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## Quality programming for learning-disabled students : a comparison of microcomputer-assisted IEPs, manual-assisted IEPs, and teacher written IEPs

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**QUALITY PROGRAMMING FOR LEARNING-DISABLED STUDENTS: A  
COMPARISON OF MICROCOMPUTER-ASSISTED IEPS, MANUAL-ASSISTED  
IEPS, AND TEACHER-WRITTEN IEPS**

*The College of William and Mary in Virginia*

Ed.D. 1986

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A COMPARISON OF MICROCOMPUTER-ASSISTED IEPS,  
MANUAL-ASSISTED IEPS, AND TEACHER-WRITTEN IEPS

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A Dissertation

Presented to

The Faculty of the School of Education  
The College of William and Mary in Virginia

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In Partial Fulfillment  
Of the Requirements for the Degree  
Doctor of Education

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by

Gretchen C. Haines

August 1986



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A COMPARISON OF MICROCOMPUTER-ASSISTED IEPS,  
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## Chapter 1.

### Introduction.

With the passage of Public Law 94-142, the Education for All Handicapped Children Act of 1975, came the requirement that an Individualized Education Program (IEP) be written for each handicapped child receiving special education and related services (United States Statutes at Large, 94th Congress, 1st Session, 1975, Volume 89, p. 776). From the beginning, difficulties have been associated with the writing of IEPs. Among problem areas cited have been: time involved in developing IEPs (Morrissey and Safer, 1977); paperwork involved in developing IEPs (Turnbull, Strickland, and Hammer, 1978); costs involved in developing IEPs (Price and Goodman, 1980); teachers' lack of skills necessary for developing IEPs (Lynch, 1977; Morrissey and Safer, 1977; Hayes and Higgins, 1978); administrators' difficulties with record-keeping and management of IEPs (McCarthy and Marks, 1977); and various aspects related to the quality of IEPs (Alper, 1978; Anderson, Barner, and Larson, 1978; Schenck, 1979; Schenck and Levy, 1979).

Evaluations of the IEP process have been mandated and conducted (Bureau of Education for the Handicapped, 1979; Comptroller General of the United States, 1981) and guidelines and solutions to problems have been suggested (Stevens and Macy, 1979; Iano, 1979; Gillespie, 1979; Morra, 1979; Walker, 1979). Still, problems with IEPs have

persisted (Tymitz, 1980; Pyecha and Morra, 1981; Sabatino, 1981; Schenck, 1981; Feinn, 1982; Nordan, 1982; Nutter, Algozzine, and Lue, 1982).

Recently, a new solution to the difficulties associated with IEPs has been put forth. School districts have begun experimenting with using computers to assist in the development of IEPs. To date, research studies involving the use of computers in the development of IEPs have focused upon time involved (Allegheny Intermediate Unit, 1981; Brown, 1982; Enell and Barrick, 1983; Ryan, 1984); costs involved (Enell and Barrick, 1983; Brown, 1982; Ryan, 1984); parent, administrator, and teacher attitudes toward and perceptions of IEPs developed using computers (Enell and Barrick, 1983; Ryan, 1984); and issues relating to the quality of IEPs developed with the aid of the computer (Allegheny Intermediate Unit, 1980; Lillie, 1983; Heidbrink, 1984).

The results of the research studies involving the development of IEPs with the aid of the computer have been positive in the areas of decreasing time involved, decreasing costs involved, and encouraging parent, administrator, and teacher favorable attitudes. However, research studies involving issues related to the quality of IEPs developed with the aid of the computer have been extremely limited in size and scope of factors investigated.



Need For The Present Study.

Studies published since 1978 have examined IEPs' long-term goals and short-term instructional objectives with regard to clarity (Alper, 1978), number (Pyecha and Morra, 1980), type (Anderson, Barner, and Larson, 1978; Feinn, 1982), and appropriateness (Schenck, 1979; Pyecha and Morra, 1980), and have evaluated IEPs with regard to the presence or absence of data specifically required by Public Law 94-142 (Schenck and Levy, 1979; Pyecha and Morra, 1980; Comptroller General of the United States, 1981; Schenck, 1981; Nordan, 1982; Nutter, Algozzine, and Lue, 1982; Welton, 1982).

The results of these studies indicate the presence of considerable deficiencies in the clarity, type, number, and appropriateness of the long-term goals and short-term instructional objectives contained in the IEPs examined, and in the presence of data specifically required by Public Law 94-142.

In view of the continuing difficulty with the quality of long-term goals and short-term instructional objectives contained in IEPs, and with the failure to include consistently in IEPs all of the data specifically required by Public Law 94-142, there is a need to focus upon finding a solution to these problems.

The use of the computer to aid in the development of the IEP has achieved positive results with regard to the solution of other problems related to IEPs (time, cost,

and parent, administrator, and teacher attitudes). Therefore, it appears logical to examine the efficacy of computer technology in the solution of problems related to the quality of IEPs.

Unfortunately, few studies involving various issues related to the quality of IEPs developed with the aid of the computer have been published. Two of the studies (Allegheny Intermediate Unit, 1981; Heidbrink, 1984) investigated the number of long-term goals and short-term instructional objectives contained in IEPs developed with and without the aid of the computer. These researchers found that a significantly greater number of objectives were selected for IEPs developed using a computerized system, and that objectives selected using the computer developed IEPs were representative of a significantly greater number of content subcategories. Another study (Lillie, 1983) focused upon the presence or absence of data specifically required by Public Law 94-142, and upon the clarity and appropriateness of long-term goals and short-term instructional objectives contained in IEPs developed with and without the aid of the microcomputer. Lillie found that microcomputer-generated IEPs were rated significantly higher than teacher-written IEPs on clarity, relevance, and legal requirements.

Results favoring the use of computers to aid in the development of IEPs as a solution to problems related to the quality of IEPs were indicated in all three of the

studies. However, the scope of the Allegheny Intermediate Unit (1981) report and the Heidbrink (1984) study is extremely limited since they provide information pertaining only to the number of long-term goals and short-term instructional objectives contained in IEPs. Lillie's (1983) study is also extremely limited since he compared a very small number of IEPs; twelve IEPs developed with the aid of the microcomputer and twelve teacher-written IEPs. Thus, the empirical evidence revealing the effectiveness of microcomputers in improving the quality of IEPs is limited.

A recent study pertaining to microcomputer-assisted IEPs was conducted by Ryan (1984). Although Ryan's (1984) study did not examine the quality of IEPs developed with the aid of the microcomputer, she addressed the quality of IEPs developed using computerized and non-computerized methods in the discussion section of her study, indicating that this issue remains in need of further investigation.

The use of microcomputers to aid in the development of IEPs usually involves the availability of a manual of long-term goals and short-term instructional objectives. Generally, teachers choose from the manual those goals and objectives appropriate for the child whose IEP they are developing. In her discussion, Ryan (1984) has proposed that it may be the use of the manuals of goals and objectives in computerized systems which enables teachers to develop IEPs of better quality than those written by

teachers without the aid of manuals of goals and objectives. Ryan (1984) further suggested that it could be argued that teachers do not need to use a computerized system in order to use a manual of goals and objectives. In order to clarify this issue, a comparison needs to be made between the quality of microcomputer-assisted IEPs and manual-assisted IEPs.

Also, a comparison of the quality of microcomputer-assisted IEPs and teacher-written IEPs would increase the empirical evidence available regarding the efficacy of microcomputers in improving the quality of IEPs. Finally, a comparison of manual-assisted IEPs and teacher-written IEPs would provide more complete information with regard to the quality of IEPs in general.

#### Theoretical Rationale.

The IEP, as set forth in the Education for All Handicapped Children Act of 1975, is the embodiment of the concept of individualization in education for handicapped children. It features the most salient characteristics of individualization: diagnosis, intervention, and evaluation (Schenck and Levy, 1979). The creation of a quality IEP, which contains well-formulated, appropriate annual goals and short-term instructional objectives, and which includes all of the data specified in Public Law 94-142, is often beyond the level of expertise of teachers as well as in excess of the time they have available.

Computer-managed instruction (CMI) has been defined

by Allen (1983, p. 33) as "the use of the computer to solve instructional management problems, [as having] come to mean computer-based assistance in the management of 'individualized' instruction." According to Burke (1982), CMI is "characterized by testing, diagnosis, learning prescriptions, and thorough record-keeping" (in Hofmeister, 1983, p. 17). A clear and strong relationship between computer-managed instruction and the special educator's IEP responsibilities becomes evident when definitions of CMI and IEPs are considered (Hofmeister, 1983). CMI can apply the data processing capabilities of the computer to the mainly clerical needs of individualized education as a solution to the many problems faced by educators involved with individualized methods. Testing, record-keeping, report generation, and the preparation of instructional prescriptions germane to individualized education can be facilitated by the use of CMI (Allen, 1980).

The use of computers to aid in the development of IEPs represents a change in the process of IEP preparation. Herzberg's (1959) research indicated that the task with which employees are involved is a motivator which contributes to job performance (Herzberg, Mausner, and Snyderman, 1959). Among the components of job performance which administrators can influence directly is task design (Hamner, 1979). In discussing methods to improve employee performance, Pasmore (1979, p. 104) described

"sociotechnical system intervention which adjusts the technology of the organization and the way the work is done." He suggested that a direct change in the behavior required of employees in the performance of their tasks can increase motivation and job performance (Pasmore, 1979).

The various factors involved in the work of developing IEPs have an effect upon the performance of this task by those to whom it is assigned. If the requirements of the task of developing IEPs are changed by the use of computer-managed instruction or by the use of manuals containing annual goals and short-term instructional objectives, then it can be expected that the quality of the IEP document will improve and teachers' attitudes toward this task will likewise improve.

#### Statement of the Problem.

The purpose of this study is to determine which IEPs are of greater quality for learning-disabled students: teacher-written IEPs (those developed without the aid of manuals of goals and objectives or microcomputers); manual-assisted IEPs (those developed with the aid of manuals of goals and objectives); or microcomputer-assisted IEPs (those developed with the aid of both manuals of goals and objectives and microcomputers). This study investigates the question: What effect does the use of microcomputers and manuals of goals and objectives have upon the quality of IEPs developed for learning disabled students?

Definition of Terms.

For the purposes of this study, the following definitions apply:

Individualized Education Program (IEP).

Individualized Education Program (IEP) is a written statement developed in a meeting by a representative of the local education agency who shall be qualified to provide or supervise the provision of instruction, the teacher, the parent or guardian, and when appropriate, the child. Individualized Education Programs include a statement of the present levels of educational performance of a child, a statement of annual goals, including short-term instructional objectives, a statement of the specific special education and related services to be provided to a child, and the extent to which a child will be able to participate in regular educational programs, the projected dates for initiation of services and the anticipated duration of the services, and appropriate objective criteria and evaluation procedures and schedules for determining on at least an annual basis, whether the short-term objectives are being achieved.

Teacher-written IEP.

Teacher-written IEP is an IEP developed in the manner described in Public Law 94-142 without the assistance of manuals of goals and objectives or the use of microcomputer technology.

### Manual-assisted IEP.

Manual-assisted IEP is an IEP developed with the assistance of catalogs of goals and objectives.

### Microcomputer-assisted IEP.

Microcomputer-assisted IEP is an IEP developed with the assistance of catalogs of goals and objectives and with the use of microcomputer technology.

### Microcomputer.

A small, stand-alone computer system designed to be accessed by one user at a time. Its memory capacity is small (usually 64K to 640K), and its central processing unit is a self-contained chip.

### Manual.

A catalog of sequenced annual goals and short-term instructional objectives.

### Quality.

The score assigned to an IEP on the Checklist for Documenting Appropriateness of the IEP.

### Research Hypotheses.

The hypotheses tested in this study are as follows:

1. IEPs developed with the assistance of the microcomputer and manuals of goals and objectives (Microcomputer-assisted IEPs) will be judged to be of greater quality for students categorized as learning-disabled than IEPs developed without the assistance of the microcomputer and manuals of goals and objectives (Teacher-written IEPs).



2. IEPs developed with the assistance of manuals of goals and objectives (Manual-assisted IEPs) will be judged to be of greater quality for students categorized as learning-disabled than IEPs developed without the assistance of the microcomputer and manuals of goals and objectives (Teacher-written IEPs).

3. IEPs developed with the assistance of manuals of goals and objectives (Manual-assisted IEPs) will be judged to be of the same quality as IEPs developed with the assistance of manuals of goals and objectives and microcomputers (Microcomputer-assisted IEPs).

#### Overview of the Study.

In Chapter 2, the theoretical concepts of computer-managed instruction (CMI) and motivation as they relate to IEPs are reviewed, and the relevant research on teacher-written and microcomputer-assisted IEPs is discussed.

In Chapter 3, the methodology of this study is presented including specific research hypotheses and research design. A random sample was drawn from the population of IEPs of students categorized as learning-disabled by the North Central Regional Education Service Agency (RESA 7) of West Virginia. Teacher-written IEPs, manual-assisted IEPs, and microcomputer-assisted IEPs are compared with regard to their quality for students categorized as learning-disabled. Instrumentation consists of the Checklist for Documenting Appropriateness of the IEP.

In Chapter 4, data collected during this study are

presented and analyzed. A determination is made of mean scores for each of the three groups of IEPs: teacher-written IEPs, manual-assisted IEPs, and microcomputer-assisted IEPs, on the Checklist For Documenting Appropriateness of the IEP. The results of "t tests" for determining if there is a significant difference between the means of the two groups involved in each of the three hypotheses being tested in this study are presented.

In Chapter 5, the conclusions of this study are discussed and placed into perspective in terms of the theoretical rationale presented in Chapter 2. Recommendations for future research and for administrative consideration of current practices are presented.

#### Limitations.

The conclusions of this investigation of the use of microcomputer technology and manuals of goals and objectives in the development of IEPs are limited to students categorized as learning-disabled, and should not be generalized to other categories of exceptionality. Also, the conclusions of this study should not be generalized to include computerized systems in which teachers simply insert diagnostic data into a computer which then chooses the appropriate goals and objectives for the IEP.

#### Ethical Considerations.

In order to protect the identity of the students whose IEPs were examined in this study, the names of the students and their parents have been deleted from the documents.

## Chapter 2.

### A Review of Related Literature.

#### Summary of Rationale and Relationship to the Problem.

Several studies involving various issues related to the quality of IEPs have found that there continues to be a need to improve the quality of the annual goals and short-term instructional objectives contained in IEPs (Alper, 1978; Anderson, Barner, and Larson, 1978; Pyecha and Morra, 1980; Schenck, 1979; Feinn, 1982), and to assure that the data specifically required by Public Law 94-142 are included on IEPs (Schenck and Levy, 1979; Pyecha and Morra, 1980; Comptroller General of the United States, 1981; Schenck, 1981; Nordan, 1982; Nutter, Algozzine, and Lue, 1982; Welton, 1982). Recent studies have indicated that the use of computer technology to aid in the development of IEPs can increase the number of annual goals and short-term instructional objectives (Allegheny Intermediate Unit, 1981; Heidbrink, 1984), as well as improve the overall quality of IEPs (Lillie, 1983). However, the size and scope of these studies prevents the evidence from being conclusive with regard to the efficacy of computer technology in improving the quality of IEPs. Also, it has been suggested (Ryan, 1984) that it may be the use of manuals of goals and objectives in computerized systems which enables teachers to develop IEPs of improved quality. It is the intent of this study to determine the effect of the use of microcomputers and manuals of goals

and objectives upon the overall quality of IEPs.

