many statistics compiled from these 23 replies, Kempfer concluded that a modified form of programmed instruction offered some real advantages for correspondence instruction; a true linear format was too bulky and expensive for general use but could be useful for some purposes. Provisions for frequent student response to specific stimuli along with immediate feedback appeared to aid learning and was liked by students.

Childs (1966) summarized work comparing correspondence courses with and without programmed instruction, and concluded that while some evidence suggests that students in programmed correspondence study complete the courses in less time, achievement of students is approximately

the same under both methods. She added that if there is a learning advantage, it rests with the regular correspondence study method.

Walsh (1962, 1963) conducted two experiments to test the importance of a programmed learning device, the PL-100, in a correspondence study situation. In each case, an experimental group used the PL-100 along with their regular correspondence course materials and a control group used only the regular materials. In the first experiment the two groups were similar in achievement, rate of progress, and nonstart and dropout rates, but the reactions of students were overwhelmingly in favor of the PL-100. In the second experiment, the progress rate was greater for the experimental than for the control group, and again the responses were overwhelmingly in favor of the PL-100. Achievement rates, nonstart rates, and dropout rates were again similar. Schoen (1964) reported a mixed reaction by students to programmed instruction, and a preference by a slight majority for conventional correspondence study. Tohtz (1963) found no differences in achievement between experimental and control groups of freshmen taking expository writing via programmed instruction or conventional homework assignments. Sjogren (1964) compared three methods for teaching ninth grade English and algebra, namely, programmed materials only, regular correspondence materials, and regular correspondence with certain parts programmed. No significant differences were found in either subject among the achievement test means or dropout rates. Algebra students using all programmed materials completed the course in considerably less time, but there were no significant differences in mean completion times in English.

Kennelly (1965) compared achievement and learning time of students using traditional correspondence work with students using programmed materials. He found that the mean performance of students using conventional correspondence materials as measured by a standardized achievement test was superior in four out of five tests of significance. The mean learning time of students using programmed instruction was faster in three out of five tests of significance.

Stewart (1965) cites two studies favorable to the use of programmed materials. In the Bronx Community College of the City University of New York, where the normal attrition rate of a physics course was higher than 30 percent, the attrition dropped to less than 5 percent after the introduction of programmed instructional materials. U.S. Air Force personnel report that in using more than 100 programmed courses, Air Force students have saved 33 percent in learning time.

Freidman (1965) learned some student reactions to programmed courses by using two groups, one taking a course via standard correspondence materials and one taking the same course with programmed materials. Midway through the course he sent to each member of the standard group a programmed lesson corresponding to the lesson they were currently studying, and to each member of the programmed group a standard lesson corresponding to the programmed lesson they were studying. He found that when a student is prmitted to inspect the lessons, he will more often choose the programmed type, but that students often feel that they do not get as complete or comprehensive a course using programmed materials.

Other research has suggested different kinds of changes which might be made in correspondence courses to improve learning. As early as 1929, Reinoehl (1929) looked at number and length of periods of inactivity in relation to performance in correspondence courses. He found that the quality of work was affected unfavorably by periods of inactivity, and the quality of work tended to decrease when the number of months to complete it became excessive. Long lapses of inactivity occurred in the students who dropped their courses before completing them. Long courses tended to be pursued more rapidly than short courses; 24 assignments made a satisfactory course length for most students.

DiVesta (1954) compared three ways of presenting written material and two kinds of examinations. The three kinds of writing styles were formal, informal, and division into units similar to those used in programmed courses. The two kinds of tests were closed book, and open book in which the students received a copy of the examination at the beginning of the course. More subjects in the open-book-examination groups finished the course than subjects in the closed-book-examination groups. There were no significant differences in achievement in subjects in the three types of learning groups, but subjects taking the open-book examination made higher achievement gains than subjects taking the closed-book examination. The retention test, closed book for everyone, was given 30 days after receipt of the final examination. Learning style made no difference in retention of the student's achievement level, but the closed-book-examination groups had significantly lower retention scores than the open-book examination groups. The subjects who took the closed book examination maintained their original

achievement level on the retention test while those who took the open book examination had significant losses over the 30-day period.

Montross (1956) and Wilson (1968) experimented with ways of making correspondence courses more personal. Montross compared an experimental group who received standard correspondence materials plus special letters and visits from the staff with a control group who received only the standard materials. The experimental group completed significantly more assignments per student per month and had a significantly greater percentage of students returning assignments each month than the control group. The experimental group completed 24 percent more assignments overall, had more total completions, and had fewer students not beginning than the control group, although these differences were not significant. Most importantly, the experimental group made significantly greater achievement gains and had a more positive attitude toward correspondence courses. Wilson's study involved two experimental groups and a control group; for one experimental group the lessons were graded but not returned, and for the other group there was feedback via telephone. The control group received only the standard correspondence materials. In terms of numbers of students submitting lesson one, completion rates, and time required for completion, the performance of the experimental groups was better than that of the correspondence subjects. Students in the experimental groups were more likely to start the course, more likely to complete it, and more likely to complete it in less time. However, of those who did complete the course, students in the traditional correspondence study group and those in the experimental group without voice contact received higher

grades and increased the posttest scores over their pretest scores by a greater, but not significantly greater, margin than the other experimental group. In line with this, Childs (1966) concluded from her survey of studies on teaching by correspondence that the nature of the response made by the teacher who evaluates student lessons is not in itself important, but that what the syllabus and/or teacher can do to elicit student responses in the form of either tests or written assignments does increase student interest and achievement.

Conclusions

1. The large numbers of students that have been enrolled in correspondence courses for a wide variety of subjects throughout this century provide adequate testimony to the need for home-based education. What is also important in assessing this evidence of need is that the large numbers of students are not concentrated in any single topic but range over the widest possible diversity of student groups, from adults with very specific vocational education aims to adults seeking professional or cultural enrichment without highly specific career goals.

2. The extensive data surveyed also make clear that the main features of this traditional form of home-based instruction have quite constant characteristics in terms of dropout rates in given areas of instruction, and it seems doubtful that substantial differences in effectiveness can be brought about by methods that stay within the traditional framework of correspondence instruction.

3. The continued increase in the absolute number of students enrolled for correspondence courses in the United States, coupled with

the evidence that this method of instruction is economially relatively cheap, leads to the conclusion that correspondence instruction will continue to have a robust future for the rest of this century. We consider later the possibilities of enhancing it by the use of recent technologies of instruction.

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Kennelly, T. E. Can graduates of a correspondence high school succeed in college. The Home Study Review, 1962, 2, 5-8.

Questionnaires were sent to college registrars to find out how well gradutates of the American School (a correspondence high school) performed in college. Questionnaires were returned from 365 colleges regarding 568 students.

Kennelly, T. E. A study comparing the effectiveness of programmed learning and correspondence instruction. In R. S. Sims (Ed.), Research in the correspondence instruction field. Madison: United States Armed Forces Institute, 1965.

A comparison of correspondence courses via programmed instruction with traditional correspondence courses at the American School (a correspondence high school.)

Kennelly, T. E. College achievement of home study high school graduates. The Home Study Review, 1967, 8, 5-9.

A follow-up to the 1962 study; this time registrars from 620 institutions responded regarding 1,191 students.

Larson, E. L. The comparative quality of work done by students in residence and in correspondence work. Journal of Education Research, 1932, 25, 105-109.

Compared the grades received by 56 students who had taken both residence and correspondence work at the university level.

LeMaire, H. J. Social and economic factors and selection of home study courses by older males. Home Study Review, 1964, 5, 25-33.

A study to see if there are any significant differences between characteristics of the United States male population and those of male correspondence school enrollees. Information was gathered from records of students who had enrolled for courses at the International Correspondence Schools during 1961.

MacKenzie, O., Christensens, E. L., & Rigby, P.H. Correspondence instruction in the United States. New York: McGraw-Hill, 1968.

An extensive study conducted by the Correspondence Education Research Project (C.E.R.P.) to provide a history of correspondence instruction, a survey of current problems and practices, an analysis and evaluation of correspondence instruction as a method, and some predictions about the future.

MacKenzie, O., & Christensen, E. L. The changing world of correspondence study. University Park: Pennsylvania State University Press, 1971.

A collection of papers by leaders in correspondence study around the world.

McCauley, J. S. Apprentice dropouts in the construction industry. The Home Study Review, 1962, 2, 27-33.

A survey of apprentice completions in building trades from 1952-1960.

Meierhenry, W. C. A vocational education program for the small high school utilizing supervised correspondence study and work experience. Unpublished dissertation, Teachers College, University of Nebraska, 1945.

An experiment concerning the use of supervised correspondence for high school vocational subjects.

Milton, O. Two-year follow-up: Objective data after learning without class attendence. Psychological Reports, 1962, 11, 833-840.

A study of long-term differences of in class exposure to a first-year psychology course compared to exposure through a correspondence course.

Montross, H. W. An experimental study of the effectiveness of field assistance in attitudes and course achievements of corespondence study students. Journal of Education Research, 1956, 50, 161-173.

Tested the effects of several ways of making correspondence courses more personal. Two groups of 44 students were selected from those who registered in the University of Wisconsin Extension Division from January 1953 to February 1954.

National Home Study Council. Correspondence education survey. The Home Study Review, 1966, 7, 24.

A survey of United States correspondence schools plus 63 correspondence schools in 29 foreign countries.

National Home Study Council. 1966 Correspondence Education Survey. The Council, 1967.

A survey of correspondence education in 1966.

Newman, S. E., & Highland, R. W. The effectiveness of four instructional methods at different stages of a course. Lackland Air Force Base: Air Force Personnel and Training Research Center, June, 1956.

Compared four instructional methods with four groups of 64 airmen in each.

Noffsinger, J. S. Correspondence schools, lyceums, and chautauquas. New York: Macmillan, 1926.

A large survey of private home study students.

Paisley, M. B., Hall, D. G, Mick, C. K., & Paisley, W. J. Reaching adults for lifelong learning. Stanford University: Institute for Communications Research, August, 1972.

An intensive study of 949 institutions including large public school systems, junior colleges, four-year colleges, and universities concerning two major questions: (1) In what ways are lifelong learning programs being promoted imaginatively and effectively? (2) Can exemplary practice be adopted or adapted by other programs for more effective outreach?

Pfeiffer, J. W., & Sabers, D. Attrition and achievement in correspondence study. National Home Study Council News, Supplement, February, 1970.

A study of correspondence students who do not complete their courses.

Reinoehl, C. M. Standardizing correspondence instruction. Journal of Education Research, 1929, 20, 260-267.

A study of the relation of number and length of periods of inactivity to achievement and completion. Subjects were 116 correspondence students at the University of Arkansas; 2,382 reports on their completed assignments were reviewed.

Ritter, E. L. A status study covering ten years of correspondence study (1954-1963) at the State College of Iowa. In R. S. Sims (Ed.), Research in the correspondence instruction field. Madison: United States Armed Forces Institute, 1965.

A study of ten years of correspondence study at the State College of Iowa, Cedar Falls, Iowa.

Rossi, P. H., & Johnstone, J. W. Social aspects of correspondence education (a background paper for Correspondence Education Research Project, Pennsylvania State University). Chicago: National Opinion Research Center, 1965.

A comprehensive study of adult, nonmilitary correspondence students in 1961-62.

Rowbotham, A. A profile study of the correspondence student. In R. S. Sims (Ed.), Research in the correspondence instruction field. Madison: United States Armed Forces Institute, 1965.

A survey of students in the University of California Extension Division.

Schoen, J. R. Programmed instruction in military home study courses. The Home Study Review, 1964, 5, 22-24.

A study of the use of programmed instruction in military home study programs--particularly student reactions to programmed

instruction. Two courses were used; 416 students completed one, and 138 completed the other.

Schwin, M. L. Analysis of correspondence course grades in the University of Colorado. Unpublished M.S. thesis, University of Colorado, 1929.

A survey of correspondence courses taken by students of the University of Colorado using data from resistration forms and correspondence instruction records.

Sjogren, D. D. Programmed materials in high school correspondence courses. Research report of Cooperative Research Project number 1534, University of Nebraska, 1964.

Compared three kinds of correspondence instruction for teaching ninth grade English and algebra; one included the use of programmed materials. There were 191 students in the English groups and 186 in the algebra groups.

Sloan, D. Survey study of university dropouts and cancellations. The Home Study Review, 1966, 7, 9-16.

A questionnaire study of 135 University of Kentucky correspondence dropouts.

Smith, G. B. Home study in adult education--Purposes and conditions affecting the nature and extent of participation of adults in courses in the home study department of Columbia University. Unpublished Ed.D. thesis, Teachers College, Columbia University, 1935.

A survey of adult participation in home study courses at Columbia University; the sample contained 5700 students who registered in correspondence courses from 1925 to 1932.

Spencer, O. Factors associated with persons who complete correspondence courses. The Home Study Review, 1965, 5, 1076.

A study of all (3,303) college credit and noncredit correspondence completions at Pennsylvania State University during the period of July 1, 1962 to June 30, 1963.

Stewart, D. L. Applications of learning systems concept to education and training courses. The Home Study Review, 1965, 6, 19-32.

Comments about applications of "learning systems" to the development of correspondence courses. Cites some studies about the use of programmed instruction in correspondence courses.

Tempest, N. Study of home completion rates, 1962-63. In R. S. Sims (Ed.), Research in the correspondence instruction field. Madison: United States Armed Forces Institute, 1965.

Study of completion rates of 2,092 University of Utah correspondence students in the 1962-63 school year.

Thordarson, T. W. Classroom versus correspondence instruction. In R. S. Sims (Ed.), Research in the correspondence instruction field. Madison: United States Armed Forces Institute, 1965.

A comparative evaluation of 400 students attending rural schools studying freshman high school subjects by supervised correspondence courses and students studying the same subjects in regular classrooms.

Tohtz, J. E., & Long, E. Out of class programmed instruction teaching compared with conventional homework assignments on expository writing in freshman English, 1963. (ERIC Document Reproduction Service No. ED 003 307)

A comparison of 273 freshmen taking expository writing by programmed instruction with others taking the same course with conventional homework assignments.

Walsh, J. E. PL-100: A programmed learning experiment of correspondence students. The Home Study Review, 1962, 3, 20-29.

A study of the importance of the PL-100 in a correspondence course in a mathematics course from the International Correspondence School. Fifteen hundred students enrolling for the

course on alternate days during July and August of 1961 received a PL-100 as part of their course materials; records were kept of a control group who did not receive the PL-100.

Walsh, J. E. Adjunct programming: A technique for home study training. The Home Study Review, 1963, 4, 36-40.

Summarizes three experiments that follow the 1962 experiment; more than 5,000 International Correspondence School students were involved. An experiment involving the use of the PL-100 in a classroom under supervised conditions is also discussed.

Wilson, R. R. The effects of selected programming--Analog techniques and voice-contact on completion behavior in correspondence instruction. Unpublished manuscript, Michigan University, 1968.

Compared the effects of attempts to personalize correspondence courses; three groups of 50 adults each were used.

II. HOME-BASED COMPUTER-ASSISTED INSTRUCTION FOR GIFTED STUDENTS

The Institute for Mathematical Studies in the Social Sciences (IMSSS) experimented with a special program of instruction for a selected number of highly gifted students in the Bay Area. Participating students, primarily in the age range of 10 to 14 years, were offered courses in mathematical logic and related parts of mathematics, including programming courses, and an introductory Russian course. The students did essentially all of the work at home on Model-33 teletypewriters that could be connected to the PDP-10 computer at IMSSS via an acoustic coupler and the home telephone. We explain the program and discuss the results of the elementary logic course in this report.

Procedure

Eight school districts in the areas surrounding Stanford University were invited to submit the names of students whose IQ as measured by the Stanford-Binet intelligence test was at least 165 and who seemed to have a wide range of outside activities; the last condition was stipulated so we could determine how well a home-based computer-assisted instruction (CAI) curriculum would compete with other established interests. The districts were asked to include with each name a statement describing the student and indicating why he or she was being recommended for the program. Some districts did this; others submitted short autobiographies which the students had written, and some submitted

only the test scores. From this information members of the Institute staff selected a total of 16 students; there were some from each district and an equal number of boys and girls. We made four exceptions to the criterion of having a Stanford-Binet IQ score of at least 165; three of these children measured "superior" on the WISC but had not taken the Stanford Binet, and the fourth child measured only 132 on the Stanford-Binet but was an outstanding achiever in his district. Children who were not selected were placed on a waiting list. All selected children were in the sixth, seventh, or eighth grade with the exception of one girl in the third grade and one in the fifth grade.

The program began in the fall of 1973; by June of 1974, 8 children had dropped out for reasons which will be explained later, and 3 more dropped out in the fall. Ten new students were selected from the waiting list in June, bringing the total number of children in the summer program to 18; 2 more new students were added in the fall, making a total of 28 gifted children who were in the program at some time during the experiment.

Tables 1 and 2 summarize IQ data and age data for the participating children.

Insert Tables 1 and 2 about here

Table 3 summarizes sibling data.

Insert Table 3 about here

Two facts about sibling placement of the students are of interest. First, none of our students were only children, and second, while

TABLE 1

IQ Scores

	Mean	Minimum	Maximum
Male	170.0	132	197
Female	171.0	170	177
Total	170.4	132	197

Note. Students who were measured by WISC are not included.

TABLE 2

Age (in Years) at Start of Experiment

	Mean	Minimum	Maximum
Male	12.3	11.0	13.5
Female	11.9	8.5	13.25
Total	12.1	8.5	13.5

TABLE 3

Placement of Subjects among Siblings

	First born	Last born	Only	Other
Male	10	5	0	0
Female	2	9	0	2

19 of the 28 students came from families with more than 2 siblings, 17 of these were either the oldest or the youngest child. We had only two students who had both an older and a younger sibling.

