



Programming Evaluation Procedure: A Diagnostic and Evaluation Instrument for Classroom Teachers

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Although many special education teachers attempt to reduce academic tasks into small, sequential steps to promote better learning for students, few of them have a consistent method for evaluating their effectiveness in the utilization of this procedure. This need for evaluation is based on the concept that, without feedback, the appropriateness of educational methods and materials cannot be determined. In addition, recent attention has been aimed at developing methods and materials whereby teachers can be held accountable to students, parents and school districts for their efforts. This concern with accountability is specifically related to the need for educators to demonstrate empirically that they are able to produce changes which are commensurate with preselected performance objectives.

The purpose of this article is to present a technique for objectively evaluating the effectiveness of a teacher's programming efforts. Although techniques such as clinical judgment and inference are used frequently, they do not provide an objective and sequential method for evaluating the influence that programming can have on a child.

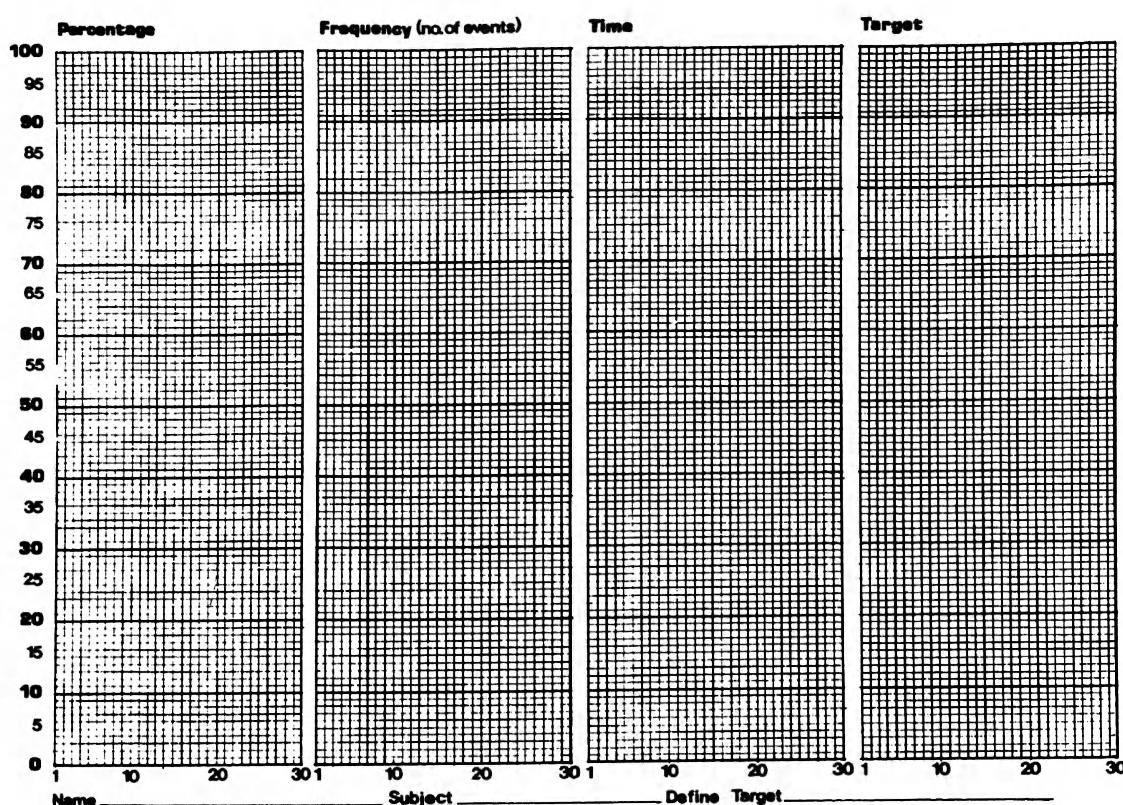
The Programming Evaluation Procedure (PEP) developed by the authors is a simple and systematic evaluative technique designed to provide feedback to teachers who are trying to plan and execute programs for individual children. The PEP is based on the concept that diagnosis and instruction in and of themselves are not sufficient to guarantee optimal functioning in exceptional children. Without evaluative procedures and without knowledge of the basic components influencing programming success, the teacher lacks the most significant information determining the effectiveness of individual programs.