#### Theoretical Background.

Concepts related to computer-managed instruction (CMI) and motivation provide the basis for this study. Allen (1980) suggests that CMI is essentially the management of individualized instruction with computer-based assistance. Jones and Seeman-Jones (1980) purport that CMI is particularly applicable to special education in the development of IEPs. Herzberg's (1959) research indicates that the task with which employees are involved is a motivator which contributes to job performance. Hamner (1979) indicates that administrators can influence directly only some components of job performance. Pasmore (1979) proposes that adjusting technology and the way work is done improves job performance.

Computer-managed Instruction (CMI). Allen (1980) discusses CMI as having emerged from instructional trends toward individualized instruction and describe it as being "the relatively simple technology of applying data processing capabilities to the mainly clerical needs of [individualized] instruction" (Allen, 1980, p. 34). He enumerates the components of CMI as being "testing, record-keeping, report generation, and prescription generation" and states that the "integration of [these] components of CMI is a product of the individualized instruction movement" (Allen, 1980, p. 34).

Jones and Seeman-Jones (1980) describe CMI as being

advantageous to special education since individualized special education seldom permits homogeneous groupings, considers not only the level of student functioning, but also the rate of student learning, and attempts to produce the acquisition of specific objectives. Further, they assert that programs for special education students must be related to the individual student rather than being geared toward administrative decision-making. Also, they point out that special education files "must be structured on a small population with a large number of data elements, using a changing and flexible curriculum with data maintained over a number of years" (Jones and Seeman-Jones, 1980, p. 94). Finally, these writers contend that increased numbers of students receiving special education services under the mandate of Public Law 94-142 has made CMI a viable alternative in support of special education.

In 1977, only two years after the enactment of Public Law 94-142, McCarthy and Marks (1977) were already cognizant of the capabilities of and need for computerization in special education. They stressed that "a computerized management system [would] be the only practical way to insure ready access to data from subordinate agencies regarding all phases of [Public Law 94-142]; that without computerization, management of [mandated special education] information [would] be arduous if not impossible" (McCarthy and Marks, 1977, p. 61). In 1982, Minnick and School stressed that the assistance of computer technology in the writing

of IEPs was becoming a necessity for the efficient and effective management of special education information.

Motivation. Motivation theory is concerned with various factors which cause high job productivity and job satisfaction among employees (Hamner, 1979).

Frederick Herzberg and his associates proposed the motivation hygiene theory as an approach to understanding motivation and commitment among employees (Herzberg, Mausner, and Snyderman, 1959). Herzberg's research, done with accountants and engineers, indicates that the task itself with which employees are involved is a motivator which contributes to job performance (Herzberg, Mausner, and Snyderman, 1959). Herzberg's "original study was replicated nine times by independent researchers on various population groups who...corroborated the concepts that emerged from the original study" (Owens, 1970, pp. 38-39). One of the corroborative studies, conducted by Sergiovanni (1967) included the task itself with which teachers are involved among the factors he identified which affect satisfaction and dissatisfaction of teachers (Sergiovanni, 1979).

Managers/administrators cannot directly change such individual factors as attitudes, needs, and values which affect a person's job performance. Usually a manager/administrator "can only influence three components of job performance directly. These include: work environment components...; task design components...; and job consequences

components...." (Hamner, 1979, p. 53). Hamner suggests:

that a change in the dimensions of the task assignment can have an effect on the intrinsic motivation of the job and, therefore, on the productivity of the employee. The task assignment can be made more positive by clearly specifying the responsibility of the task, by making the task more challenging, by matching the job to the person, and by reducing the amount of conflict and ambiguity associated with the task" (Hamner, 1979, p. 54).

Pasmore (1979) discusses methods which have been developed by applied behavioral scientists to satisfy employee needs and improve employee performance on the job. One of the techniques Pasmore describes is "socio-technical system intervention which adjusts the technology of the organization and the way the work is done" (Pasmore, 1979, p. 104). According to Pasmore:

Sociotechnical system interventions directly change the behavior required of workers to perform their tasks, and thus focus on changing the work itself. It is expected that employees will comply with the changes introduced; in so doing, it is believed that they will find the new behaviors satisfying and motivating, and will therefore be productive" (Pasmore, 1979, p. 111).

The various factors involved in the work of developing IEPs have an effect upon the performance of this task by those involved. If the requirements of the task of developing IEPs are changed by the use of microcomputers and manuals of goals and objectives, then it can be expected that the quality of the IEP documents generated will be an improvement over the quality of IEPs developed without the assistance of microcomputers or manuals of

goals and objectives (Whitney and Hofmeister, 1981). The changes in the task of developing IEPs which result from the use of microcomputers and manuals of goals and objectives should bring about an improvement in the motivation of teachers toward performing this task.

Research on Teacher-written IEPs.

The research studies investigating teacher-written IEPs have focused upon issues such as time involved in the development of IEPs, costs involved in the development of IEPs, parent, administrator, and teacher attitudes toward and perceptions of IEPs, and quality of IEPs.

Time Involved in the Development of IEPs. Price and Goodman (1980) reported the results of a study involving 75 elementary and secondary special education teachers in 22 school districts in Montgomery County, Pennsylvania, during the 1977-78 school year. A randomly selected sample of teachers, representing all areas of exceptionality, systematically logged the time that they spent developing IEPs for all students (807) in their classes from October 1, 1977 to March 30, 1978. The teachers recorded the amount of time and the types of activities involved in IEP preparation, and whether or not IEP preparation time was expended during school time or on personal time. The IEP development activities logged included telephone calls, IEP conferences, other professional conferences, gathering data to write the IEP, writing the IEP document, and other IEP activities. School time was broken down into a



number of subdivisions including: before and after school, during release time, during the teacher's lunch hour, during recess, during preparation time other than before and after school, and during pupil's instructional time. The teachers were provided with data collection packets, were instructed on data collection procedures and forms, and were visited on two separate occasions to insure that procedures were being followed. Results indicated that the average amount of teacher time expended in developing an IEP was 390 minutes (6.5 hours) per student. Of the 390 minutes, 265 minutes (68% of the time spent by teachers on IEPs) came from the teacher's work day (school time) and 125 minutes (32% of the time spent by teachers on IEPs) came from the teacher's personal time. An analysis of the percent of school time used indicated that teachers spent an average of 123 minutes of instructional time in IEP preparation for each student; this represented 47% of the average total school time expended on IEP development. Teachers were asked to provide information not only on the amount of time expended in IEP preparation but also to indicate how the expended time was used. The researchers concluded that school and personal time contribute to the total time commitment for IEP preparation. Also, the data indicate that the writing of the IEP document and the gathering of supportive diagnostic data account for the major time expenditures in the overall document development process: 144 minutes were used in the gathering of

assessments, one to two hours for time spent during instructional time for related IEP work, and a median of two hours for time spent for review and updating. Quinn noted that the items on her questionnaire referring to the time spent on listing educational and related services (2.20 hours) was often misinterpreted by participants in her study. This illustrates one of the disadvantages of the use of the questionnaire method of gathering data: the possibility of misinterpretation of the questions by respondents. Trying out the questionnaire with a few subjects typical of those on whom it will be used in the study helps to alleviate this disadvantage. Quinn (1982) did not indicate that such a procedure was used in her study. Another problem arising from the questionnaire methodology used by Quinn is the difficulty to predict accurately what will be remembered by respondents.

The total time spent on the development of an IEP in Quinn's (1982) study was less than the total time reported in Price and Goodman's (1980) study. This finding could be due to the differences in methodology used in the two studies: the participants in Price and Goodman's (1980) study logged the time they spent as they worked on the IEPs, whereas those in Quinn's (1982) study were recalling the time they remembered spending on developing IEPs. Also, the amount of time spent for IEP related work and assessments during instructional time was greater in Quinn's (1982) study than in Price

and Goodman's (1980) study. This finding could be due to the fact that, in 1980, teachers were no longer receiving the amounts of release time for IEP development which was being made available to them in 1977-78. Quinn (1982) also found, as had Price and Goodman (1980), that as the years of teaching experience increased, the time involved in developing IEPs decreased.

Kyser (1984) partially replicated the study reported by Price and Goodman (1980) on 35 special education teachers of learning-disabled, mentally handicapped, and behaviorally disordered programs in Cass County, Missouri. Kyser's results revealed a mean total time of 209 minutes spent in IEP development; 71 minutes used in gathering diagnostic data; and 21 minutes involved in the actual writing of the IEP document. In Kyser's study, an analysis of the percent of school time used indicated that teachers spent an average of 54 minutes of instructional time in IEP preparation for each student; this represented a decrease to 26% of the average total school time expended on IEP development. Kyser (1984) also found that increased teacher experience resulted in increased total time spent in IEP development.

Kyser (1984) investigated time involved in IEP development for only three areas of exceptionality, whereas Price and Goodman (1980) investigated time involved in IEP development for all categories of exceptionality. When Kyser compared her data from three exceptionalities

With Price and Goodman's (1980) data from all exceptionalities, the category (hearing impaired) which required three times as much teacher time to prepare IEPs was eliminated; also, one of the three areas of exceptionality in Kyser's (1984) study was the category (mentally handicapped) which, according to Price and Goodman, required the least amount of teacher time to prepare IEPs. Thus, Kyser's (1984) results, indicating a decrease in the teacher time required for development of IEPs when compared with Price and Goodman's (1980) results, are unclear.

The Price and Goodman (1980), Quinn (1982), and Kyser (1984) studies present conflicting results regarding years of teacher experience and time spent in IEP development. These discrepancies might be explained by the fact that in 1977-78 (the first year that teachers were required to develop IEPs) and still in 1980, more experienced teachers had the advantage of being better acquainted with the teaching profession than less experienced or new teachers. Thus, the more experienced teachers were possibly better able to grasp the concept of IEPs and to develop them more quickly than less experienced or new teachers. However, by 1982-83, new teachers and teachers with just a few years of experience would have had the advantage of exposure to and experience with the concept of the IEP in their teacher education programs. Teachers who might have had more years of experience on record, might also have been returning to teaching after a retirement of several

years (due to childrearing, etc.); thus, the teachers with more years of teaching experience would have less exposure to and experience with the concept of the IEP, and might spend more time in developing IEPs than new teachers or those with less teaching experience.

Costs Involved In the Development of IEPs. With regard to costs involved in developing IEPs, Price and Goodman (1980) took the time figures for IEP development for each exceptionality and for the entire sample in their study and gave them monetary values based on the teachers' rate of compensation (salary and fringe benefits). They advised against generalizing from their specific cost figures indicating that the numbers were only suggestive of the total teacher cost for IEP development, and did not include administrative and other indirect costs. Their results suggested that the total teacher cost for IEP development was \$66.81 per student, ranging from a low of \$25.35 for speech impaired students to a high of \$193.62 for hearing impaired students. Price and Goodman did not indicate the hourly pay rate for the teachers involved in the study. In the discussion of their results, the researchers indicated that the category of trainable mentally retarded required the least amount of time for IEP development. However, the results tables actually included in their study revealed that the category of speech impaired was listed as requiring the least amount of time for IEP development. In determining the low figure

for cost of IEP development, Price and Goodman used the category of speech impaired. This is in agreement with the procedure they indicated that they had used. However, it remains unclear why they said in their discussion that the category of trainable mentally retarded required the least amount of time for IEP development.

Teachers' Lack of Skills Necessary For the Development Of IEPs. Holland (1979) reported the results of a research study designed to identify the perceived needs of both special education teachers and regular class teachers in developing the IEP. Suburban public school districts were selected by administrative and geographical convenience for inclusion in the study. Approximately 120 special education teachers and 50 regular class teachers were asked to complete anonymously an IEP questionnaire developed by Holland. Holland's results revealed that both regular and special class teachers identified a lack of diagnostic, instructional, and affective materials, with the regular class teachers indicating a much greater need for these items. Also, the regular class teachers in Holland's study indicated a lack of their own diagnostic skills to assess student strengths and weaknesses as well as a lack of knowledge of educational materials necessary to prescribe an educational program for handicapped students.

Brown (1981) examined inservice training needs of special education teachers related to individual program planning for handicapped students. Brown's results revealed

a need for inservice training involving formal and informal assessment strategies, and preparation, selection, and adaptation of instructional materials. Teachers with one to four years of experience and teachers with more than nine years of experience indicated a greater need for inservice training than did teachers with five to eight years of experience. Interpretation of these findings might suggest that teachers with one to four years of experience (newer teachers) and teachers with nine or more years of experience (possibly some returning teachers) would indicate a greater need for inservice training since they were adjusting and re-adjusting to the teaching profession, whereas teachers with five to eight years of experience had fewer adjustments to make when confronted with the IEP process. Brown (1981) also found that teachers of emotionally-disturbed and learning-disabled students indicated a greater need for inservice training than did teachers of trainable or educable mentally retarded students. These findings are understandable in view of the fact that before this time there had been fewer classes for emotionally-disturbed and learning-disabled students in the schools, whereas classes for trainable and educable mentally retarded students had been common. Public Law 94-142 increased the number of classes for emotionally-disturbed and learning-disabled students and consequently more teachers were needed to teach these classes. Thus, the teachers of the emotionally-disturbed

and learning-disabled students in Brown's (1981) study might also have been the newer and returning teachers (who were filling the new positions being made available).

Educators' and Parents' Attitudes Toward and Perceptions Of IEPs. With regard to teachers' attitudes and reactions to developing IEPs, four states (Alabama, New Jersey, Wisconsin, and Washington) participated in a study called Project IEP from February to May of 1977. Project IEP was designed to identify and clarify perceptions related to roles in the IEP process as mandated by Public Law 94-142. Approximately 800 persons, including state and local administrators, regular and special teachers, parents and handicapped children, were given open-ended interviews. The results of this study indicated that the major concerns of teachers were that they would be forced to devote excessive amounts of time to non-instructional activities resulting in lost planning, teaching, and personal time with a subsequent decline in staff morale; that they would need additional special training in order to become effective participants in the IEP process of development and implementation; that the IEP process would put additional pressure on the relationships between regular and special education personnel; that the IEP would neither improve the education provided for handicapped children nor reflect the instruction the children receive; that they felt powerless as federal and state mandates redefined their roles without their prior



knowledge; that they felt the IEP reflected a lack of trust in their commitment to educating children; that they were unsure about whether they had the skills to prepare an IEP which would assist a child's instruction; that they felt they were being held accountable for their teaching and were resentful; that they would bear principal accountability for the children's progress regardless of the involvement of other staff; that they were being asked to assume additional clerical and other responsibilities inappropriate to their role as instructional personnel (Lewis, 1977; Norton, 1977; Penney, 1977; and Sagstetter, 1977).

Semmel (1978) reported the results of a study using a 100-item questionnaire to obtain information about the attitudes of a stratified sample of 717 educators in 9 local education agencies, to determine the sources of influence upon them. Semmel's results revealed that role (i.e., regular class teacher, special educator, principal) exerted a strong influence upon educators' attitudes toward the IEP. Overall, regular class teachers and principals were more positive about the IEP than special educators. Semmel attributed the less positive attitudes of special education teachers toward the IEP to the amount of additional work which the IEP requires of the special education teacher.

With regard to parents' attitudes and reactions to IEPs, Penney (1977) found that parents felt that their

lack of knowledge about special education, specific details about the child's handicapping condition, and the procedures employed by the school district hampered their ability to contribute to the IEP process.

