Brief History of Educational Objectives and Specific Impact on Foreign Language Acquisition in Engineering

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Abstract: - Practice units, lectures and seminars, all need specific educational outcomes for learners. Also called instructional objectives, such targets express what students are expected to know, understand, or do. Applying Bloom's Taxonomy to the desired outcomes generates objectives by which educators and students can identify what to learn, how to acquire it, and assessment modalities. Using general course objectives to guide lesson planning is productive, clear, easy to follow, and constitutes a real incentive in building students’ intrinsic motivation for learning, additionally favouring the development of learning styles and thinking maps. However, the use of objectives remains a matter of teachers’ personal preference, as they are supposed to be mainly concerned with effective class-work and responsible, well prepared students.

KeyWords: educational objectives, English teaching in engineering, historical overview, curriculum development

1 Introductory definition

The term objective is frequently used as a synonym for goal, sometimes replaced by aim or intention, without appreciable loss of meaning. In a more specialised, educational sense, it refers to an intended and pre-specified outcome of a planned teaching programme, and it is expressed in terms of what is hoped the student will have learnt. These 2 usages are often distinguished by referring either to general objectives (goals) or to specific ones (intended learning outcomes). The technical use of the term objectives, with its associated demand for lengthy detailed statements of intended learning outcomes, is criticised by a number of writers on both practical and theoretical grounds. Thus, to facilitate understanding some of the controversies, as well as the development among educators of a specialised terminology for communicating objectives, this approach will focus on a brief historical survey. It introduces recommendations for the specification of objectives, with special attention directed both to the notion of levels of specification and to various formulations of the concept of behavioural objectives. The ensuing discussion of problems associated with the status of objectives examines structural relationships between objectives, the logic of intentions expressed by an objective, and the political status of statements of objectives. Finally, uses of objectives in curriculum development, in lesson planning, in instructional design, in evaluation, and, of course, in the process of communicating to students will be analyzed.

2 Problem Formulation

The general attitude towards didactic methods and programming is still largely traditional, and few agree that current approaches to needs analysis and curriculum development represent the most adequate solution to date to problems of education planning. All actors in the instructional process focus their attention on learners' needs and target performance, with a view to improve the process of foreign language acquisition for engineering students in technical universities. With this perspective in mind, I am convinced that objectives are here to stay, and that trying to define and develop them as accurately as possible is an endeavor worth pursuing.

2.1 Historical review of educational objectives

The origin of thinking about objectives in a technical manner is attributed to Bobbitt (1918), whose book The Curriculum was probably the earliest systematic treatise on curriculum theory. Circumstances were significant: only five years before, he had been the first to formulate principles of educational administration directly based on
Taylor’s theory of scientific management (1912). Industrial language invaded the book as Bobbitt accepted Spencer’s utilitarian approach to knowledge selection. A similar position was advocated by Charters in 1924. In his notes for curriculum construction, he emphasised the necessity that first of all the major objectives of education should be determined, by means of a study regarding the life of man in its social setting. Secondly, these objectives should be analysed and translated into ideas and activities, continuing this process down to the level of working units. Pendleton’s taking this advice resulted in his listing of 1581 objectives for English. On the other hand, Billings, doing the same thing, listed 888 important generalisations for social studies teachers.

Hence the objectives movement was already collapsing under its own weight when its prevailing utilitarian ideology was eclipsed by progressivism in the 1930s. Its revival by Ralph Tyler was in a different context – that of diagnostic testing and evaluation – and with a different philosophy – one of individual development rather than utilitarian efficiency. Tyler’s Eight-year Study was a cooperative venture with a group of progressive schools; one of its main purposes was to formulate educational objectives which involved students in thinking for themselves and applying their knowledge rather than merely memorising it or performing routine tasks. This aspect of the work was further developed by Tyler’s former student, Benjamin Bloom, and a group of college examiners who eventually publish-ed two taxonomies of objectives. Tyler’s approach to curriculum development was based on reciprocal interaction between the formulation of objectives and the evaluation of their attainment. Assessment was important for improving educational programs and proper evaluation required knowledge of what targets the programs aimed to achieve. Thus, objectives had to be formulated with sufficient specificity to guide evaluation and subsequent attempts at course improvement in which the objectives themselves might be altered, both to include new possibilities and to remove what was no longer considered feasible or sufficiently important. For this purpose Tyler recommended that curriculum planners use behavioural objectives, in which both content and intended type of student behaviour are specified, and that course objectives be summarised into a two-dimensional matrix with content categories along one dimension and behavioural ones along the other.