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Figure 1
Sample of PEP Sheet



The PEP sheet is divided into four areas, each of which accounts for separate programming components. The component parts of the Programming Evaluation Procedure are percentage, frequency, time and a target behavior related to academic functioning.

Percentage

The percentage portion of the PEP sheet represents the score the subject earns when the number of problems completed correctly is divided by the total number of problems assigned. For example, out of 20 possible math problems, a student correctly completed 17. The percentage is computed by dividing the number correct (17) by the number possible (20). This equals a percentage of 85. This measure is one barometer of the appropriateness of the program or task which has been assigned. The percentage should not fluctuate greatly from the level of success that the teacher feels is necessary to maintain the motivation of the subject. Initially this level should be quite high, i.e., 95-100 percent, in order to develop confidence

and enthusiasm in a child. Once this initial success level has been established, the teacher will be able to manipulate certain variables related to the percentage correct. By monitoring the percentage measure the teacher is able to manipulate continually the criterion level and maintain a student at an appropriate success level.

For the child who has not experienced excessive failure, the procedure could vary. Here the teacher could disregard the criterion (e.g., 95 percent) and use the PEP to determine the best method of instruction for the child. By examining the percentages obtained with different materials while the number of events and time are held constant, the programmer can obtain a quick indication of the best methods and materials to use with a given student.

The plotting of the data on the graph is a very simple procedure. The teacher marks the percentage earned by locating the percentage on the vertical axis and finding the number of the session on the horizontal axis. The location where the two meet will be where the percentage is marked on the PEP sheet.

Frequency

This part of the PEP sheet represents the number of individual problems which are assigned to a student during a given session. The teacher should follow the same procedure for plotting frequency as was followed for plotting percentage. The frequency graph is of most value when the teacher can obtain feedback on both the percentage and time graphs. Depending on the percentage obtained and the amount of time that a subject takes to complete an assignment (time graph), the teacher may or may not decide to alter the number of events (see Figure 1).

Time

The third section on the PEP sheet is concerned with time. This is simply the amount of time that it takes a student to complete an assigned task. The plotting on the time graph is accomplished in the same manner as the plotting in the previous sections. This variable is most effective when it is evaluated in reference to the percentage and frequency of material assigned. For example, if the percentage of correct responses is below the criterion which the teacher had decided upon and the frequency is high, the teacher may want to experiment with adjusting the time factor (see Figure 1).

Target

Many educators have found it beneficial to pinpoint (define) and evaluate certain behaviors that are incompatible with appropriate academic and social functioning. The target behavior section of the PEP sheet provides an opportunity for the teacher to analyze and record certain non-productive behaviors. Variability in the frequency of these behaviors will probably occur as a function of the amount of success that a student is having on an academic task. The teacher should observe the target behavior in the same time frame that the programmed task is assigned in order to draw conclusions on the target behavior relative to the programming of the task.

For example, a teacher may wish to evaluate a social behavior such as "talking out without permission" along with a student's academic functioning. If a student were able to complete correctly 95 percent of the 25 math problems assigned to him in a 20-minute period, and during the same time have 10 inappropriate verbalizations, the teacher might want to manipulate the degree of difficulty, the amount of time allotted for the task or the number of problems assigned (see Figure 1).

Three Key Points in Successfully Using the Programming Evaluation Procedure

1. The teacher should determine what percentage correct the child needs to achieve and the materials appropriate to promoting the percentage desired before programming begins.

This is a decision which involves many variables and which the teacher can best make. For example, a child who has a history of school failure should be initially programmed for between 90 and 100 percent success on his academic tasks. This decision affects both the number of events (problems assigned) and the time involved. For example, the teacher will want to make sure that the student has enough time to successfully complete a given number of problems. As the child progresses and establishes a pattern of success, the teacher will want to re-evaluate the percentage correct required to keep the subject functioning at a given level.

2. An increase in frequency in the number of problems assigned for a given academic area should occur only when the teacher notes a decrease in the amount of time necessary to complete the task or a percentage score above what the teacher had set as the level of acceptance (criterion).

3. An increase in the time variable while the frequency variable is held constant will probably indicate that the child is having difficulty with the skill and the acquisition or mastery of this skill should be expected only with more assignments. Repetition will probably help the student decrease the amount of time necessary to complete such assignments.