In November of 1973 letters of invitation were sent to the parents of each child selected for the program; copies were sent to the cooperating school district. The letters provided a description of the program, including the available curriculums and necessary equipment, and indicated that there would be no cost to the family. All families agreed to participate. Installation of teletypes began as soon as permission was given by the parents; all were installed by January of 1974. The students were shown how to dial the computer at IMSSS, how to use the terminal, and how to sign on to the elementary logic course. With this minimal explanation all students were able to begin their CAI work.

A meeting was held on January 14, 1974 at IMSSS for parents and students. This was a general meeting to answer questions about the program and the curriculums and to provide a tour of the IMSSS facilities. Parents were encouraged not to urge their children to work on the teletypes; instead, students were to pace themselves and work as much or as little as they wished The meeting was well received and follow-up monthly meetings were planned; however, due to the gasoline shortage no further meetings were held until June when the 10 new students had been selected.

A proctor was available at IMSSS 4 days a week during scheduled times so students could telephone for help. Some students, who indicated they felt too shy to telephone, were telephoned once a week by the proctor to see if they were having any problems.

The summer program was similar to the spring program. Letters of invitation and explanation were sent to the 10 new students and a meeting was held June 17, for old and new students. This time the parents were not encouraged to come.

Summer students were told that they could take a programming course, BASIC, along with the logic course, by writing or telephoning IMSSS to request a BASIC manual. This left the initiative with the student; six students requested the manual and began the BASIC course, and two finished the course by January 1, 1975.

By midsummer it was apparent that eight students--four new students and four old students--were not working regularly toward completing the logic course. Weekly individual goals were set to encourage regular study. The students expressed approval of the goal setting but, in fact, did not change their work habits. By January 1, 1975, four of these students (two old and two new) completed the logic course, two (new students) were still working very slowly and irregularly, and two (old students) had dropped out.

Two students, who were friends attending the same school, seemed to enjoy competing with each other on the CAI curriculums, and this competition apparently stimulated progress. After further inquiry, a telephone list of all participating students was mailed to each student. However, the students did not make much use of the list, possibly because they were too shy to telephone peers they had not met.

Curriculum

The first part of the elementary logic-algebra program is basically a tutorial course in elementary logic which is concerned with introducing numerical and sentential variables, forming algebraic terms and sentences, and truth conditions of simple sentences. The logical connectives are introduced as well as their truth analysis. Along with the introduction of each connective, the rules of derivation appropriate to it are also presented. The student is required to make logical derivations using each of the rules, as well as more complex derivations combining the rules. In addition to the rules of logic, the student also learns and uses some algebraic rules. Several lessons are devoted to the concepts of validity of rules and validity of arguments.

The second part of the program is concerned with modern algebra. From a small set of axioms and rules of inference the properties of the field of rational numbers are developed. Beginning with the axioms for addition, the student proves some elementary theorems such as the cancellation law for addition. Thereafter, axioms for multiplication and ordering are introduced, and the student eventually derives as theorems the standard properties of the field. A more detailed outline of the elementary logic-algebra program and a complete list of rules and axioms taught each year can be found in Suppes, Goldberg, Kanz, Searle, and Stauffer (1971) and Suppes (1972); the early histroy of the elementary logic curriculum (for 1964-65) is given in Appendix 1 of Suppes, Jerman, and Brian (1968).

Basic information, including new vocabulary, dominance of connectives, strategies, and derivations involving English sentences, are

presented in a multiple-choice response mode. The rules are presented one at a time followed by a few problems making one-step and then two-step use of the rule. Thereafter, derivations make regular use of the new rule and all previously given rules. For multiple-choice problems the error message WRONG, TRY AGAIN follows incorrect responses; the student continues to respond until he gives a correct answer. For derivation problems, incorrect syntax or invalid comments from the student are followed by brief explanatory messages. However, as there are often many ways of deriving a given conclusion from given premises, the computer will allow any valid step, whether or not it helps reach the conclusion. Which rules to use and details of their use are matters of strategy determined by experience and ingenuity.

Other courses available to the students--the college logic course, the Russian course, and the programming courses--are not discussed in this report.

Results

Before presenting the data, we would like to give some observations of a general nature concerning student reactions to their CAI work. Three boys were, from the beginning, extremely interested in the system itself, both the hardware and the software. Two of these worked through the logic curriculum very quickly, while the third worked more slowly but regularly; these boys appeared to be more interested in completing the curriculum as a step toward learning more about the system than in the curriculum itself. Another boy was obviously enthusiastic about learning the logic material as an end in itself, and so worked

very fast. A group of eight students (including one of the boys already mentioned) worked more slowly but regularly and without any pushing by the proctor. The remaining children required much encouragement by the proctor and even so worked very slowly and irregularly.

Of the 28 students, 10 asked to have their teletypes removed before they had completed the elementary logic course. All but two of these completed at least the first part of the curriculum. Five stopped at either the fifth or sixth lesson of Part 2; these lessons teach conditional proofs including the use of a working premise and the affirm-the-antecedent rule. These concepts proved to be difficult for most students and evidently were enough to push a student who was wavering into dropping. Two of the remaining three who completed the first part of the curriculum were about one-fourth of the way into the second part of the elementary logic and the third student was a little over half way through. One student dropped out of the program as soon as he completed the elementary logic course; he was a very good (i.e., fast) summer student who felt that once school had started again in the fall he would have too much school work to begin the CAI college logic course.

When questioned about why they wished to drop, two students indicated a preference for other time-consuming activities--swimming in one case and children's theater in the other; two others said they would have liked more personal contact--they liked the meetings and felt the telephone conversations with the proctor were not sufficient. The remaining students were not as specific and simply indicated a general lack of interest. Eight of the students who requested the removal

of their teletypes had worked a little on the programming courses but evidently were not stimulated by these either.

Tables 4, 5, and 6 show sibling data, IQ data, and age data for the 11 students who dropped out of the program early. Six of the 11

Insert Tables 4, 5, and 6 about here

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came from families of more than two siblings; only one was a middle child. It is interesting that both the student with the lowest IQ and the student with the second highest IQ were among those who dropped out.

Eleven students completed the elementary logic course as of January 1, 1975. One winter student completed the course in 5.5 months, one completed it in 7 months, one completed it in 9.5 months, and one completed it in 10.5 months. Of the summer students, one completed the course in 1.5 months, two completed it in 2.5 months, one completed it in 5 months, and two completed it in six months.

The minimum number of hours used to complete the course was 26; this student spread the hours over a period of 9.5 months. Another student used more hours to complete the course (32.5 hours), but fitted those hours into a period of 19 days. Of the students who have completed the course, the maximum number of hours used is 55.3; this student worked for 10.5 months. One winter student and two summer students had not yet completed the elementary logic by January 1, 1975; as of this date, they had spent 24.2, 25.3, and 48.5 hours on the system. The average number of hours that have been used by those who completed the elementary logic course is 37.7.

TABLE 4

Placement of Subjects among Siblings for Students

Leaving the Program Early

	First born	Last born	Only	Other
Male	4	3	0	0
Female	1	2	0	1

TABLE 5

IQ Scores for Students Leaving the Program Early

	Mean	Minimum	Maximum
Male	166.8	132	184
Female	170.8	170	173
Total	168.3	132	184

TABLE 6

Age (in Years) at Start of Experiment for Students Leaving the Program Early

	Mean	Minimum	Maximum
Male	12.1	11.0	13.3
Female	11.7	10.3	12.9
Total	12.0	10.3	13.3

Models of Individual Interest Trajectories.

We studied in depth the interest level of individuals over time by using some general axioms about interest level from which can be derived a basic stochastic differential equation that seems to be is characteristic of many different curriculums. The equation is derived in Suppes, Fletcher, and Zanotti (1973). The solution of the stochastic differential equation may be written as

$$y(t) = bt^{k} + c,$$

where, $y(t)$ is cumulative time on the system, t is a function of the length of time the teletype has been in the home, and parameters b, k, and c are estimated separately for each student. In fact, we estimated b and c 25 times for each student, once for each value of k from .05 to 1.25 in steps of .05. (That is, $k = .05, .10, .15, \ldots, 1.25$.) As we will show later, the value of k does not significantly affect the fit of the theoretical curves to the data.

In estimating individual parameters and fitting individual curves to individual student data, we used the mean standard error as our main measure to evaluate the fit of the theory. To be explicit, let o_{ij} be observation i for student j and t_{ij} be the corresponding theoretical prediction. Then the standard error of n_j predictions for student j is:

$$\text{standard error} = \left[1/n_j \sum_{i=1}^{n_j} (o_{ij} - t_{ij})^2\right]^{1/2}$$

and the mean standard error for the sample population of students is just the mean of their standard errors. We also used the mean absolute residual, that is, the mean absolute difference in the predicted and observed observations for each student, and the mean of the maximum residuals for each student as measures of fit.

We observed the cumulative time for each student on the first and fifteenth of every month from October 1, 1973 through December 31, 1974, making an average of 10 points per student. The minimum number of points for any student was 2 (this student was not included in data which test the theory), and the maximum was 22.

For the most part the theoretical curves were very close to the observed data. Figures 1a and 1b are examples of typical observed curves for students who entered the program by January of 1974, and Figures 1c and 1d are examples of typical observed curves for students who entered in June 1974.

Insert Figure 1 about here

The curves for the summer students differ from those of winter students as we would expect because of the greater amount of time available to them during school vacation for working on the program. Plotted with each curve are two theoretical curves, one using the k that gave the best fit in terms of mean standard error and the other using the k that gave the worst fit. It is clear that the theoretical curves fit the data quite closely and that there is not much difference between curves given by the best and worst k.

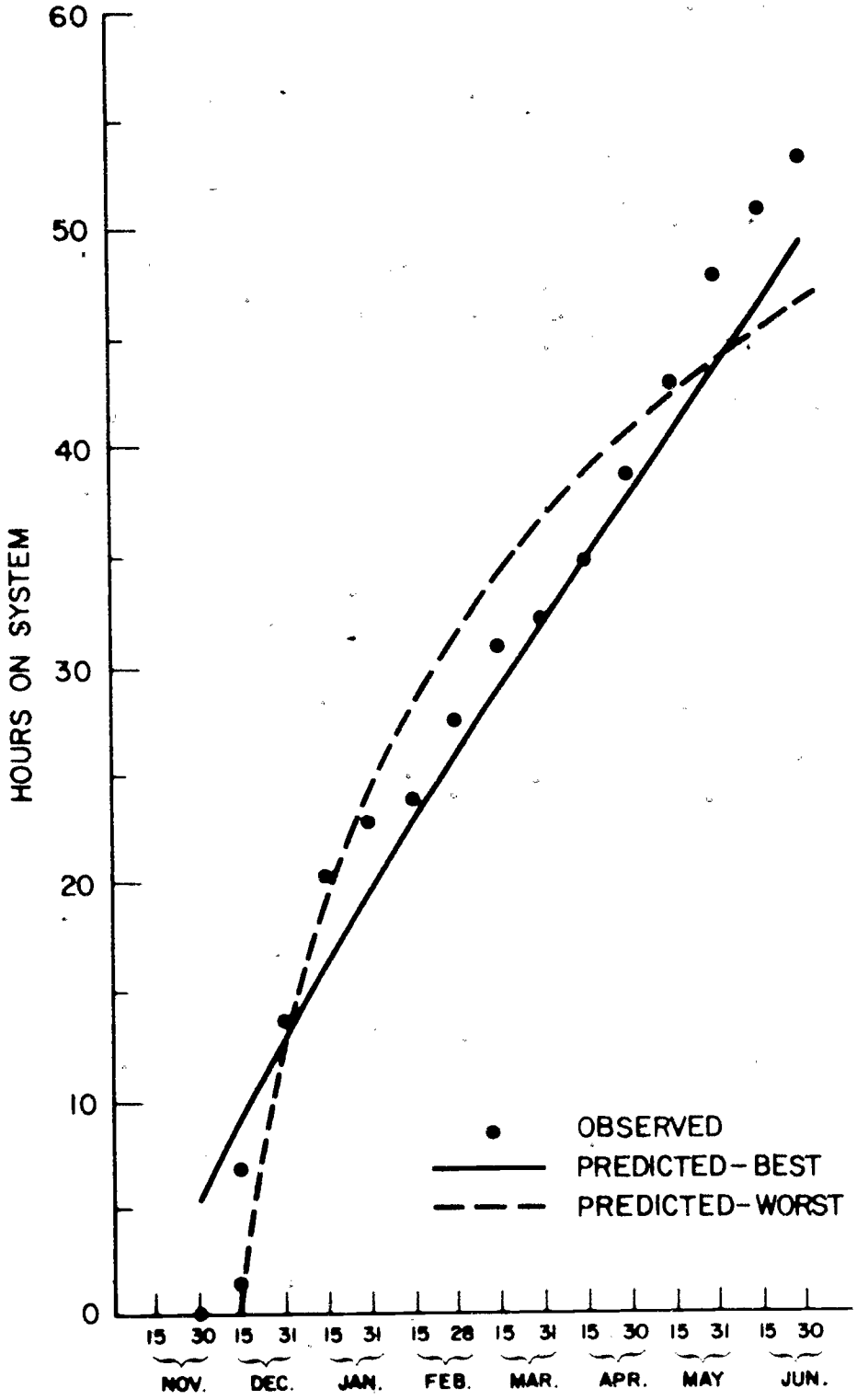

Fig. 1a. Typical student curves with best and worst predicted curves (Student A).

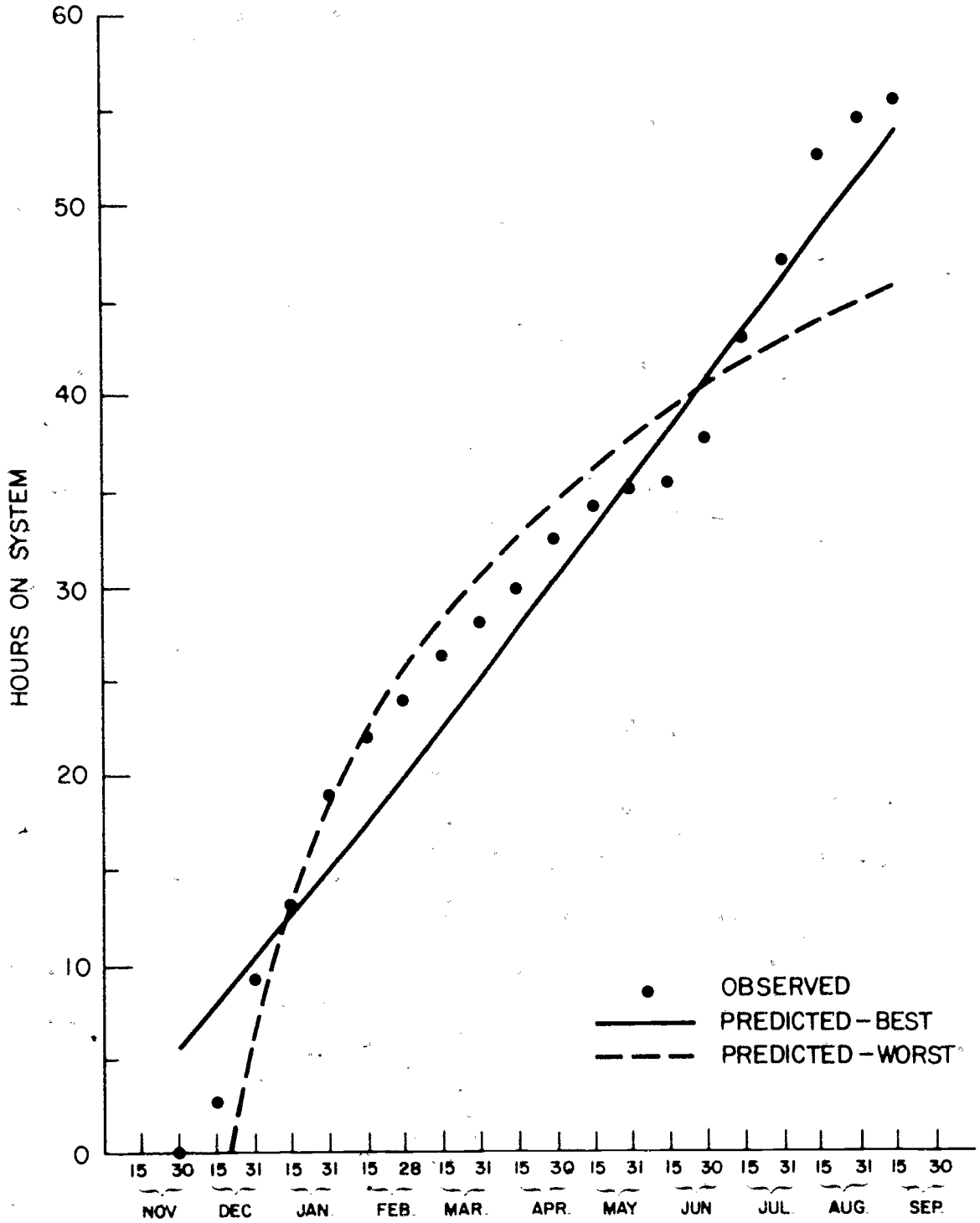

Fig. 1b. Typical student curves with best and worst predicted curves (Student B).