It is sometimes forgotten that Tyler and the taxonomists defined objectives at a relatively general level and it was Mager’s influential book on pre-paring for programmed instruction (1962) which fully recaptured the spirit of Bobbitt. Moreover, like Bobbitt before him, Mager derived his position from the behavioural technology approaches of trainers in military and industrial settings. In his influential paper written in 1962, he argued that behaviour should be specified only in observable terms and outlawed the use of verbs like ‘know’, ‘understand’, ‘feel’, or ‘appreciate’, that were indicative only of unobservable internal states of mind. Then, he insisted that the standard of performance should be specified in minute detail, providing an assumption of mastery (i.e.90% of the students should get 90% of the questions correct in the test covering a given topic. Further on, to avoid any ambiguity, he asked for the conditions of performance to be clearly identified. Given the focus on the value of terminal performance itself, objectives which satisfy Mager’s criteria are also called performance objectives, though behavioural objectives is still more usual.

In 1965, Gagné was among the many psychologists who welcomed Mager’s operational definition as it would help to determine the particular type of learning required. Unlike Tyler, who was concerned with providing general guidance to teachers and curriculum planners, Mager and Gagné were interested in instructional design, which at that time was seen in terms of detailed planning of instructional events in accordance with principles of the behaviourist psychology. Several authors took up Mager’s guidelines on specifying observable behaviours and gave special attention to the action verbs whose incorporation into objective statement was said to meet this requirement. Then, in 1974, Gagné and Briggs, realising that operational definitions of performance conveyed little data on the kind of learning that had taken place, suggested the addition of a ‘learned capability’ component to the specification of an objective. Finally, it should be noted that a planning group can formulate objectives to pursue each of the four dimensions mentioned above (content, behaviour, conditions, and standards), to varying degrees of specificity.

2.2 Levels of specificity and their limits in foreign language objectives for science

In 1965, Krathwohl distinguished three levels of specificity and suggested that each is appropriate for a different purpose. At the first and most abstract level are the quite broad and general statements, most helpful in the development of programs of instruction, for the laying out of types of courses and areas to be covered, and for the general goals.
towards which several years of education or an entire unit such as an elementary, junior, or senior high school might strive. At a second and more concrete level, a behavioural objectives orientation helps to analyse broad goals into more specific ones, which are useful as building blocks for curricular instruction. These behaviourally stated objectives are helpful in specifying the goals of an instructional unit, a course, or a sequence of courses. Third and finally, there is the level needed to create instructional materials. Such materials are the operational embodiment of one particular route (rarely are there multiple routes included) to the achievement of a curriculum planned at the second and more abstract level, the level of detailed analysis involved in the programmed instruction movement.

The first movement corresponds to what Taba in 1962 has called a 'platform for general objectives', though it may also apply to a specific program within a school. The second level corresponds to Tyler and Taba's version of the term 'behavioural objective', and is also the level at which taxonomies were developed. In 1976, Taba calls them 'general objectives', a term which he reserves for level one. While it is customary to describe levels of specificity in terms of language and purpose, the addition of a quantitative density dimension can sometimes be helpful. Since objectives are usually formulated in groups/clusters, a density index can be simply defined as: number of objectives in list/hours of learning list covers.