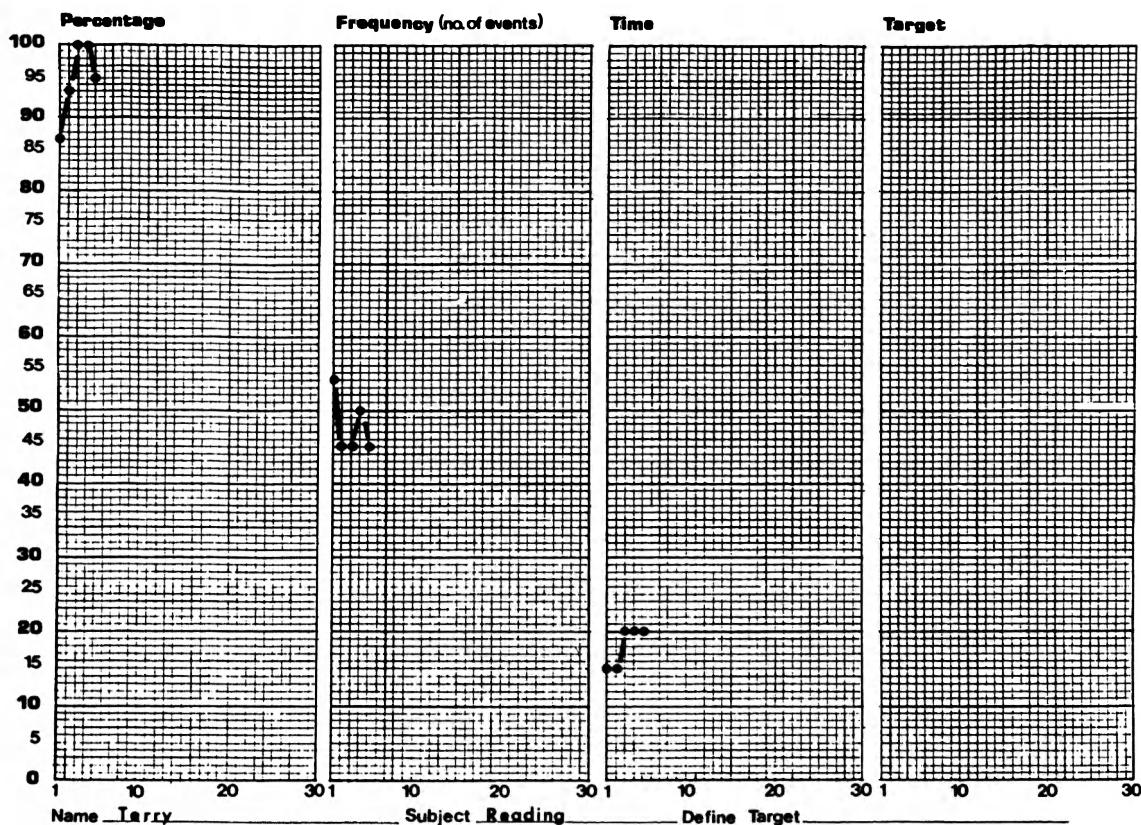
Suggested Procedure for Establishing Initial Programming Level

Since motivation plays such a significant role in determining functioning level, it could be beneficial to the teacher to have the child complete an assignment on the task to be programmed under both tangible reinforcement and standard (non-reinforced) conditions. By tangibly reinforcing the child on one lesson, the teacher will be able to gain a more realistic picture of a child's potential level. Thus, the level where the child is first programmed will be more closely aligned with his potential level of functioning rather than his level of interest or motivation.

The reinforcement-non-reinforcement technique for establishing an initial programming level should be coupled with a child's past history. A child who has had a history of failure should be initially programmed for success 90 to 100 percent of the time. This should be continued until the child's confidence will allow a gradual manipulation of the programming variables (time, fre-

Figure 2

PEP Sheet with Data



quency, difficulty of the material). By checking the PEP daily the teacher can determine if she is gradually developing the child's level of competence in relation to the degree of success that may be necessary to offset a backlog of failure.

Terry: A Case Study

Terry had encountered much failure in his academic work at school. His social behavior was also chronically unacceptable. Frequently he was known to engage in such attention-seeking behaviors as crawling on the floor of the classroom during a lesson and purposely dropping books on the classroom floor.

A reading evaluation revealed that Terry was particularly weak in the area of word attack skills. Subsequently an educational prescription was developed to remediate this specific deficit.