Mowder, Doberman, and Prasse (1980) reported a study examining a sample of 91 parents drawn from two suburban school districts in a large city in the North East. Parents were asked to respond to a 9-item questionnaire concerning their attitudes and reactions to the development of IEPs for their children. The results of the study revealed that parents wanted to be involved in the IEP process; that they felt the psycho-educational evaluations were only somewhat useful; that they felt that the short-term objectives were more realistic for their children than were the long-term goals; that they felt positive about school personnel following through in providing the services specified in the IEP; and that they felt that the IEP had been a useful tool for improving their child's education. These findings support the contention on which much of the federal legislation is built: that parents want to be involved in the process in which recommendations are made for their child's educational program. Further, the results indicate that Public Law 94-142 is effective in bringing parents into the decision-making process in special education. However, Mowder, Doberman, and Prasse (1980) experienced a disadvantage peculiar to the use of mailed questionnaires: low return. Of 329 parents who were

mailed the questionnaire, 91 parents responded, giving a response rate of 27%. This not only reduced the size of the study sample, but may also have biased the results, preventing valid generalizations since respondents in questionnaire studies have been found generally to be more favorable to the issue involved in the questionnaire than nonrespondents.

Quality of Teacher-written IEPs. With regard to various issues related to the quality of IEPs, Alper (1978) reported the results of a study conducted during the 1977-78 academic year involving 265 IEPs collected from 13 school districts in California. The districts represented various programs under traditional special educational funding, and the IEPs were developed by several different types of committees including school appraisal teams, educational assessment services teams, and admissions and dismissal committees. The IEPs were evaluated by trained expert raters, according to Alper, in order to determine their comprehensiveness, specificity, clarity, and the extent to which a least restrictive environment was provided. Results indicated that both long-term goals and short-term instructional objectives were poorly written and specified; only 25% of the short-term objectives contained a behavior, situation, and criterion specification; additionally, the IEPs lacked a specification of setting and of formative evaluation procedures. The IEPs in Alper's study were found to have common deficiencies

in certain areas: they often failed to specify pupil's grade level, principal language, percent of pupil's time in regular classes, alternative placements considered, justification for the placement decision, and often did not contain the required consent signatures including the pupil's parents. Alper also reported that regular class teachers frequently were not involved in the functioning of the assessment/placement committee, even though they were later required to implement suggestions made on the IEP. Alper indicated that his results showed a wide variance in the procedures used by IEP development committees, and suggested that the lack of uniformity in their approaches might be diminished by the use of a handbook of standard operating procedures.

Anderson, Barner, and Larson (1978) reported the results of a study of 400 IEPs produced in California's Costa County Master Plan for Special Education program. The IEPs, developed by teachers specially trained and with one full year of experience in IEP writing, were randomly selected, read, and rated by four evaluators trained for the task using a specially designed rating instrument. The rating process included collection of rater agreement data which suggested that moderate consistency between raters was attained, although no numerical reliability data were included. No specific information was given by the researchers regarding the construction of their instrument or its validity. The researchers reported results

which revealed that fewer objectives were being written than students might require; that over 75% of the objectives addressed basic academic areas: reading, math, and language, whereas only 10% of objectives were listed in areas relating to social, emotional, and behavioral needs; and that 6% of the IEPs lacked checks for parent program approval. The researchers recommended that the writers of IEPs should be intensely trained in goal and objective writing, should include adequate numbers of goals and objectives which address the emotional, social, and behavioral needs of students. Finally, they stressed that documentation of communication with parents regarding IEPs should be closely monitored.

Schenck (1979) examined 300 IEPs and corresponding psycho-educational assessments randomly selected from 37 local education agencies in Connecticut. The purpose of Schenck's study was to determine the extent to which long-term goals and short-term instructional objectives on the IEP could be traced back to the psycho-educational assessment which should form the basis of the IEP. Statistical independence between the recommendations of the psycho-educational assessments and the long-term goals and short-term instructional objectives on the IEP led Schenck to conclude that no significant relationship existed between the psycho-educational assessments and the long-term goals and short-term instructional objectives on the IEPs examined in her study.

Schenck and Levy (1979) reported that a significant number of cases in their study of 240 IEPs had missing data specific to the IEP requirements of Public Law 94-142. Data relative to objectives and required components of the IEP were analyzed through the procedure of frequency distribution. The results revealed an absence of data regarding present levels of academic functioning in 64% of the IEPs evaluated; the omission of the type of educational services being provided in 18% of the IEPs; the failure to indicate the extent of regular educational program participation in 68% of the IEPs; the failure to report either the date of formulation of the IEP or the date for the initiation of special education services in 33% of the IEPs; the absence of evaluation procedures for determining whether instructional objectives were being met in 33% of the IEPs; the failure to indicate within the IEP the participants in its formulation in 66% of the IEPs examined. Schenck and Levy's results suggested that there was confusion among professionals regarding the mechanics of developing the IEP and what required data must be included. Inservice training for clarification regarding the content necessary for IEP development was suggested by Schenck and Levy.

Pyecha and Morra (1980) reported the results of a national survey commissioned by the Bureau of Education for the Handicapped in order to assist Congress in evaluating the usefulness of the IEP. This study investigated

the content and quality of 2,657 IEPs from 507 schools in 208 school districts in 42 states, and 550 IEPs of students in 71 state/special facilities in 46 states. A trained survey specialist visited each school and facility and selected a sample of 5 to 8 students, photocopied each student's IEP (deleting any personally identifiable information), distributed brief questionnaires to school principals and to the teacher most knowledgeable about the development of each sample student's IEP, collected and scan-edited the completed questionnaires.

From analysis of the data collected, the researchers reported that 99% of the IEPs contained a statement of specific educational services to be provided, and indicated a projected date for initiation of services; that 95% of the IEPs indicated the anticipated duration of specific services; that 94% contained a statement of annual goals; that 91% of the IEPs had short-term objectives and included proposed evaluation procedures; that 90% contained a statement of present levels of educational performance; that 88% of the IEPs made assurances of at least an annual evaluation; that 87% indicated proposed schedules for determining whether objectives were being met; that 65% of the IEPs included proposed evaluation criteria; that 62% of the IEPs contained a statement of the extent to which the child would be able to participate in the regular education program; and that the IEPs had an average length of nearly five pages. From the first to the second year

of the study, Pyecha and Morra found an increase in the average number of pages in an IEP, more short-term objectives, and an improvement in the internal consistency of the IEPs examined.

Schenck (1981) reported the results of a study involving 186 IEPs of learning-disabled students. Her results, following a series of frequency distributions performed on the data, indicated that 62% of the IEPs evaluated did not report the current performance level of the students; that 12% of the IEPs failed to provide either goals or objectives; that 72% of the IEPs omitted any reference to the amount of time spent in regular education classrooms; that 80% made no mention of the time to be spent receiving special education services; that 28% of the IEPs did not specify a program starting date; that 80% of the IEPs did not identify evaluation procedures; and that 75% of the IEPs failed to show evidence of parental approval of the IEP. These results indicate that there continues to exist among professionals some confusion regarding the inclusion of data on IEPs.

From April through August, 1978, the Office of the Comptroller General of the United States reviewed 456 IEPs prepared by 23 local education agencies in six states. The review included discussions with appropriate management, teaching, and other personnel, and examination of school records (including children's individual education folders). The states reviewed were selected to provide



a cross section of large and small populations, high and low per capita state and local funding levels, older and newer state handicapped laws, approved and not yet approved state handicapped plans, and geographic distributions. Neither the states nor the local education agencies were selected because their programs were considered better or worse than others. The resulting report to the Congress of the United States (1981) documented a lack of compliance with IEP requirements including IEP content problems: 84% of the IEPs examined lacked one or more of the required items of information, or lacked evidence that the three required participants attended the IEP meeting. Specifically, the IEPs examined indicated only special education and related services currently available in the child's district. About 65% of the IEPs lacked one or more of the items of information specifically required by Public Law 94-142: 20% lacked a statement of present levels of educational performance, while 9% included a vague statement of present levels of educational performance; 15% lacked annual goals, while 16% included vague annual goals; 17% lacked short-term instructional objectives, while 6% included vague short-term objectives; 21% lacked dates for initiation of services; 30% lacked criteria and evaluation procedures, while 3% included vague criteria and evaluation procedures; and 52% lacked evidence that all required participants attended the IEP meeting. In view of these results, the Comptroller General

recommended that program regulations be revised to state clearly that IEPs must include all special education and related services needed to provide a free appropriate public education, and that instructions, guidance, and models relating to IEPs be distributed to all states.

Nutter, Algozzine, and Lue (1982) reported a study involving the quality of 60 IEPs from a middle-sized school district in Florida. They indicated that their results were obtained on only 30 of the IEPs examined (approximately 50%). However, they failed to include a definition of "middle-sized" or the reasons why half of the IEPs in their study were excluded from a discussion of results found. In stating their results, Nutter, Algozzine, and Lue indicated that 100% of the IEPs reviewed had included the five major components of the IEP. However, it remained unclear from their discussion how many IEPs in their study contained all of the components of the IEP mandated by Public Law 94-142: the 60 IEPs they selected or the 30 IEPs they reviewed.

Feinn (1982) examined 192 randomly selected IEPs from two intermediate units serving learning-disabled, behavior-disordered, and educable mentally retarded students in south central Pennsylvania. The purpose of Feinn's study was to determine whether special education teachers included affective goals and objectives on the IEP and whether the goals and objectives addressed classroom management or the personal development of the learner.

The results of Feinn's study indicated that teachers of behaviorally-disordered students wrote affective goals more frequently than teachers of either learning-disabled or educable mentally retarded students, and that affective goals and objectives addressed classroom management but not the personal development of the learner. Feinn indicated that his results suggested a need for pre-service and in-service teacher education to improve the quality of the IEP.

Heluk (1983) reported the results of a study investigating the adequacy of the IEP in stating a basic plan and instructional guide designed to meet the personal-social needs of learning-disabled children. Sixty IEPs and supporting psychological, social, and educational documents were selected from 276 IEPs for learning-disabled children in grades K-8 from six New Jersey school districts. Heluk examined the assessment procedures used to determine present levels of personal-social performance of learning-disabled children. His results indicated that there was limited use of classroom observation and standardized techniques in the personal-social assessment process. Heluk's study also involved the rating of IEPs to determine the extent of compliance of the IEP components with established federal and New Jersey state requirements. His results indicated limited IEP statements in compliance with the established regulations. Heluk's results suggested that the IEP does not

adequately state a basic plan and instructional guide designed to meet the unique personal/social needs of learning-disabled students. Heluk proposed that a change in IEP format and emphasis might improve IEPs in that regard.

Maier (1983) reported a study comparing the effectiveness of two team approaches to IEP development. One team used a five-step problem-solving process and related set of questions called Complimentary Program and Service System (COMPASS), and the other team used the traditional unstructured approach to IEP development. The results of this study revealed that 96% of the IEPs developed using the COMPASS approach were evaluated as being complete with regard to federal requirements, whereas 52% of the IEPs developed using the traditional unstructured approach were evaluated as meeting the criteria for a complete IEP. Maier suggested that COMPASS may be a practical and effective procedure for the development of IEPs. However, Maier noted certain limitations of the study: the small sample of IEPs involved (28 IEPs developed using the COMPASS approach, and 31 IEPs developed using the traditional unstructured approach); and the use of only two teams, suggesting that factors other than team procedures, such as positive "data-based attitudes" among COMPASS team members, may have accounted for the results.

#### Research on Computer-assisted IEPs.

Research studies concerned with the solution of problems

associated with IEPs through the assistance of computer technology in the development of IEPs have focused upon time involved in developing IEPs with the aid of the computer; costs involved in developing IEPs with the aid of computers; parent, administrator, and teacher attitudes toward and perceptions of IEPs developed with the aid of the computer; and various issues related to the quality of IEPs developed with the aid of computers.

Time Involved in Developing Computer-assisted IEPs.

Helmick (1979) reported the results of a study assessing, by means of a questionnaire, the attitudes of special educators toward three issues: classroom applications of computer technology, IEPs, and Skiltrac, a prototype computer-based instructional management system for the development of IEPs. Data were obtained from a sample of users of Skiltrac who had volunteered to use the program. Helmick found that for both IEPs and classroom applications of computer technology, the greatest perceived drawbacks involved commitment of time; IEPs were seen as too time-consuming to develop and computer technology was seen as too time-consuming to use and information took too long to receive from the computer.

The Allegheny Intermediate Unit (1981) reported the results of its project to develop a computerized system to assist in the development of IEPs. Its Improved Individualized Instruction program, an outgrowth of the concerns of educators over the time-consuming aspects of

the IEP, was developed as a means of providing a more efficient system of individualized instruction. The program was a federally funded project under Title IV-G which serviced learning-disabled students within the Allegheny Intermediate Unit, Exceptional Children's Program, Pittsburgh, Pennsylvania. Of 13,000 children, grades K-12, in the 46 suburban school districts in Allegheny County, 2400 were diagnosed as learning-disabled. The Improved Individualized Instruction program was a computer-managed instruction (CMI) program maintained on a Hewlett-Packard 3000 Series II computer. One of the objectives of the Improved Individualized Instruction program was that as a result of program participation, less teacher time would be required to write and update IEPs. In order to evaluate this, all teachers of learning-disabled students were administered an IEP questionnaire in the Spring of 1979 and then again in the Spring of 1980. Teachers were asked to estimate the average amount of time they spent writing an IEP, and the amount of time they spent updating an IEP. To determine if there had been a reduction in the amount of time, the responses of 68 non-project teachers who completed the questionnaire in 1979 were compared with the responses collected from 66 teachers involved in the project in 1980. Results indicated that, in 1979, an average of 130.81 minutes were required to write an IEP, whereas, in 1980, an average of 111.29 minutes were required. Thus, the average reported time

to write an IEP decreased by almost 20 minutes with the assistance of the computer. However, one of the weaknesses of using questionnaires in gathering research data is the difficulty involved in predicting what respondents have remembered accurately due to the passage of time. This problem must be considered when evaluating the findings of the Allegheny Intermediate Unit (1981).

Brown (1982) reported the results of a field test to demonstrate the efficacy of the Computer-Assisted Management of Educational Objectives (CAMEO) system as a time-saving solution to the workload created by IEPs. At the time of the study, CAMEO was run on a centrally located Hewlett-Packard 3000 computer and could be accessed remotely over the telephone or centrally at the Multnomah County Education Service District in Portland, Oregon. A field test was conducted in November, 1981, and another one was done in June, 1982. In November, a five-page questionnaire was sent to the 63 people who had compendiums of objectives at that time; 41 people responded. Results from the first evaluation revealed that 79% felt that CAMEO reduced the amount of time required to prepare and write IEPs. The average time to develop an IEP was half an hour, with a range of 5 minutes to 1 hour, often cutting IEP development time by more than half. The second evaluation was sent in June, 1982, and consisted of a one-page questionnaire condensed from the previous evaluation. At the time of the second evaluation, 141 people

were using compendiums of objectives. Questionnaires were returned by 20 people who felt they had not used the system long enough to respond, and by 40 people who had completed the evaluation. Results of the second test were consistent with the earlier evaluation. 89% of the respondents felt that CAMEO reduced IEP preparation time. The average time to develop an IEP using CAMEO was 50 minutes with a range of 10 minutes to 3 hours. Without CAMEO, the average time was 2 hours with a range of 10 minutes to 6 hours. The results of Brown's first field test indicated that about 65% of those sent questionnaires actually responded. In Brown's second field test, only about 29% responded. Since the goal in a questionnaire study is typically 70-80% return, Brown's return rate of less than 30% causes question as to interpretation of her results.

