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OBJECTIVE OBSERVATION -- AN EVALUATING INSTRUMENT

Dwight L. Chapman, Jr.


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Approved by:


Dr. Russell H. Landis
Industrial Arts Instructor

Walter A. Klehm
Dr. Walter A. Klehm
Adviser

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OBJECTIVE OBSERVATION -- AN EVALUATING INSTRUMENT

INTRODUCTION

"Evaluation is a relatively new technical term which designates a more comprehensive concept of measurement than is implied in conventional tests and examinations."¹ Instructors in any course that includes laboratory work use this term to explain their methods of measuring students' varying achievements in the laboratory.

That part of evaluation other than conventional tests and examinations will be discussed in this paper. Such evaluating concerns the procedures that instructors can use to measure degrees of attainment of the goals of the course by the use of objective techniques to guide personal judgments.

Most projects in industrial arts display some evidence of the technical knowledge and manipulative skill acquired by the student who constructed them. In general, many industrial arts instructors grade the project only, a measure which does not tell the whole story of the individual's accomplishments.

If the instructor wishes to rate students upon their performance, habits, traits, or attitudes he should have an objective means of measuring attainment in each of these areas.

The major difficulty lies in the fact that an instructor's impressions of the student's achievements in these various goals are often vague and are not based upon objective evidence. Many instructors assume they have an intimate acquaintance with the student's attainments in each of these areas, which provides them automatically with

¹J. Wayne Wrightstone, "Evaluation", Encyclopedia of Educational Research, p. 468.

adequate information and ability to distribute the grades for these achievements justifiably.

The instructor's impressions are sometimes formulated through observation. In many cases only a mental record is kept of the observation, and the instructor tends to give too much weight to the most recent observation. By having the points he wishes to observe and measure clearly defined on some form of written record and rating scale to accompany each, he then eliminates the memory element to as high a degree as possible, keeps recent impressions in their correct perspective, and has a more objective approach for his evaluation.

Contained herein are some explanations of how the industrial arts instructor may use objective observation to more efficiently analyze his instructional methods and make his evaluation of students more effective and meaningful.

NEED FOR EMPLOYING OBSERVATION

There are many situations where observation of the student while he is working or performing some other phase of laboratory activity, serves as the chief means of evaluation. A combination of written or performance tests serves to help check certain phases of achievement, but to have a complete measure of the student's achievements and accomplishments, the industrial arts instructor can employ observation as a means of evaluating his goals. Before he does this observing, he should choose goals that lend themselves to evaluation by observation. Using the following list of objectives of industrial arts as an example will illustrate this point:

1. Interest in Industry. To develop in each pupil an active interest in industrial life and in the methods and problems of production and exchange.
2. Appreciation and Use. To develop in each pupil the appreciation of good design and workmanship, and the ability to select, care for, and use industrial products wisely.
3. Self-realization and Initiative. To develop in each pupil the habits of self-reliance, self-discipline, and resourcefulness in meeting practical situations.
4. Co-operative Attitudes. To develop in each pupil a readiness to assist others and to join happily in group undertakings.
5. Health and Safety. To develop in each pupil desirable attitudes and practices with respect to health and safety.
6. Interest in Achievement. To develop in each pupil a feeling of pride in his ability to do useful things and to develop worthy leisure-time interests.
7. Orderly Performance. To develop in each pupil the habit of an orderly, complete, and efficient performance of any task.
8. Drawing and Design. To develop in each pupil an understanding of drawings, and the ability to express ideas by means of drawing.

9. Shop Skills and Knowledge. To develop in each pupil a measure of skill in the use of common tools and machines and an understanding of the problems involved in common types of construction and repair."²

A number of these goals may be evaluated wholly or in part by objective observation. To observe and evaluate them as they are stated above would be inadequate and meaningless unless they are further subdivided. For example, let us assume the instructor wishes to observe and evaluate the student's attitudes more objectively. There are many attitudes which could fall under this heading, such as: attitudes toward tools and equipment, attitudes toward his fellow students, attitudes toward his laboratory duties, etc. Each of these may be further subdivided, and if this is done, the final result will be more objective and meaningful.

²A Guide to Improving Instruction in Industrial Arts, American Vocational Association, Washington, D. C., 1953, p. 13.

OBJECTIVE OBSERVATION VERSUS INFORMAL OBSERVATION

"Observation is directed attention."³ The word "objectivity" in the field of measurement means the elimination of personal factors to as high a degree as possible. We might conclude from these two definitions that objective observation is a measurement of more or less intangible outcomes of instruction through directed attention, and the elimination of personal factors and judgments as much as possible. The objectivity of these observations may be increased by thorough planning and preparation for the observation through the construction of rating scales and anecdotal records.