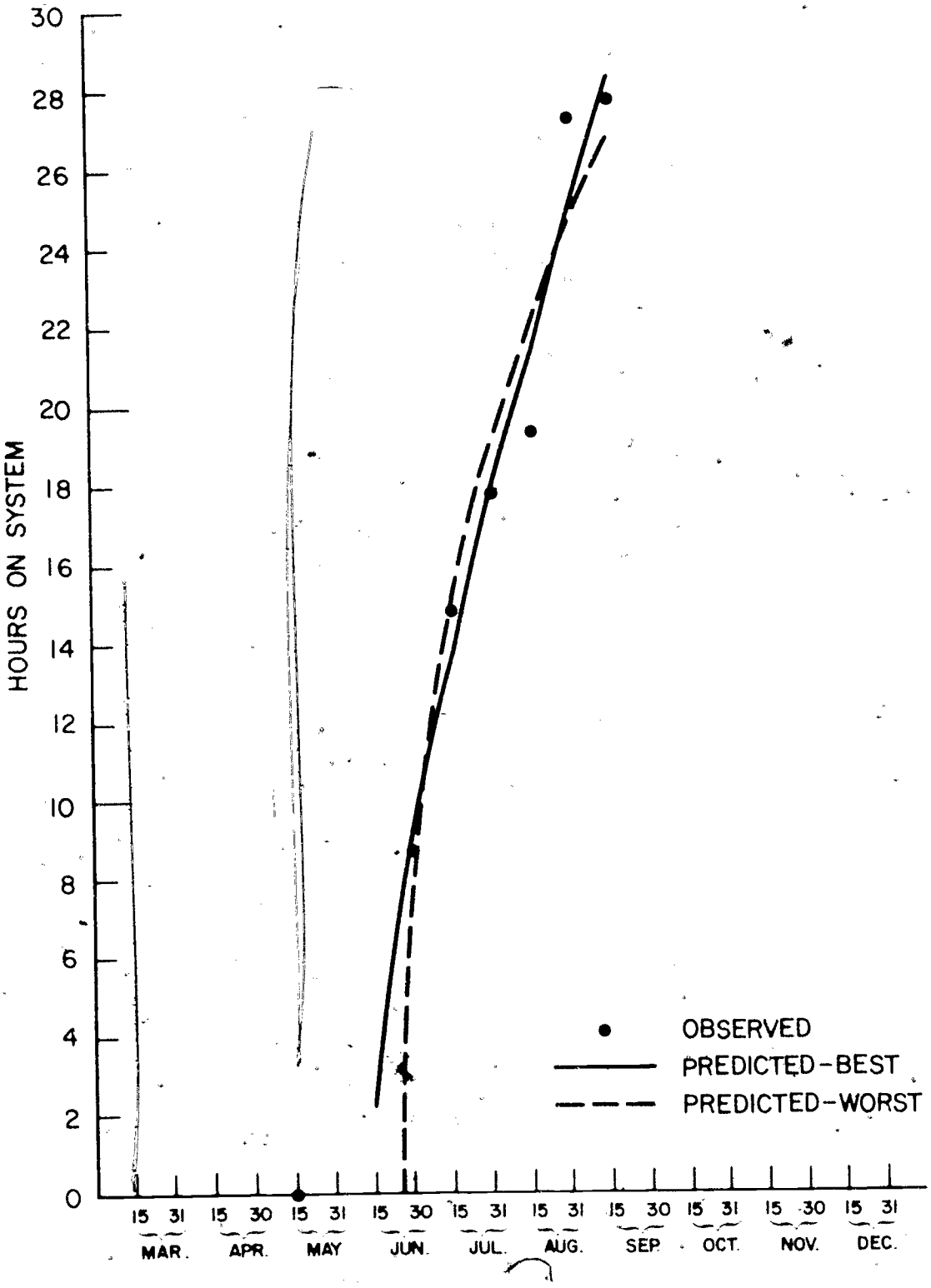

Fig. 1c. Typical student curves with best and worst predicted curves (Student C).

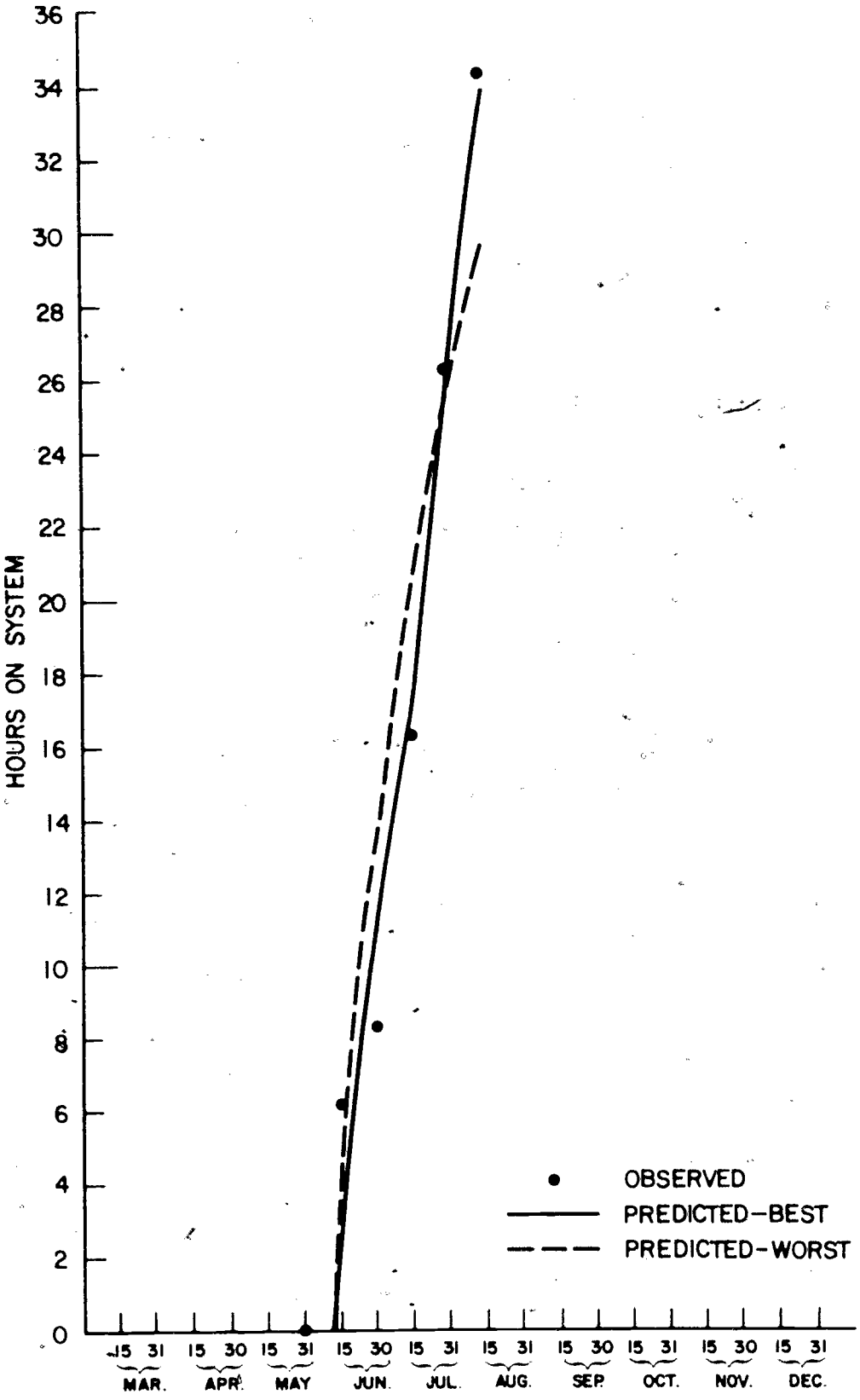

Fig. 1d. Typical student curves with best and worst predicted curves (Student D).

Figure 2 shows an observed curve for which the theory did not predict well; this student had a long period of inactivity followed by

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Insert Figure 2 about here

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a period of being very active. It would be possible to derive an equation that would handle cases such as this one in which there are long periods of inactivity and then short bursts of activity, but only two of our students followed this pattern and we decided not to pursue the matter further.

To give a sense of the effect of using the same k for all students and to see how the mean standard error varies with the variation of k, we show in Table 7 the results of letting k range from .05 to 1.25.

Insert Table 7 about here

As can be seen from the table, the mean standard error varies from a maximum of 2.3606 for $k = .05$ to a minimum of 1.9391 for $k = .70$. The third column shows the range across students of the standard error. In the worst case, with $k = .05$, the top of the range is just slightly under 7 hours. The mean absolute residuals are shown in the fourth column; again the minimum, 1.6564, is for $k = .70$ and the maximum, 2.0207, is for $k = .05$. The sixth column shows the mean of the maximum absolute residuals; here the values range from a minimum of 3.3661 for $k = .55$ to a maximum of 4.3897 for $k = 1.25$. The range of the absolute residuals and the maximum absolute residuals are shown in columns 5 and 7; they exhibit a pattern similar to the ranges

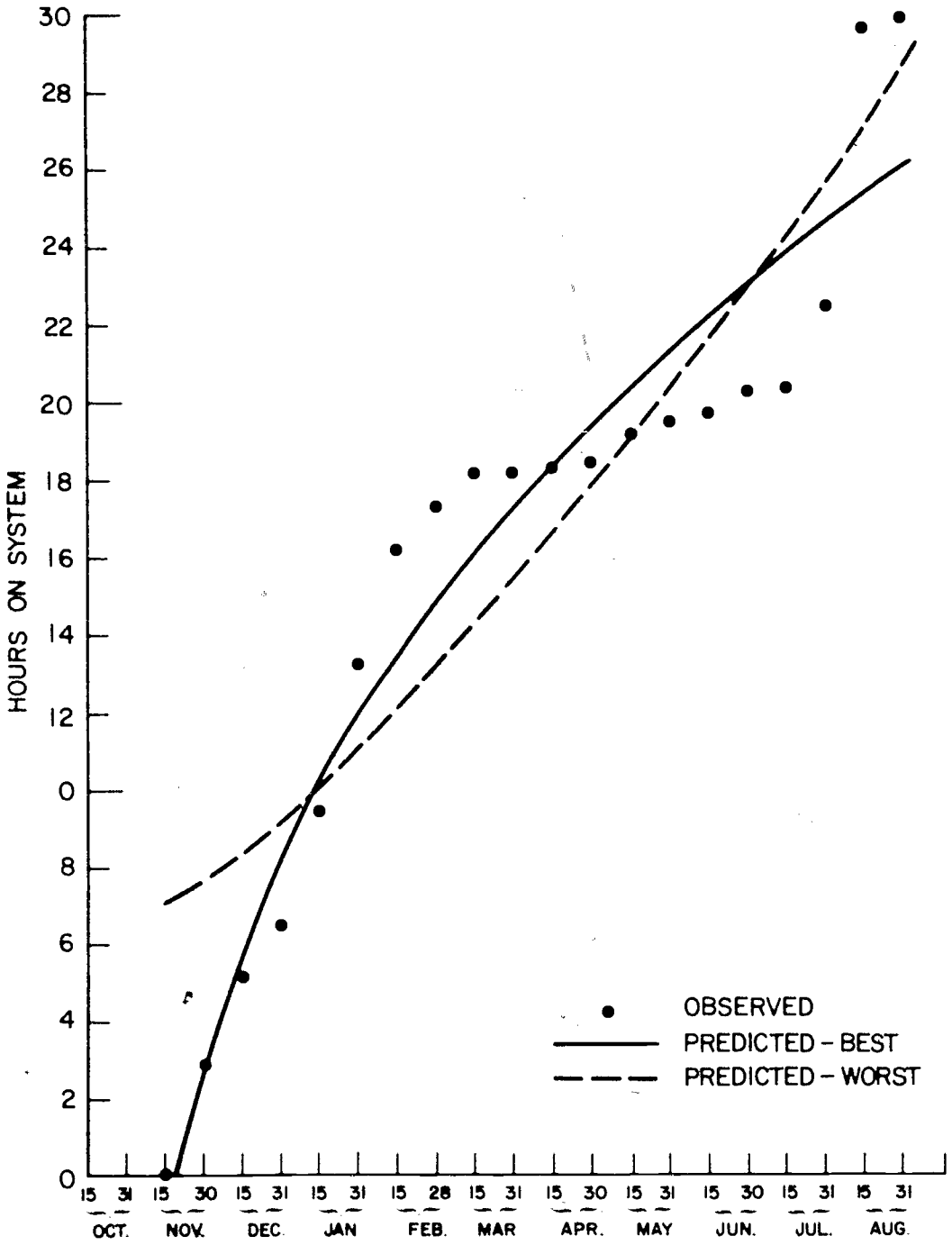

Fig. 2. Curves for student for whom the model did not fit well.

TABLE 7

Evaluation of Fit of Theory Using Same Exponent k for Each Student, but Individual Parameters b and c

k	Mean SE	Range of SE	Mean abs. residual	Range of abs. residual	Mean of max. abs. residual	Range of max. abs. residual
.05	2.3606	.2053-6.9852	2.0207	.1916-6.4676	4.1134	.2874-10.4569
.10	2.2999	.2291-6.7705	1.9643	.2139-6.2583	3.9860	.3210-10.1398
.15	2.2429	.2530-6.5572	1.9125	.2302-6.0457	3.8623	.3548-9.8041
.20	2.1898	.2770-6.3457	1.8635	.2478-5.8305	3.7460	.3888-9.4509
.25	2.1411	.3011-6.1368	1.8220	.2653-5.6135	3.6401	.4231-9.0823
.30	2.0973	.3253-5.9308	1.7886	.2826-5.3952	3.5464	.4575-8.7141
.35	2.0585	.3492-5.7282	1.7575	.2993-5.1763	3.4919	.4920-8.7196
.40	2.0252	.3579-5.5298	1.7329	.2890-4.9576	3.4448	.5267-8.7144
.45	1.9976	.3459-5.3358	1.7110	.2787-4.7394	3.4041	.5546-8.6987
.50	1.9754	.3342-5.1468	1.6917	.2683-4.5225	3.3814	.5377-8.6728
.55	1.9586	.3226-4.9634	1.6772	.2578-4.3074	3.3661	.5209-8.6368
.60	1.9471	.3112-4.8668	1.6675	.2494-4.2528	3.3815	.5044-8.5912
.65	1.9406	.3001-4.9359	1.6610	.2426-4.3080	3.4158	.4882-8.5363
.70	1.9391	.2829-5.0036	1.6564	.2358-4.3609	3.4620	.4722-8.4724
.75	1.9423	.2787-5.0698	1.6565	.2291-4.4116	3.5092	.4566-8.4000
.80	1.9500	.2684-5.1345	1.6615	.2224-4.4600	3.5596	.4414-8.3368
.85	1.9621	.2585-5.1977	1.6706	.2158-4.5061	3.6133	.4265-8.5248

(Table 7, continued)

k	Mean SE	Range of SE	Mean abs. residual	Range of abs. residual	Mean of max. abs. residual	Range of max. abs. residual
.90	1.9782	.2490-5.2593	1.6821	.2092-4.5500	3.6701	.4120-8.7100
.95	1.9980	.2399-5.3194	1.6962	.2027-4.5916	3.7421	.3979-8.8922
1.00	2.0214	.2312-5.3779	1.7128	.1963-4.6310	3.8430	.3843-9.0714
1.05	2.0480	.2230-5.4349	1.7315	.1900-4.6683	3.9410	.3711-9.4048
1.10	2.0774	.2154-5.4904	1.7531	.1838-4.7034	4.0478	.3583-9.8368
1.15	2.1094	.2082-5.5443	1.7746	.1777-4.7365	4.1637	.3460-10.2527
1.20	2.1436	.2017-5.5967	1.7974	.1717-4.7675	4.2767	.3341-10.6527
1.25	2.1800	.1958-5.6477	1.8206	.1658-4.7965	4.3897	.3227-11.0373
.5620	1.9554	.3199-4.9202	1.6744	.2552-4.2561	3.3638	.5169-8.6267

of standard error with the largest values for the extreme values of k and the smallest values for the middle values of k.

At the bottom of the table we have shown the fixed value of k = .5620 that arises from taking the mean of the best individual k's. This mean fixed k is close to the minimum shown in the table in terms of each measure of fit; this was true of the data in Suppes et al. (1973) as well.

In Table 8 we compare the results for this population mean of individually best k's with the mean standard error for the individually best k's.

Insert Table 8 about here

As in the Suppes et al. (1973) data, all measures show improvement from going from an approximately best k which is constant for all students to individually estimated k's. The standard error moves from 1.9554 with a constant k to 1.4745 with individual k's; the mean of the mean absolute residuals moves from 1.6744 to 1.2932; and the mean of the maximum absolute residuals moves from 3.3638 to 2.7448.

Figure 3 shows how relatively flat curve of the mean standard error is when a fixed parameter k is used for the entire student population; the data are graphed from the second column of Table 7.

