

INNOVATIVE EVALUATION PROCEDURES IN SCIENCE

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Teachers and supervisors need to evaluate and revise the curriculum to provide for diverse needs, interests and abilities of learners in the school and class setting. Each pupil needs guidance to achieve optimally.

There are numerous techniques to appraise pupil achievement in the science curriculum. Traditional techniques which seemingly have stood the test of time include:

1. Teacher-written test items. These include true-false, multiple choice, matching, completion, and essay items.
2. Checklists and rating scales. Specific behaviours are listed and each learner is checked (on the checklist) if more guidance is needed to achieve that objective, or a numerical rating (5 = excellent, 4 = good, 3 = average, 2 = below average, and 1 = poor) is given in terms of perceived performance on a rating scale.
3. Appraising learner products. Each written paper, art project, or construction item may be appraised in terms of desired criteria.
4. Teacher observation and anecdotal records. What the teacher observes as representative learner behaviour may be recorded in a behavioural journal. The date should also be listed with the event.

Additional appraisal procedures will be discussed in the remainder of the paper.

Instructional Management Systems

A school may utilise Instructional Management Systems (IMS) to appraise pupil progress. To develop an IMS takes considerable time and effort on the part of teachers and supervisors in the school/class setting. Generally, at least a year should be given to writing up the diverse sections of an IMS before its implementation. The very first step to follow in developing an IMS is to write precise measurable objectives for pupils to attain in each curriculum area through the sequential years of schooling. Thus, for each grade level and in each curriculum area, there are a certain number of precise objectives that a pupil must achieve. To complete a grade level, a learner then needs to finish the identified number of measurable ends for each subject matter area studied. These are minimal essentials. If a pupil does not complete that which is required for a specific grade level in a given school year, he/she must satisfactorily finish the omitted parts during the next school year. As soon as these have been completed, the learner might then work on measurably stated objectives for the new grade

level. Gifted and talented learners as well as numerous average achievers need to make continuous progress, and thus achieve more objectives than the minimum essentials.

The classroom teacher chooses learning activities for pupils to achieve stated objectives. After this, the teacher measures if a learner has been successful in goal attainment. If so, he/she progresses to the next sequential objectives. If not, the teacher needs to utilise the same or a modified strategy of teaching to guide the learner to be successful in goal attainment.

Advantages given for advocating IMS to evaluate pupil achievement include the following;

1. The teacher can be certain if a pupil has/has not attained any one specific measurable objective.
2. Pupils may know ahead of time what is expected in terms of precise learnings.
3. Parents may also get to know specifically what their offsprings are to learn.
4. Verifiable results may be given to supervisors and other responsible persons desiring knowledge of learner progress.
5. A system of accountability of teachers is in evidence if empirical evidence is available for each learner's achievement. Teachers may be held accountable for pupils attaining the pre-specified objectives.

Disadvantages given for IMS include the following:

1. It is difficult to pre-plan objectives for pupils to achieve. The objectives may need to be pre-planned a semester or entire school year before their implementation. .

2. Learner having achieved an objective (or objectives) does not guarantee, by any means, the retention of subject matter contained in each end.
3. Emerging objectives in terms of questions and comments come from learners as lessons and units progress. These ends may be perceived by pupils more vital as compared to adult predetermined measurable goals.
4. Pupils sequence objectives rather than adults. Thus, sequential learnings accrue in the minds of individual learners rather than instructors.
5. Precise measurable goals might measure trivial learnings, such as specific facts, rather than worth while values, attitudes, problem-solving skills as well as critical and creative thinking.

Preston and Herman¹ wrote the following involving the use of behavioural objectives:

Despite the logical appeal of behavioural objectives, many educators and psychologists do not accept them as a final solution of either the curriculum or the evaluation problem. J.M. Stephens, in an intensive analysis of the process of schooling, found that it consists largely of spontaneous, unsophisticated teacher behaviours and that the teacher's effect upon pupil learning is not likely to be improved by most deliberate innovations, including the insistence in some quarters upon behavioural objectives. He contends that teachers who have a lively interest in a subject, but who slight objectives even outrageously, would probably bring about greater subject matter learning than teachers whose interest is less but who are punctilious about specifying objectives.

Learning Centres and Evaluation

Learning centres may be developed in several ways. The teacher may choose the materials and tasks for each learning centre in the classroom. Or, pupils with teacher guidance might plan concrete and semi-concrete items for each centre as well as the related learning experiences. In either approach, learners need to sequentially choose tasks to complete. There needs to be an adequate number of experiences in order that learners may omit those tasks perceived as not being purposeful or of personal interest. In a humane curriculum, described by humanism as a psychology of learning, pupils need to choose and make decisions. The teacher should not dictate objectives, learning activities, and evaluation procedures. Rather, pupils individually need to achieve self-actualisation.

