

Editorial

## Misjudgement and Misuse of the Learning Objectives

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### Abstract

In medical education, the curriculum passes through at least four stages between vision and learning of students namely: “intended” to “planned” to “implemented” to the “learned” curriculum. The most important safeguard for keeping these formats compatible is the quality of the aims and objectives. This editorial describes the hierarchy of the educational objectives, their importance, types, sources, and qualities and best ways to formulate effective learning objectives that link learning and outcomes to the vision and consequent aims. Also, the article highlights the common misjudgements and misuses of the learning objectives which may produce different and certainly poorer outcomes than those planned for.

Keywords Learning Objectives, Curriculum, Misjudgement

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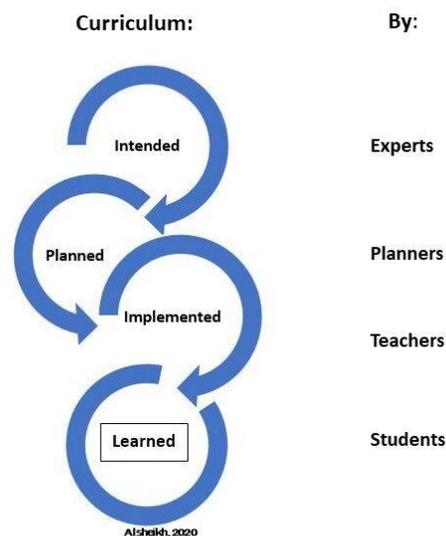
#### Compliance with ethical standards

**Conflict of interest** the authors declare no conflict of interest

In medical education, it is crucial that the planned goal of any program curriculum is achieved. It is easy to set a mission for the college of medicine for the purpose of realizing its vision. It is also, vital for the college staff and students to be aware of and to believe in such vision and mission and work towards achievement. One of the most decisive elements of the demanded success is related to the program teaching/learning objectives. These objectives should be particularised to enable both teachers and learners to serve this drive.

It is well accepted that curriculum is differently presented and further noted to be differently implemented.<sup>1</sup> Between vision and learning, any curriculum traverses through four different curricular stages/types: the ideally “intended” curriculum format in

the mind of the visionaries which is then planned as a “written” curriculum by a team of experts. The written document will later be “implemented” by teachers to reach the last stage when the “curriculum” becomes the attained or “learned” curriculum.<sup>2</sup> See below figure 1.



The Four Curriculum Traversing Stages  
[Based on Curriculum typology, Kurz et al, 2010]

Figure 1. Curriculum from conception to evaluation.<sup>2</sup>

The critical question here is, how can we guarantee that the intended or at least the planned and written curriculum is, at the end, learned by students as it is intended to be learned? No doubt, many factors contribute to achieve or miss such a tough guarantee. The most feasible and crucial element which adheres to the different stages of curriculum lies in the way the *educational objectives (EO)* are covered and formulated. They are the leading guide through the above four stages and as much as they are correctly written, the more compatibility between the four stages is secured. Therefore, it seems empirical to overcome any chance to misunderstand, misjudge and misuse the educational objectives.

Educational objectives, or Learning Objectives (LO), or Intended Learning Outcomes (ILO) are statements that clearly describe what the **learner/student** will be able to do or to behave after having attended an **educational program or activity** that s/he could not do before. See figure 2.

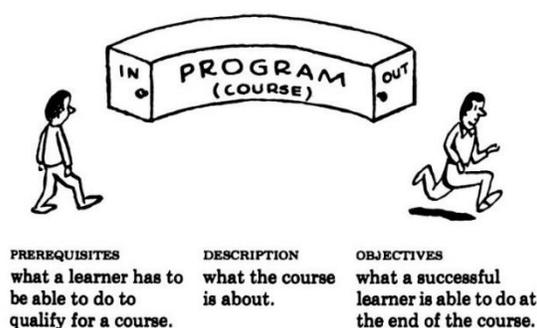


Figure 2. The meaning of learning objective.<sup>3</sup>

Educational objectives can be categorized according to the: (1) Targeted levels in being general objectives, at the level of the whole program or being intermediate objectives, at the level of each of the study years or each of the subjects/units/blocks or being a specific objective at the level of individual

educational activity like a discussion session, a lecture, a seminar, a training session, or any self-learning setting. (2) Targeted functions as aims and goals, as instructional or as learning objective. This short article is devoted to the learning objectives (LO).