Insert Figure 3 about here

The flatness of Figure 3 indicates that if a fixed k is used for the entire population, there is no need to have an exact estimate of it; any value in the range from .45 to 1.00 will give about as good

TABLE 8

Comparison of Individually Best k's with Population Mean

of Individually Best k's

	Mean SE	Range of SE	Mean of mean abs. residuals	Mean of max. abs. residuals
Mean k = .5620	1.9554	.3199-4.9202	1.6744	3.3638
Individual k's	1.4745	.1916-4.0212	1.2932	2.7448

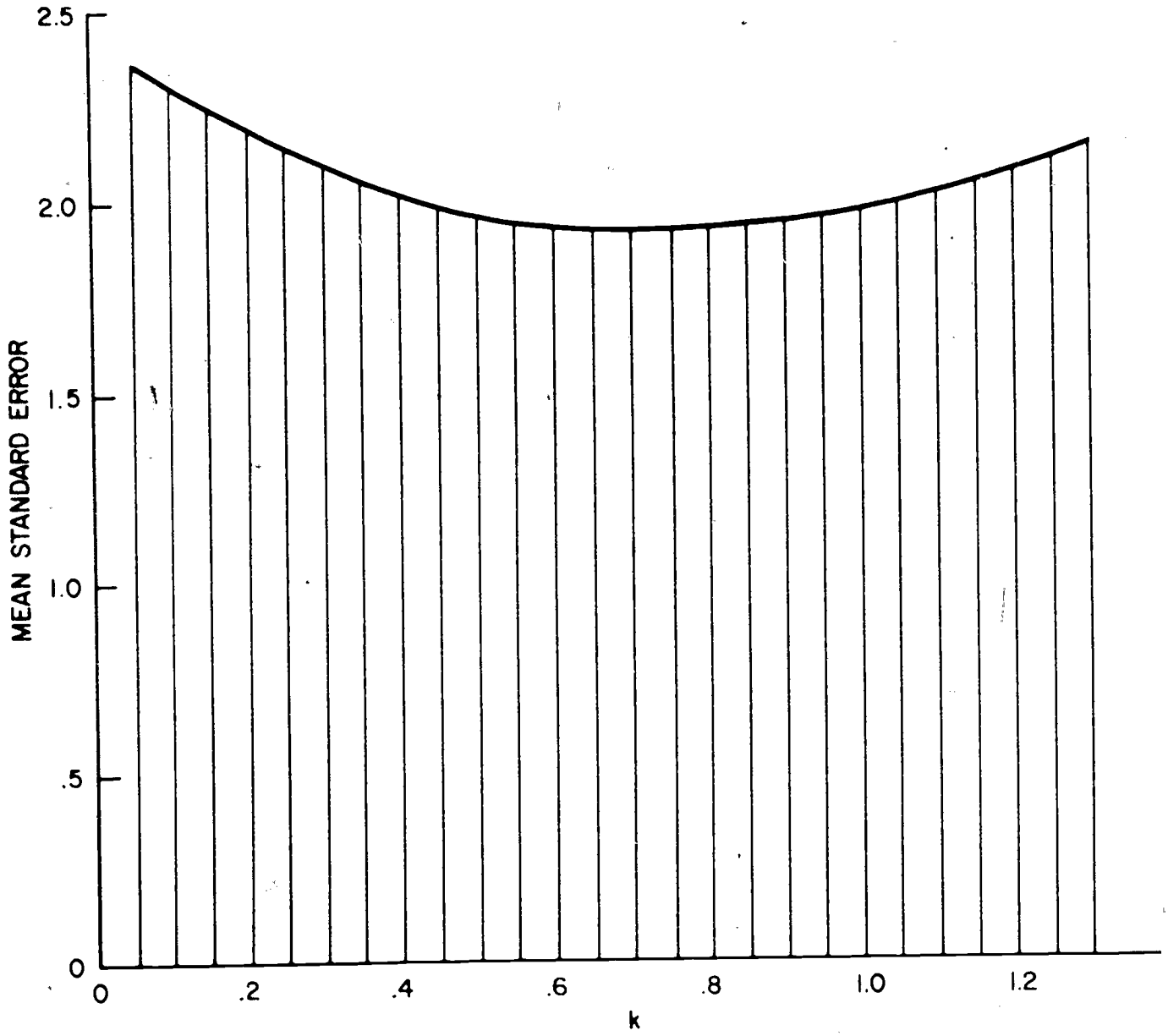

Fig. 3. Graph of mean standard error as a function of the parameter k.

an estimate as any other. In Suppes et al. (1973), a similar curve was found with the best choices for k being between .3 and .6.

In Figure 4, we show the histogram for the distribution of the exponent k when individually estimated. The figure shows a wide

---

Insert Figure 4 about here

---

range of best k values, and in this respect there is great student variability. On the other hand, Figure 3 and the Suppes et al. (1973) work have shown that considerable variation in the range of k will affect only slightly the fit of the predicted curve to the observed data, and so the variability is not as great as it appears.

Conclusions

Five rather different but salient conclusions seem to emerge from this study.

First, the high dropout rate experienced with this very special and very bright population of students is characteristic of the high dropout rates observed in other home-study courses. We left the structure of the program very free in order to test whether very able students of the kind we were working with would be able to sustain an interest in relatively difficult material over a long period of time. It should also be remarked that all of these students had very busy programs both in and out of school. We were in fact surprised, after the program began, to find the amount of time some of them were devoting to it.

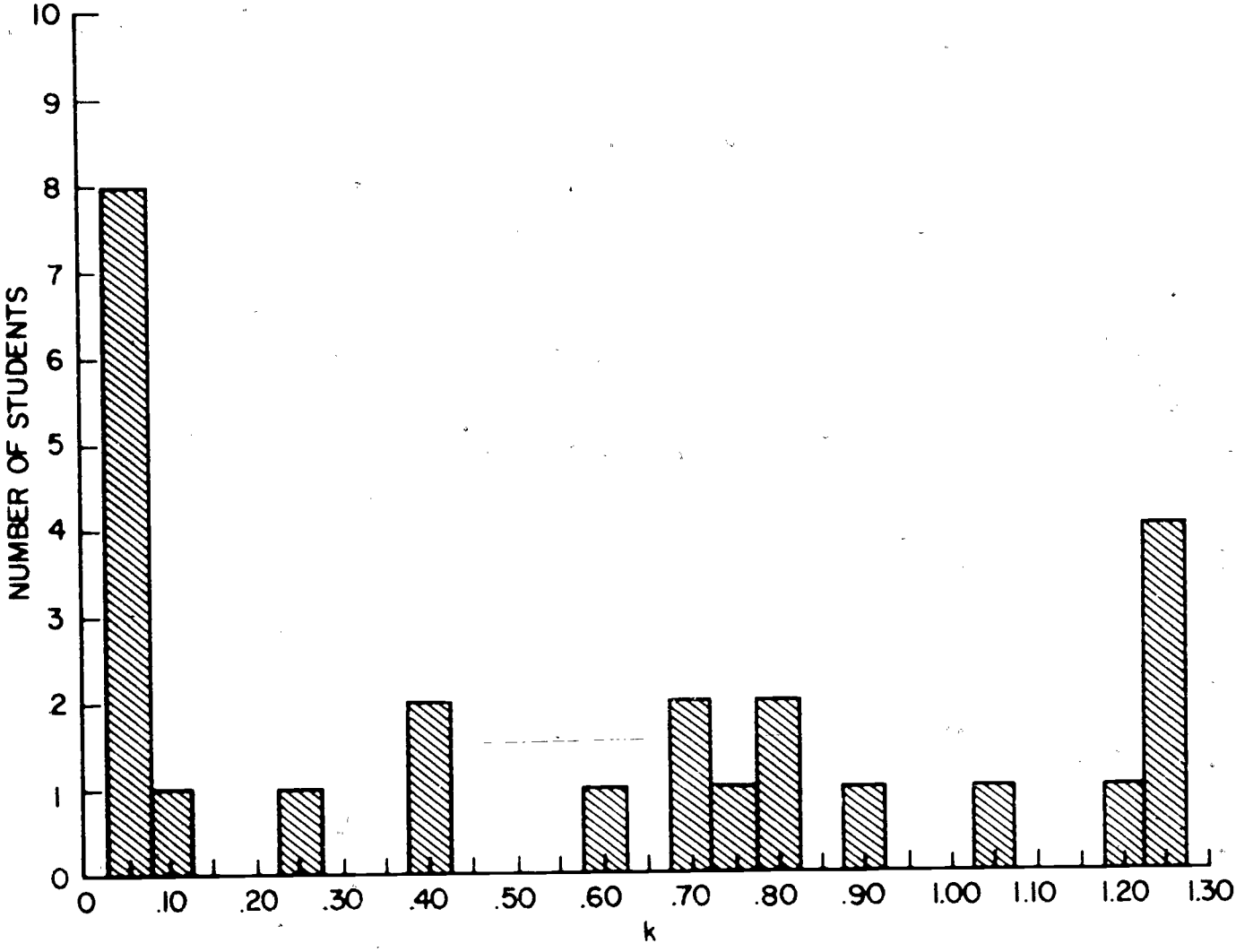

Fig. 4. Histogram of the exponent k estimated individually for 25 students.

Second, on the basis of the high dropout rate experienced, we would conclude that a sustained program of home study for gifted students would require the introduction of considerable structure and also probably clear arrangements about academic credit for the course work done. Perhaps the best arrangement would be to be able to replace part of the routine school courses by the advanced courses available at computer terminals for home study, or at the very least to arrange for advanced credit for the courses competed.

From our extensive survey of the literature and from this intensive experiment, we believe that arrangements for introducing structure providing short-range goals for students, feedback on their progress, telephone conversations with proctors, and other forms of guidance and interaction need extensive experimentation in order to determine the optimal mix for home-study instruction. Our search of the literature indicates that there has as yet been very little serious experimentation on these matters. In view of the very large number of students engaged in home-study work in one form or another and given the technological possibilities for the future in terms of more intensive interactive courses available in the home, it seems most desirable that an extensive program of experimentation on the appropriate structures for such courses be undertaken.

Third, even though the students were in a very free environment of individualized study, the theoretical curves derived from the earlier work of Suppes et al. (1973) fit the student data surprisingly well. We believe that such theoretical curves can be introduced at a practical level to give students clear predictive information on what they will

accomplish in weeks ahead and to provide detailed guidance on their rate of progress. Such predictive student trajectories have, as far as we know, not previously been studied for home-based instruction. We believe that they offer an opportunity for a deeper understanding of learning rates in this environment and can be combined with advantage in the implementation of the kind of exprimental work described in the preceding paragraph.

Fourth, in ordinary studies of achievement of students in different technologies, for example, in the extensive survey of Jamison, Suppes, and Wells (1974), pretest and posttest achievement measures have been the primary instrument of assessment. The extensive data from correspndence courses and the restricted but detailed data from the group of very gifted students described in the present section indicate that, in the case of home-based instruction, the dropout rate is a more significant measure at the present time of assessment than actual achievement. This is meant in the sense that the primary problem of home-based instruction at the present time is, surely, to find ways to reduce the very large dropout rates encountered in almost all forms of home-based instruction. The variables that prove to have an effect on the dropout rate that were identified in Section I undoubtedly have substantial transfer effect to other technologies of instruction. We would recommend a very concentrated focus on dropout rate as an appropriate dependent variable for any experimental studies, and we would recommend that detailed quantitative and statistical models to predict the behavior of this variable be constructed. Although the literature surveyed in Section I is extensive, in one sense, with regard to

analysis of the causes of dropout, it is on the other hand clear that detailed quantitative and statistical analysis using relatively sophisticated models has not as yet taken place, and would almost certainly yield a better understanding of the phenomena than we now have.

Fifth, as we noted in the introducton to this report, we were disappointed at the lack of systematic studies of the costs of using various technologies for home-based instruction. We would strongly recommend that such studies be made, and we have some specific recommendations about such studies. It is evident that a number of community colleges are now beginning to transfer a significant number of courses to a home-based environment. It would be particularly desirable to have data on the costs of this alternative method of instruction and also information as to whether the administrative decisions that have led to the offering of such courses have partly been due to economic pressures. We were not able to find data on the point, but it is our conjecture that the strong economic pressures on the system of higher education in this country constitute the most important single force for the continuing development of home-based instruction. Within the confines and purposes of this report, we were not able to undertake the analyses required for serious projection of some of these trends. In fact, we believe that it is extremely difficult to obtain the relevant data to make such projections. It is for this reason that we would recommend that detailed analyses of a few specific community colleges and universities that are beginning to offer extensive home-based instructional programs by television would be desirable. It may be premature to undertake serious economic analysis within the next year, but certainly

within the next three or four years such analysis should be feasible on the basis of the experience that various units of higher education will have accumulated by that time.

It is important that the matter of economic analysis be kept in perspective. It will for the indefinite future, until the cost of paper is far beyond what it is now, be cheapest to offer rather simple correspondence courses from the standpoint of educational inputs, but as our enormously complex system of higher education in this country gives adequate evidence of, we are not satisfied with minimizing educational costs even though the necessity of operating with strict budgetary constraints is now a problem faced by all levels of education. What we would recommend is that a specific effort be conducted over several years to develop and measure educational production functions for home-based instruction and that experimentation on various technologies for delivery of instruction be examined, especially from the standpoint of their production function characteristics.

Computer-assisted Instruction References

Suppes, P. Computer-assisted instruction at Stanford. In Man and computer. (Proceedings of international conference, Bordeaux 1970.) Basel: Karger, 1972.

Suppes, P., Fletcher, J. D., & Zanotti, M. Models of individual trajectories in computer-assisted instruction for deaf students (Tech. Rep. 214) Stanford, Calif.: Institute for Mathematical Studies in the Social Sciences, 1973.

Suppes, P., Goldberg, A., Kanz, G., Searle, B., & Stauffer, C. Teacher's handbook for CAI courses (Tech. Rep. 178). Stanford, Calif.: Institute for Mathematical Studies in the Social Sciences, 1971.

Suppes, P., Jamison, D., & Wells, S. The effectiveness of alternative instructional media: A survey. Review of Educational Research, 1974, 44, 1-67.

Suppes, P., Jerman, M., & Brian, D. Computer-assisted instruction: Stanford's 1965-66 arithmetic program. New York: Academic Press, 1968.

III. CROSS-REFERENCED ANNOTATED BIBLIOGRAPHY

Description of Bibliography

The cross-referenced annotated bibliography is in three subsections. The first subsection is the annotated references, numbered and alphabetized in five groups with the following group headings: computers in education; television and videotape; multimedia; nontraditional study; and reference materials. To briefly describe the contents of each reference we developed a list of categories and subtopics; these descriptors include information about the nature of the paper, the type of program, and the particular subjects discussed in the paper.

The second and third subgoups combine the descriptor list with the reference list. The second subsection is a list of all the references with each reference followed by the numbers of the descriptors that fit best. The third subsection is the mirror image of the second subsection; it contains a list of all the descriptors with each descriptor followed by the numbers of the appropriate references. We have six groups of descriptors with the following descriptor-group headings: effects on users, media, program construction, programs, and programs abroad. We did not include a special set of references to television in the media descriptor-group because we have a large group of major television references in the first subsection and because more than three-fourths of the other references we cite are concerned in some degree with television; thus a special listing for television here would not be useful in distinguishing references. We did not cross-reference

any of the material in the reference group (in the first subsection); the content is evident from the title.

Most of the references we cite directly involve home study; however, we have included some references which discuss independent study programs that could be extended to home study. Similarly, some references to experiments in adult education and innovative educational technology that could be applied to home study have been included.

Our survey found very few references concerning the educational use of computers in homes. Britain's Open University uses some home-based computer terminals as a part of their program (see item [1.04] in the annotated references) as does the TICCIT (Time-shared Interactive, Computer-controlled, Information Television) project in the United States [1.03]. The Dial-A-Drill program in New York was a computer-controlled program in which students were called at home and given 5 minutes of practice in oral arithmetic problems; the oral exercises were generated from digitized word recordings stored on a computer disk, and the students respond by using a touch-tone dial [1.01]. The work of Stanford's Institute for Mathematical Studies in the Social Sciences, reported in the preceding section of this report, concerning use by gifted students of home-based CAI is one of the few examples of detailed research into the use of computers for home study.

The articles we found on the uses of television for instruction fall into four categories: position papers and conferences, descriptions of educational television projects for adults, descriptions of educational television projects for children, and the use of educational

television in other countries. The articles on videotapes include position papers and descriptions of educational uses for adults; these are much fewer in number than those on television. An outspoken proponent of the use of television in all aspects of education is Gattegno [2.21]; his book suggests a basic set of elements necessary for the successful use of the medium and includes some new ideas for more effective methods of presentation. Behrman [2.03] takes the opposite position and claims that television with its one-way communication is not a viable procedure for teaching. Gross [2.25] conducted a large experiment comparing 8,000 students enrolled in two television courses with on-campus students in the same courses. Much work has been done concerning the Children's Television Workshop; some of it is descriptive and some experimental in nature [2.02, 2.06, 2.11, 2.12, 2.13, 2.22, 2.36, 2.38, 2.39]. Another television project for children is one concerning environmental education that was tried in Maine [2.04]. Foreign countries that have experimented with educational television are: Australia, Israel, and New Zealand [2.29], South Africa [2.30], and Japan [2.01].

We have combined literature concerning educational uses of combinations of media or uses of media other than computers, television, and videotape in the multimedia group. Programs in this group that combine media are not as extensive in scope as those included in the non-traditional study group which follows and do not, by themselves, lead to an advanced degree. We cite work that provides a sample of programs in the United States and in foreign countries and have included position papers, conference reports, and research reviews. Because of the scarcity of data concerning the use of these media in homes, we have

included some references to projects involving media in classrooms or learning centers that do not require human instructors and thus could be used in homes as well; this is particularly true of radio projects.

The group we have called nontraditional study includes degree-oriented programs that involve the use of a combination of media for out-of-class study. A leader among such programs is Britain's Open University. Articles that describe the total program at the Open University have been included here (e.g., [4.08, 4.32]); articles that are concerned with a particular type of media as used in the program have been included in one of the earlier groups. Several projects in the United States have been patterned after the Open University; these include the large SUN (State University of Nebraska) project (e.g., [4.16, 4.25]), the University Without Walls project [4.27], the Open University of Houston [4.33], and external degree programs in New York [4.18] and Florida [4.10]. Some work is being done at Montclaire State College in New Jersey [4.21] toward finding ways to educate disadvantaged adults at home. Other literature mentioned in this group includes position papers, comparative overviews of several programs, and a few reports of similar work in other countries.

In the reference group we have included many bibliographies and educational indexes and directories to aid the reader interested in obtaining further information regarding a particular topic.

Annotated Bibliography

1. Computers in Education

1.01

TITLE: Final Report: An Evaluation of the Dial-A-Drill Program.

AUTHOR: Beech, R. P., McClelland, S. D., Horowitz, G. R., & Forlano, G.

INSTITUTION: State Education Department, New York, 1970.

Telephone: In this program students are called at home and given 5 minutes' practice in oral arithmetic problems. The oral

Computer: exercises are generated from digitized word recordings stored on a computer disk, and the students respond by using a touch-tone dial. The report describes the program and data and provides some conclusions about the

Attitudes: results. A summary of the authors' extensive investigation of parent and student attitudes toward the program is included.

1.02

TITLE: Computer Assisted Lesson Service for Independent Study

AUTHOR: Brothers, W. L.

JOURNAL: Educational Technology, June 1972, Vol. 12, No. 6, p. 64.

Institution: This article describes the computer-assisted-instruction service of the United States Armed Forces Institute

Statistics: (USAFI). It includes major elements of the system history of the program and cites some of the limitations and statistics of the lesson volume.

1.03

TITLE: Team Production of Learner-Controlled Courseware: A Progress Report.

AUTHOR: Bunderson, C. V.