A.H. Maslow², late leading humanist, indicates the following requirements which need satisfying in order that learners may truly achieve self-actualisation.

1. physiological (food, rest, shelter and water)
2. safety (security from danger)
3. belonging (love and affection)
4. esteem (recognition and status)
5. self-actualisation (satisfy one's potential)

Combs, et al³. state the following pertaining to humanism:

Perceptual psychology is more than the expression of the humanist movement. It is also a frame of reference specially designed to deal with a question raised by the movement and to contribute to its implementation in the solution of

human problems. The humanist movement requires a person-centred psychology, one capable to dealing not only with behaviour, but with the meanings and perceptions that constitute the internal experience of persons as well. Perceptual psychology is uniquely suited to provide this kind of understanding. So it is that the authors of this volume conceive of perceptual psychology as both the expression of the humanist movement and the beginnings of a science through which the humanness of persons can be more adequately understood and the fulfilment of human potential more adequately achieved.

Knowledge is subjective, not objective, to the learner. Thus, adequate emphasis needs to be given to art, music, drama, literature, creative writing, and the social studies at diverse learning centres in the class setting. Adequate emphasis must also be given to subject matter which is more objective in structure, such as science and mathematics.

Advantages given for utilising humanism, as a psychology of education, to appraise learner progress include the following:

1. Open-ended flexible means may be utilised to appraise progress. With pupils being involved in choosing objectives, learning activities, and evaluation procedures, ample consideration needs to be placed upon the quality and ability of learners to make decisions.
2. Pupils must have personal needs met to do well in the school/class setting. Thus, adequate stress must be placed in the evaluation process upon meeting needs of learners to achieve self-realisation.

3. Learners need to have adequate knowledge of the self and of others. Thus, a quality evaluation programme needs to appraise, pupil's increasing knowledge, skills, and attitudes in the affective or attitudinal dimensions.

Disadvantages given for humanistic evaluation procedures include the following:

1. Learners are adequately mature to make choices and decisions in the school/class setting. The school's role is to get pupils ready for adult roles in society.
2. A teacher determined curriculum may meet the personal needs of many learners, especially if learning activities are based on motivating achievement.
3. A teacher determined curriculum can be sequentially arranged so that pupils experience continuous progress, thus aiding in effective development of pupils.

IMS versus Humanism

Teachers and supervisors need to evaluate, rather continuously, appraisal procedures utilised to ascertain learner achievement. Traditional means exist such as using teacher written test items and recorded teacher observations of learner involvement in ongoing learning activities.

Relatively recent evaluation procedures have also appeared on the horizon. These include instructional management systems involving behaviourism, as a psychology of learning. The Missouri Department of Elementary and Secondary Education in their recent brochure entitled *Instructional Management. A Priority for*

Missouri Schools during the 1980s, lists the following criteria that effective schools follow:

1. High expectations for learning. Teachers and administrators expect a high level of achievement by all students and communicate their expectations to students and parents. No students are expected to fail, and the school assumes responsibility for seeing that they don't.
2. Strong leadership by building principals. The building principal is an instructional leader who participates in all phases of instruction. The principal is a visible leader of instruction, not just an office-bound administrator.
3. Emphasis on instruction in the basic skills. Since mastery of the basic skills is essential to learning in all other subjects, the effective schools make sure that students at least master the basic skills.
4. Clear-cut instructional objectives. Each teacher has specific instructional objectives within the overall curriculum which are communicated to students, parents and the general public. In effective schools, teachers and administrators – not textbooks – are clearly in charge of the curriculum and teaching activities.
5. Mastery learning and testing for mastery. Students are taught, tested, retaught and retested to the extent necessary to assure mastery of important objectives. Students are not taught more difficult objectives until prerequisite objectives have been mastered.
6. School discipline and climate. The effective schools may not be shiny and modern, but they are at least safe, orderly and free of distractions. All teachers and students as well

as parents, know the school's expectations about behaviour and discipline.

Humanism has its supporters in the educational arena. Self-actualisation is a key concept in the thinking of humanists. Maslow⁴ wrote the following:

Self-actualisation is defined in various ways, but a solid core of agreement is perceptible. All

definitions accept or imply: (a) acceptance and expression of the inner core or self, i.e., actualisation of these latent capabilities and potentialities, "fully functioning", availability of the human and personal essence; and (b) minimal presence of ill health, neurosis, psychosis, or loss of diminuation of the basic human and personal capacities.

References

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