### What is a learning objective?

A specific learning objective is “a clear, concise and specific statement of observable student behaviors that can be evaluated at the conclusion of the learning activities and contributes to reaching the goal.” In other words, LO deals with learning and with its aim. Learning has to do with students acquiring new skills and knowledge; objective is a direction guiding the student on what to learn and where to end up through the educational activity. First, the learning objective states what the learner will be able to do. It is not a description of the course materials or something that the teacher does. These are two common misconceptions or errors. So, if you are teaching and training a medical student, the learning objectives are what medical students should ultimately be able to do upon graduation and when the undergraduate training is over. And second, it is something the learner performs—some form of action that can be observed, verified and measured. Mager says: “If you are not certain of where you are going you may very well end up somewhere else, and not even know it”.<sup>3</sup>

In his 1962 book “*Preparing Objectives for Programmed Instruction*”, Robert F. Mager invented and pioneered, a new approach to instructional design which involved establishing objectives for instruction and hence, the first mention of “learning objectives”. This made such an impact that in later editions, it could be said, the manual for preparing instruction because of its clearly outlined steps on how to define objectives. It was so revolutionized

instructional methods that a bill was passed by the government of California that required teachers to describe what they wanted their students to achieve, i.e. behavioral outcomes, by writing these as objectives. Mager, (June 10, 1923-May 11, 2020), found that establishing objectives could easily be misjudged and misused. He went further to formulate clear steps that would clearly guide the process of defining solid and measurable terminal objectives i.e. outcomes. This resulted in the publication "*Goal Analysis*" in 1972.<sup>4</sup> This work became a cornerstone of the "Criterion Referenced Instruction" (CRI), as well as addressing areas of goal orientation, student motivation and evaluation, educational change, performance technology, and [instructional design](#). Even after almost 6 decades, and though there are other schools of thought about learning objectives, what Mager had to say is still a solid advice in many cases.

### Measuring learning objectives

Browsing the curricular educational activities in websites of the Iraqi medical colleges, clearly discloses the way and format used in writing the aims and learning objectives with number of deficiencies and shortcomings. Almost all LOs give the impression to have been written separately by dispersed departments, committees or even individuals. The adopted statements of mission and general institutional objectives are not reflected or connected to the courses and activities objectives. While mission and general objectives focus on life-long-learning (LLL) and production of competent graduate, the specific learning objectives focus on knowledge rather than intellectual skills. Furthermore, the specific learning objectives lack measurability and specificity. In the majority of colleges, the LOs are written according to sequence and content of the syllabus of departmental subjects rather than competencies required upon graduation. It is

easy to discover the close linkage between current learning objectives and syllabus contents. Examples include: "At the end of the clinical course, fifth year students should know the following..."; "Teaching the student to be able to think critically"; "To understand the role of the pathologist as a member of an integrated medical team responsible for the diagnosis of the medical case..."; "Teaching students to adopt the idea of long-term learning". Most of the LOs contain memorising acts like describe, discuss, define, recite, list, enumerate...etc. This is unfortunately found even in the colleges adopting the integrated curriculum. Learning objectives can be measured by examining the act in response to questioning. For example, when we use the verb describe in the knowledge domain, what would the student "do" to answer the following question: "Describe the so and so". The student will remember what s/he memorized and answer. But when we ask student in response to LO using the act of "differentiate", s/he will need analytical skills to be able to answer. Furthermore, when we use the act of "decide" in LO, student will need problem solving skills which is a much higher level of intellectual skills to comprehend, organize and then collate different aspects of data to solve a problem. Similar method is applied in testing and measuring of LOs on manual and affective skills.

### Sources of learning objectives

In writing the LOs, credible and relevant sources need to be identified. The unflinching source is neither the currently used syllabus nor the table of contents of textbooks for different subjects. The right way is to go through a process of analysis of the adopted graduate outcomes that every medical college should have done such adoption. The analysis starts with the role, functions, activities, tasks

which can be subjected to further analysis to yield 3 needed enabling skills namely intellectual skills (knowledge), psychomotor skills (practical skills) and affective skills (attitudes and behaviors.) With such elaborate series of analysis, the specific learning objectives will be designed and written to train medical students to enable them to perform the required tasks in order to achieve the prescribed role they are expected to play upon graduation. Therefore, all medical colleges should adopt a graduate outcomes document to enable faculty to design relevant, unambiguous, feasible, logical, observable and measurable learning objectives.<sup>5</sup> The resulting three enabling skills categorize the learning specific objectives into three categories: knowledge-based, skills-based and affective learning objectives.<sup>6</sup>

#### **Composition of learning objectives**

There are several recommended approaches to describe the composition of LOs. However, we have used a simple and vibrant formula ("A<sub>v</sub>C<sub>3</sub>" Formula) in training staff and also, students during their repeated routine daily learning activities.<sup>7</sup> Any specific learning objective should be composed of four equally essential components: the act or active verb (A<sub>v</sub>), the content (first C), the condition (second C) and the criteria (C<sub>3</sub>). In reality, Act, Content and Condition constitute a task that a doctor performs during health care work. The criteria in LOs are added to tasks specify the level of performance of the act according to the student's level of competence in training i.e. years of study.<sup>6</sup>