INSTITUTION: Institute for Computer Uses in Education, Division of Instructional Services, Brigham Young University, W164 Stadium, Provo, Utah 84601. May 1, 1973.

MITRE: In 1971, the National Science Foundation funded two or-

Texas: ganizations, the MITRE Corporation in McLean, Virginia, and the University of Texas CAI laboratory, with two separate but related contracts for investigations lead-

TICCIT: ing to the further development of MITRE's TICCIT (Time-

TV & CAI: shared Interactive, Computer-Controlled, Information Television) computer system concept. The concept of using minicomputers, television, and cable distribution

to produce a low-cost CAI system had been developed extensively by MITRE on the strength of a substantial internal commitment prior to this time. MITRE was to develop hardware, and Texas was to develop courseware. Since substantial additional courseware was required, a third team was established at Brigham Young University. This report gives an overview of the specific learner-controlled courseware production. An extensive reference list on the project is available.

Hardware:

Courseware:

Learner:

References:

1.04

TITLE. Communications Terminals Provide Lessons at Britain's Open University.

JOURNAL: Educational Technology, Oct. 1971, Vol. 11, No. 10, p. 16ff.

1.05

TITLE: Correspondence Study, Lost or Found.

AUTHOR: Holmberg, B.

JOURNAL: Convergence, 1972, Vol. 5, No. 2, pp. 7-14.

Correspondence: The article describes correspondence study with emphasis on new educational methodology, course material, and media including CAI. Home study and student-teacher relationships are also discussed.

Relationship:

1.06

TITLE: Computer Assisted Instruction, Testing and Guidance.

AUTHOR: Holtzman, W. (Ed.)

PUBLISHED: New York: Harper & Row, 1970, 402 pages.

Implications: The book deals with the application of computer technology to education, and the psychological and sociological implications of computer teaching, testing, and counseling.

1.07

TITLE: An Overview of the TICCIT Program.

CORPORATION: The MITRE Corporation, Washington Operations, 1820 Dolley Madison Boulevard, McLean, Va. 22101. Jan. 1974.

CAI: The MITRE Corporation attempts to accelerate the mass dissemination of an educationally sound form of CAI through a multiyear program of development, demonstration, and evaluation.

Goal: The goal of this program is to demonstrate that CAI can provide better instruction at less cost than traditional instruction in community colleges.

References: An extensive list of other papers written about the project is available.

2. Television and Videotape

2.01

TITLE: Educational Broadcasting in Japan.

AUTHOR: Anderson, R. S.

JOURNAL: Educational Perspectives, Oct. 1968, Vol. 7, No. 3, pp. 23-27, 31.

Television: The article discusses various aspects of educational broadcasting in Japan.

2.02

TITLE: The First Year of Sesame Street: An Evaluation.

AUTHORS: Ball, S., & Bogatz, C.

INSTITUTION: Educational Testing Service (ETS), Princeton, N.J., 1970.

3-5-year-olds: This report is an evaluation of the impact of educational television on 3- to 5-year-old children. One of the research questions was: Do children learn more in

Characteristic: the home or in class? Characteristics of good learners are contrasted with those of poor learners. Two conclu-

Conclusions: sions were: (a) children who watched the most tended to have the best pre-post gain scores, and (b) children

viewing in their homes were at no disadvantage in com-

Peers: parison with those viewing in a peer-group environment with teacher supervision.

2.03

TITLE: TV, No Panacea for Education's Ills.

AUTHOR: Behrman, D.

PUBLISHED: UNESCO Features, 1971.

Criticism: This was an experiment to show faults of educational television. The thesis is that one-way communication is not a viable procedure for teaching.

2.04

TITLE: North of Hamaskeog: A Newer-active TV Project.

AUTHOR: Bogart, E. R Van de

JOURNAL: Educational Broadcasting, Nov./Dec. 1972, Vol 5, No. 7.

Subject: A TV project in environmental education produced by the

Producer: Maine Public Broadcasting Network.

2.05

TITLE: Education and the Cable (A Personal View).

AUTHOR: Booth, E. G.

JOURNAL: Educational and Industrial Television, June 1973, Vol. 5, No. 6, pp. 11-13.

Advantage: The author suggests ways in which educators can take advantage of the opportunity cable television offers. She states that while the number of educational institutes or public-school systems with actual experience in cable television is small, there are many indications that significant progress is being made in educating educators about cable.

Educators:

2.06

TITLE: Three Models for Home-based Instructional Systems Using Television.

AUTHOR: Bretz, R.

PUBLISHED: Oct. 1972, 68 pages.

Home-based: A study was conducted concerning the use of television as a component of instructional programs designed for home-based students. Three programs were examined: Chicago's "TV College," Bavaria's "Telekolleg," and one of the Children's Television Workshop series, "Sesame Street." The paper discusses the planning and development stages of these three projects, pointing out the procedures, activities, and elements of each that appear to be particularly significant to its success.

Examples:

Checklist: A checklist of items necessary in the development of a new instructional program using television classifies the components neccessary for success, in four phases.

Model: A general model is described that synthesizes the successful components in the preplanning, planning, promotion, production, operations, and evaluation stages, and gives a comparison of costs.

2.07

TITLE: Team Production of Learner-controlled Courseware: A Progress Report.

AUTHOR: Bunderson, C. V.

INSTITUTION: Institute for Computer Uses in Education, Division of Instructional Services, Brigham Young University, W164 Stadium, Provo, Utah 84601 May 1973.

MITRE; Texas: TICCIT: TV & CAI: Hardware: Courseware: In 1971, the National Science Foundation funded two organizations, the MITRE Corporation in McLean, Virginia, and the University of Texas CAI laboratory, with two separate but related contracts for investigations leading to the further development of MITRE's TICCIT (Time-shared Interactive, Computer-Controlled, Information Television) computer system concept. The concept of using minicomputers, television and cable distribution to produce a low-cost CAI system had been developed extensively by MITRE on the strength of a substantial internal commitment prior to this time. MITRE was to develop hardware, and Texas was to develop courseware. Since substantial additional courseware was required,

a third team was established at Brigham Young University. This report gives an overview of the specific learner-controlled courseware production. An extensive list of other papers written about the project is available.

References:

2.08

TITLE: 1970 National Institute on Instructional Television and Adult Basic Education.

AUTHOR: Buskey, J.

ORGANIZATION: University of Maryland, Conferences and Institutes Division, University College; Division of Radio and Television, Department of Speech and Dramatics, College of Arts and Sciences. Summer 1970, 238 pages.

Training: A 3-week summer institute was established to train adult educators in the uses and techniques of instructional television and to acquaint television technicians with problems and goals of adult basic education. A central goal was to give television more than its previously marginal role in Adult Basic Education (ABE) programs.

Goal:

2.09

TITLE: A Concept for Continuing Education of Adults. Adult Learning Program Service Development of Phase III.

AUTHOR: Carlisle, R.

CORPORATION: Corporation for Public Broadcasting. May-Nov. 1972, 60 pages.

Report: Details about the goals and content of the Adult Learning Program Service Development "ALPS One" project are included in this report by the Corporation for Public Broadcasting (CPB).

2.10

TITLE: Progress Testing . . . (With Sesame Street).

AUTHOR: Children's Television Workshop.

PUBLISHED: Jan. 27, 1970.

CTW: This report contains the following information about Children's Television Workshop (CTW) and Sesame Street:

Testing: methods and procedures, progress testing, and results of

Results: the Character Familiarity Test. It also gives results of the ETS-CTW Sesame Street Test Battery.

2.11

TITLE: Children's Television Workshop . . . A Proposal, 1970/1971.

Proposal: This report contains the following information about

Problem: CTW: the present and the future, the problem of the preschool-educational wasteland, utilization by target

Reading: audiences, and exploration of a new series on an approach to reading. Also in the appendix is a report on

Appendix: the following: instructional goals of Sesame Street,

1969-70, a proposal for Summative Evaluation of Sesame Street, 1969-70, and a Children's Television Workshop Utilization.

2.12

TITLE: Who Watched 'The Electric Company'. (The Electric Company In-school Utilization Study 1971-1972)

AUTHOR: Children's Television Workshop.

School survey: The report discusses the success of The Electric Company as shown by a school survey. The survey included questions about school adoption levels, slow readers

Target pupils: (target pupils), and viewing by pupils. There is also a

Manual: teacher survey and a description of a manual, "Teachers Guide to the Electric Company." A discussion of technical deficiencies, activities to aid viewing, and future research is included in the report.

2.13

TITLE: Simulated Interpersonal Process Recall Through CCTV.

AUTHORS: Davis, W. C., & Whitehead, T. G. J.

JOURNAL: Educational Broadcasting, Jan./Feb. 1973, Vol. 6, No. 1.

Experiment: The article describes an experimental process which utilizes Closed Circuit Television (CCTV) to improve

Interviewer: interviewer skills and to acquaint individuals with

Training: their own impact on others. The goal is to train people in a basic technique for self-analysis and review in an interviewer setting.

2.14

TITLE: An Interim Report on Britain's Open University.

AUTHOR: Dirr, P.

JOURNAL: Educational Television, Dec. 1971, Vol. 3, No. 12, pp. 17-18, 27.

2.15

TITLE: Improving College and University Training.

AUTHOR: Dwyer, F. M.

JOURNAL: Improvising Visuals for Televised Instruction, 1970, Vol. 18, No. 4.

Suggestions: The article contains recommendations and suggestions to improve the visuals for instruction on television.

2.16

TITLE: Educational Television, The Next Ten Years.

REPORT: Stanford University Institute for Communications Research, Stanford University, California.

SPONSOR: U.S. Office of Education, OE-34036, Washington, D. C. 1965.

Problems: Problems of finance, program quality, manpower training

and design and equipment of schools are discussed.

History: Appendices include brief histories of both educational television and educational radio.

2.17

TITLE: EVR: Teacher in a Cartridge.

JOURNAL: Change, Jan./Feb. 1971, Vol. 3, No. 1, pp. 40-43.

New tool: The article discusses the electronic videocartridge as a potent new learning tool while emphasizing some of the new problems it creates.

2.18

TITLE: Cumbin: City University Mutual Benefit Instructional Network.

AUTHORS: Freund, S. A., & Marlmas, V. C.

JOURNAL: Educational Broadcasting, July/Aug. 1972.

CCTV: The development of a closed circuit television (CCTV) system has allowed the following 22 institutions to offer specialized courses on their campuses: 10 senior colleges, 8 community colleges, a graduate center, an affiliated graduate school, and 2 urban centers of CUNY.

Users:

2.19

TITLE: The Video Cassette as an Educational Reality.

AUTHOR: Gabor, S. C.

JOURNAL: Educational Technology, Apr. 1972, Vol. 12, No. 4, pp. 35-37.

2.20

TITLE: Towards a Visual Culture: Educating Through Television.

AUTHOR: Gattegno, C.

PUBLISHED: New York: Outerbridge & Dienstfrey. 1969, 117 pages.

Dr. Caleb Gattegno, a professional mathematician and educator, has been working in various fields of instruction for over thirty years; he is an outspoken proponent of the use of television in all aspects of education.

Elements: His book suggests a basic set of elements necessary for the successful use of the medium. He calls for a more

Visual use: visual use of the medium and claims that sound hampers the viewer's sight or vision as he watches television. Gattegno suggests that more experimentation must take place to produce a new technology that would produce effects on the screen and the space around it. The author spends considerable time discussing not only television, but the viewer as well. Gattegno suggests the use of "horizontal programming," by which he means the use of 5- or 10-minute segments every day to develop

a course of study that may take years to complete. One might call the segments single-concept presentations, or

Commercials: commercials. Sample "lessons" utilizing the horizontal programming concept are included.

2.21

TITLE: Pre-reading on Sesame Street.

AUTHORS: Gibbon, S. Y., & Palmer, E. L.

PAPER: Children's Television Workshop, June 1, 1970, 78 pages.

Description: This paper presents a brief history of CTW--its operational model and the workshop that carried out the initial experiment. It is concerned with the language and

Goals: prereading goals represented in the Sesame Street curriculum. Descriptions of production techniques, teach-

Strategies: ing strategies, letter-learning goals, humor, and problems of sequencing and scheduling are provided. Some

Data: preliminary data indicate that success has been achieved in teaching letter identification.

2.22

TITLE: The Maze of People and Machines.

AUTHOR: Gibson, L. G.

JOURNAL: Educational Broadcasting, Sept./Oct. 1972, Vol. 5, No. 6.

Advantages: The article contrasts advantages and disadvantages of choosing television as a training/communications medium.

2.23

TITLE: Video-Cassettes, Formalists, and Informalists in Education.

AUTHORS: Gordon, G. N., & Falk, I. A.

JOURNAL: Educational Technology, Jan. 1972, Vol. 12, No. 1, pp. 61-65.

Questions: This article deals with questions such as: What is this technology? What are the educational antagonisms?

2.24

TITLE: The Southern California Consortium for Community College Television.

AUTHOR: Gross, L. S.

JOURNAL: Educational and Industrial Television, Jan. 1973, Vol. 5, pp. 16-17, 20.

Comparision: A consortium of 20 community colleges in Southern California enrolled 8,000 students for two televised college-credit courses and made comparisions between these students and on-campus students in the same

Information: courses. Information was gathered through questionnaires, college records, or interviews about course effectiveness, audience composition, and publicity

Results: effectiveness. Results are discussed.

2.25

TITLE: Directed Private Study.

AUTHOR: Jones, L. H.

JOURNAL: Adult Education (London), March 1972, Vol. 44, No. 6, pp. 374-379.

Media: This article discusses directed private study, which offers flexibility, effectiveness, and economy when it uses television and other media in addition to the traditional classroom instruction.

2.26

TITLE: The Talk'n Tube MBA at the University of South Carolina.

AUTHOR: Knauss, Z.

JOURNAL: Educational Television, Dec. 1971, Vol. 3, No. 12, pp. 9-11.

2.27

TITLE: Course Production at the Open University I: Some Basic Problems.

AUTHOR: Lewis, B. N.

JOURNAL: British Journal of Educational Technology, Jan. 1971, Vol. 2, No. 1, pp. 4-13.

Team: The aim of this paper is to expose problems that arise when a collaborating team has to produce teaching materials for television broadcast under high time pressure.

2.28

TITLE: ITV and Education of Children of Migrant Farm Workers, Indians, and Inner-city Poor: Cross-cultural Comparisons of International Uses of Media. Vols. 1, 2.

AUTHORS: Mackin, E. (Vol. 1), Kimmel, P. (Vol. 2), and others.

PUBLISHED: Jan. 1971, Vol. 1, 195 pages, and Vol. 2, 192 pages.

ERIC: ERIC Document Reproduction Service Nos. ED 050 570 and ED 050 571.

ITV: In order to appraise the usefulness of instructional television (ITV) as the core component in instructional systems designed to meet the special needs of the educationally disadvantaged children of migrant farm workers, American Indians, and the innner-city poor, a study was made of the use of ITV programs to meet similar needs in other countries.

4 programs: The four in-depth case studies that are presented are: educational radio and television in Australia, ITV in Israel, the Nippon Hoso Kyokai (NHK) Gakuen (high school) program in Japan, and educational radio in New Zealand.

Supplement: The programs used in Australia, New Zealand, and Japan rely on correpondence courses to supplement the instruction provided on television, while the Israel ITV system is integrated into the school curriculum throughout the country.

2.29

TITLE: Management Training by Teletuition.

AUTHOR: Marais, G.

CONFERENCE: 3rd International Productivity Congress--Management in the Future, Vienna, Hofburg, Oct. 28-30, 1970.

INSTITUTION: University of South Africa, Pretoria, South Africa.

Programs: This is a detailed paper outlining management training by television in South Africa. It describes the School of Business Leadership, the Master in Business Leadership, the Advanced Executive Program, and the Doctoral Program of the University of South Africa.

2.30

TITLE: Effects of Educational Television on Higher Education in the State of Colorado.

AUTHORS: Maxwell, L. M., & Lord, W.

JOURNAL: IEEE Transactions on Education, Feb. 1971, Vol. E14, No. 1, pp. 1-6.

Success: The authors suggest that the use of videotape at Colorado State University aids in instruction, as it saves costs and reaches many students. They feel that

Projects: project SURGE, graduate-level courses leading to higher degrees in engineering, and CO-TIE, a project offering prerequisites for pre-engineering, are applicable as solutions facing educators.

2.31

TITLE: MIT Videotape Series Can Replace Textbooks.

INSTITUTION: Massachusetts Institute of Technology Center of Advanced Engineering Study.

JOURNAL: Chemical and Engineering News, Nov. 15, 1971.

Lectures: The article advocates videotaping lectures and describes a special videotaped lecture series of Dr. R. F. Baddour, a noted chemist. The authors go so far as to ask the question, "Why have resident professors?"

2.32

TITLE: A Perspective on Cable Television and the University.

AUTHOR: Morris, A. J.

JOURNAL: Eudicom, Fall 1974, p. 4.

University: This article about a conference, held in 1974 and called "Cable Television and the University," covers a wide range of the topics and issues dealt with at the conference, and supplements and clarifies some key points relating to the conference.

2.33

TITLE: Television Technology and the Culture of Childhood.

AUTHOR: Morrisett, L. N.

JOURNAL: Educational Researcher, Dec. 1973, Vol. 2, No. 12, pp. 3-5.

Research: This is a discussion of the importance of television to children (the heaviest television viewers) and the difficulty and lack of research evidence to analyze the effects of television. There is speculation on the role

Cable TV: of cable television and the educational use of interactive cable television, with emphasis on the need for good research on the relation of the technology and childhood culture. Also discussed are technological changes in the future, such as the educational applica-

Two-way service: tions of two-way service. Such service would allow a child sitting at home to have his personal instructor in a course or play with his own companion in a game by

Computer: hooking up his television set to a central computer. The possibilities for new children's programs are almost endless; Sesame Street and the Electric Company are only the beginnings of what might be accomplished.

2.34

TITLE: An Overview of the TICCIT Program.

