

# THE EVALUATION STRATEGIES OF INTEGRATED SCIENCE TEACHING AND LEARNING

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In educational literature we can find different definitions on evaluation. Evaluation is the pay-off of description – it is the synthesis of descriptive information and criterial information according to very strict and difficult rules (Scriven, 1975). Evaluation can be characterised as the process by which people make judgements about value and worth; evaluation is the process by which people make value judgements about things (Oliver, 2000).

It is obvious that evaluation is a delicate and sensitive task. On the other hand, it is not a simple and obvious process. Usually evaluation has its formal and informal sides.

The main questions are:

- what is to be evaluated?
- when and why evaluate?
- how to evaluate?
- whether the process of evaluation is fair and objective?

The evaluation of the integrated science teaching is carried out at different levels and with the different purposes. One of the most important evaluation object is science curriculum. In many schools, evaluation of the curriculum is often an informal undertaking. Usually science teachers discuss the development of work at team or staff meetings and plan changes for the future. Results of an evaluation must be analyzed to draw concrete conclusions and recommendations for all process of teaching and learning. If we talking about curriculum evaluation there are six steps to effective evaluation (Bentley, Watts, 1992):

- deciding on the purpose;
- what will be evaluated?
- preparing evaluation plans (who should evaluate?; drawing up the plans; planning resources; reporting the results; drawing up operational guidelines for an evaluation);
- collecting evidence;
- deciding on the evaluation methods/instruments (questionnaires and checklists; classroom observation; structured interviews; personal documents and diaries; content analysis etc.);
- using the information to make judgements.

It is obvious that different models of evaluation can be used. The choice depends on various factors, especially from the assessor's experience (teacher's, lecturer's etc.).

Also it is important to evaluate effectiveness of integrated science course. In this case, evaluator can use pre-course questionnaire and post-course questionnaire.

Guba and Lincoln (1981) and Nevo (1983) defined evaluation as the integration of description and judgment, in which the description part emphasizes the objective part of the

assessment, while the judgment part dwells on its subjective aspect. Evaluation requires a systematic process, and the application of evaluation skills potentially enhances the objectivity of the descriptive part of the evaluation (Dori, Herscovitz, 1999).

Another important point is how to involve all students in evaluation. Black and Wiliam (1998) encourage teachers to use questioning and classroom discussion as an opportunity to increase their students' knowledge and improve understanding.

For an evaluation of process of science teaching and learning there are different strategy and ways. The main questions are: what is to be evaluated? when and why evaluate? how to evaluate? It is clear that for science teaching success one of the most important resources is feedback from students (Lamauskas, Vilkonienė, 2008). Teachers can evaluate a whole science course, analyse students' learning needs, and investigate students' experiences of teaching. Evaluation should be correlated both with the purposes and to specific educational situations. Also it is very important to strengthen teachers' and students' motivation when evaluating. There are multiple methods for collecting data on science teaching effectiveness. Also it is clear that a key to effective teaching evaluation is to collect data from multiple sources (*triangulation*).

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