Informal observation could be defined as an unsystematic, subjective, unreliable, and unrecorded method of evaluating student achievement. Informal observation depends almost entirely upon the instructor's memory. Instructors sometimes assume at the conclusion of a term that through their many unrecorded observations they are thoroughly acquainted with their students' achievements in the objectives of the course. In a few minutes or perhaps seconds he makes an overall judgment (analysis) of the student and assigns him a grade. Some of the common faults of this type of observation are:

1. Tendency to give all students in the class approximately the same rating.
2. Failure to consider major objectives of the course in determining what to observe.
3. Tendency to observe without paying much attention to the detailed aspects of the student's performance.
4. Tendency to let marks previously made by students influence current ratings.

³Einar E. Siro, "Performance Tests and Objective Observation", Industrial Arts and Vocational Education, Vol. 32, pp. 162-165, (April, 1943).

5. Tendency to rate a given student the same on all factors considered.
6. Tendency to give high ratings to students who have pleasing personalities without due regard for the quality and quantity of work performed.
7. Habit of waiting until grade reports are due and then hurriedly recording marks with little real, honest effort to evaluate achievement.
8. Tendency to base evaluation solely either upon the most recent observations of the student at work or upon one or two striking and vivid instances of exceptional behavior.
9. Failure to have clearly in mind what to observe.
10. Lack of clearly defined standards on which you base your judgments.
11. Attempting to rate students on a limited number of factors."⁴

Many of the above mentioned weaknesses, which are the results of informal observation by subjective appraisals, can be avoided or overcome if the instructor examines critically the objectives of the course. By outlining the specific objectives of the course and deciding to what extent he expects his students to fulfill each, he can reduce these weaknesses to a minimum and make his observations more objective and meaningful. He should observe carefully and critically specific activities and performances if he wishes to achieve this goal. Each activity, performance, and incident should be rated independently with appropriate emphasis on each. By doing this, he increases the reliability and validity of his observation.

⁴Ray M. Karnes, and William F. Micheels, Measuring Educational Achievements, McGraw-Hill Book Co., Inc., 1950, pp. 394.

Objective observation can be justified and enhanced by viewing the criteria used in its defense. Through it many more factors may be evaluated such as, procedure which the student follows, his use of tools and equipment, time required for each separate operation, the assistance he required, how closely he adhered to safety precautions, his conduct in class, his willingness to afford help to others, etc. These are not all the points which an instructor may apply nor is it possible for him to observe each and all of these at one time. The instructor may compile a list similar to the above, then select from this list the items he deems most important. Each or any of the items may be further subdivided, if he so desires. With each student being rated individually on several or all the points mentioned above, the instructor may be assured his assignment of marks is more valid.

When rating such items as quality and quantity of work with a rating scale, the personality of the student being evaluated would not affect the final grade. When one relies upon memory to evaluate his students, then the personality of the student can be a deciding factor. If the instructor uses some form of written procedure to observe and grade each student, then he would have clearly in mind those things he wishes to observe. By using this method of written procedure, more attention may be directed toward detailed aspects of the student's performance. Also, the instructor would have a chronological and thorough rating of each student throughout the course and it would give him a much more comprehensive basis on which to assign marks.

PURPOSES OF OBJECTIVE OBSERVATION

Objective observation, when used by an industrial arts instructor, may be employed to achieve results other than those of rating and evaluating students. The instructor may use it as one basis for judging his teaching methods.

The following is a list of other reasons for using the objective method of observation:

1. Ascertaining the rate of learning of the students.
2. Selecting and classifying the students.
3. Grading and rating students.
4. As a basis for individual guidance.
5. To detect learning difficulties.
6. To measure the efficiency of his teaching.
7. To motivate students.
8. To make his teaching more objective.

OBSERVATIONAL INSTRUMENTS

Rating Scales

As indicated earlier, an instructor needs some form of written record on which to report his observations. One form that lends itself readily to recording periodic observations is the rating scale.

A rating scale is a device or instrument used for the systematic recording of observations and evaluations on a scale of units or values given to specific goals of the course and to estimate the degree to which the student achieves these goals. There are three types of rating scales commonly used by the industrial arts instructor. They are as follows:

1. Descriptive rating scales in which the rater chooses one of several descriptive phrases regarding each objective.
2. Numerical rating scales in which numbers are assigned to every objective rated.
3. Graphic rating scales, which consists of a graph with descriptive phrases at various points."⁵

A suggested form for each of these three types of scales and a description of the use of each in a typical industrial arts laboratory situation is given below.