CORPORATION: The MITRE Corporation, Washington Operations, 1820 Dolley Madison Boulevard, McLean, Va. 22101. Jan. 1974.

CAI: The MITRE Corporation attempts to accelerate the mass dissemination of an educationally sound form of CAI

through a multiyear program of development, demonstration, and evaluation. The goal of this program is to demonstrate that CAI can provide better instruction at less cost than traditional instruction in community colleges. An extensive list of other papers written about the project is available.

Goal:

References:

2.35

TITLE: Formative Research in Educational Television Production.

AUTHOR: Palmer, E. L.

PUBLISHED: Children's Television Workshop, 1972.

Behavioral: This comprehensive paper delineates the CTW operational model, curriculum planning, behavioral goals, experimental production, appeal of existing materials, and research on several other aspects of the CTW. It also addresses itself to internal compatibility; activity-eliciting, organizational and interpersonal factors; and many other topics regarding CTW.

Interpersonal:

2.36

TITLE: Automated Apprenticeship Training (AAT). A Systematized Audio-visual Approach to Self-paced Job Training.

AUTHORS: Pieper, W. J., et al.

PUBLISHED: April 1973, 241 pages.

Self-pacing: AAT is a systematized audiovisual approach to self-paced job training employing an easily operated teaching device. Two courses were developed for Air Force security police. Results indicate superior scores for the AAT graduates on a job-specific preformance test, an apprentice knowledge test, and supervisor's ratings. Trainee man-hour requirements were lowered 30% and supervisory man-hours were lowered 70%.

Scores:

2.37

TITLE: The Responses of Children in 6 Small Viewing Groups to Sesame Street.

AUTHOR: Reeves, B. F.

PUBLISHED: Children's Television Workshop, July 20, 1971.

Comparison: This report compares whole programs according to the following: degree of variety; length of individual program elements; program elements, including the teaching of numbers, words, letters, concepts, and cooperation; and program techniques including the use of guest stars, songs, and films.

Techniques:

2.38

TITLE: The Sesame Mother Project, Final Report.

INSTITUTION: Institute for Educational Development.

REPORT: ERIC Reports. Aug. 27, 1971.

Overview: This report is a project overview including a literature survey, goals, objectives, details of the procedures, profiles of Sesame mothers and children, and an evaluation of the pilot project. It is a thorough and comprehensive report, complete with data evaluation and conclusions.

Profiles:

2.39

TITLE: CATV: Its Implication . . . 1971.

AUTHOR: Shabut, O. E.

LOCATION: Chicago City College.

CATV: This is a position paper on Community Antenna Television (CATV)--its educational promise and relevancy to the City College of Chicago.

2.40

TITLE: Televised College Courses in Maryland.

AUTHOR: Smith, W. S.

JOURNAL: Educational and Industrial Television, Oct. 1973, Vol. 5, No. 10, pp. 18, 57.

Credit: The article describes how college credit via television in the fourth year of operation has become a large-

Courses: scale statewide operation in Maryland. In the fall of 1973, the Maryland Center for Public Broadcasting

offered 8 different courses which provided credit

State: through 17 colleges in every section of the state.

2.41

TITLE: Pilot Pattern for Home Management Instruction in Area Vocational School Curricula Based on Problems of Young Homemakers Employed Full-time in Clerical and Sales Occupations. (Continuation of Nos. 28 and 51). Final Report.

AUTHORS: Thomas, V. F., & Newman, A.

PUBLISHED: June 1970, 25 pages.

ERIC: ERIC Document Reproduction Service No. ED 048 470.

9 Packets: This report discusses the experience of 107 vocational students in a 6-week pilot project which tested curriculum materials and implemented an instructional method consisting of 9 audiovisual instructional packets supplemented by correspondence with a master teacher. Data were acquired through interviews with teachers and questionnaires administered to students. It was suggested that, in order to use the materials in other types of educational centers, continuous correspondence between master teacher and students be encouraged, and additional units incorporating on-the-job management tasks be created. Several project materials are appended.

Questionnaires:

Materials:

2.42

TITLE: Dr. Walter J. Fahey: Microcampus Originator.

JOURNAL: Videoplayer, Feb. 1973, Vol. 20, pp. 20-25,,28.

Interview: An interview with the originator of a new approach to off-campus education utilizing videoplayers.

2.43

TITLE: Fifteen Years of Televising College Courses.

AUTHOR: Zigerell, J. J.

JOURNAL: Chronicle of Higher Education, Washington, D.C., Jan. 3, 1972, Vol. 6, No. 13, p. 8.

TV courses: In a letter to the Chronicle, James Zigerell, Executive Dean of the Learning Resources Laboratory and Television College, City Colleges of Chicago, discusses the televised college courses offered by this educational institution prior to the use of the term "external degree program."

Degree:

3. Multimedia

3.01

TITLE: Potential Market for Two-way Information Services to the Home, 1970-1990.

AUTHOR: Baran, P.

INSTITUTION: Institute for the Future. Riverview Center, Middletown, Conn. 06457. Dec. 1971, 131 pages.

Industry: Two-way information services to the home may become a $20 billion per year industry by the end of the next decade; this report presents some market forecasts for 30 such home-information services. The 30 possible home information services are grouped into 6 major

Categories: categories: education, business, general information access, shopping facilities, entertainment, and person-to-person communications. Services included in the

Education: education category are: computer-aided school instruction, computer tutor, correspondence school, and adult evening courses on television. Based on a Delphic

Predictions: study, predictions are made on uses of the categories of series. Appended computer printouts offer a compressed view of the forecasts for the 30 proposed systems.

3.02

TITLE: Open-minded Adult Education.

AUTHOR: Barnes, N.

JOURNAL: Adult Education (London), March 1971, Vol. 43, No. 6, pp. 356-370.

The Open University may stimulate integrated multimedia teaching in the field of adult education.

3.03

TITLE: An Experiment to Determine the Effectiveness of Using Audio-tapes for Independent Activities in a First Grade.

AUTHOR: Button, M.

PUBLISHED: 1972, 40 pages.

ERIC: ERIC Document Reproduction Service No. ED 079 952.

Tape recorder: The experiment investigates the effectiveness of taped lessons accompanying worksheets for independent work activities in the first grade. The activities relate to reading and auditory perception. The audiotapes appeared to improve students' listening skills, but there were no other significant differences between experimental and control groups. It appeared that further study should investigate the impact of the individual's cultural background upon his ability to read.

Listening:

Control group:

3.04

TITLE: Broadcasting and Britain's Open University.

AUTHOR: Carroll, J.

JOURNAL: Educational and Industrial Television, Oct. 1973, Vol. 5, No. 10, pp. 21-22, 55.

Radio, TV: This article is a brief evaluation of the British Open University focusing on its use of radio and television.

3.05

TITLE: Central Arrangements for Promoting Educational Technology in the United Kingdom.

INSTITUTION: Great Britain, Department of Education and Science, 1972.

Overview: This a detailed report of the role of educational technology in Britain including descriptions and financing of old and new organizations. In addition, relations with the educational technology industry are discussed.

Finances:

Foundation: Annexed to the report is a proposal for audiovisual aids in education and an educational foundation for visual aids.

3.06

TITLE: The Open University--Tomorrow's Higher Education.

AUTHOR: Derolf, J.

JOURNAL: Adult Leadership, March 1972, Vol. 20, No. 9, pp. 329-330, 343.

Interdiscipline: The author describes Britain's Open University as a flexible adult-education system which utilizes an interdisciplinary approach and covers a wide range of subjects. He believes that each course should consist

Packages: of correspondence packages, a series of television and radio programs, organized tutorials, and counseling

U.S.A.: systems. He explores possibilities of the establishment of such universities in the U.S.A.

3.07

TITLE: Development of Multimedia, Self-instructional, Study Units. Fourth Annual Progress Report, April 1, 1972 through December 8, 1972.

PUBLISHED: 1972, 92 pages.

Program: This is the fourth annual progress report of a multimedia, self-instructional, nursing education program. Accomplishments are outlined, and the current state of

Sections: the project is described. Also included are sections on the probability of attaining the objectives, the impact of the project, and other publications. Descriptions of the study units which have thus far been developed and various other supplementary materials are appended.

3.08

TITLE: Extension Applications of Educational Technology.

JOURNAL: Spectator, March 1972, pp. 19-25.

Teaching aids: The article includes descriptions of programs using audiocassette tapes, computers, electrowriters, learning resource centers, audiotutorials, instructional television, radio, telelectures, telenetworks, closed-circuit television, videotapes, videocassettes, and instructional films.

3.09

TITLE: Multi Media Systems. International Compendium. Eleven Project Descriptions of Combined Teaching Systems in Eight Countries.

AUTHOR: Gaudray, F., Comp.

PUBLISHED: 1970, 245 pages.

ERIC: ERIC Document Reproduction Service No. ED 047 533

Society: The demands made by modern technological society on the traditional educational system are briefly discussed.

8 countries: The remainder of the compendium describes 11 projects that are using educational technology--principally televised instruction--with success. These are projects from Brazil, Canada, West Germany, France, England, Japan, Poland, and the United States. Each report includes the aims of the project, a description of the

Open University: educational broadcasting is also examined, with particular attention given to the Open University. Ten

References: references are included.

3.11

TITLE: Applications of Educational Technology at the Open University.

AUTHOR: Hawkridge, D. G.

JOURNAL: AV Communication Review, Spring 1972.

Analysis: The author analyzes problems of subject-matter competence, diagnosing student abilities, creating conditions

Measuring: for improving instruction, and measuring achievement within the Open University framework.

3.12

TITLE: Continuing Education by Tape Correspondence.

AUTHOR: Hurley, H. K.

JOURNAL: Australian Journal of Adult Education, Nov. 1972, Vol. 12, No. 3, pp. 91-100.

Radio: The article describes a program at the University of New South Wales, Australia, which utilizes radio lectures that are taped and sent to students.

3.13

TITLE: The Effectiveness of Alternative Instructional Media: A Survey.

AUTHORS: Jamison, D., Suppes, P., & Wells, S.

PUBLISHED: Institute for Mathematical Studies in the Social Sciences, Stanford University, Stanford, California, Technical Report No. 196, February 1973, 72 pages.

Effectiveness: This survey provides an overview of research on the effectiveness of alternative instructional media. classroom instruction (CI), instructional radio (IR), instructional television (ITV), programmed instruction (PI), and computer-assisted instruction (CAI). The

Overall result: objective is to bring together the overall results for

Reference: the principal media. An extensive bibliography is included.

3.14

TITLE: Recent Developments in Radio/Correspondence Education in Kenya.

AUTHOR: Kinyanjui, P. E.

JOURNAL: Convergence, 1972, Vol. 5, No. 2, pp. 51-59.

Radio: This article describes a radio program that has been particularly effective in upgrading teachers, who comprise 90% of the enrollees.

3.15

TITLE: England's Open University: Revolution at Milton Keynes.

AUTHOR: Maclure, S.

JOURNAL: Change, March/April 1971, Vol. 3, No. 2, pp. 62-68.

Radio, TV: This article on the Open University discusses televised instruction, educational radio, and educational technology.

3.16

TITLE: Mass Media in Adult Education.

AUTHOR: UNESCO.

PUBLISHED: Prague, Czechoslovakia: Czechoslovakian UNESCO Commission, International Central Institute for Youth and Educational Television. Aug. 2, 1967, 105 pages.

Seminar: Documents of the Prague Simmar, "The Contribution of Research to the Use of Audio-Visual Mass Media in Adult Education, Oct. 5-10, 1966." This international seminar, organized by the Central Committee of the

Specialists: Czechoslovakia Trade Union of Educational and Cultural Commission, brought together 118 specialists in mass

Aims: media from 14 countries. The aims of the seminar were to accelerate research relating to the use of audio-visual mass media in adult education, to initiate inter-disciplinary exchange in such areas as techniques and

methodology, and to further the cooperation of organizations and the coordination of their efforts in the field. Seminar reports, accompanied by commentary, deal with primary research problems, the state of the art of mass-media adult education, evaluation criteria, and aspects of viewer research. The work groups discussed radio, television, films, and possibilities for further research. Conclusions and suggestions were given concerning research and training needs, publications, information exchange, and cooperative program planning through UNESCO. The Document is available in English, French, Spanish, Russian, Czech, and German.

Topics:

Media:

Conclusions:

3.17

TITLE: Correspondence Study in Multimedia Learning Systems.

AUTHOR: Mathieson, D. E.

JOURNAL: Continuing Education for Adults, Nov. 1970, No. 154, pp. 1-4.

ERIC: ERIC Clearing House, 1970, No. 14.

Correspondence: Assets and potentials of correspondence study with multimedia. This is a description of the Open University including uses of radio and television, correspondence study, short-term residential courses, and face-to-face meetings with other students and tutors. It briefly examines College Proficiency Examinations.

Institution:

Face-to-face meetings:

Examination:

3.18

TITLE: Mediated Instructional Materials, Final Report.

PUBLISHED: Sept. 28, 1970, 176 pages.

ERIC: ERIC Document Reproduction Service No. ED 079 958.

Materials: This final report reviews the Elementary and Secondary Education Act (ESEA) TITLE 3 project that Evanston Township High School used to prepare self-instructional materials on film, audiotape, and videotape for use by students during independent study time. It lists the

Objectives: following objectives: (a) to determine the effectiveness of materials when used by other schools, (b) to identify problems involved with the exchange of materials between schools, (c) to identify students' and teachers' attitudes toward these materials, (d) to evaluate the effectiveness of these materials, and (e) to locate problems associated with local production and

Expectations: distribution of materials. A summary on expectations and the effect on cooperating agencies is given. The final section deals with continuing the project without

Importance: federal assistance and states that the greatest resulting change was faculty recognition of the importance of mediated instructional materials.

3.19

INSTITUTION: National Association of Educational Broadcasters.

NEWSLETTER: Memo on Instruction, March 15, 1971.

ADDRESS: National Association of Educational Broadcasters, 1346 Connecticut Ave., N.W., Washington, D.C. 20036.

Radio, TV: This newsletter, which is published at unspecified intervals, contains news about educational radio and

New programs: television. New public, private, and government programs are summarized.

3.20

TITLE: Radioprimaria: Pilot Project in Mexico Using One Teacher plus Radio to Teach Grades 4-6.

INSTITUTION: Information Center on Instructional Technology,

NEWSLETTER: Instructional Technology Report, July/Aug. 1974, pp. 2-3.

Mexico: The purpose of the Radioprimaria, a project of the Mexican Secretariat of Education begun in 1970, is to provide instruction in Grades 4, 5, and 6 to rural schools which have only the first three grades of primary school. The incomplete primary schools provide one teacher for Grades 4 through 6 who is assisted by

Radio: the radio programs. The programs are prepared regularly in Mexico City and then transported to a university-operated radio station in San Luis Potosi where they

Evaluation: are broadcast for 90 minutes a day. A Stanford study of Radioprimaria utilized the following methods to evaluate the radio schools in rural areas: direct observation, achievement testing, analysis of cost, questionnaires, and interviews. Their findings are briefly discussed.

3.21

TITLE: R and D for Adult Learning.

AUTHOR: Rahmlow, H. F.

JOURNAL: Audiovisual Instruction, April 1971, Vol. 16, No. 4, pp. 55-56.

Laboratory: Harold Rahmlow, the Executive Director of the Zimmerman Adult Learning Laboratory at the American College of Life Underwriters in Bryn Mawr, Pennsylvania, describes the multimedia facility for adult-learning research and

Vocations: development. The laboratory is the first to provide an experimental facility of this type where adults in the professions and vocations will be provided with learning resources to be used in career study.

3.22

TITLE: Continuing Education in Kenya.

AUTHOR: Reed, J.

JOURNAL: Educational Broadcasting, Oct. 1971, Vol. 4, No. 9, pp. 34-35

Radio: This article discusses educational radio, adult education, and correspondence study in Kenya. Program descriptions are included.

3.23

TITLE: Towards Mass Education.

AUTHORS: Remtulla, K., & Barrett, H.

CONFERENCE: Paper presented at Conference of the African Adult Education Association (3rd, University of Dar Es Salaam, Tanzania, April 19-24, 1971). 17 pages.

ERIC: ERIC Document Reproduction Service No. ED 050 321.

Tanzania: Discussed in this paper are instruments directed toward mass education in use or soon to be in use in Tanzania.

Radio: These include: radio, radio with the addition of written study aids, and a combination of these with correspondence instruction. Because the radio approach to adult education has been uncoordinated at the national

Coordination: level, plans are in progress to show the need for this type of coordination. The Cooperative Education Centre

Future: in Moshi has developed different methods of organizing and teaching cooperative education. The plan to establish a national correspondence institution includes provisions for radio programs, study groups, and short

Residential: residential courses.

3.24

TITLE: Report of the Conference on Newer Media in Correspondence Study.

INSTITUTION: Division of Extension, University of Texas. U.S. Department of Health, Education, and Welfare. Austin, Texas. 1962, 91 pages.

Guide: This is a report of a conference held in Austin, Texas, to develop a guide for the use of available audiovisual media in correspondence study, and to set guidelines

Research: and specific projects for future study and research relating to the use of the newer media in correspondence study.

3.25

TITLE: Science and Technology Courses at the Open University.

JOURNAL: Educational Broadcasting International, June 1971, Vol. 5, pp. 92-94.

Integration: The article reviews an Open University science course, which integrates concepts of the major sciences. The

Computer: course is a multimedia course evaluating assignments

Television: via computer and using instructional television.

3.26

TITLE: Application of Radio to Teaching Elementary Mathematics in a Developing Country.

AUTHOR: Searle, B.

INSTITUTION: Institute for Mathematical Studies in the Social Sciences (IMSSS), Stanford University, Stanford, California. June 30, 1974, 96 pages.

First grade: First-grade mathematics is being taught in Nicaragua classrooms by radio using a format designed to elicit active responses by children. Daily radio lessons use oral and written responses to carry the burden of instruction. Intensive analysis of student responses is made possible by the collection of daily worksheets.