Another writer to identify 3 levels of objectives was Scriven, in 1967, though his perspective was primarily epistemological. His first level, entitled a 'conceptual description of educational objectives', gives priority to conceptual structure and to student motivation. His second level, 'manifestation dimensions of criterial variables', is concerned with the various ways in which students' conceptual knowledge and understanding and their attitudes and non-mental abilities may be manifest or made observable. The third level provides an operational description of an objective in terms of how it is to be assessed. Thus, Scriven’s second and third levels correspond fairly closely to those of Kratwohl, but the first level has quite a different character, being based on curriculum content rather than on general goals. Both Kratwohl and Scriven say that level one statements of objectives can guide the development of level two objectives, and that level two statements can guide level three. But this process is more complicated than simple logical deduction. There is no defensible set of rules or procedures for deriving specific objectives from general objectives because, according to Hirst’s point of view, (1973): selection decisions are made involving judgements about appropriateness and priority; the kind of analysis required goes beyond the existing state of philosophical and psychological knowledge.

In 1970, Gronlund makes a useful distinction between minimum essentials and developmental objectives. While minimum essentials can be handled as level three objectives, developmental objectives are so complex that:

- Only a sample of key behaviours can be tested.
- Teaching is directed to the general behaviour in the objective, not to the specifically tested sample.
- Standards of performance are difficult to define, so it is best to direct each student towards the maximum level of development he/she is capable of.

A radical distinction is made by Eisner in 1969. He argues for separate treatment for instructional and expressive objectives. While instructional objectives can be pre-specified and mastered, expressive objectives are concerned with outcomes that cannot and should not be pre-specified because some form of original response is being sought. An expressive objective may specify an educational situation or task, but it cannot predict what will be learnt from what is intended to be an idiosyncratic response. While more usually associated with art and literature, the term is equally applicable to essays/projects in which students are encouraged to develop personal perspectives and insights.

### 2.3 Objectives guiding foreign language curriculum development in engineering education

Objectives may be used in curriculum development without any assumption that more detailed specification by teachers or by instructional designers will necessarily follow. The arguments in favour of using objectives for curriculum development purposes alone would appear to be: that they clarify the intentions of the developers and that they focus attention upon the learner as well as the teacher. What the use of objectives cannot do is to resolve disputes over what should be taught, though sometimes they may help to map out the issues. Objectives at the second level will never be devoid of ambiguity, and some educators are more skilful than others in using the language of objectives, so the question whether or not objectives do indeed clarify intentions can only be answered in terms of individual cases. At institutional level, however, the context of curriculum specifications is quite different since formal curriculum documents are only a small part of the communication among the teachers concerned. A statement of objectives has a strong index character in which its meaning is enriched by,
and partly dependent upon, other communications occurring before, during and after its preparation.

An important criticism from a theoretical rather than a practical perspective does not concern the use of objectives, actually, but focuses on the approaches to curriculum development which assume that statements of objectives are adequate on their own in the first stage of curriculum planning. Several authors, such as Stenhouse in the '70s, have argued for prime attention to content; others for an early consideration of assessment, which often counteracts the impact of objectives; and yet others for the early specification of certain crucial and often non-traditional learning experiences such as project work, community service, work experience, or artistic performance. Many of these other curriculum elements can be so important for a course that they need discussion prior to any detailed formulation of objectives. Moreover, when curriculum development is viewed as a problem-solving activity with a premium on creative imagination, an early emphasis on objectives may lead only to the reformulation of traditional practice at a time when more radical change is what is really needed, as Eraut envisaged in 1976. Thus, when the emphasis is on curriculum innovation, objectives may not be a starting point but a late development of the curriculum maker’s platform, in Walker’s opinion, expressed in 1971.

The argument against using objectives which has probably received the greatest support is that they are only appropriate for some areas of the curriculum. In 1969, Eisner has eloquently argued against behavioural objectives in the arts, Stenhouse, in 1971, against their usefulness for describing higher level learning in the humanities, and Eraut, in 1975, has questioned their utility in the field of social sciences. In all these cases it is the individuality and complexity of students’ work which is said to limit the applicability of the language of objectives. Two major issues are at stake—the nature of the subject and the autonomy of the learner. Both have been and will long continue to be matters of debate among educators, although many would now agree that objectives are more helpful in some situations than in others. The main problem lies in recognising those situations in which the use of objectives is appropriate.