The value of PEP can be best illustrated by demonstrating how it was used to help program for Terry. The PEP sheet marked Figure 2 is an actual reproduction of Terry's sheet. The points on the three graphs (target is not included on this graph) for day one represent the first lesson presented.

The percentage of success which the teacher had established as appropriate for Terry was 95. This level was sought because of the significant amount of past failure Terry had experienced. The percentage correct expected is always a decision which the teacher should establish by evaluating a student's individual background. Initially, Terry obtained a percentage score of 87 percent. This percentage score was obtained under programming conditions of 54 assigned problems (frequency) in 15 minutes. Since Terry did not reach the standard established, the teacher reduced the number of problems which Terry was to complete on the second day to 45. The amount of time allotted was held at 15 minutes. The percentage increased to 94. At this point the teacher felt that Terry's knowledge of the skill was sufficient enough that, if given more time, he could score 95 or better. Therefore, the third day Terry was given 20 minutes to complete the same number of events or problems; he responded by scoring 100 percent.

It is possible that without the benefit of examining Terry's performance in this objective manner, the teacher would not have had sufficient

data to conclude that a slight manipulation of the frequency and time variables would produce the desired results.

After Terry was able to reach the initial criterion level, he was assigned additional problems. The teacher's assumption was that a slight increase in the number of events would be easily absorbed by Terry's increased knowledge and increased confidence. Terry again obtained a percentage score of 100 percent. At this point the programmer decided to increase the difficulty of the task. The lessons that followed over the next four-day period demanded division of two- and three-syllable words. On the first lesson 20 minutes were allotted for 45 events; this combination of time and events was determined by evaluating previous programming efforts. Even though the task was different from the previous one, the teacher felt that the previous task had given him a good basis to try this combination. Terry's percentage for this lesson was 96. Since Terry reached criterion (95 percent) on the first lesson of the new skill, the programmer concluded that an increase in frequency or a decrease in time would be appropriate for the next lesson.

Conclusion

Surprisingly little attention has been directed toward measuring the outcome of academic efforts. Although accountability is an issue that will undoubtedly remain as long as special education exists, educators are currently ill-equipped to evaluate the influence that they have on their students. Providing academic materials for the student at his instructional level has been presented as the proposed norm for both children in the regular classroom and those receiving special educational services. The Programming Evaluation Procedure (PEP) provides one systematic approach to objectively obtaining feedback. This procedure allows the teacher to present materials at the level and rate which is best for each child. The PEP procedure makes the teacher aware of the components of good programming and by so doing allows the teacher to be more precise in his teaching. Since evaluation procedures are becoming more and more an integral part of any educational program, it is essential that instruments of this type continue to be developed and refined. □

Brochure on Books, Materials

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Interactive Computer Simulations for Teacher Education

Janice L. Flake

Teaching/learning processes are highly complex. Many phenomena occur simultaneously. It takes considerable skill on the part of the teacher to make maximum use of his abilities to bring about desired outcomes.

Four levels of teacher awareness have been identified in the Gregorc (1971) model. These four levels can be referred to as: (1) imitating others, (2) using hunches, (3) identifying principles and (4) applying these principles. A theory of teaching/learning would consist of identifying and applying principles.

The responsibility of teacher educators would seem to be to help teachers move to high awareness levels of such principles. An effective teacher education program would seem to involve effective methods of demonstrating the implementation of education principles, i.e., implementation of theory into practice.

Stages of professional preparation of teachers have been outlined by Broudy (1964). These stages include: laboratory experience, clinical experience and internship. Broudy has indicated that he feels that internship is the time for *applying* theories rather than the time to *learn* theories.

How can theory be made more relevant? One way is through appropriate laboratory experiences. Such experiences may help the intern believe the text. A more sophisticated use of the laboratory experience is for discovery. An intern can experiment using the interaction of several previously learned principles to test an hypothesis; he can also experiment to learn more about his own individual behavior. The intern can ask, "What will happen if I do . . . ?" Such laboratory activities can provide for the following stages of learning: (1) exploratory investigation, (2) formulating of principles and (3) operating from principles.

What types of laboratory activities exist for education interns? One type of laboratory experience is the use of simulation activities. Simulation is a working analogy. The analogy may be of some form of reality, e.g., the analogy of flying an

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