Enell and Barrick (1983) conducted a study to identify, analyze, and assess all major computer systems used to assist in the writing of IEPs in order to report the extent and practicality of computer use in California. The researchers investigated procedures and reactions to teacher-written IEPs in a sample of four Special Education Local Planning Agencies which did not use computers to assist in the development of IEPs. A total of 55 people within these agencies were interviewed including directors, program specialists, teachers, and parents. A statewide survey identified 12 Special Education Local Planning Agencies which used microcomputers or mainframe computers



to aid in the development of IEPs. Four of these agencies were selected for the study. Although the researchers indicated that one of the agencies was in the process of installing its system at the time of the study (and thus, was not included in the interviewing process), they did not indicate why they chose the agencies they did for participation in the study. In addition to the people included in the teacher-written IEP sample interviews, computer programmers were included in the computer-assisted IEP sample; 58 people were interviewed regarding computer-assisted IEPs. The findings from the interviews held with the teacher-written IEP sample were compared with those of the computerized IEP sample. Comparisons were made regarding the usefulness of the IEP produced by either method as viewed by parents, teachers, and administrators; also, comparisons were made of the attitudes of these groups toward the use of computers in constructing the IEP. Enell and Barrick's results revealed that administrators thought that the computerized IEPs saved teachers time and that teachers perceived a time-savings. These beliefs are supported by the findings of this study. A comparison of special education teacher/specialist time used in assessment and in IEP meetings with and without computer-assisted IEPs indicated: an average savings of 12 minutes for assessment (a decrease from an average of 151 minutes to an average of 139 minutes); an average savings of 16 minutes in IEP meetings (a decrease from

an average of 57 minutes to an average of 41 minutes); with an average total time savings of 28 minutes (a decrease from an average of 208 minutes to 180 minutes). Enell and Barrick's (1983) data indicate that the time saved varied for different types of placements and for annual review meetings.

Ryan (1984) investigated the difference between districts using computerized and noncomputerized IEPs with regard to the time spent by teachers writing and preparing IEPs. Twelve randomly selected special education districts in Massachusetts, six using computerized IEPs and six using noncomputerized IEPs, were involved in the study. Data related to 180 computerized IEPs and 220 noncomputerized IEPs were compared. A total of 19 special education teachers in the computerized districts and 26 in the noncomputerized districts kept track of the amount of time they spent developing IEPs during the period of March to June, 1984. From the time logs kept by teachers, an average IEP writing time and an average IEP preparation time was computed for each teacher. Ryan concluded that teachers using computerized IEP systems spend less time writing IEPs than teachers using non-computerized systems (64.6 minutes for teachers using computerized systems and 118 minutes for teachers using noncomputerized systems).

Costs Involved In Developing Computer-assisted IEPs.

Brown (1982), when discussing the results of her field

tests of the Computer-assisted Management of Educational Objectives (CAMEO) system, reported that the cost of using CAMEO was approximately \$3.00 per IEP. This figure included the cost of computer time, secretary time, and paper.

Enell and Barrick's (1983) interviews with staff involved in the development of teacher-written IEPs and staff who participated in the development of IEPs with the aid of the computer identified members who participated in IEP meetings and gave estimates of the average time spent in various types of IEP activities. Costs were based upon the personnel involved in each phase of the IEP development process and the time estimates which were given by those interviewed. By averaging the number of minutes reported for various activities, the total time used by various professionals was obtained for different types of meetings. The personnel cost estimates were based upon the mean salaries paid to various staff in the far west geographic region of the United States during 1981-82 and reported by the Education Commission of the States. Results indicated that up to 18% of the total costs for annual review meetings could be saved: the most notable finding favoring the use of computers was for the annual review meeting using a minimal team, where the cost without computers was \$76.03 and the cost with computers was \$62.60. Costs for initial placement meetings varied with the type of placement being considered; the greatest

savings in initial placement meetings were noted for students in resource programs.

Ryan's (1984) investigation comparing the differences between districts using computerized and noncomputerized IEPs also determined an average IEP cost for each district from budget data provided by each district's Director of Special Education. Included in the computation of average cost were costs associated with teacher time and clerical assistance, costs of supplies, equipment, and contracted services. Ryan's results revealed that the average IEP cost in computerized districts was \$66.57, whereas the average IEP cost in the noncomputerized districts was \$84.18.

Parent, Administrator, and Teacher Attitudes Toward And Perceptions of Computer-assisted IEPs. Part of Enell and Barrick's (1983) study comparing teacher-written IEPs and computer-assisted IEPs involved an investigation of parent, administrator, and teacher attitudes toward using computers to assist in preparing IEPs. The results of their interviews revealed that parents and teachers had a cooperative attitude when constructing the IEP; that parents valued the more frequent and personal communication achieved with computer-assisted IEPs; that parents felt they could use the IEP as a reference; and that they felt involved in the IEP process. Specifically, their results revealed that 90% of the parents approved of using the computer to assist in the construction of the IEP. Enell

and Barrick also found that teachers did not object to using the computer, and that they felt that computer-assisted construction of the IEP had many advantages and few disadvantages. Advantages included: time savings, paper-work decreases, provision of the most appropriate education for each child, useful goals and objectives, and a more legible and more easily understood document. However, it was found also that teachers felt that computer-produced IEPs were impersonal, and that sometimes the objectives did not fit a particular student, and often were not written at the proper level. Enell and Barrick found that administrators thought that computer-assisted IEPs saved teachers time, were more legible, and contained better-written goals and objectives than IEPs developed without computer assistance. Administrators also sensed that parents and teachers were very positive about computerized IEPs. Confidence in Enell and Barrick's results is provided by their use of interviewing as a research technique, since this method is a well-established procedure for data collection having the advantage of flexibility for the explanation and clarification of questions.

Ryan (1984) also investigated the difference in teachers' attitudes toward IEPs in districts in Massachusetts using computerized and noncomputerized IEPs. The 45 teachers in Ryan's (1984) study completed an IEP survey form developed specifically for her study. The IEP survey form measured attitudes toward IEPs on five factors: value

for instructional planning, curriculum planning, value for individualized instruction, team planning, and general value. Factor scores were computed for each factor. The results of the computerized and noncomputerized groups on the five factor scores (plus the writing time and preparation time and cost per IEP discussed above) were analyzed using a multivariate analysis of variance and followed up with a stepwise discriminant function analysis. From her results, Ryan (1984) concluded that teachers using computerized IEP systems have a more favorable attitude toward the value of the IEP for instructional planning than teachers who do not use computerized IEPs.

Quality of Computer-assisted IEPs. Very few studies have investigated issues related to the quality of IEPs developed with the aid of the computer.

A document reporting the 1979-80 progress of the Allegheny Intermediate Unit Exceptional Children's Program For Improved Individual Instruction in Pittsburgh, Pennsylvania (1981) indicated that teachers were able to set a larger number of objectives per child as a result of project participation. In determining this, the number of objectives written per child by teachers in year two of the project was compared with the number of objectives they wrote in year three after the computerized system was implemented. The student was chosen as the unit of analysis; owing to student attrition, complete IEP data for the two project years were available for only 48

students. The student population was divided by grade level and correlated t-tests were conducted within each subpopulation. Results from the analysis showed that at the elementary level, there was a statistically significant increase in the average number of objectives written per student from year two to year three of the project.

Although the number of objectives written for students at the secondary level also increased, the gain was considerably smaller and non-significant. The same data collection methods and analysis revealed that the average number of objectives updated for both primary and secondary students increased significantly from year two to year three of the project. Also, the Allegheny Intermediate Unit anticipated that the IEPs written during the third year (1979-80) of their project would be of the same or higher quality than those written during the second year of the project (1978-79). Two experts were asked to rate a sample of 79 IEPs prepared in year three by 12 teachers. Each IEP was rated on two dimensions: adequacy of the objectives and adequacy of the overall IEP. Ratings were made along a three-point scale where "1" represented "very adequate" and "3" represented "inadequate". The average values obtained from these ratings were compared with the ratings of 56 IEPs (prepared by the same 12 teachers) which were made during the second project year. Means and standard deviations were computed. Examination of the data indicated very little change in the judged adequacy of the IEPs across

project years. The authors of the report indicated that lack of reliability across raters and time frames made the validity of their data suspect.

As a result of the interviews conducted by Enell and Barrick (1983), it was found that educators and parents consider computerized IEPs to be more legible and better organized than handwritten IEPs; to contain clearer and more consistent terminology than handwritten IEPs; to provide more objectives, better written objectives, and objectives from more areas than handwritten IEPs; and to contain more mandated and desirable items than handwritten IEPs. On the other hand, their results also revealed that educators and parents felt that, at times, computerized IEPs were more impersonal than handwritten IEPs; that objectives were sometimes too broad and often were not written at the proper level given assessment results, and that unused objectives were sometimes included in computerized IEPs.

Lillie (1983) compared IEPs generated with the assistance of the Unistar I microcomputer software program and teacher-written IEPs. Twelve teacher-written IEPs from the 1981-82 school year were randomly selected from three elementary schools in Charlotte, North Carolina. Identification information and present functioning level information for each of the twelve students were taken from the IEPs and used to generate twelve microcomputer-assisted IEPs using the Unistar I software program. Lillie



adapted the Checklist for Documenting Appropriateness of the IEP (Turnbull, Strickland, and Brantley, 1982) for use as a rating scale. Twelve special education teachers from several school systems in Northeastern North Carolina acted as raters. Each teacher independently rated the two IEPs on the same student (one teacher-written and one computer-assisted). Lillie's results indicated that the teachers rated the Unistar I microcomputer-generated IEPs significantly higher across each of the categories (legal requirements, relevance, and clarity) represented on the checklist. A t-test was used to determine the level of significance; the results showed that the difference between the two mean rating scores was highly significant. Lillie cautioned that interpretation of his data was limited for several reasons. Reliability of the rating procedure across raters and IEPs had not been established and the number of IEPs surveyed was small.

Heidbrink (1984) compared IEPs developed in hand-written form and those developed using a computerized system. Differences were examined in relation to the number of objectives selected and the number of content categories and subcategories from which objectives were selected. The major results of the study indicated a significantly greater number of objectives were selected for IEPs that were developed using the computerized system. Also, objectives selected using the computer developed IEPs were representative of a significantly greater number of content

subcategories.

Summary of Research and Relationship to the Problem.

Computer-managed instruction (CMI) and motivation theory provide a theoretical framework for the use of computers in the development of individualized education programs. The trend in education toward individualized instruction has been cited as the rationale behind the inclusion of IEPs in the mandates of Public Law 94-142 (Pappas, 1982). According to Allen (1980), computer-managed instruction (CMI) also emerged from the movement in education toward individualized instruction. The characteristics of individualized instruction have been incorporated by IEPs (diagnosis, intervention, and evaluation) and by CMI (testing, generation of study prescriptions, keeping of records, and generation of reports). IEPs, which have sprung out of the trend toward individualized instruction, have been fraught with problems, and CMI, which also resulted from trends toward individualized instruction, has been employed as a solution to some of the problems with IEPs. The use of computer-managed instruction (CMI) to assist in the development of IEPs represents a change in the work of developing IEPs. Motivation theory indicates that the work itself contributes to job performance (Herzberg, 1959); that a change in the dimensions of a task assignment influences job performance (Hamner, 1979); and that adjustments in technology affect job performance (Pasmore, 1979). A change from teacher-written

IEPs to computer-assisted IEPs represents a change in the technology of the task assignment involved. Motivation theory suggests that a change from teacher-written IEPs to computer-assisted IEPs should affect the job performance of teachers developing the IEPs.

Research investigating teacher-written IEPs has indicated that many problems have existed with them with regard to time, cost, and the quality of the documents produces. Although research done on computer-assisted IEPs has been favorable with regard to the solution of problems involving time, cost, and educators' and parents' attitudes toward and perceptions of IEPs, research studies on the quality of computer-assisted IEPs have been extremely limited in size and scope. However, the use of computers, with their CMI capabilities, appears to be a promising solution to problems related to the quality of IEPs.

Ryan (1984) has suggested that it may be the use of manuals of goals and objectives involved in the development of computer-assisted IEPs which is enabling teachers to produce better quality IEPs. The question then remains, "Will the use of microcomputers and manuals of goals and objectives in the development of IEPs enable teachers to produce documents which are of greater overall quality than those produced in the traditional, teacher-written manner?"

## Chapter 3.

### Methodology.

#### Population and Selection of the Sample.

The focus of this study was upon the IEPs of students categorized as learning-disabled by the North Central Regional Education Service Agency (RESA 7) of the state of West Virginia. The counties of RESA 7 were chosen because they have designed a manual of long-term goals and short-term instructional objectives called Strands Individual Education Programs (1983) to assist in the development of individualized education programs (IEPs). Also, RESA 7 has adopted a computer program written specifically for Strands. The computer program allows annual goals and short-term instructional objectives to be printed by typing in code numbers, thus eliminating the lengthy process of hand-writing or typing the IEP. Of the twelve RESA 7 counties, four currently are not using the Strands document, one currently is using the Strands document without computer assistance, and seven currently are using the Strands document with the assistance of microcomputers. All of the counties in RESA 7 use the same format for the IEP document.

The sample used in this study was drawn from 2,519 students categorized as learning-disabled from RESA 7. An IEP for each of 40 students categorized as learning-disabled was selected randomly from the part of the population (817 students in four counties) which does not use microcomputers or Strands Individual Education Programs (1983) to assist in

the development of IEPs. An IEP for each of 40 students categorized as learning-disabled was selected randomly from the part of the population (710 students from one county) which uses Strands Individual Education Programs (1983) to assist in the development of IEPs. An IEP for each of 40 students categorized as learning-disabled was selected randomly from the part of the population (992 students from five counties) which uses microcomputers and Strands Individual Education Programs (1983) to assist in the development of IEPs. Two counties in RESA 7 which use microcomputers and Strands Individual Education Programs (1983) to assist in the development of IEPs were not able to participate in this research because of a natural disaster. All of the IEPs used in this study were developed in the 1984-85 school year.

#### Procedure.

The personally identifying information was removed from each of the IEPs selected for this study in order to maintain the confidentiality of the students involved. The 120 IEPs were interspersed and numbered from 1 to 120. A master list was kept by the researcher indicating which group of IEPs was matched with which numbers. Each of the three raters (one special education teacher, one educational diagnostician, and one special education administrator) examined and evaluated, individually, all of the IEPs involved in the study. The raters evaluated the IEPs using the Checklist for Documenting Appropriateness of the

IEP (Turnbull, Strickland, and Brantley, 1982).

Instrumentation.

The Checklist for Documenting Appropriateness of the IEP (Appendix 1) was adapted for use as a rating scale. Three of the four categories of appropriateness (legal requirements, relevance, and clarity) that are included in the checklist were used for the ratings. The category of manageability was not used because the three items in that category appear to be more subjective than the items in the other categories. For each question on the checklist, a "yes" response by a rater was given a score of 2; a "sometimes" response by a rater was given a score of 1; and a "no" response by a rater was given a score of 0.