Before we can illustrate these three types of scales we must indicate what goals we want to evaluate and during the student's performance of an operation. For example, we might wish to observe the procedure he followed, the quality of the work produced, his observance of safety rules, his use of the tools and equipment, time consumed, and the help he received. A specimen of a descriptive type of rating

⁵J. Wayne Wrightstone, Joseph Justman, and Irving Robbins, Evaluation in Modern Education, American Book Co., New York, 1946, p. 342.

scale using these stated goals might be as follows:

"Unsatisfactory performance--was unable to follow accepted procedure. Failed to complete work in time available. Failed to observe safety precautions. Misused tools and equipment. Failed to respond to help given.

Meets minimum requirements--had difficulty in following accepted procedure. Completed work of poor quality. Observed only the most obvious safety precautions. Showed tendency to misuse tools and equipment. Required maximum time to complete work. Required much help.

Average performance--followed correct procedure in most details. Completed work of average quality. Observed major safety precautions. Used tools and equipment correctly. Worked slowly, required considerable help.

Excellent performance--followed accepted procedure in every detail. Completed work of high quality. Observed all safety precautions. Used tools and equipment correctly. Completed operation in average time. Required little help from instructor.

Outstanding performance--followed prescribed procedure in every detail. Completed work of outstanding quality--accurate and correct. Carefully observed all safety precautions. Used all tools and equipment correctly. Completed operation in minimum length of time. After initial instruction, required no assistance."⁶

The descriptive type illustrated above helps to achieve objectivity, but has a major fault in that it does not discriminate closely enough. If the student observed all safety rules, but took an undue amount of time to complete the performance, the rater must then judge which is the most important element and check accordingly. This type of rating could be more effective if each of the goals were evaluated separately. This can be accomplished by using a numerical or graphic form of recording on the rating scale.

⁶Karnes and Micheels, op. cit., p. 384.

In the numerical type number values are assigned to each of the levels of proficiency that were used in the descriptive type. The levels of proficiency as described in the descriptive type of rating scale as "unsatisfactory", "meets minimum requirements", average performance", "excellent performance", and "outstanding performance" can be assigned numerical values of 1, 2, 3, 4, 5 respectively. The numerical type of rating scale could be arranged as follows:

1. Safety precautions	1 2 3 4 5
2. Procedure followed	1 2 3 4 5
3. Quality of work	1 2 3 4 5
4. Assistance required	1 2 3 4 5
5. Use of tools and equipment	1 2 3 4 5
6. Time required	1 2 3 4 5

A graphic form of rating scale is shown below using one of the above named goals.

Quality of work

Unsatisfac- tory Perform- ance	Meets Minimum Requirements	Average Perform- ance	Excellent Performance	Outstand- ing Per- formance
--------------------------------------	-------------------------------	-----------------------------	--------------------------	-----------------------------------

To give each item more objectivity than the preceding examples have, it is necessary to further subdivide each of these items. If this were a drawing class it must be decided what constitutes quality in a drawing. If such elements are selected as the placement of views, accuracy of dimensions, lettering, cleanliness, size of arrowheads, etc., each of these should be evaluated separately. The more objective

the description of the element in the rating scale the greater the objectivity of appraisal.

If rating scale is constructed using one of the above suggested forms, a systematic, more objective means of evaluation through observation is obtained. It is suggested by Erickson⁷ that students be allowed to evaluate their own work and also that of other students, periodically, through the use of a type of scale. Such a practice furnishes valuable educational experience for those who participate and may help to achieve some of the objectives of the course.

Rating scales in the field of industrial arts may be used to motivate students as well as rate and grade them, to rate teachers, and to make teaching more objective.

There are certain limitations underlying the use of rating scales in objective observation. The following are to be considered:

1. The observer needs to be conscious of the danger of misinterpretation through the many variable physical symptoms which accompany many situations.
2. Recording of the observations must be done promptly so that none of the important details will be forgotten.
3. The significance of the observation depends to some extent upon the ability, understanding, and characteristics of the observer.
4. The construction of the rating scales are laborious and time consuming.
5. The scales should be used by more than one instructor to insure reliability.
6. They must be revised as objectives of the course and instructional methods change.