Given the problems of deriving, formulating and justifying objectives, it is safer if, in the context of the education system as a whole, objectives were regarded as means, rather than ends. Planned courses and curricula constitute the means by which students are guided towards a variety of ends. In this context, the language of objectives provides one modality of clarifying intentions during the planning process.

2.4 The impact of objectives on planning foreign language lectures and seminars

The claim that highly specific objectives (Kratwohl’s first level) improve the quality of lesson plans and, subsequently, students’ performance, is argued against by asserting that good unit planning is logically dependent on knowing what one is trying to achieve, and that it necessarily entails learning objectives. Both parts of this assertion have been challenged. To begin with the second, one counter-argument is that teachers know what they are doing because they are working within a recognised teaching tradition. Provided that they can relate the content of their lessons to a topic on a syllabus, a chapter in a textbook, or a possible question in an examination, they need no separate list of course objectives. Once a tradition is clearly established, objectives become redundant. The use of objectives in such a context is less likely to be one of defining the course, or one of inspiring teachers to move their students beyond the level of routine completion of textbook exercises and memorization of content.

When more informal approaches to teaching are adopted, objectives are less likely to be implicit in textbooks/syllabi/examinations. Sackett, in 1976, argued that objectives were totally inadequate as descriptions of teachers’ ends because a teacher always has other equally important ends, to which his/her actions were directed: being fair to groups, getting students to ask questions, building up weaker children’s confidence, developing inter-pupil discussion, and so on. Though one can argue that these procedural aims should be included as general course objectives, they need to be pursued over a long period. Such aims have a justifiably important influence on teaching, but it cannot be converted into specific objectives for individual lessons.

Another criticism came from Jackson, in 1968: during his interviews with teachers judged as outstanding, he discovered that both their planning and their classroom actions were not aimed directly at achieving objectives, but at creating productive learning conditions & securing student involvement. So, good lesson planning depends on appropriate activities and strategies to achieve a high degree of student participation. Where there is no established tradition, course objectives are helpful in choosing among possible activities and in alerting teachers to use all special opportunities; but it is unreasonable to expect a teacher to sustain detailed knowledge on how each of his students is progressing towards each of many objectives in every single lesson. Worse still, it might distract the teacher from the primary task of securing involvement in learning.
A further argument against using highly specific objectives in lesson planning is that they over-constrain the teacher. Both Jackson and Socket characterise good teaching as being strong on opportunism. Moreover, as early as 1968, Atkin suggested that higher order objectives were best pursued whenever the opportunity appeared, rather than according to pre-planned schedules. Eisner’s expressive objectives also resist precise planning.

3 Problem Solution
Each of the 3 domains in Bloom’s taxonomy, Cognitive/Affective/Psychomotor, relate to 3 basic learning outcomes: knowledge, attitude, and skills. The domains are also split into levels ranging from primary to the highest order. The verb chosen for the learning objective can be changed according to these domains and levels, in order to vary the difficulty or entirely change the degree of the outcome.

3.1 The need for more highly qualified, certified foreign language teachers:
• Address/correct the shortage of highly-qualified language teachers by increasing the number of avenues by which teachers demonstrate competence and become certified at all levels of education, and by voluntary standardization of this process;
• Address/correct current foreign language teachers shortage by providing scholarships, funding, study abroad opportunities, and other incentives to foreign language students and professionally competent graduates with language proficiency to pursue credentials for language teaching careers;

• Increase funding and incentives for teacher professional development opportunities, including study abroad and language immersion experiences, to increase the number of highly qualified language teachers at all levels. Legislation&adequate policies ensure future national workforce, better equipped with the necessary communication and cultural skills to become active participants in a global society. Students thus have language resources to compete with peers around the world for job opportunities, also providing their country with professionals prepared to deal with national security, economic stability, clever diplomacy, and other critical issues and challenges, typical of our century’s development.