Reliability of the Instrument. In order to establish reliability for the Checklist For Documenting Appropriateness of the IEP, the three evaluators who participated in this study were gathered together. They were shown three IEPs, one which was considered to be of very good quality, one which was considered satisfactory in quality, and one which was considered to be poor in quality. They were also shown the Checklist for Documenting Appropriateness of the IEP completed for each of the three sample IEPs, and standards for evaluation were clarified and discussed. Each evaluator then was given copies of ten IEPs which were not used in the study and ten blank copies of the Checklist for Documenting Appropriateness of the IEP. Each rater then separately evaluated the ten IEPs using the

Checklist for Documenting Appropriateness of the IEP and returned them to the researcher. Examination of the completed checklist forms was undertaken by the researcher to determine the degree of agreement existing among the raters when using the Checklist for Documenting Appropriateness of the IEP in the evaluation of the IEPs. A Pearson product-moment correlation coefficient was calculated to indicate the degree of interjudge reliability when using the three categories (legal requirements, relevance, and clarity) on the Checklist for Documenting Appropriateness of the IEP. A correlation of +.96 was found to exist between raters 1 and 2, a correlation of +.90 was found to exist between raters 2 and 3, and a correlation of +.85 was found to exist between raters 3 and 1 for the total scores for the ten IEPs when using the Checklist for Documenting Appropriateness of the IEP.

Also, a calculation was made of the number of instances in 240 (24 items for each of the ten IEPs) in which one rater gave a "no" response and another rater gave a "yes" response resulting in a two-point discrepancy between their scores on an item. A two-point discrepancy was found to occur 4% (10/240) of the time for raters 1 and 2; 2.5% (6/240) of the time for raters 2 and 3; and 3.7% (9/240) of the time for raters 3 and 1.

Validity of the Instrument. In order to establish concurrent validity for the Checklist for Documenting Appropriateness of the IEP, examples of what the raters

considered to be very good, satisfactory, and poor IEPs were shown to four special education teachers working in the field. Some of the IEPs were selected from among those used to calculate interjudge reliability and some were from among the 120 used in the study. This was done in order to increase the variability of the quality of the group of IEPs being used to establish the validity of the instrument. For each of ten IEPs, the teachers were asked to respond to three general questions on an IEP Evaluation Questionnaire (Appendix 1), each corresponding to one of the three categories (legal requirements, relevance, and clarity) on the Checklist For Documenting Appropriateness of the IEP. A "yes" response to a question was given a score of 2; a "partially" response to a question was given a score of 1; and a "no" response to a question was given a score of 0. For the four teachers, a total score was calculated for each of the three questions (corresponding to the three checklist categories) on each of the ten IEPs. Also, for each of the three raters, a total score was calculated for each of the three categories on each of the ten IEPs. A Pearson product-moment coefficient of correlation was calculated for the four teachers on each of the three questions and for each of the three raters on each of the three checklist categories. For the category of legal requirements, a correlation of  $+0.92$  was found to exist between the evaluations by the four teachers in the field and the evaluations of rater one participating



in this study; a correlation of  $\pm .95$  was found to exist between the evaluations by the four teachers in the field and the evaluations of rater two participating in this study; and a correlation of  $\pm .92$  was found to exist between the evaluations by the four teachers in the field and the evaluations of rater three participating in this study. For the category of relevance, a correlation of  $\pm .84$  was found to exist between the evaluations by the four teachers in the field and the evaluations of rater one participating in this study; a correlation of  $\pm .79$  was found to exist between the evaluations by the four teachers in the field and the evaluations of rater two participating in this study; and a correlation of  $\pm .88$  was found to exist between the evaluations by the four teachers in the field and the evaluations of rater three participating in this study. For the category of clarity, a correlation of  $\pm .89$  was found to exist between the evaluations by the four teachers in the field and the evaluations of rater one participating in this study; a correlation of  $\pm .90$  was found to exist between the evaluations by the four teachers in the field and the evaluations of rater two participating in this study; and a correlation of  $\pm .89$  was found to exist between the evaluations by the four teachers in the field and the evaluations of rater three participating in this study (Table 3.1).

TABLE 3.1  
CORRELATION OF RATERS' EVALUATIONS  
WITH COMBINED TEACHERS' EVALUATIONS

	Legal Requirements	Relevance	Clarity
Rater <sub>1</sub>	+ .92	+ .84	+ .89
Rater <sub>2</sub>	+ .95	+ .79	+ .90
Rater <sub>3</sub>	+ .92	+ .88	+ .89

Statistical Hypotheses.

Hypothesis 1.

Null Hypothesis: No difference will be found in the mean scores for quality between teacher-written IEPs and microcomputer-assisted IEPs as evaluated using the Checklist For Documenting Appropriateness of the IEP.

Alternative Hypothesis: The microcomputer-assisted IEP mean score for quality as evaluated using the Checklist For Documenting Appropriateness of the IEP will exceed that of the teacher-written IEP.

Hypothesis 2.

Null Hypothesis: No difference will be found in the mean scores for quality between teacher-written IEPs and manual-assisted IEPs as evaluated using the Checklist for Documenting Appropriateness of the IEP.

Alternative Hypothesis: The manual-assisted IEP mean score for quality as evaluated using the Checklist for Documenting Appropriateness of the IEP will exceed that of the teacher-written IEP.

Hypothesis 3.

Null Hypothesis: No difference will be found in the mean scores for quality between microcomputer-assisted IEPs and manual-assisted IEPs as evaluated using the Checklist for Documenting Appropriateness of the IEP.

Research provides insufficient guidance for the development of an alternative to null hypothesis 3.

### Analysis.

A total score on the Checklist For Documenting Appropriateness of the IEP was determined for each IEP in each of the three groups: teacher-written IEPs, manual-assisted IEPs, and microcomputer-assisted IEPs. A mean total score on the checklist for each group was calculated. A t test was used to test each of the hypotheses to determine if there was a significant difference between the mean scores of the two groups involved in each hypothesis.

### Summary of the Methodology.

Teacher-written IEPs, manual-assisted IEPs, and microcomputer-assisted IEPs were evaluated for quality using the Checklist For Documenting Appropriateness of the IEP. Differences in scores for quality as evaluated using the Checklist for Documenting Appropriateness of the IEP were noted. Hypotheses were tested using a t test to determine any significance in the differences between the groups involved in each hypothesis.

## Chapter 4.

### Analysis of Results.

The purpose of this study was to determine which IEPs are of greater quality for learning-disabled students: teacher-written IEPs (those developed without the aid of the microcomputer or manuals of goals and objectives); manual-assisted IEPs (those developed with the aid of manuals of goals and objectives); or microcomputer-assisted IEPs (those developed with the aid of the microcomputer and manuals of goals and objectives). 40 teacher-written IEPs, 40 manual-assisted IEPs, and 40 microcomputer-assisted IEPs were obtained from 10 counties in the same regional education service agency in West Virginia. All of the IEPs had been developed using the same format; all of the manual-assisted IEPs had been developed using the same manual of goals and objectives; all of the microcomputer-assisted IEPs had been developed using the same computer program. Three raters were trained in the use of the Checklist For Documenting Appropriateness of the IEP, and each rater independently evaluated all 120 IEPs used in this study. A total score on the Checklist For Documenting Appropriateness of the IEP was obtained for each IEP in each of the three groups. Values for  $t$  were computed and a  $t$  test was performed to determine if there was a significant difference between the mean scores of the two groups involved in each hypothesis being tested in this study.

Hypothesis 1.

This hypothesis states that there will be no significant difference between the West Virginia RESA 7 IEPs developed with the assistance of both manuals of goals and objectives and microcomputers (microcomputer-assisted IEPs) and the West Virginia RESA 7 IEPs developed without the aid of microcomputers or manuals of goals and objectives (teacher-written IEPs).

The means and standard deviations of the scores on the Checklist For Documenting Appropriateness of the IEP were computed for the microcomputer-assisted IEPs and for the teacher-written IEPs. The results indicated a mean score of 40.2 with a standard deviation of 3.43 for the microcomputer-assisted IEPs, and a mean score of 30.3 with a standard deviation of 6.04 for the teacher-written IEPs. A t test was performed on the means of the microcomputer-assisted IEPs and the teacher-written IEPs to determine whether a significant difference ( $p < .05$ ) in the quality of the IEPs existed as a result of the use of microcomputers to aid in the development of IEPs. A resulting t value of 8.187, representing a significant difference in quality ( $p < .01$ ) due to the use of microcomputers to aid in the development of IEPs, was indicated where the microcomputer-assisted IEPs received significantly higher scores on the Checklist For Documenting Appropriateness of the IEP than teacher-written IEPs (Table 4.1).

On the basis of the higher scores on the Checklist

TABLE 4.1  
 HYPOTHESIS 1 - RESULTS OF t TEST ON MEAN SCORES  
 OF TEACHER-WRITTEN IEPS AND MICROCOMPUTER-ASSISTED IEPS  
 ON THE CHECKLIST FOR DOCUMENTING APPROPRIATENESS OF THE IEP

TYPE OF IEP	n	MEAN	STANDARD DEVIATION	DEGREES OF FREEDOM	t VALUE
MICRO-COMPUTER-ASSISTED	40	40.2	3.433	78	8.187**
TEACHER-WRITTEN	40	30.3	6.049		

\*\*Significant at  $p < .01$

For Documenting Appropriateness of the IEP received by the microcomputer-assisted IEPs when compared with the scores received by the teacher-written IEPs, hypothesis 1 was rejected. The results of this study support the directional research hypothesis that West Virginia RESA 7 IEPs developed with the assistance of the microcomputer and manuals of goals and objectives (microcomputer-assisted IEPs) are judged to be of greater quality than West Virginia RESA 7 IEPs developed without the aid of microcomputers or manuals of goals and objectives (teacher-written IEPs).

Hypothesis 2.

This hypothesis states that there will be no significant difference between the West Virginia RESA 7 IEPs developed with the assistance of manuals of goals and objectives (manual-assisted IEPs) and the West Virginia RESA 7 IEPs developed without the assistance of manuals of goals and objectives (teacher-written IEPs).

The means and standard deviations of the scores on the Checklist For Documenting Appropriateness of the IEP were computed for the manual-assisted IEPs and for the teacher-written IEPs. The results indicated a mean score of 36.5 with a standard deviation of 5.61 for the manual-assisted IEPs, and a mean score of 30.3 with a standard deviation of 6.04 for the teacher-written IEPs. A t test was performed on the means of the manual-assisted IEPs and the teacher-written IEPs to determine whether a significant difference ( $p < .05$ ) in the quality of the IEPs existed as a result of



the use of manuals of goals and objectives to aid in the development of IEPs. A resulting  $t$  value of 3.696, representing a significant difference in quality ( $p < .01$ ) due to the use of manuals of goals and objectives to aid in the development of IEPs, was indicated where the manual-assisted IEPs received significantly higher scores on the Checklist For Documenting Appropriateness of the IEP than teacher-written IEPs (Table 4.2).

On the basis of the higher scores on the Checklist For Documenting Appropriateness of the IEP received by the manual-assisted IEPs when compared with the scores received by the teacher-written IEPs, hypothesis 2 was rejected. The results of this study support the directional research hypothesis that West Virginia RESA 7 IEPs developed with the assistance of manuals of goals and objectives (manual-assisted IEPs) are judged to be of greater quality than West Virginia RESA 7 IEPs developed without the aid of manuals of goals and objectives (teacher-written IEPs). Hypothesis 3.

This hypothesis states that there will be no significant difference between the West Virginia RESA 7 IEPs developed with the assistance of manuals of goals and objectives (manual-assisted IEPs) and the West Virginia RESA 7 IEPs developed with the assistance of both manuals of goals and objectives and microcomputers (microcomputer-assisted IEPs).

The means and standard deviations of the scores on the

TABLE 4.2

HYPOTHESIS 2 - RESULTS OF t TEST ON MEAN SCORES  
 OF TEACHER-WRITTEN IEPS AND MANUAL-ASSISTED IEPS  
 ON THE CHECKLIST FOR DOCUMENTING APPROPRIATENESS OF THE IEP

TYPE OF IEP	n	MEAN	STANDARD DEVIATION	DEGREES OF FREEDOM	t VALUE
MANUAL- ASSISTED	40	36.5	5.619		
TEACHER- WRITTEN	40	30.3	6.049	78	3.696**

\*\*Significant at  $p < .01$

Checklist For Documenting Appropriateness of the IEP were computed for the manual-assisted IEPs and for the micro-computer-assisted IEPs. The results indicated a mean score of 36.5 with a standard deviation of 5.61 for the manual-assisted IEPs, and a mean score of 40.2 with a standard deviation of 3.43 for the microcomputer-assisted IEPs. A t test was performed on the means of the manual-assisted IEPs and the microcomputer-assisted IEPs to determine whether a significant difference ( $p < .05$ ) in the quality of the IEPs existed as a result of the use of microcomputers together with manuals of goals and objectives to aid in the development of IEPs. A resulting t value of 3.414, representing a significant difference in quality ( $p < .01$ ) due to the use of microcomputers together with manuals of goals and objectives to aid in the development of IEPs, was indicated where the microcomputer-assisted IEPs received significantly higher scores on the Checklist For Documenting Appropriateness of the IEP (Table 4.3).

On the basis of the higher scores on the Checklist For Documenting Appropriateness of the IEP received by the microcomputer-assisted IEPs when compared with the scores received by the manual-assisted IEPs, hypothesis 3 was rejected. The results of this study indicate that West Virginia RESA 7 IEPs developed with the assistance of microcomputers together with manuals of goals and objectives (microcomputer-assisted IEPs) are judged to be of greater quality than West Virginia RESA 7 IEPs developed with the

TABLE 4.3  
 HYPOTHESIS 3 - RESULTS OF t TEST ON MEAN SCORES  
 OF MICROCOMPUTER-ASSISTED IEPs AND MANUAL-ASSISTED IEPs  
 ON THE CHECKLIST FOR DOCUMENTING APPROPRIATENESS OF THE IEP

TYPE OF IEP	n	MEAN	STANDARD DEVIATION	DEGREES OF FREEDOM	$\bar{t}$ VALUE
MICRO-COMPUTER-ASSISTED	40	40.2	3.433	78	3.414**
MANUAL-ASSISTED	40	36.5	5.619		

\*\*Significant at  $p < .01$

aid of manuals of goals and objectives (manual-assisted IEPs).

Information regarding the presence of legal requirements, the relevance, and the clarity of the IEPs involved in this study is given in Tables 4.4, 4.5, and 4.6. The data included in these tables indicate that more "yes" responses were given by the raters participating in this study for the microcomputer-assisted IEPs than for the manual-assisted IEPs or for the teacher-written IEPs. The results also indicate that more "yes" responses were given by the raters for the manual-assisted IEPs than for the teacher-written IEPs involved in this study.