The act (verb) is the description of the task aimed at and it is expressed by an active verb and not any immeasurable and inactive verb like to understand, to know, to believe in. Active verb leads to a specific and measurable action by the learner. The

inactive verbs can be exposed by presenting the verb in a question and ask the student: do you understand this or that, do you know, do you believe in so and so? Simply, one can imagine the student's FULL answer will be "yes". In such case, the logic dictates that such answer will get the maximum score for the question which is a false scoring as answering yes does not guarantee understanding, knowing, or believing because student cannot demonstrate that act by doing. When writing a LO, put it in a question format and see how this LO is performed to discover false and inactive verbs and also locate which level of performance of the knowledge, manual or affective skill.

The content of the LO, specifies the subject in relation to which the act is to be performed e.g. to "list symptoms" means what to list. As much the content is clearly defined, the more the LO will be specific. The condition is the description of the circumstances in which the act must take place (data, restrictions and limitations.) The criteria mean the definition of the acceptable level of performance expected from the student in relation to the stage of study. For example, a learning objective to measure blood pressure can have criteria of recording the systolic and diastolic pressure of up to 20 or 10% error when the LO is used for a student in first year of medical study and the range of error will be minimised in forthcoming years of study.

Let us take an example specific learning objective and identify each of its elements. The LO states: By the end of the course of diagnostic radiology, fifth-year student will be able to "Identify, on frontal X-ray films of the thorax, the presence of opacities of the pulmonary parenchyma of more than 2 cm diameter in any of presented 3 x-rays." The LO will be dismantled into its Act: "Identify the presence" indicates the act to be

performed. Content, what to identify: "Opacities of the pulmonary parenchyma." Condition, where: "Frontal X-ray films of the thorax". Criterion: The student must identify "any opacity of >2 cm" in "any of the 3 provided x-rays."

In order to perform the above stated LO, students must receive appropriate knowledge in the subject at both basic and clinical aspects, proper training on how to apply the knowledge to perform the act of identification, a proper training on how to handle, position and read the x-ray sheets, and a practical training on how to observe the positive attitude towards sickness and privacy, and a repeated training on how to behave positively and communicate effectively with those involved during the act. No doubt, these three categories of LOs (intellectual, manual and affective skills) cannot be separated and usually and practically students need to gain ability to apply relevant knowledge and to acquire manual and affective skills needed to perform any prescribed task. This act is a clearly integrated act and training needs to be as integrated as the act is performed in reality. It is not accepted to have the knowledge part in a separate lecture, the manual skill in a skills lab and the affective skills in a lecture on ethics.

On the other hand, learning objectives for any of these three domains (knowledge, skills and attitude) is categorized into 3 levels of performance. A junior student will start with lowest level and proceed in the study to reach the highest prescribed level of performance at time of graduation. Each level of each of the three categories of LO are shown in table 1 below.

In conclusion, misjudgement and misuse of learning objectives embrace a variety of wrong-doings like: deriving LOs exclusively from syllabus without referring and working on adopted graduate outcomes and college's general educational objectives. In this way, there will be weak linkage, if any, between the intended, the planned, the implemented and the learned curriculum. The poorly constructed LOs lead to poor learning and poor outcomes. The choice of the right and specific active verb in all LOs is crucial and can make-or-break the quality of the whole curriculum. The other most important issue to observe is the adoption of the same format of any of the LOs in teaching, in training and conditionally in student assessment. Learning objectives and training in the areas of manual skills and behavioral skills can be valueless if teachers focus and give higher share of the score in student assessment to theory memorization more than skills. The last and most important misuse of LOs materializes when teachers keep the LOs for themselves as guide for teaching and ignore sharing with students well ahead of the educational activities so that students can make use of them as guide to seek as many sources as possible to fulfil their prescribed objectives and accomplish their self-learning skills.

Table 1. Hierarchy of learning objective for intellectual, manual and affective skills.