Radio:

Worksheets:

3.27

TITLE: Social Education and Its Administration in Japan.

PUBLISHED: 1972, 44 pages.

ERIC: ERIC Document Reproduction Service No. ED 069 956.

Japan: Japanese social education covers most aspects of life including out-of-school education for children and life-long education of parents in the home. Both governmental and nongovernmental agencies are concerned with the programs. Training for the personnel of these agencies is provided by the National Training Intitute of Social Education, study tours abroad, and a training course on audiovisual education. Facilities utilized in the program such as radio and television companies are listed. An appendix gives locations of youth centers, shows

Training:

Radio:

trends in enrollment, and diagrams the school educational system.

3.28

TITLE: Training in Business, Industry and Government.

SERIES: The Educational Technology Reviews Series. No. 12.

AVAILABLE: Educational Technology Publications, Inc., 140 Sylvan Ave., Englewood Cliffs, N.J. 07632. Jan. 1973, 135 pages.

Training: This volume of the Review Series deals with training in business, industry, and government; it is compiled from selected articles published in recent issues of Educational Technology magazine. Topics discussed are quality control, computer support, development of training systems, attitude change in industrial education, motivation, military training, specifying objectives, self-shaping training systems, programmed instruction, multimedia instruction, and computers.

Problems:

3.29

TITLE: The Open University: Breakthrough for Britain?

AUTHOR: Walsh, J.

JOURNAL: Science, Nov. 1971, Vol. 174, No. 4010, pp. 675-678.

Topics: The following topics are discussed with respect to the Open University: educational television, educational radio, social influences, and correspondence study.

3.30

TITLE: Report of Assessment and Development--INCE's Department of Instruction.

AUTHOR: Wedemeyer, C. A.

PUBLISHED: Feb. 1973, 69 pages.

ERIC: ERIC Document Reproduction Service No. ED 078 299.

Venezuela: This is an evaluation of INCE's Department of Instruction, Caracas, Venezuela, which suggests ways in which the present program can be expanded and advises the staff concerning the use of media and technology.

3.31

TITLE: Chicago City Colleges, University Without Walls and With No Illusions.

AUTHOR: Zigerell, J. J.

INSTITUTION: Chicago City Colleges. Oct. 1971.

Interest: The author cites reasons for the new surge of interest in programs serving adults without higher education and

Credentials: emphasizes the importance of credentials.

4. Nontraditional Study

4.01

TITLE: Adult Education in Sweden.

PUBLISHED: 1970, 49 pages.

ERIC: ERIC Document Reproduction Service No. ED 055 263.

Forms: This review discusses the forms of adult education in Sweden; it includes the courses provided by the Labour Market Board, the folk high schools, the national and local educational schemes, the Commission for Television and Radio in Education (TRU), and the training courses

Organizations: arranged by the employee organizations. Brief mention is also made of other organizations, but the review is not intended to be taken as a comprehensive report on Swedish adult education.

4.02

TITLE: Open University/External Degree Program for Massachusetts.

AUTHOR: Allen, J. E., Jr.

PUBLISHED: Oct. 12, 1971, 28 pages.

ERIC: ERIC Document Reproduction Service No. ED 071 585.

Extension:
Cost:
Off-campus:
Organization:
Conclusions:
Resources:

Recognition of the need for new approaches to the extension and improvement of higher educational opportunity, and for ways of reducing the cost of education to both students and taxpayers, has accelerated the interest in the establishment of external degree programs and programs for off-campus higher education. In spring 1971, the chancellor of the Massachusetts board of higher education appointed two study teams to study the feasibility of an external degree program as a means of providing an alternate form of higher education in Massachusetts, and to develop recommendations concerning a possible administrative and organizational structure for the proposed external degree program. This document presents the results of one of these studies. The conclusions and recommendations are based on information about the Massachusetts higher education system obtained from reports and memorandums, from analysis of legislation, from personal interviews with leaders of government and higher education, and from information about plans for the implementation of external degree programs elsewhere in the country.

4.03

TITLE: Aspects of Adult Education in North America and Great Britain.

AUTHOR: Bentley, C. F.

ERIC: ERIC Document Reproduction Service No. ED 060 429.

4 countries: The author presents the results of a tour made to obtain a broad picture of the state of development of adult education in cities of the United States, Canada, India, and the United Kingdom. Another objective of the tour was to examine the provisions made for residential adult education overseas. Other topics discussed in the report are the use of technical resources, the Open University, cooperation between agencies, and workers' education.

Residential:

Topics:

4.04

TITLE: Reaching Adults for Lifelong Learning. Effective Communication Strategies for Recruitment and Program Development in Adult Education.

AUTHORS: Butler-Paisley, M., Hall, D. C., Mick, C. K., & Paisley, W. J.

INSTITUTION: Institute for Communications Research, Stanford University. Aug. 1972 and Dec. 1973, 164 pages.

U.S.A.: This report describes a study undertaken in 1971-1972 concerning the outreach (promotion for recruitment and programs development) of lifelong learning in the United States. This is a condensation of a previous report for the United States Office of Education which occupied 3 volumes and 300 pages.

Condensation:

4.05

TITLE: The Open University--The Increasing Challenge to the Regions.

AUTHOR: Cosford, R. H.

JOURNAL: Adult Education (London), Jan. 1973, Vol. 45, No. 5, pp. 286-292.

Technology: This is an evaluation of the Open University in Great Britain, which enrolls 40,000 students in correspondence courses and uses technological media for education.

4.06

TITLE: The Open University.

AUTHOR: Collings, S. N.

JOURNAL: Mathematical Gazette, June 1971, Vol. 55, No. 393, pp. 283-286.

Mathematics: This article describes the curriculum and methods of instruction used for a foundation course in mathematics at the Open University in Britain.

4.07

TITLE: The Open University . . . Report on the Transplant.

AUTHORS: Drazek, S. J., & Walker, H. A.

JOURNAL: NUEA Spectator, June 1973, Vol. 37, No. 12, pp. 24-27.

Adults: The article describes the Open University of Britain including its establishment by Royal Charter to serve adult students, student characteristics, data tables, instructional materials, and program development.

4.08

TITLE: Goal Analysis of Post-secondary and Other Secondary Education.

INSTITUTION: Office of the Chancellor of the Swedish Universities, Department of Educational Research and Development.

CIRCULAR: Educational Development, Information on Research and Development in Post-secondary Education, 1974:2, 6 pages.

Goal analysis: This is a summary of a goal analysis project; the purpose of the project is to reaeh a greater understanding of the functions of education in a society with a greatly increasing interest in adult education.

4.09

TITLE: Innovative Higher Education for Adults. Redesigning the Halls of Ivy: Innovations in Higher Education.

AUTHOR: Kearney, K. E.

JOURNAL: Compact, Oct. 1971, Vol. 6, No. 5, pp. 31-33.

Florida: The article describes a unique external degree program at the University of South Florida which offers to adults a bachelor's degree based largely on independent study.

4.10

TITLE: The Experimental Study Group: A New Undergraduate Program.

AUTHOR: Levensky, M.

JOURNAL: Interchange, 1973, Vol. 4, No. 1, pp. 49-63.

Independent: This paper is an account of the first two years of the Experimental Study Group. Suggestions are made for a full-time program of supervised independent study and for planning similar programs in otherwise traditional schools.

4.11

TITLE: The Scene Today.

AUTHOR: Liechti, H. N.

JOURNAL: Educational Broadcasting, Nov./Dec. 1972, Vol. 5, No. 7.

Relations: The article outlines the evaluation, present role, and future plans of a program designed to improve student, college, and community relations.

4.12

TITLE: Revolution--Putting the Pieces Together.

AUTHOR: Lucas, V. B.

JOURNAL: Training in Business and Industry, Sept. 1971, Vol. 7, No. 9, pp. 29-33.

Building: A new education building at the American College of Life Underwriters in Bryn Mawr, Pennsylvania, will provide for experimentation and validation of innovative learning experiences for adults.

4.13

TITLE: The Open University.

AUTHOR: Michael, R. E.

JOURNAL: New Campus, Spring 1971, Vol. 24, pp. 6-8.

Innovation: This article discusses various aspects of the Open University, including instructional innovation, correspondence study, and educational development.

4.14

TITLE: Students Abroad Studying Their Own Thing.

AUTHOR: Michielli, J. A.

JOURNAL: Improving College and University Teaching, 1972, Vol. 20, No. 3, pp. 160-161.

Abroad: Programs for independent study abroad promote true appreciation of foreign cultures.

4.15

TITLE: A Model, Regional Open Learning System. Proposal to the National Institute of Education.

INSTITUTION: University of Mid-America. Oct. 15, 1974, 234 pages. (With Appendix)

SUN: In 1974, SUN investigated formation of a regional consortium in order to broaden its economic base of operations, increase its potential target audience, and assure that the open learning program reaches the widest possible learner market. The plan developed was found to be both advantageous and feasible, and the University of Mid-America (UMA) was incorporated on an non-profit basis. (See reference 4.25 of this bibliography.)

UMA:

4.16

TITLE: Another Approach to Higher Education. In Universal Higher Education: Costs and Benefits.

AUTHOR: Mood, A. M.

ANNUAL MEETING: 1971 Annual Meeting, American Council on Education, Washington, D.C.

Restructuring: Radical restructuring of higher education centered around videocassettes and "some kind of institutional structure" called Video University is the proposal of the Director of the Public Policy Research Organization at the University of California at Irvine. The rzstructuring would involve students attending college full

time for only one year, with additional higher education as a part-time activity extending throughout their lives.

Part time:

4.17

TITLE: Experience with Guided Self-study.

AUTHOR: Moo-Young, M.

JOURNAL: Journal of Engineering Education, Oct. 1972, Vol. 63, No. 1, pp. 27-29.

Self-paced:

Lecture:

An innovative teaching method called "Proctorial, Autograded, Self-paced Study" was employed in an engineering college. The results are reported indicating that it has many advantages over the conventional lecture method of teaching.

4.18

TITLE: Regents External Degrees. Redesigning the Halls of Ivy: Innovations in Higher Education.

AUTHOR: Nolan, D. J.

JOURNAL: Compact, Oct. 1972, Vol. 6, No. 5, pp. 3-5.

Extension:

A unique external degree program is offered by the regents of the New York State University to anyone who can pass appropriate proficiency examinations with or without attending college.

4.19

TITLE: Educational Technology and Non-traditional Study. 1972.

AUTHOR: Norwood, Frank W.

Critique: The author provides general comments and a critique of the resistance traditionally given to advances in educational technology, and suggests possible alternatives open to institutions and nontraditional educational programs.
Alternatives:

4.20

TITLE: Chicago City Colleges, Opening the University to the Adult Citizen Who Can Study Only Off Campus. A Proposal . . . 1971.

INSTITUTION: Chicago City Colleges, 1971.

Proposal: A discussion is offered on the need for as well as the goals of off-campus programs. A description of course preparation and administration at the University of the State of Illinois is given as an example.
Illinois:

4.21

TITLE: Final Report: Demonstration and Evaluation of Program Learning in ABE Learning Centers.

AUTHOR: Ouderkirk, M., comp.

PROCEEDINGS: Strategy and Action; Curricular-Instructional Materials and Related Media for the Disadvantaged Adult in the 1970's: Conference Proceedings, Cherry Hill. Feb. 4-6, 1970.

INSTITUTION: Adult and Continuing Education Center, Montclair State College.

PUBLISHED: Upper Montclair, N.J. 1970, 172 pages.

Series: This unit is part of a series of five documents and two cassette tapes that represent the procedure, findings, and recommendations of the Demonstration Learning Center project in Newark-Camden, New Jersey, July 1968 to August, 1970, and the materials developed by project participants. This document records the work and findings of a conference of adult educators, researchers, librarians, and representatives of the American Educational Publishers Institute, which met to identify the instructional priorities of Adult Basic Education (ABE) in this decade and to develop a strategy for the creation and testing of new instructional materials for the diverse groups of undereducated adults. Included are:

Conference:

Content: position papers, publisher presentations, conference recommendations, and transcript of speeches. Emphasis throughout is on reaching the adult realistically within his own economic and cultural context.

Emphasis:

4.22

TITLE: Report on Study Leave Tour, April-July 1972. Ninth International Conference of International Council on Correspondence Education and Visits to Various Countries.

AUTHOR: Pratt, H. C.

PUBLISHED: Royal Melbourne Institute of Technology, Jan. 1973, 96 pages.

Conference: This is a report by the Head of the Department of External Studies of the Royal Melbourne Institute of Technology, after he attended the conference and selected

14 countries: institutions in 14 countries. The first part deals separately with each country, and the second part deals with many aspects of external study on a very short

Topics: topic-by-topic basis. Topics include: radio and television, study for credit, regional study centers, and the future.

4.23

TITLE: Research into Higher Education, 1974:3.

INSTITUTION: Office of the Chancellor of the Swedish Universities, Department of Educational Research and Development.

CIRCULAR: Educational Development, Information on Research and Development in Post-secondary Education. 1974:3, 11 pages.

Areas: The following are areas in which research projects are financed by the Office of the Chancellor of the Swedish

Universities (UKA): (a) the structure of higher education and its relation to society as a whole, (b) the organization and working patterns of teaching, and (c) evaluation--function and result control. This circular presents, in the form of summaries, the recently financed projects in these areas in 1974-1975; a list of projects and names of scientific leaders and research institutions is included.

Projects:

4.24

TITLE: External Studies in Australia.

AUTHOR: Smith, K.

JOURNAL: Home Study, June 1971, Vol. 2, No. 4, pp. 9-12.

History: The Assistant Director of External Studies at the University of New England in Australia describes the growth of external courses in higher education.

4.25

PROJECT: S-U-N (State University of Nebraska).

INSTITUTION: University of Nebraska, P.O. Box 82446, Lincoln, Nebr.

Nebraska: SUN is a large project that started in 1971 at the University of Nebraska, with 11 full-time staff members. Several large reports have been published on the project and may be obtained by writing to the address given

Objectives: above. Objectives of the project are to bring college-level courses to people wherever they may live or work. As SUN progresses it should cover 20 college-level courses, the equivalent of freshman and sophomore years.

Media: The media used are lesson modules utilizing newspapers, television, audio and TV cassettes, printed materials and study kits, tutoring assistance at resource centers near home, and tutoring assistance by telephone. SUN

Basic thrusts: hopes to develop (a) a new concept for the systemized design and validation of college-level courseware of superior quality, and (b) a new delivery system for American higher education that employs multiple instructional technologies in a modular manner to bring

Stages: educational opportunity to all adults. Stages of the project have been: (a) October 1971 to February 1972--a Nebraska clientele study and a concern with questions related to awarding credit by "examination for experience," (b) February 1972 to June 1973--designing regional resource centers, and developing cooperative relationships with other institutions, and (c) June 1972 to May 1973--a literature survey, of related mate-

Statistics: rial from 1969 to 1974. Statistics are presented concerning kinds of tests, clientele population in Nebraska, educational technology in external degree programs, and flexibility of curricular patterns. The reports

Appendices: have appendices with information including similar experiments at other institutions, available resources, television in Nebraska, and technological media available through business and industrial organizations and educational publishers. (See reference 4.15 of this bibliography.)

4.26

TITLE: College Degree for Adults. Redesigning the Halls of Ivy: Innovations in Higher Education.

AUTHOR: Troutt, R.

JOURNAL: Compact, Oct. 1972, Vol. 6, No. 5, pp. 27-30.

Oklahoma: The article describes the unique Bachelor of Liberal Studies Program at the University of Oklahoma, which serves as an adult-education equivalent to more traditional baccalaureate programs.

Baccalaureate:

4.27

TITLE: Universities Without Walls.

NEWSLETTER: Ford Foundation Letter, Aug. 1, 1974, 1 page.

Experiment: This is a brief description of the Universities-Without-Walls program administered by the Union for Experimenting Colleges and Universities, and set up with Ford Foundation and federal assistance. This experiment

Residency: provides higher education without traditional residency, course, and timing requirements.

4.28

TITLE: Using Programmed Instruction.

SERIES: The Educational Technology Reviews Series. No. 10.

AVAILABLE: Educational Technology Publications, Inc., 140 Sylvan Avenue, Englewood Cliffs, N.J. 07632. Jan. 1973, 136 pages.

Articles: This is a volume of the Review Series centers on using programmed instruction; it is composed of articles selected from recent issues of Educational Technology magazine.

Subjects: Subjects covered in the articles include performance in problem solving, the criterion problem, programmed materials, contingency management, Soviet Union programs, reinforcement, specific subject-area programs, materials for handicapped children, behavioral approaches, accountability, the history of programmed instruction, costs, self-instruction and growth, and humanizing education.

4.29

TITLE: Best Buy in Degrees.

AUTHOR: Verringer, F.

JOURNAL: Home Study, March 1971, Vol. 2, No. 3, pp. 10-12.

Costs: This article compares the costs and services of four British colleges offering external degree courses with those of the Open University. It consists of tabulated data on degrees offered, subjects, entrance requirements, educational methods, program length, and costs.

Content:

4.30

TITLE: Who Are the Home Students?

AUTHOR: Verringer, F.

JOURNAL: Home Study, June 1973, Vol. 2, No. 4, pp. 6-8.

History: Some findings of the first major pieces of research into the vast world of home study in Great Britain are discussed.

4.31

TITLE: Taking Education to the People.

AUTHOR: Wall, M.

JOURNAL: Educational and Industrial Television, Oct. 1973, Vol. 5, No. 10, pp. 15-17.

SUN: This a description of the research and development that went into the SUN project in Nebraska. It shows a study that demonstrates how to deliver higher education to the living room. A description of the project is

given elsewhere in this bibliography (see reference 4.25).

4.32

TITLE: Britain's Open University--A Model for Change.

AUTHOR: Wilson, T. C.

JOURNAL: Educational and Industrial Television, Oct. 1973, Vol. 5, No. 10.

Influence: The author describes ways in which the educational system of Britain's Open University may affect education in the United States.