The average scores for each category on the Checklist For Documenting Appropriateness of the IEP for the IEPs involved in this study are indicated in Table 4.7. The mean score for the three raters for the legal requirements category on the Checklist For Documenting Appropriateness Of the IEP for the microcomputer assisted IEPs was 15.845 out of a possible total of 18; the mean score for the manual-assisted IEPs was 14.625 for the legal requirements category; and the mean score for the teacher-written IEPs was 12.813 for the legal requirements category. The mean score for the relevance category on the Checklist For Documenting Appropriateness of the IEP for the microcomputer-assisted IEPs was 6.985 out of a possible total of 10; the mean score for the manual-assisted IEPs was 5.77 for the relevance category; and the mean score for the teacher-written

TABLE 4.4  
 PERCENTS OF IEPs CONTAINING  
 THE LEGAL REQUIREMENTS  
 MANDATED BY PUBLIC LAW 94-142

	MICROCOMPUTER- ASSISTED IEPs			MANUAL- ASSISTED IEPs			TEACHER- WRITTEN IEPs		
	YES	SOMETIMES	NO*	YES	SOMETIMES	NO*	YES	SOMETIMES	NO*
LEVELS OF PERFORMANCE	77.5	20	2.5	60	15	25	60	20	20
ANNUAL GOALS	97.5	2.5	0	87.5	10	2.5	32.5	27.5	40
SHORT-TERM OBJECTIVES	100	5	0	100	0	0	55	30	15
EVALUATION SCHEDULES	95	5	0	90	10	0	95	5	0
EVALUATION PROCEDURES	92.5	7.5	0	72.5	25	2.5	67.5	15	17.5
RELATED SERVICES	75	20	5	57.5	27.5	15	52.5	35	12.5
SPECIFIC SPECIAL EDUCATION	75	25	0	67.5	30	2.5	60	37.5	2.5
REGULAR CLASS PARTICIPATION	45	40	15	45	47.5	7.5	52.5	35	12.5
DATES FOR PROGRAM INITIATION/ DURATION	65	35	0	35	60	5	55	35	10

\* as evaluated using the Checklist for Documenting Appropriateness of the IEP

TABLE 4.5  
 PERCENTS OF IEPs WITH RELEVANT GOALS,  
 OBJECTIVES, EVALUATION PROCEDURES, PLACEMENT AND SERVICES

	MICROCOMPUTER- ASSISTED IEPs			MANUAL- ASSISTED IEPs			TEACHER- WRITTEN IEPs		
	YES	SOMETIMES	NO*	YES	SOMETIMES	NO*	YES	SOMETIMES	NO*
APPROPRIATE TO HANDICAP OF STUDENT	42.5	55	2.5	37.5	40	22.5	7.5	67.5	25
DETERMINED IN CONSIDERATION OF STRENGTHS AND WEAKNESSES	17.5	12.5	70	12.5	12.5	75	2.5	20	77.5
APPROPRIATE TO STUDENT'S LEVEL OF PERFORMANCE	42.5	55	2.5	35	45	20	5	67.5	27.5
EVALUATION PRO- CEDURES CORRELATED WITH GOALS AND OBJECTIVES	90	10	0	72.5	25	2.5	45	27.5	27.5
CRITERIA IN OBJECTIVES REAL- ISTIC FOR STUDENT	75	25	0	50	35	15	42.5	30	27.5

\* as evaluated using the Checklist for Documenting Appropriateness of the IEP

TABLE 4.6  
 PERCENTS OF IEPS WITH CLEAR TERMINOLOGY,  
 SKILL STATEMENTS, GOALS AND OBJECTIVES, EVALUATION  
 PROCEDURES, SCHEDULES OF EVALUATION, SPECIFIC SPECIAL  
 EDUCATION, AND RELATED SERVICES

	MICROCOMPUTER- ASSISTED IEPS			MANUAL ASSISTED IEPS			TEACHER- WRITTEN IEPS		
	YES	SOMETIMES	NO*	YES	SOMETIMES	NO*	YES	SOMETIMES	NO*
CLEAR TERMINOLOGY	100	0	0	100	0	0	95	5	0
SPECIFIC SKILL STATEMENTS IN LEVELS OF PERFORMANCE	12.5	7.5	80	5	12.5	82.5	7.5	7.5	85
A SPECIFIC BEHAVIOR IN THE OBJECTIVES	97.5	2.5	0	100	0	0	55	27.5	17.5
A CRITERION LEVEL IN THE OBJECTIVES	87.5	12.5	0	76.5	17.5	15	55	20	25
A CONDITION IN THE OBJECTIVES	97.5	2.5	0	97.5	2.5	0	40	32.5	27.5
GOALS INDICATING WHAT STUDENT WILL DO WHEN TERMINATED	97.5	2.5	0	87.5	10	2.5	22.5	25	52.5
EVALUATION PROCEDURE SPECIFYING TYPE OF EVALUATION OR SPECIFIC TESTS	97.5	2.5	0	75	22.5	2.5	70	15	15
SCHEDULES INDICATING WHEN EVALUATIONS WILL OCCUR	95	5	0	90	10	0	87.5	10	2.5
SPECIAL EDUCATION STATED IN SPECIFIC TERMS	67.5	32.5	0	65	30	5	55	40	12.5
RELATED SERVICES CLEARLY SPECIFIED	75	20	5	57.5	27.5	15	52.5	35	12.5

\* as evaluated using the Checklist for Evaluating Appropriateness of the IEP



TABLE 4.7  
 MEAN SCORES FOR EACH CATEGORY ON THE  
CHECKLIST FOR DOCUMENTING APPROPRIATENESS OF THE IEP  
 FOR THE IEPs INVOLVED IN THIS STUDY

TYPE OF IEP	MEAN SCORE FOR LEGAL REQUIREMENTS*	MEAN SCORE FOR RELEVANCE**	MEAN SCORE FOR CLARITY***
MICRO- COMPUTER- ASSISTED	15.845	6.985	17.375
MANUAL- ASSISTED	14.625	5.77	16.168
TEACHER- WRITTEN	12.813	4.69	13.155

\* - Perfect Score 18

\*\* - Perfect Score 10

\*\*\* - Perfect Score 20

IEPs was 4.69 for the relevance category. The mean score for the clarity category on the Checklist For Documenting Appropriateness of the IEP for the microcomputer-assisted IEPs was 17.375 out of a possible total of 20; The mean score for the manual-assisted IEPs was 16.168 for the clarity category; and the mean score for the teacher-written IEPs for the clarity category was 13.155.

#### Additional Findings.

From the West Virginia RESA 7 IEPs in the study sample developed during the 1984-85 academic year, additional information was available to the researcher regarding various issues relating to the quality of IEPs. In order to add current information to that gathered by researchers who had examined IEPs previously, a series of frequency distributions was performed by the researcher on the data collected during this study.

The number of signatures of participants in the development of the IEPs in this study is given in Table 4.8. The results of this study revealed that 95% of the microcomputer-assisted IEPs, 67.5% of the manual-assisted IEPs, and 65% of the teacher-written IEPs contained the three signatures mandated by Public Law 94-142 to appear on the IEP document. Furthermore, 2.5% of the microcomputer-assisted IEPs, 17.5% of the manual-assisted IEPs, and 30% of the teacher-written IEPs contained the signatures of a parent and a special education teacher; and 2.5% of the microcomputer-assisted IEPs, 2.5% of the manual-assisted IEPs,

TABLE 4.8  
 PERCENTAGE OF SIGNATURES OF PARTICIPANTS IN THE  
 DEVELOPMENT OF THE IEPs EVALUATED IN THIS STUDY

TYPE OF IEP	CONTAINING 3 SIGNATURES*	CONTAINING 2 SIGNATURES**	CONTAINING 2 SIGNATURES***	CONTAINING 1 SIGNATURE****
MICRO- COMPUTER- ASSISTED	95%	2.5%	2.5%	0%
MANUAL- ASSISTED	67.5%	17.5%	2.5%	12.5%
TEACHER- WRITTEN	65%	30%	2.5%	2.5%

\* - Teacher, Parent, and Local Education Agency Representative signatures

\*\* - Teacher and Parent signatures

\*\*\* - Parent and Local Education Agency Representative signatures

\*\*\*\* - Only a teacher signature

and 2.5% of the teacher-written IEPs contained the signatures of a parent and the local education agency representative. All of the microcomputer-assisted IEPs contained a parent signature; 12.5% of the manual-assisted IEPs and 2.5% of the teacher-written IEPs did not contain a parent signature on the IEP document.

Table 4.9 gives the number of IEPs in this study indicating an area of learning disability in the levels of performance/strengths and weaknesses section of the IEP and/or including goals and objectives addressing an area of learning disability. With regard to the number of IEPs in this study which specifically indicated an area of learning disability when describing the levels of performance/strengths and weaknesses of the student, 20% of the microcomputer-assisted IEPs, 17.5% of the teacher-written IEPs, and 15% of the manual-assisted IEPs listed an area of learning disability. Additionally, 30% of the microcomputer-assisted IEPs, 20% of the manual-assisted IEPs, and 27.5% of the teacher-written IEPs contained goals and objectives addressing an area of learning disability. Further, the results of this study showed that even fewer of the IEPs involved (15% of the microcomputer-assisted IEPs, 10% of the manual-assisted IEPs, and 10% of the teacher-written IEPs) had indicated an area of disability in the levels of performance/strengths and weaknesses section of the IEP, and then had followed this with the expected goals and objectives addressing the area of learning disability indicated. Only

TABLE 4.9  
 PERCENTAGE OF IEPs IN THIS STUDY INDICATING  
 AN AREA OF LEARNING DISABILITY AND/OR  
 INCLUDING GOALS AND OBJECTIVES  
 ADDRESSING AN AREA OF LEARNING DISABILITY

TYPE OF IEP	INDICATING LD IN LEVELS OF PERFORMANCE	CONTAINING LD GOALS & OBJECTIVES	INDICATING LD IN LEVELS OF PERFORMANCE AND CONTAINING LD GOALS AND OBJECTIVES	CONTAINING LD GOALS & OBJECTIVES BUT NOT INDICATING LD IN LEVELS OF PERFORMANCE	GIVING NO INDICATION OF IN LEVELS OF PERFORMANCE AND CONTAINING NO LD GOALS AND OBJECTIVES
MICRO- COMPUTER- ASSISTED	20%	30%	15%	12.5%	42.5%
MANUAL- ASSISTED	15%	20%	10%	10%	60%
TEACHER- WRITTEN	17.5%	27.5%	10%	17.5%	45%

12.5% of the microcomputer-assisted IEPs, 10% of the manual-assisted IEPs, and 17.5% of the teacher-written IEPs contained goals and objectives addressing an area of learning disability although they had failed to indicate an area in the levels of performance/strengths and weaknesses section of the IEP from which are expected to flow the goals and objectives included in the IEP. Finally, 42.5% of the microcomputer-assisted IEPs, 60% of the manual-assisted IEPs, and 45% of the teacher-written IEPs (approximately half of all of the IEPs in the study) gave no indication of an area of learning disability in the levels of performance/strengths and weaknesses section of the IEP, and contained no goals and objectives addressing an area of learning disability.

The average number of goals and objectives contained in the IEPs involved in this study is given in Table 4.10. The mean number of goals per IEP for the microcomputer-assisted IEPs was 9.9 with a range of 1 to 30 and a standard deviation of 6.63; the mean number of goals per IEP for the manual-assisted IEPs was 7.1 with a range of 1 to 25 and a standard deviation of 5.45; and the mean number of goals per IEP for the teacher-written IEPs was 5.5 with a range of 1 to 36 and a standard deviation of 6.02. The mean number of objectives per IEP for the microcomputer-assisted IEPs was 43.95 with a range of 8 to 140 and a standard deviation of 31.76; the mean number of objectives per IEP for the manual-assisted IEPs was 33.28 with a range 1 to 147 and a standard deviation of 30.21; and the mean number of objectives per

TABLE 4.10  
THE MEAN NUMBER OF GOALS AND  
OBJECTIVES CONTAINED IN IEPs IN THIS STUDY

TYPE OF IEP	MEAN NUMBER OF GOALS PER IEP	MEAN NUMBER OF OBJECTIVES PER IEP
MICRO- COMPUTER- ASSISTED	9.9	43.95
MANUAL- ASSISTED	7.1	33.28
TEACHER- WRITTEN	5.5	14.30

IEP for the teacher-written IEPs was 14.3 with a range of 0 to 47 and a standard deviation of 13.87.

Summary.

The results of the study were as follows:

A t test indicated that the mean score of the micro-computer-assisted IEPs as evaluated using the Checklist For Documenting Appropriateness of the IEP was significantly higher ( $p < .01$ ) than the mean score of the teacher-written IEPs. The null hypothesis that there was no significant difference between the West Virginia RESA 7 IEPs developed with the assistance of both manuals of goals and objectives and microcomputers (microcomputer-assisted IEPs) and the West Virginia RESA 7 IEPs developed without the aid of microcomputers or manuals of goals and objectives (teacher-written IEPs) was rejected.

A t-test indicated that the mean score of the manual-assisted IEPs as evaluated using the Checklist For Documenting Appropriateness of the IEP was significantly higher ( $p < .01$ ) than the mean score of the teacher-written IEPs. The null hypothesis that there was no significant difference between the West Virginia RESA 7 IEPs developed with the assistance of manuals of goals and objectives (manual-assisted IEPs) and the West Virginia RESA 7 IEPs developed without the assistance of manuals of goals and objectives (teacher-written IEPs) was rejected.

A t test indicated that the mean score of the micro-computer-assisted IEPs as evaluated using the Checklist For



Documenting Appropriateness of the IEP was significantly higher ( $p < .01$ ) than the mean score of the manual-assisted IEPs. The null hypothesis that there was no significant difference between the West Virginia RESA 7 IEPs developed with the assistance of manuals of goals and objectives (manual-assisted IEPs) and the West Virginia RESA 7 IEPs developed with the assistance of both manuals of goals and objectives and microcomputers (microcomputer-assisted IEPs) was rejected.

With regard to the average scores for each category on the Checklist For Documenting Appropriateness of the IEP, the microcomputer-assisted IEPs received the highest mean scores in each of the categories, followed by the manual-assisted IEPs which received the second highest mean scores for each of the categories, and the teacher-written IEPs which received the lowest mean scores for each of the categories on the Checklist For Documenting Appropriateness of the IEP.

Information regarding the presence of legal requirements, the relevance, and the clarity of the IEPs involved in this study revealed that more "yes" responses were given by the raters participating in this study for the microcomputer-assisted IEPs than for the manual-assisted IEPs or for the teacher-written IEPs; and that more "yes" responses were given by the raters for the manual-assisted IEPs than for the teacher-written IEPs involved in the study.

Frequency distributions performed by the researcher on

the data collected during this study revealed that the majority of the IEPs in each group (microcomputer-assisted IEPs, manual-assisted IEPs, and teacher-written IEPs) contained the three signatures mandated by Public Law 94-142 to appear on the IEP document. Only 5% of the IEPs involved in this study lacked a parent signature.

The results of this study also revealed that 17.5% of the IEPs involved in the study specifically indicated an area of learning disability when describing the levels of performance/strengths and weaknesses of the student. Moreover, 26% of the IEPs involved in this study contained goals and objectives addressing an area of learning disability. Only 12% of the IEPs involved in this study had indicated an area of learning disability in the levels of performance/strengths and weaknesses section of the IEP and then had followed this with the expected goals and objectives addressing the area of learning disability indicated. Further, 13% of the IEPs involved in this study contained goals and objectives addressing an area of learning disability although they had failed to indicate an area in the levels of performance/strengths and weaknesses section of the IEP from which are expected to flow the goals and objectives included in the IEP. Finally, 49% of the IEPs involved in this study gave no indication of an area of learning disability in the levels of performance/strengths and weaknesses section of the IEP, and contained no goals and objectives addressing an area of learning disability.

With regard to the number of goals contained in the IEPs involved in this study, the microcomputer-assisted IEPs had more goals than the manual-assisted IEPs or the teacher-written IEPs; the manual-assisted IEPs had more goals per IEP than did the teacher-written IEPs. With regard to the number of objectives contained in the IEPs involved in this study, the microcomputer-assisted IEPs had more objectives per IEP than the manual-assisted IEPs or the teacher-written IEPs; the manual-assisted IEPs had more objectives per IEP than did the teacher-written IEPs.