L		Knowledge-Based LOs	Practical Skills-Based LOs	LOs for Affective Attitudes and Behavior
Level 1	To recall	The lowest level of thinking is to memorize and to be tested by recall of facts, principles, processes, patterns and methods necessary for efficient performance of a professional task. <b>Example:</b> The student must be able to communicate orally or in writing without constant reference to a book, a dictionary or other text. <b>Action verbs:</b> define, label, list, name, describe, discuss, explain, identify, indicate, locate, recite.	To initiate actions of a model <b>The first level</b> is that of Imitation. The student, exposed to an observable action, makes an attempt to copy it step by step, guided by an impulse to imitate: s/he needs a model. <b>Example:</b> A student who has seen intramuscular injections performed before her/him several times tries to imitate the movements involved. <b>Action verbs:</b> Imitate, emphasize, handle, visualize.	To show receptivity <b>Receiving:</b> Demonstrate a will to participate, it implies sensitivity to the existence of a certain phenomenon and includes a willingness to receive. <b>Example:</b> Noticing the anxiety of a patient awaiting the result of a laboratory test for a disease that can have serious consequences. <b>Action verbs:</b> Detect, note, discover, distinguish and find other's feeling or concern.
Level 2	To interpret	The second level is that of Interpretation of data. This is a process of application or use of ideas, principles or methods to deal with a new phenomenon or situation. <b>Example:</b> After analyzing observable data, the student interprets their meaning, grasps their relationships and arranges them into a known pattern. <b>Action verbs:</b> Analyse, apply, calculate, categorize, chart, circle, compare, compile, differentiate.	To show affective control of skill <b>The second level</b> is that of control. At this stage the student is able to demonstrate a skill according to instructions and not merely on the basis of observation and begins to differentiate between one set of skills and another and to choose the one required. <b>Example:</b> The student becomes accustomed to carrying out certain routine minor acts under supervision. <b>Action verbs:</b> exemplify, show how, demonstrate, exhibit.	To supply a response <b>Responding:</b> Show sufficient interest in the phenomenon noticed and to do something about it. <b>Example:</b> In the case described in the previous example, the response would be to say a few reassuring words to the patient so that s/he does not feel alone. <b>Action verbs:</b> Aid, assist, explain, respond, support, supply, suggest
Level 3	To solve problem	The highest level is that of problem solving relating to diagnosis, treatment, organization, etc. This at best should include finding solutions for a problem arising from new situations with no precedent to serve as a guide. <b>Example:</b> The student, faced with a pathological condition for which s/he has not been prepared, is able to get on the right track by applying scientific methods and a sound experiential approach. <b>Action verbs:</b> Audit, create, decide, diagnose, evaluate, organize, resolve, solve, treat.	To perform automatic efficient skill <b>The third level</b> is that of Automatism. A high degree of proficiency is attained in using the skill, which now requires only a minimum of energy. <b>Example:</b> A trained student upon graduation performs intramuscular injection carefully and without causing any discomfort and if trained, skillfully demonstrates the act of injection in a skills lab. <b>Action verbs:</b> operate, manage, measure, record, perform, cut, suture, inject.	To adopt a feeling <b>Valuing:</b> This implies that student's perception of a feeling has found a place in her/his scale of values and has affected her/him to adapt attitude to the value system of the others as if s/he was experiencing the same. <b>Example:</b> On the death of a child, student's attitude to members of patient's family will show them that s/he cares about their grief and are ready to help them to get over it. <b>Action verbs:</b> Care for, collaborate, communicate, cooperate, encourage, take responsibility.

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The three levels of performance of learning objectives for intellectual, manual and affective skills and behavior.

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## الخلاصة

### سوء تقدير واستعمال أهداف التعلّم

يعتبر تحقيق الهدف المخطط لأي منهج دراسي الغاية الأساسية من التعليم الطبي ومن السهل تحديد رسالة كليات الطب لتحقيق الرؤية التي تسعى الوصول إليها على المدى البعيد. ومن البديهي والأهمية أن يدرك كل العاملين في الكلية وطلابها ويؤمنون بهذه الرؤية والرسالة والعمل على تحقيقها ويرتبط ذلك النجاح بتوفر عنصر هام وحاسم وهو وجود أهداف التدريس والتعلّم في البرنامج ومدى عكسها وتناغمها مع الرؤية والرسالة لتمكين كل من الأساتذة والطلبة في تحقيق هذا الدافع. ومن المعروف الآن أن أي منهج يمر بصيغ أربعة بين الرؤية وإنجاز عملية تعلّم الطالب وهي صيغته المقصودة والمخطط لها ومن ثم الصيغة المطبقة إلى الصيغة التي تعلّمها فعلاً الطالب ولا يوجد أي رابط بين النماذج الأربعة أفضل من الأهداف التعليمية التي تبدأ بالرؤية وتنتهي بتعلّم وتخرج الطالب. يصف هذا المقال أهمية الأهداف التعليمية ومصادر وأجزائها وكيفية كتابتها وكيفية تجنب حالات وقوع المخطط بأخطاء تؤدي إلى سوء تقدير الأهداف وسوء استعمالها مما يؤدي إلى جعل مخرجات البرنامج التعليمي تختلف عما قصدها المخطط.