3.2 Use of objectives in instructional design
Instructional design commonly refers to the design of teaching/learning materials by a specially designated team, who may/may not include teachers responsible for their implementation. The claim that using highly specific objectives at Kratwohl’s third level improves the quality of instructional design is prominent in literature, and is often taken for granted. It would be more reasonable if the opinion above were restricted to the following: highly specific objectives are needed for individualised learning programmes based on mastery learning, having much stronger theoretical and practical backing.

3.3 Use of objectives in evaluation
It is in the context of evaluation that the concept of objectives has been continuously used and elaborately improved. Tyler’s primary concern was with evaluation and the taxonomies were also developed for evaluation purposes. Intended student outcomes can often be expressed either as objectives or in terms of performance on some task or in some anticipated situation. Thus, an evaluation concerned with the achievement of intention will usually need either to collect existing evidence of student performance (folders of work, test papers, etc.) or to devise some means of assessing what students have learnt. If differentiated comment on student performance is required, this can be done by separate reports on each performance task or by using objectives list and commenting on each achievement. Classification schemes may be used to help set out the range of objectives, in data analysis stages or in constructing assessment instruments wherever necessary. The convenience of collecting student achievement data in this way and using them for improving the course by what is called formative evaluation is what led to Tyler’s model of curriculum development, and it helps to explain the continuing popularity of that
model with many evaluators, as Bloom specifies in 1981. Moreover, as other disputes about performance (Stake, 1973) and careful studies of test performance (Cicourel, 1974) have revealed, the kind of cognitive behaviour which leads to a particular performance is not necessarily the same as the one intended. Students interpret tasks differently and get tested in different contexts. Thus, the utility of information on objectives and achievement depends on additional information about conditions which assist in their interpretation. Even statements of objectives must be seen in context, as they are not absolute criteria, but mere indications of people’s attempt to express their intentions. A further problem in evaluating large-scale educational programs is that objectives are negotiated as part of political compromise, thus being ill-suited for program evaluation on educational objectives (Cronbach 1980). Closely related to using objectives in evaluation is their implementation in monitoring student achievement/accountability.

3.4 Use of objectives in communicating to engineering students in foreign languages

There is more empirical evidence on this issue than on any other use of objective, and several reviews on the topic have been published throughout time: Hartley and Davies, 1974; Faw and Waller, 1976; Lewis, 1981. As ways of drawing learners’ attention to what is expected of them, Hartley&Davies discuss pre-tests, overviews and advance organizers. Faw and Waller also include inserted questions. Most of the evidence reported is based on work with college/high-school/technical university students, and little with other populations, and it has emerged from situations of learning from textual material rather than a teacher. All in all, clear indications given to students enhance their learning and objectives are only one modality of doing it. However, the list format which is commonly used to communicate sets of objectives is not suitable for conveying structural information.

There may also be considerable differences between structures embedded in course materials, structures in the teacher’s mind, and structures developing in each student’s mind. When objectives compilers pay attention to structural assumptions, they frequently turn to the concept of learning hierarchy. A group of objectives is said to constitute a learning hierarchy when it can be represented by a structure similar to a family tree, where achieving each objective depends on achieving all objectives connected to it on levels below. A hierarchy is developed by logical analysis, breaking down an objective into sub-objectives until each step is a clearly distinguishable learning task. From students’ perspective, what matters most is the position of objectives on an immediacy/remoteness scale. Many objectives appear both as conceptually remote (because they are far from what seems to be relevant in the community outside school) and as temporally remote (because their utility is put off).

Perceiving links between their immediate objectives and possible final goals can be crucial for students’ motivation. The suggestion is that objectives being communicated to students should be accompanied by individual rationales or justifications, which relate them to more distant and more valued goals.

4 Conclusion

Educational objectives cannot be considered in isolation, either from the accompanying ones or from those intended to come before/after in a planned sequence, being necessarily embedded in structures of intentions, described explicitly in plans/documents or left implicit in curriculum organization.

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