## Chapter 5.

### Summary and Conclusions.

#### Summary.

Purpose. Public Law 94-142 mandated the writing of IEPs for handicapped children. From the time of the law's enactment, difficulties (time, costs, and paperwork involved; teachers' lack of skills necessary for developing IEPs; administrators' difficulties with record-keeping and management; and issues relating to quality) have been associated with the writing of IEPs. Solutions to the problems have been suggested, but difficulties have persisted. Recently, educators have begun using computers as a solution to the problems associated with the development of IEPs. Results of research investigating the use of computers to solve some of the problems associated with IEPs (time, costs, educators' and parents' attitudes and perceptions) have been favorable. The few research studies investigating the quality of IEPs developed with the aid of computers have been extremely limited in size and scope, thus, providing little empirical evidence revealing the effectiveness of computers in improving the quality of IEPs. Ryan (1984) addressed the issue of quality of IEPs developed using computerized and noncomputerized methods, indicating that this issue remains in need of further investigation. Ryan (1984) has suggested that it may be the use of manuals of goals and objectives in computerized systems which enables teachers to develop IEPs of better quality than those

written by teachers without the aid of manuals of goals and objectives. The purpose of this study was to determine which IEPs are of greater quality: teacher-written IEPs (those developed without the aid of manuals of goals and objectives or microcomputers); manual-assisted IEPs (those developed with the aid of manuals of goals and objectives); or microcomputer-assisted IEPs (those developed with the aid of the microcomputer and manuals of goals and objectives).

Review of the Literature. Concepts related to computer-managed instruction (CMI) and motivation provided the basis for this study. Allen (1980) suggested that CMI is essentially the management of individualized instruction with computer-based assistance. Jones and Seeman-Jones (1980) assert that CMI is particularly applicable to special education in the development of IEPs. Herzberg's (1959) research indicated that the task with which employees are involved is a motivator which contributes to job performance. Hamner (1979) indicated that administrators can influence directly only some components of job performance. Pasmore (1979) proposed that adjusting technology and the way work is done improves job performance.

A review of the research investigating difficulties associated with teacher-written IEPs indicated that the IEP process is very costly and time-consuming (Price and Goodman, 1980; Quinn, 1982; Kyser, 1984); that teachers felt they lacked the skills necessary to develop IEPs (Holland, 1979; Brown, 1981); that educators' and parents' attitudes and

perceptions revealed that much concern existed about the IEP process (Lewis, 1977; Norton, 1977; Penney, 1977; Sagstetter, 1977; Semmel, 1978; Mowder, Doberman, and Prasse, 1980); that there has continued to be a need to improve the quality of the annual goals and short-term instructional objectives included in IEPs (Alper, 1978; Pyecha and Morra, 1980; Anderson, Barner, and Larson, 1978; Feinn, 1982; Schenck, 1979); and that there has continued to be a need to assure that the data specifically required by Public Law 94-142 are included on IEPs (Schenck and Levy, 1979; Pyecha and Morra, 1980; Comptroller General of the United States, 1981; Schenck, 1981; Nordan, 1982; Nutter, Algozzine, and Lue, 1982; Welton, 1982).

Recent studies have indicated that the use of computer technology to aid in the development of IEPs can increase the number of annual goals and short-term instructional objectives (Allegheny Intermediate Unit, 1981; Enell and Barrick, 1983; Heidbrink, 1984), as well as improve the overall quality of IEPs (Enell and Barrick, 1983; Lillie, 1983). The size, scope, and design of these studies prevents the evidence from being conclusive with regard to the efficacy of computer technology in improving the quality of the IEP. Also, it has been suggested (Ryan, 1984) that it may be the use of manuals of goals and objectives in computerized systems which enables teachers to develop IEPs of improved quality. A need to determine the effect of the use of microcomputers and manuals of goals and objectives upon

the overall quality of IEPs was evident.

Methodology. The sample consisted of 120 IEPs of students categorized as learning disabled: 40 of the IEPs were teacher-written (developed without the aid of manuals of goals and objectives or microcomputers); 40 of the IEPs were manual-assisted (developed with the aid of manuals of goals and objectives); and 40 of the IEPs were microcomputer-assisted (developed with the aid of manuals of goals and objectives and microcomputers). Three trained raters examined and evaluated, individually, all of the IEPs involved in the study with regard to legal requirements, relevance, and clarity using the Checklist For Documenting Appropriateness of the IEP.

Major Findings. A statistical analysis of the data collected regarding each hypothesis revealed the following findings:

1. A t test indicated that the microcomputer-assisted IEPs in this study received a significantly higher mean total score ( $p < .01$ ) on the Checklist For Documenting Appropriateness of the IEP than did the teacher-written IEPs in this study. As a result, the null hypothesis (that there was no difference in quality between microcomputer-assisted IEPs and teacher-written IEPs as evaluated using the Checklist For Documenting Appropriateness of the IEP) was rejected.

2. A t test indicated that the manual-assisted IEPs in this study received a significantly higher mean total score ( $p < .01$ ) on the Checklist For Documenting Appropriateness of

the IEP than did the teacher-written IEPs in this study. As a result, the null hypothesis (that there was no difference in quality between manual-assisted IEPs and teacher-written IEPs as evaluated using the Checklist For Documenting Appropriateness of the IEP) was rejected.

3. A t test indicated that the microcomputer-assisted IEPs in this study received a significantly higher mean total score ( $p < .01$ ) on the Checklist For Documenting Appropriateness of the IEP than did the manual-assisted IEPs. As a result, the null hypothesis (that there was no difference in quality between manual-assisted IEPs and microcomputer-assisted IEPs as evaluated using the Checklist For Documenting Appropriateness of the IEP) was rejected.

#### Conclusions.

The major findings of the study led to the following conclusions:

1. The use of microcomputers and manuals of goals and objectives in the development of IEPs produced documents which were of greater quality than those developed in the traditional manner without the aid of the microcomputer or manuals of goals and objectives.

2. The use of manuals of goals and objectives in the development of IEPs produced documents which were of greater quality than those developed in the traditional manner without the aid of manuals of goals and objectives.

3. The use of both microcomputers and manuals of goals and objectives in the development of IEPs produced documents



which were of greater quality than those developed with only the aid of manuals of goals and objectives.

Discussion.

Significantly higher scores for quality, as evaluated using the Checklist For Documenting Appropriateness of the IEP, were achieved by the microcomputer-assisted IEPs when compared with either the teacher-written IEPs or the manual-assisted IEPs. These findings support the position that computer-managed instruction (CMI) can be used to solve instructional management problems unique to individualized instruction, and that CMI is particularly applicable to the special educator's responsibilities with regard to the development of IEPs. It may be simply that using computers in the development of IEPs provides a more systematic way of conducting the IEP process than exists when IEPs are developed in the traditional manner. Thus, the quality of computer-assisted IEPs might be consistently greater as a function of the reduction in the variability of the documents due to individual differences in educators' abilities and experience.

Significantly higher scores for quality as evaluated using the Checklist For Documenting Appropriateness of the IEP were achieved by both the microcomputer-assisted IEPs and the manual-assisted IEPs when compared with the teacher-written IEPs. These findings are consistent with the motivation theories put forth by Herzberg (1959), Hamner (1979), and Pasmore (1979). Herzberg (1959) proposed that the task with

which employees are involved is a motivator which contributes to job performance. The various factors (i.e., time, paperwork, etc.) involved in the work of developing IEPs have an effect upon the performance of this task by those to whom it is assigned. Hamner (1979) suggested that among the components of job performance which management can influence is task design. Administrators can alter the design of the IEP development process by changing the various factors involved in the work (i.e., decreasing time and paperwork involved, etc.). Pasmore (1979) asserted that a direct change in the behavior required of employees in the performance of their tasks (i.e., a sociotechnical system intervention which adjusts the technology of the organization and the way the work is done) can increase motivation and job performance. The use of computers and/or manuals of goals and objectives in the development of IEPs represented a change in the process of IEP preparation. The requirements of the task of developing IEPs were changed by the use of computer-managed instruction (CMI) and manuals of goals and objectives. The resulting higher quality of the IEP documents produced when computers and manuals of goals and objectives were used was consistent with the motivational theories of Herzberg (1959), Hamner (1979), and Pasmore (1979).

If the data contained in tables 4.4, 4.5, and 4.6 are examined, the results obtained by the t tests for each hypothesis are further clarified and the various specific

strengths and weaknesses of the microcomputer-assisted IEPs, manual-assisted IEPs, and teacher-written IEPs are revealed. Table 4.4 shows that for all of the items contained in the legal requirements category, higher percentages of "yes" responses were given by the raters for the microcomputer-assisted IEPs than for the manual-assisted IEPs and the teacher-written IEPs. Table 4.4 also shows that for most (6/9) of the items contained in the legal requirements category, higher percentages of "yes" responses were given by the raters for the manual-assisted IEPs than for the teacher-written IEPs. 60% of the manual-assisted IEPs and 60% of the teacher-written IEPs were given "yes" responses by the raters for the levels of performance item. For the items related to evaluation schedules, dates for program initiation and duration, and for regular class participation, slightly higher percentages of "yes" responses were given by the raters for the teacher-written IEPs than for the manual-assisted IEPs.

Table 4.5 reveals that for all of the items contained in the relevance category, higher percentages of "yes" responses were given by the raters for the microcomputer-assisted IEPs than for the manual-assisted IEPs and the teacher-written IEPs. Table 4.5 also shows that for all of the items contained in the relevance category higher percentages of "yes" responses were given by the raters for the manual-assisted IEPs than for the teacher-written IEPs.

Table 4.6 shows that for most (7/10) of the items

contained in the clarity category, higher percentages of "yes" responses were given by the raters for the micro-computer-assisted IEPs than for the manual-assisted IEPs. For the items related to clear terminology of the IEP and the presence of a condition in the short-term instructional objectives, the same percentages of "yes" responses were given by the raters for the microcomputer-assisted IEPs and manual-assisted IEPs. A slightly higher percentage of "yes" responses was given by the raters for the item related to the presence of a specific behavior in the short-term instructional objectives for the manual-assisted IEPs than for the microcomputer-assisted IEPs. Table 4.6 also shows that for most (9/10) of the items contained in the clarity category, higher percentages of "yes" responses were given by the raters for the manual-assisted IEPs than for the teacher-written IEPs. For the item related to the presence of specific skill statements in the levels of performance, a slightly higher percentage of "yes" responses was given by the raters for the teacher-written IEPs than for the manual-assisted IEPs.

Discussion with RESA 7 teachers involved in the construction of the microcomputer-assisted IEPs used in this study revealed that no direct contact between teachers and computers actually existed at the time of this study. Teachers simply consulted the Strands manual of goals and objectives provided to them, and listed on paper the code numbers for various goals and objectives, for objective

criteria, for assessment procedures, and for initiation dates. Central office staff then interacted with the computer to produce the IEP documents from the information provided by teachers. Teachers participating in the process of developing microcomputer-assisted IEPs indicated a positive attitude toward the changes introduced. The novelty and ease of simply writing code numbers, as opposed to writing out IEPs in long-hand, may have contributed to the positive teacher attitudes toward computerized IEPs. The positive teacher attitudes in turn may have contributed to improved performance of the task of developing IEPs. The existence among teachers of a positive attitude toward computerized IEPs supports the findings of Enell and Barrick (1983) and Ryan (1984). During the 1986-87 academic year, RESA 7 teachers will begin to interact with the Apple IIe microcomputers in the development of IEPs. Training with the computers has required only about 45 minutes of teachers' time; the new method is reported to be enjoying a positive acceptance by the RESA 7 teachers involved.

The results of this study may be limited by the fact that only 27.5% of the teacher-written IEPs were printed/typed, whereas 72.5% of the manual-assisted IEPs were typed/printed, and 100% of the microcomputer-assisted IEPs were printed/typed. Due to time constraints involved in the completion of this research, those IEPs which were not printed/typed were left in hand-written form. This may have contributed to a bias on the part of the raters who

were able to identify, in many cases, which IEPs were teacher-written or manual-assisted, as opposed to micro-computer-assisted. Thus, an improvement over the design of this study would be to re-print or re-type all of the IEPs so that they all would be consistent in appearance.

Since the IEPs used in this study were left in their natural, handwritten or typed/printed form, an attempt was made to clarify the issue regarding possible rater bias in favor of typed/printed IEPs. The handwritten teacher-written IEPs were compared with the typed/printed teacher-written IEPs, and the handwritten manual-assisted IEPs were compared with the typed/printed manual-assisted IEPs. The results of a t test revealed that there was no significant difference between the mean total score of the handwritten teacher-written IEPs and the typed/printed teacher-written IEPs (Appendix 2, Table 1). The results of a second t test revealed that there was no significant difference between the mean total scores of the handwritten manual-assisted IEPs and the typed/printed manual-assisted IEPs (Appendix 2, Table 2). Further, the handwritten teacher-written IEPs were compared with the handwritten manual-assisted IEPs, and the typed/printed teacher-written IEPs were compared with the typed/printed manual-assisted IEPs. The results of a t test revealed that there was a significant difference in the mean total scores of the handwritten teacher-written IEPs and the handwritten manual-assisted IEPs (Appendix 2, Table 3). The results of another t test revealed that there

was a significant difference between the mean total scores of the typed/printed teacher-written IEPs and the typed/printed manual-assisted IEPs (Appendix 2, Table 4). Thus, it seems that the appearance of the IEPs involved in this study did not have a biasing effect upon the raters' responses to items on the Checklist For Documenting Appropriateness of the IEP.

Discussion with the raters who participated in this study indicated that they experienced some frustration with the design of the Checklist For Documenting Appropriateness of the IEP, particularly within the relevance category where they were required to consider several different aspects of the IEP (goals, objectives, evaluation procedures, placement, and services) when making a single "yes", "sometimes", or "no" decision. Perhaps reconstructing the Checklist For Documenting Appropriateness of the IEP to address different aspects of the IEP separately with regard to questions relating to relevance would have improved the raters' ability to indicate where the IEPs were deficient.

An attempt was made during this study to establish concurrent validity for the Checklist For Documenting Appropriateness of the IEP. Teachers working in the field were given several IEPs of varying quality to examine. Their evaluations of the IEPs revealed that a highly dependable relationship existed between the opinions of the teachers regarding the quality of IEPs and the evaluations made by the raters in this study using the Checklist For

Documenting Appropriateness of the IEP. Thus, the Checklist For Documenting Appropriateness of the IEP appears to be useful as a measure for determining quality of IEPs which would be consistent with the thinking of practicing teachers.

Previous research (Alper, 1978; Schenck and Levy, 1979; Schenck, 1979; Comptroller General of the United States, 1981) investigating teacher-written IEPs revealed that the majority of the IEPs examined lacked parent signatures on the IEP. Examination of the IEPs involved in this study revealed that 97.5% of the teacher-written IEPs and 87.5% of the manual-assisted IEPs contained a parent signature. Although more recent research with computer-assisted IEPs has not given any information with regard to the number of parent signatures on computerized IEPs, this study revealed that 100% of the microcomputer-assisted IEPs contained parent signatures. These results imply that there has been an improvement in the contact and communication between parents and special educators as intended by Public Law 94-142.

More goals and objectives were included on the micro-computer-assisted IEPs than on the manual-assisted IEPs and the teacher-written IEPs, possibly because teachers were not required to write them out in long-hand on each IEP. More goals and objectives were included on manual-assisted IEPs than on teacher-written IEPs, possibly because teachers needed only to select and write pre-written goals and objectives from a manual instead of needing to compose their



own goals and objectives. These findings are in agreement with the results of previous research by the Allegheny Intermediate Unit (1981) which indicated that there was a statistically significant increase in the average number of objectives written per student when a computerized system was used in the development of IEPs. Also, as a result of their interviews with educators, Enell and Barrick (1983) indicated that more goals and objectives were included on computerized IEPs than on teacher-written IEPs.

