INFORMATION PAPER 4
HYPOTHESIS GENERATION AND TESTING

When a concern about an individual student is expressed, school personnel want to know the answers to two questions: 1) Why is the student experiencing a problem?; and 2) What can be done about it? Traditionally, educators have attempted to answer these questions with assessment aimed at eligibility determinations. Although this approach has made possible the provision of special services to many students, it is also problematic. It does not provide much specific information to answer the questions listed above for two reasons.

First, traditional assessment's explanation for why a student has a problem is an example of circular reasoning: that is, the student has a performance problem because he/she has a disability; the student has a disability because he/she has a performance problem. This circular reasoning provides little meaningful information to explain exactly why a student has a problem.

A second difficulty with traditional assessment is that it is not very useful for planning interventions. Traditional assessment has its most direct link to labelling and placement issues, and is much more remotely linked to intervention design. In other words, traditional assessment is most useful for describing the student and his/her performance problem, but is much less useful in deciding how to intervene.

On the other hand, a systematic problem-solving approach is very valuable in answering the two questions listed above. This problem-solving approach emphasizes assessment for intervention rather than assessment for identification and placement. It makes use of procedures for generating and testing hypotheses about why students have performance problems.

Hypothesis generation and testing procedures and their relationship to other steps in the problem-solving approach are the subject of the remainder of this paper. The term "hypothesis" will be defined, and basic procedures in the process will be described.

DEFINITION

Procedures for hypothesis generation and testing are part of systematic problem-solving. These procedures form a direct link between the assessment of a problem and the development of potential solutions to the problem. The purpose of these procedures is to develop "high probability interventions" that are likely to be successful in improving student performance.

Hypotheses are possible reasons for why the student is experiencing a school problem. Hypotheses are used to formulate predictions about student behavior. From these predictions come assessment questions that need to be answered. Data is collected to answer the assessment questions, and to either confirm or reject the suggested hypotheses. The confirmed hypotheses are used to develop an intervention.

TYPES OF HYPOTHESES

Hypotheses may be generated about five different factors that may be related to the student's performance problem (Knoff, 1990). These factors, or types of hypotheses, are listed below. Regardless of the particular factor to be addressed, all hypotheses and the resulting predictions and assessment questions must be observable and measurable, as well as relevant to the behavior of concern and potential interventions.

The five types of hypotheses are:

A) Curricular hypotheses. Hypotheses about the curriculum in which the child is being instructed might have to do with the sequence of objectives, teaching methods or practice materials provided in the curriculum. Questions to be considered might have to do with whether or not the curriculum is appropriate for the child's instructional needs.

B) Teacher/instructional hypotheses. These hypotheses have to do with the manner in which the teacher is using the curriculum. Hypotheses might be generated about the teacher's instructional techniques and presentation style, questioning techniques, feedback and error correction procedures and so on.

C) Environmental hypotheses. These hypotheses have to do with the student's physical environment and how this environment affects learning. For example, hypotheses might be generated about the physical arrangement of the classroom, or about materials and media equipment used to teach lessons.

D) Student skills hypotheses. Hypotheses about student skills might address the issue of whether the student has the necessary prerequisite skills to perform a given academic or non-academic task.

E) Student process hypotheses. These hypotheses might address questions about the student's capacity to learn as well as the student's problem-solving strategies.

PROCEDURES

The first step in the problem-solving process is to define the behavior(s) of concern. Behavioral definitions are usually developed in the course of a consultative interview among problem-solving team members including the student's teacher. As part of the consultative interview, existing background information about the student is reviewed. A record review might include examination of the student's cumulative folder, health records, and/or standardized test results. It might also include interviews with the student's past teachers. The background information to be collected should have primary relevance to the student's problem, and should help clarify the conditions or situations under which the problem behavior might be occurring. Factors to be considered might include the student's prior exposure to the curriculum, attendance patterns, physical health, social history, and/or developmental history.

Once the target behavior(s) have been defined, the problem-solving team generates hypotheses about why the problem is occurring. The generation of hypotheses may be treated as a brain-storming session in which all team members take part. Hypotheses should be stated in the following manner: "[The behavior of concern] occurs because [possible reason]". For example, "Tom's out-of-seat behavior occurs because the independent seatwork assignment is too difficult."

After a list of hypotheses have been generated, the problem-solving team uses the list to develop predictions about the student's behavior. Predictions should be stated in the form of "If-then," or "When-then," statements such as "If Tom's seatwork assignment is easy, Tom will remain in his seat." In most cases, each prediction statement should be accompanied by a converse or opposite prediction. For example, if the above prediction were made, a converse prediction might be "If Tom's seatwork assignment is difficult, Tom will get out of his seat frequently." Prediction statements should fit three criteria: they should be measurable, observable, and should allow the collection of data in the naturally occurring environment.

When the prediction statements have been written, the next step is to use them to create assessment questions. These assessment questions should be data-based questions that will allow the team to either confirm or reject the hypotheses. The assessment questions must be clearly stated and must be directly related to the predictions. They should be measurable and should allow the collection of data through functional assessment techniques.

After the assessment questions have been written, appropriate data collection strategies are selected and implemented to provide the information necessary to confirm or reject the hypotheses. A variety of functional assessment techniques may be used including interviews, observations and individual testing. The most reliable data can be generated by using multiple methods of data collection across multiple settings using multiple sources of information.

Once the necessary data has been collected, it is reviewed in order to determine which hypotheses should be rejected, or proven untrue, and which hypotheses should be confirmed, or proven true. Confirmed hypotheses can be used to suggest interventions to change student behavior. Because these

interventions are based on specific information and are directly related to proven reasons for the student's problem, they are likely to have a high probability of success. However, goals should be written, and progress monitoring procedures should be implemented to evaluate the actual effectiveness of the intervention strategies.

SUMMARY

Hypothesis generation and testing procedures are important parts of the sysatematic problem-solving process. In contrast to more traditional assessment, hypothesis generation and testing provides a direct link between assessment and intervention design. The resulting interventions are likely to have a high probability of success because they are based on proven reasons for the student's problem.

REFERENCES

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