4.33

TITLE: The Open University at Houston.

AUTHOR: Zwicky, L.

JOURNAL: Educational and Industrial Television, Oct. 1973, Vol 5, No. 10, pp. 19, 53.

Use: The author discusses ways in which the University of Houston uses materials from Britain's Open University.

5. Reference Materials

5.01

TITLE: Bibliography by American College of Life Underwriters.

5.02

TITLE: Bibliography by the College Entrance Examination Board.

5.03

TITLE: Bibliography by the Commission on Non-Traditional Study.

5.04

TITLE: Bibliography by the Educational Testing Service.

5.05

TITLE: British Broadcasting Corporation, BBC Handbook, London.

5.06

TITLE: Career Education: An ERIC Bibliography.

PUBLISHED: Macmillan Information, New York, N.Y. 1973, 360 pages.

166

Guide: This ia a bibliographical guide to career education materials; it contains all the references on file at ERIC on this subject. Included are abstracts of the documents and journal articles complete with title, authors' names, date of publication, and number of pages. To facilitate the information exchange, subject and author indexes are provided.

Abstracts:

Index:

5.07

TITLE: Educational Broadcasting of NHK; Special issue of NHK Today and Tomorrow.

PUBLISHED: Oct. 1972, 42 pages, and Oct. 1971, 47 pages.

Japan: Nippon Hoso Kyokai (NHK), the Japan Broadcasting Corporation, is the only public service broadcasting organization in Japan. This booklet lists the schedule of courses offered by NHK on Educational Television and Radio for 1972. These courses, covering kindergarten to high school, include Japanese language, science, social studies, English, music, art, ethics, technical questions, and home economics. Programs are also offered for correspondence education at senior-high-school and college levels. There are also special programs for physically or mentally handicapped children. The goals of NHK programming in each of these areas are discussed briefly.

Schedule '72:

Programs:

5.08

TITLE: Education Index.

5.09

TITLE: Educational Technology: A Selected Bibliography.

AUTHORS: Dobson, C. R., & Leatherman, D. G.

JOURNAL: Educational Technology, May 1972, Vol. 12, No. 5, pp. 25-28.

5.10

TITLE: The Open University, The External Degree and Non-Traditional Study.

AUTHOR: Fletcher, M.

PUBLISHED: 1972.

This bibliography was prepared by Marjorie Fletcher, the Research Librarian for the American College of Life Underwriters.

5.11

TITLE: Explorations in Non-Traditional Study.

AUTHORS: Gould, S. B., & Cross, P. (Eds.)

PUBLISHED: 1972.

5.12

TITLE: Index to Educational Audio Tapes.

DISTRIBUTOR: National Information Center for Educational Media (NICEM), University of Southern California, Los Angeles. 1971, 419 pages.

Objective: This index is intended to provide media staff, library personnel, and educators with a bibliographical guide to commercially prepared educational audiotapes. It

Titles: includes over 10,000 titles of tapes which may be used with students in Grades 1-12, college students, teacher trainees, or professionals. The division is as follows:

Division: (a) Subject Guide to Audio Tapes, including a Subject Heading Outline and an Index to Subject Headings; (b) Alphabetical Guide to Audio Tapes, incuding data such as age, level, length; and (c) Directory of Producers and Distributors.

5.13

TITLE: Index to Educational Videotapes

DISTRIBUTOR: National Information Center for Educational Media (NICEM), University of Southern California, Los Angeles. 1971, 245 pages.

Objective: This index is intended to provide media staff, library personnel, and educators with a bibliographical guide to commercially prepared videotapes in Helical Scan and Standard Quadruplex configurations. It includes over

Content: 5,000 titles of videotapes, which may be used with

Users: students in Grades 1-12, college students, teacher trainees, or professionals. The division is as follows:

Division: (a) Subject Guide to Video Tapes including a Subject Heading Outline and an Index to Subject Headings; (b) Alphabetical Guide to Videotapes, including data such as age, level, and length; and (c) Directory of Producers and Distributors.

5.14

TITLE: NAEB Yearbook and Directory of Educational Broadcasting. Most recent year.

Listings: Listings of educational television and radio stations.

5.15

TITLE: Readers Guide to Periodical Literature.

5.16

TITLE: College Credit for Off-campus Study.

AUTHOR: Sharon, A. T.

PUBLISHED: March 1971, 18 pages.

ERIC: ERIC Document Reproduction Service No. ED 048 520.

Literature: This paper summarizes some of the recent literature on unconventional college-level education gained outside

the classroom. The first section reviews the major types of off-campus learning for which college credit is received, including correspondence schools, educational television, military service experiences, and independent study. The second section discusses methods by which formal recognition is provided for this form of education, such as the College-level Examination Program, the New York State College Proficiency Examination Program, and the General Education Development Testing Program. A list of references concludes the paper.

Examinations:

References with Descriptors

1. Computers in Education	Descriptors
1.01 Final Report: An Evaluation of the Dial-A-Drill Program. Beech, R. P., McClelland, S. D., Horowitz, G. R., & Forlano, G.	B2 C1 D2
1.02 Computer Assisted Lesson Service for Independent Study Brothers, W. L.	D3 C1 E6
1.03 Team Production of Learner-Controlled Courseware: A Progress Report. Bunderson, C. V.	B1 C1 D2
1.04 Communications Terminals Provide Lessons at Britain's Open University.	C1 F1
1.05 Correspondence Study, Lost or Found. Holmberg, B.	A4 B2 C1 D4
1.06 Computer Assisted Instruction, Testing and Guidance. Holtzman, W. (Ed.)	B2 C1
1.07 An Overview of the TICCIT Program.	B1 C1 D2
2. Television and Videotape	
2.01 Educational Broadcasting in Japan. Anderson, R. S.	F2
2.02 The First Year of Sesame Street: An Evaluation. Ball, S., & Bogatz, C.	B1 B2 E1
2.03 TV, No Panacea for Education's Ills. Behrman, D.	B1
2.04 North of Hamaskeog: A Newer-active TV Project. Bogart, E. R. Van de	E4

2.05	Education and the Cable (A Personal View). Booth, E. G.	A4
2.06	Three Models for Home-based Instructional Systems Using Television. Bretz, R.	B1 D2 D3 D5 E1
2.07	Team Production of Learner-controlled Courseware: A Progress Report. Bunderson, B. V.	B1 C1 D2
2.08	1970 National Institute on Instructional Television and Adult Basic Education. Buskey, J.	A5 C2
2.09	A Concept for Continuing Education of Adults. Adult Learning Program Service Development of Phase III. Carlisle, R.	E4
2.10	Progress Testing . . . (With Sesame Street). Children's Television Workshop.	E1
2.11	Children's Television Workshop . . . A Proposal, 1970/1971.	B1 B2 D6 E1
2.12	Who Watched 'The Electric Company'. (The Electric Company In-school Utilization Study 1971-1972) Children's Television Workshop.	A5 B1 E1
2.13	Simulated Interpersonal Process Recall Through CCTV. Davis, W. C., & Whitehead, T. G. J.	A5 B1 B2
2.14	An Interim Report on Britain's Open University. Dirr, P.	F1
2.15	Improving College and University Training. Dwyer, F. M.	D3 D5
2.16	Educational Television, The Next Ten Years. Stanford University Institute for Communications Research, Stanford University, California.	C2 D2 D5
2.17	EVR: Teacher in a Cartridge.	B1 C3
2.18	Cumbin: City University Mutual Benefit Instructional Network. Freund, S. A., & Marlmas, V. C.	D1
2.19	The Video Cassette as an Educational Reality. Gabor, S. C.	A4 C3

2.20 Towards A Visual Culture: Educating Through Television. Gattegno, C.	A4	
2.21 Pre-reading on Sesame Street. Gibbon, S. Y., & Palmer, E. L.	B1 E1	D3 D5
2.22 The Maze of People and Machines. Gibson, L. G.	A4	
2.23 Video-Cassettes, Formalists, and Informalists in Education. Gordon, G. N., & Falk, I. A.	A4	C3
2.24 The Southern California Consortium for Community College Television. Gross, L. S.	B1	B2 D1
2.25 Directed Private Study. Jones, L. H.	D2	
2.26 The Talk'n Tube MBA at the University of South Carolina. Knauss, Z.	E4	
2.27 Course Production at the Open University I: Some Basic Problems. Lewis, B. N.	F1	
2.28 ITV and Education of Children of Migrant Farm Workers, Indians, and Inner-city Poor: Cross-cultural Comparisons of International Uses of Media. Mackin, E. (Vol. 1), Kimmel, P. (Vol. 2), and others.	B1 F2	C2 E5
2.29 Management Training by Teletuition. Marais, G.	A1	E6 F2
2.30 Effects of Educational Television on Higher Education in the State of Colorado. Maxwell, L. M., & Lord, W.	C3	D2 E4
2.31 MIT Videotape Series Can Replace Textbooks.	A4	C3
2.32 A Perspective on Cable Television and the University. Morris, A. J.	A1	
2.33 Television Technology and the Culture of Childhood. Morrisett, L. N.	A4	B2 C1
2.34 An Overview of the TICCIT Program.	C1	D2
2.35 Formative Research in Educational Television Production. Palmer, E. L.	B2 E1	D3 D5

2.36 Automated Apprenticeship Training (AAT). A Systematized Audio-visual Approach to Self-paced Job Training. E4 E6
Pieper, W. J., et al.

2.37 The Responses of Children in 6 Small Viewing Groups to Sesame Street. B1 E1
Reeves, B. F.

2.38 The Sesame Mother Project, Final Report. B2 E1
Institute for Educational Development.

2.39 CATV: Its Implication . . . 1971. A4
Shabut, O. E.

2.40 Televised College Courses in Maryland. D1 E4
Smith, W. S.

2.41 Pilot Pattern for Home Management Instruction in Area Vocational School Curricula Based on Problems of Young Homemakers Employed Full-time in Clerical and Sales Occupations. (Continuation of Nos. 28 and 51). Final Report. D4 E6
Thomas, V. F., & Newman, A.

2.42 Dr. Walter J. Fahey: Microcampus Originator. A4 C3

2.43 Fifteen Years of Televising College Courses. A4 E2
Zigerell, J. J.

3. Multimedia

3.01 Potential Market for Two-way Information Services to the Home, 1970-1990. C1 D2 D6
Baran, P.

3.02 Open-minded Adult Education. F1
Barnes, N.

3.03 An Experiment to Determine the Effectiveness of Using Audio-tapes for Independent Activities in a First Grade. B1 B2
Button, M.

3.04 Broadcasting and Britain's Open University. C2 F1
Carroll, J.

3.05 Central Arrangements for Promoting Educational Technology in the United Kingdom. A2 D2 D5 D6
Great Britain, Department of Education and Science, 1972.

3.06	The Open University--Tomorrow's Higher Education. Derolf, J.	C2 E3 F1
3.07	Development of Multimedia, Self-instructional, Study Units. Fourth Annual Progress Report, April 1, 1972 through December 8, 1972.	D3 D4
3.08	Extension Applications of Educational Technology.	C1 C2 C3 D4
3.09	Multi Media Systems. International Compendium. Eleven Project Descriptions of Combined Teaching Systems in Eight Countries. Gaudray, F., Comp.	B2 E5 F2
3.10	Some Background Considerations to the Establishment of an External Studies Programme. Gordon, H. L. A.	B2 C2 D2 D5 E2 F1 F2
3.11	Applications of Educational Technology at the Open University. Hawkridge, D. G.	F1
3.12	Continuing Education by Tape Correspondence. Hurley, H. K.	C2 F2
3.13	The Effectiveness of Alternative Instructional Media: A Survey. Jamison, D., Suppes, P., & Wells, S.	B1 C1 C2 D2
3.14	Recent Developments in Radio/Correspondence Education in Kenya. Kinyanjui, P. E.	C2 E6 F2
3.15	England's Open University: Revolution at Milton Keynes. Maclure, S.	C2 F1
3.16	Mass Media in Adult Education. UNESCO.	A1 B1 C2 D1
3.17	Correspondence Study in Multimedia Learning Systems. Mathieson, D. E.	A4 C2 F1
3.18	Mediated Instructional Materials, Final Report.	B1 B2 C3 D1 D4
3.19	National Association of Educational Broadcasters. Memo on Instruction, March 15, 1971.	A3 C2

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3.20 Radioprimaria; Pilot Project in Mexico Using One Teacher plus Radio to Teach Grades 4-6. Information Center on Instructional Technology. — A3 B1 C2 D2 F2

3.21 R and D for Adult Learning. Rahmlow, H. F. — E6

3.22 Continuing Education in Kenya. Reed, J. — C2 E5 E6 F2

3.23 Towards Mass Education. Remtulla, K., & Barrett, H. — A1 C2 D1 F2

3.24 Report of the Conference on Newer Media in Correspondence Study. Division of Extension, University of Texas. — A1 D5

3.25 Science and Technology Courses at the Open University. Educational Broadcasting International, June 1971. — C1 D4 F1

3.26 Application of Radio to Teaching Elementary Mathematics in a Developing Country. Searle, B. — C2 F2

3.27 Social Education and Its Administration in Japan. — A5 B2 F2

3.28 Training in Business, Industry and Government. The Educational Technology Review Series. No. 12. — A2 B1 B2 C1 E6

3.29 The Open University:Z Breakthrough for Britain? Walsh, J. — B2 C2 F1

3.30 Report of Assessment and Development--INCE's Department of Instruction. Wedemeyer, C. A. — F2

3.31 Chicago City Colleges, University Without Walls and With No Illusions. Zigerell, J. J. — E3

4. Nontraditional Study

4.01 Adult Education in Sweden. — A2 C2 E5 E6 F2

4.02 Open University/External Degree Program for Massachusetts. Allen, H. E., Jr. — A4 D2 E2 E3 F1

4.03 Aspects of Adult Education in North America and Great Britain. Bentley, C. F.	D1 E5 F2
4.04 Reaching Adults for Lifelong Learning. Effective Communication Strategies for Recruitment and Program Development in Adult Education. Butzer-Paisley, M., Hall, D. C., Mick, C. K., & Paisley, W. J.	D3
4.05 The Open University--The Increasing Challenge to the Regions. Cosford, R. H.	F1
4.06 The Open University. Collings, S. N.	B1 F1
4.07 The Open University . . . Report on the Transplant. Drazek, S. J., & Walker, H. A.	B1 D4 F1
4.08 Goal Analysis of Post-secondary and Other Secondary Education. Office of the Chancellor of the Swedish Universities, Department of Educational Research and Development.	A3 A4 B2 F2
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4.10 The Experimental Study Group: A New Undergraduate Program. Levensky, M.	D5
4.11 The Scene Today. Liechti, H. N.	E4
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4.13 The Open University. Michael, R. E.	B2 F1
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4.18 Regents External Degrees. Redesigning the Halls of Ivy: Innovations in Higher Education. E2
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4.19 Educational Technology and Non-Traditional Study. 1972. A4
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4.20 Chicago City Colleges, Opening the University to the Adult Citizen Who Can Study Only Off Campus. A Proposal . . . 1971. A4 D6 E3

4.21 Final Report: Demonstration and Evaluation of Program Learning in ABE Learning Centers. A1 D4
Ouderkirk, M., Comp.

4.22 Report on Study Leave Tour. April-July 1972. Ninth International Conference of International Council on Correspondence Education and Visits to Various Countries. A1 C2 E2 E5 F2
Pratt, H. C.

4.23 Research into Higher Education, 1974:3. A3 B1 B2 E5
Office of the Chancellor of the Swedish Universities, Department of Educational Research and Development.

4.24 External Studies in Australia. E2 F2
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4.25 S-U-N (State University of Nebraska). D1 D6 E2 E3
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4.26 College Degree for Adults. Redesigning the Halls of Ivy: Innovations in Higher education. E4
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4.27 Universities Without Walls. A2 E3
Ford Foundation Letter, Aug. 1, 1974.

4.28 Using Programmed Instruction. A2 D2
The Educational Technology Reviews Series. No. 10.

4.29 Best Buy in Degrees. B1 D2 E2 F1
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(D) Program Construction

1. Cooperation among institutions	2.18	2.24	2.40	3.16	3.18	3.23
	4.03	4.25				
2. Costs and finances	1.01	1.03	1.07	2.06	2.07	2.16
	2.25	2.30	2.34	3.01	3.05	3.10
	3.13	3.20	4.02	4.16	4.28	4.29
3. Development and production	1.02	2.06	2.15	2.21	2.35	3.07
	4.04					
4. Lesson materials	1.05	2.41	3.07	3.08	3.18	3.25
	4.07	4.21				
5. Planning	2.06	2.15	2.16	2.21	2.35	3.05
	3.10	3.24	4.10			
6. Proposal	2.11	3.01	3.05	4.15	4.16	4.20
	4.25					

(E) PROGRAMS

1. Children's Television Workshop	2.02	2.06	2.10	2.11	2.12	2.21
	2.35	2.37	2.38			
2. External Degree Programs	2.43	3.10	4.02	4.09	4.18	4.22
	4.24	4.29	4.25			
3. Programs in U.S.A. similar to Open University	3.06	3.31	4.02	4.15	4.20	4.25
	4.27	4.31	4.32	4.33		
4. Other programs in U.S.A.	2.04	2.09	2.26	2.30	2.36	2.40
	4.11	4.26				
5. Overviews of several programs	2.28	3.09	3.22	4.01	4.03	4.22
	4.23					

6. Vocational programs	1.02 2.29 2.36 2.41 3.14 3.21 3.22 3.28 4.01 4.12

(F) Programs Abroad

1. Open University	1.04 2.14 2.27 3.02 3.04 3.06 3.10 3.11 3.15 3.17 3.25 3.29 4.02 4.03 4.05 4.06 4.07 4.13 4.29 4.30 4.32 4.33 5.10
2. Others	2.01 2.28 2.29 3.09 3.10 3.12 3.14 3.20 3.22 3.23 3.26 3.27 3.30 4.01 4.03 4.08 4.14 4.22 4.24 4.30