Higher scores were indicated in each of the three categories on the Checklist For Documenting Appropriateness of the IEP for the microcomputer-assisted IEPs than for the manual-assisted IEPs and the teacher-written IEPs. This was possibly because teachers had more time available to devote to concentrating on all aspects of the IEP process. Higher scores were indicated in each of the three categories on the Checklist For Documenting Appropriateness of the IEP for the manual-assisted IEPs than for the teacher-written IEPs. Again, this was possibly because more time may have been available for considering all aspects of the development of IEPs. The results of this study revealed that the microcomputer-assisted IEPs achieved a mean of 70% of the total score possible in the relevance category and that the teacher-written IEPs achieved a mean of 50% of the total score possible in the relevance category. These findings support the results of Enell and Barrick (1983) whose interviews revealed that special educators felt that sometimes

the objectives on computerized IEPs did not fit a particular student and often were not written at the proper level as well as the results of Schenck's (1979) study which failed to indicate the presence of a diagnostic/instructional link in IEPs.

Although Lillie (1983) did not investigate manual-assisted IEPs, he found that teachers rated Unistar I microcomputer-generated IEPs significantly higher than teacher-written IEPs across each of the categories represented on the Checklist For Documenting Appropriateness of the IEP. His results are supported by the findings of this study regarding microcomputer-assisted IEPs: Higher scores were indicated in each of the three categories on the Checklist For Documenting Appropriateness of the IEP for the microcomputer-assisted IEPs when compared with the manual-assisted IEPs and the teacher-written IEPs. Closer examination of Lillie's (1983) results revealed that higher mean scores for each of the three categories on the Checklist For Documenting Appropriateness of the IEP were achieved by the Unistar I microcomputer-generated IEPs in Lillie's study than for the microcomputer-assisted IEPs examined in this study. This could be due to the differences in the features and capabilities of the Strands program and the Unistar I program. Higher mean scores for each of the three categories were also achieved by the teacher-written IEPs in Lillie's (1983) study than for the teacher-written IEPs investigated in this study. This could be due to a number of factors such

as the school systems' IEP development guidelines, release time provided for the development of IEPs, etc. These findings could also be due to different standards employed by the raters involved in the studies when evaluating IEPs using the Checklist For Documenting Appropriateness of the IEP.

The IEP is supposed to contain levels of performance/strengths and weaknesses of students determined as a result of the psychoeducational assessment procedure. It could be expected that IEPs for learning-disabled students would reflect the findings of the psychoeducational assessment by indicating an area of learning disability in the levels of performance/strengths and weaknesses section of the IEP. Further, it would be expected that goals and objectives addressing the area of learning disability indicated in the levels of performance/strengths and weaknesses section would follow. The findings of this study revealed that only 12% of all of the IEPs involved had indicated an area of learning disability in the levels of performance/strengths and weaknesses section of the IEP and then had followed this with the expected goals and objectives addressing the area of learning disability indicated. This finding supports the results of Schenck's (1979) study to determine the extent to which the goals and objectives on the IEP could be traced back to the psychoeducational assessment which should form the basis of the IEP. Schenck concluded that no significant relationship existed between the psychoeducational assessment

and the goals and objectives included on the IEP document. Both Schenck's (1979) results and the findings of this study appear to be inconsistent with current thinking among professionals in special education and the mandates of Public Law 94-142 that there should be a diagnostic/instructional link in order to insure the existence of specially designed instruction for special needs children.

#### Recommendations For Future Research.

As a result of the analysis of the results of this study, recommendations are suggested for future research which will provide additional information regarding the efficacy of computer technology in the development of IEPs:

1. Continued research and development of microcomputer software which can increase the efficiency of the IEP process and further improve the quality of the IEP is warranted.

2. Studies investigating the various IEP development software programs available would provide information needed by special educators concerning the capabilities of such programs to contribute to improving the quality of IEPs.

3. A study of microcomputer-assisted IEPs with regard to their completeness at the date of termination of the IEP would provide information concerning the capability of such IEPs to assist teachers' instructional decision-making in view of information available regarding the skills a student has mastered.

4. A study of microcomputer-assisted IEPs investigating

whether the increased numbers of goals and objectives found to appear on such IEPs are actually being taught/mastered would provide information regarding the benefit of having greater numbers of goals and objectives included on IEPs.

5. A study regarding the efficacy of computer technology in the establishment of the diagnostic/instructional link in IEPs would provide information concerning ways to improve the quality of IEPs.

6. A study to determine if teachers could be taught to relate diagnostic data to an appropriate educational program would provide information regarding the solution of problems related to the lack of a diagnostic/instructional link in the IEP.

APPENDIX 1

CHECKLIST FOR DOCUMENTING APPROPRIATENESS OF THE IEP

Legal Requirements

- 1. Does plan include all information required by law?
  - a. level of performance
  - b. annual goals
  - c. short-term instructional objectives
  - d. schedules of evaluation
  - e. procedures for evaluation
  - f. related services
  - g. specific special education
  - h. extent of participation in the regular classroom
  - i. projected dates for initiation and duration of services

YES NO SOMETIMES

YES	NO	SOMETIMES

Relevance

- 1. Are goals, objectives, evaluation procedures, placement, and services:
  - a. appropriate to the handicap of the student?
  - b. determined in consideration of identified strengths and weaknesses?
  - c. appropriate to the student's level of performance?
- 2. Are the specified evaluation procedures correlated with the goals and objectives?
- 3. Do the minimum acceptable criteria stated in objectives seem realistic for the student?

Clarity

- 1. Is the terminology used in the plan understandable to all other committee members?
- 2. Is the student's level of performance specified in terms of specific skill statements?
- 3. Do short-term instructional objectives clearly state
  - a. the specific behavior to be required of the student?
  - b. the condition under which the behavior is to occur?
  - c. the minimum acceptable criteria for attaining the objectives?
- 4. Do annual goals indicate what the student will be able to do when the IEP is terminated?
- 5. Do evaluation procedures specify the type of evaluation to be used and, where appropriate, specific tests?

YES NO SOMETIMES

YES	NO	SOMETIMES

- 6. Does the schedule of evaluation clearly indicate how often evaluation will occur?
- 7. Is the special education to be provided stated in specific terms?
- 8. Are related services clearly specified in terms of extent or amount of services to be provided?

IEP EVALUATION QUESTIONNAIRE

Please evaluate the attached IEPs, numbered 1 to 10, with regard to quality. Look over each IEP and answer the three questions below by placing a mark in the appropriate blank for each question so that your answer to each question is a YES, a PARTIALLY, or a NO.

-----  
 1. Are all of the legal requirements mandated by Public Law 94-142 present?

IEP #1:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #2:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #3:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #4:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #5:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #6:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #7:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #8:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #9:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #10:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO

2. Are the goals, objectives, evaluation procedures, placement, and services appropriate and realistic for the student?

IEP #1:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #2:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #3:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #4:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #5:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #6:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #7:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #8:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #9:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #10:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO

3. Is the terminology of the IEP clear enough and specific enough for a classroom teacher to implement?

IEP #1:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #2:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #3:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #4:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #5:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #6:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #7:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #8:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #9:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO
IEP #10:	<input type="checkbox"/> YES	<input type="checkbox"/> PARTIALLY	<input type="checkbox"/> NO



APPENDIX 2

Since the IEPs used in this study were left in their natural, handwritten or typed/printed form, an attempt was made to clarify the issue regarding possible rater bias in favor of typed/printed IEPs. The researcher divided the manual-assisted IEPs and the teacher-written IEPs into four groups: one containing handwritten teacher-written IEPs; one containing handwritten manual-assisted IEPs; one containing typed/printed teacher-written IEPs; and one containing typed/printed manual-assisted IEPs. The handwritten teacher-written IEPs were compared with the typed/printed teacher-written IEPs, and the handwritten manual-assisted IEPs were compared with the typed/printed manual-assisted IEPs. Also, the handwritten teacher-written IEPs were compared with the handwritten manual-assisted IEPs, and the typed/printed teacher-written IEPs were compared with the typed/printed manual-assisted IEPs.

The means and standard deviations of the scores on the Checklist For Documenting Appropriateness of the IEP were computed for the handwritten teacher-written IEPs and for typed/printed teacher-written IEPs. The results indicated a mean score of 29.5 with a standard deviation of 5.35 for the handwritten teacher-written IEPs, and a mean score of 32.3 with a standard deviation of 7.73 for the typed/printed teacher-written IEPs. A t test was performed on the means of the handwritten teacher-written IEPs and the typed/printed teacher-written IEPs to determine whether a significant difference ( $p < .05$ ) in the quality of the IEPs existed as a result of their having been handwritten or typed/printed.

A resulting  $t$  value of 1.41 represents no significant difference in quality ( $p < .05$ ) between the handwritten teacher-written IEPs and the typed/printed teacher-written IEPs. (Table 1).

The means and standard deviations of the scores on the Checklist For Documenting Appropriateness of the IEP were computed for the handwritten manual-assisted IEPs and for the typed/printed manual-assisted IEPs. The results indicated a mean score of 34.8 with a standard deviation of 6.49 for the handwritten manual-assisted IEPs and a mean of 37.3 with a standard deviation of 5.33 for the typed/printed manual-assisted IEPs. A  $t$  test was performed on the means of the handwritten manual-assisted IEPs and the typed/printed manual-assisted IEPs to determine whether a significant difference ( $p < .05$ ) in the quality of the IEPs existed as a result of their having been handwritten or typed/printed. A resulting  $t$  value of 1.18 represents no significant difference in quality ( $p < .05$ ) between the handwritten manual-assisted IEPs and the typed/printed manual-assisted IEPs (Table 2).

Further, a  $t$  test was performed on the means of the handwritten teacher-written IEPs and the handwritten manual-assisted IEPs to determine whether a significant difference ( $p < .05$ ) in the quality of the IEPs existed as a result of their having been teacher-written or manual-assisted. A resulting  $t$  value of 2.41 represents a significant difference ( $p < .05$ ) between the handwritten teacher-written IEPs and the handwritten manual-assisted IEPs (Table 3). Also, a  $t$  test

was performed on the means of the typed/printed teacher-written IEPs and the typed/printed manual-assisted IEPs to determine whether a significant difference ( $p < .05$ ) in the quality of the IEPs existed as a result of their having been teacher-written or manual-assisted. A resulting t value of 2.43 represents a significant difference in quality ( $p < .05$ ) between the typed/printed teacher-written IEPs and the typed/printed manual-assisted IEPs (Table 4). Thus, it seems that the appearance of the IEPs involved in this study did not have a biasing effect upon the raters' responses to items on the Checklist For Documenting Appropriateness of the IEP.

TABLE 1  
 RESULTS OF t TEST ON MEAN TOTAL SCORES OF  
 HANDWRITTEN TEACHER-WRITTEN IEPS AND  
 TYPED/PRINTED TEACHER-WRITTEN IEPS

TYPE OF IEP	n	MEAN	STANDARD DEVIATION	DEGREES OF FREEDOM	t VALUE
HANDWRITTEN TEACHER- WRITTEN	29	29.5	5.35	38	1.41**
TYPED/PRINTED TEACHER- WRITTEN	11	32.3	7.73		

\*\*Not Significant at  $p < .05$

TABLE 2  
 RESULTS OF t TEST ON MEAN TOTAL SCORES OF  
 HANDWRITTEN MANUAL-ASSISTED IEPS AND  
 TYPED/PRINTED MANUAL-ASSISTED IEPS

TYPE OF IEP	n	MEAN	STANDARD DEVIATION	DEGREES OF FREEDOM	t VALUE
HANDWRITTEN MANUAL- ASSISTED	11	34.8	6.49	38	1.18**
TYPED/PRINTED MANUAL- ASSISTED	29	37.3	5.33		

\*\*Not Significant at  $p < .05$

TABLE 3  
 RESULTS OF t TEST ON MEAN TOTAL SCORES OF  
 HANDWRITTEN TEACHER-WRITTEN IEPS AND  
 HANDWRITTEN MANUAL-ASSISTED IEPS

TYPE OF IEP	n	MEAN	STANDARD DEVIATION	DEGREES OF FREEDOM	t VALUE
HANDWRITTEN TEACHER-WRITTEN	29	29.5	5.35	38	2.41**
HANDWRITTEN MANUAL-ASSISTED	11	34.8	6.49		

\*\*Significant at  $p < .05$

TABLE 4  
 RESULTS OF t TEST ON MEAN TOTAL SCORES OF  
 TYPED/PRINTED TEACHER-WRITTEN IEPS AND  
 TYPED/PRINTED MANUAL-ASSISTED IEPS

TYPE OF IEP	n	MEAN	STANDARD DEVIATION	DEGREES OF FREEDOM	t VALUE
TYPED/PRINTED TEACHER- WRITTEN	11	32.3	7.73	38	2.43**
TYPED/PRINTED MANUAL- ASSISTED	29	37.3	5.33		

\*\*Significant at  $p < .05$



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## Abstract

QUALITY PROGRAMMING FOR LEARNING-DISABLED STUDENTS: A  
COMPARISON OF MICROCOMPUTER-ASSISTED IEPs, MANUAL-  
ASSISTED IEPs, AND TEACHER-WRITTEN IEPs

Gretchen C. Haines, Ed.D.

The College of William and Mary in Virginia, December 1986

Chairman: Louis P. Messier, Ed.D.

The purpose of this study was to determine which IEPs are of greater quality for learning-disabled students: teacher-written IEPs (those developed without the aid of microcomputers or manuals of goals and objectives); manual-assisted IEPs (those developed with the aid of manuals of goals and objectives); or microcomputer-assisted IEPs (those developed with the aid of both manuals of goals and objectives and microcomputers). This study investigated the question: What effect does the use of microcomputers and manuals of goals and objectives have upon the quality of IEPs developed for learning-disabled students?

The sample consisted of 120 IEPs of students categorized as learning-disabled by the North Central Regional Education Service Agency (RESA 7) of West Virginia. Forty of the IEPs were teacher-written, forty of the IEPs were manual-assisted, and forty of the IEPs were microcomputer-assisted. Three trained raters examined and evaluated, individually, all of the IEPs involved in the study with regard to legal requirements, relevance, and clarity using the Checklist For Documenting Appropriateness of the IEP.

A statistical analysis of the data collected regarding each hypothesis revealed the following findings:

1. A t test indicated that the microcomputer-assisted IEPs in this study received a significantly higher mean total score ( $p < .01$ ) on the Checklist For Documenting Appropriateness of the IEP than did the teacher-written IEPs in this study. As a result, the null hypothesis (that there was no difference in quality between microcomputer-assisted IEPs and teacher-written IEPs as evaluated using the Checklist For Documenting Appropriateness of the IEP) was rejected.

2. A t test indicated that the manual-assisted IEPs in this study received a significantly higher mean total score ( $p < .01$ ) on the Checklist For Documenting Appropriateness of the IEP than did the teacher-written IEPs in this study. As a result, the null hypothesis (that there was no difference in quality between manual-assisted IEPs and teacher-written IEPs as evaluated using the Checklist For Documenting Appropriateness of the IEP) was rejected.

3. A t test indicated that the microcomputer-assisted IEPs in this study received a significantly higher mean



total score ( $p < .01$ ) on the Checklist For Documenting Appropriateness of the IEP than did the manual-assisted IEPs. As a result, the null hypothesis (that there was no significant difference in quality between manual-assisted IEPs and microcomputer-assisted IEPs as evaluated using the Checklist For Documenting Appropriateness of the IEP) was rejected.