⁷Emanuel E. Erickson, Teaching the Industrial Arts, Chas. A Bennett Co., Inc., Peoria, Illinois, 1956, p. 228.

Anecdotal Records

"Traxler reports several definitions of anecdotal records which appear in the (educational) literature. Anecdotal records have been defined as 'reports of significant episodes in the life of students,' as 'simple statements of incidents deemed by the observer to be significant with respect to a given pupil,' and as 'descriptions of actual behavior taking place in situations noted by the instructor,' in contrast with rating scales which provide records only of the summary interpretations of the behavior observed."⁸

In general, anecdotal records are a series of notes on exactly what a student says or does in specific situations. These records help direct the observation of the instructor to the student's habits, traits, attitudes and interests, and guide him in his efforts to improve the student's development in these aspects.

Certain standards should be observed in recording anecdotal material. One essential for recording an anecdote is that it should be an objective reporting of facts. A generalized statement by the instructor who is doing the rating is helpful, but this statement should be accompanied by reports of specific factual incidents. Each entry should contain a brief factual description of the incident so that it can be understood later, when an overall evaluation is desired. A statement as to where and how the situation occurred should be included. Every time an anecdote is reported it should be dated in order to ascertain if the lapses of time between reports reveals improvement or decline in the student's conduct. Anecdotes should be recorded at

⁸Wrightstone, Justman, and Irving, op. cit., pp. 123-124.

the time they occur, before the instructor's memory becomes distorted. There should be an adequate number of reports upon which to base the final rating and judgment of the observer. Some students, such as those who are extremely slow or those who are discipline problems, may require more detailed observation than others. Both the instructor's actions and the student's behavior should be reported. It is impossible and unnecessary to record every detail of an incident, but if enough factual samplings are secured they tend to make the observations more objective.

Anecdotal records are used primarily in informal situations when the student does not know the instructor is watching. There is no objection to using them for formal situations if a rating scale is not available. Such factors as the length of time of the observation period, and the position of the observer are directly related to the situation and purpose of evaluation. Anecdotal records should be reviewed periodically to ascertain whether the data is adequate to give a fair rating or interpretation.

The purposes of this type of observation are to evaluate the student's work habits, study habits, interests, performance of laboratory duties, cooperative activities, personal independence, and shop skills.

The following is a recording of an incident which conforms closely to the previously stated criteria:

STUDENT: Joe Smith

CLASS: Ind. Arts 105

DATE: May 20, 1958

Incident: John Jones asked Joe Smith to assist him gluing some boards together. Joe refused very rudely, saying, "Get someone else, I'm busy."

Interpretation: Joe did not appear busy. He talked with

another member of the class for five minutes. They did not talk about work in the class.

OBSERVER: Mr. Chapman

Anecdotal records may be kept in files on single sheets or cards. It is suggested that the original hand-written record be on a small card, about 3" by 5", which may be kept in a shirt pocket or shop coat pocket.

The advantages of using small cards are that a few cards may be carried in one's pocket and brief notes may be made when there is occasion to do so. Original records for each student can be filed together in chronological order to provide a cumulative picture of the student for later review.

Progress Charts

Primarily progress charts are used to record the completion of manipulative work. When used in a form in which the instructor merely checks each student's progress toward the completion of listed operations on the charts, it contributes little or nothing to objective observation. If provisions are made on the chart for indicating how well or how poorly the student performed each operation then the instructor has a better record of his observations of the student's performance.

SUMMARY

Observation serves as one means of evaluating the student's achievements of the varying goals of industrial arts education. By comparison, it is shown that objective observation is more effective than informal observation. Objective observation may be used to motivate students, ascertain their rate of learning, measure teaching efficiency and make it more objective, detect learning difficulties, classify students, grade and rate students, and as a basis for individual guidance.

The instructor should record the results of his observations briefly and quickly and in definite terms which describe levels of achievement of the goals of the course. This can be done through the use of such devices as the rating scales, anecdotal records, and progress charts. There are different forms of rating scales from which the instructor may choose. The three most commonly used forms are the graphic, the descriptive, and the numerical. A combination of the descriptive form with either the graphic or numerical forms of recording appears to be the most effective type. When employing the anecdotal record as an evaluating device the instructor should build a cumulative, systematic file of such incidents for each student. When using this type of observation for purposes of evaluation sufficient information recorded in each observation to justify its use for this purpose and to ensure a fair rating for each student.

If the instructor has conducted his observations objectively, and accurately recorded his results this, together with grades from both informal and periodic tests provide a sounder basis for awarding grades of achievement to individual students.

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