Abstract

Instructional design is the art and science of creating an instructional environment and materials that will bring the learner from the state of not being able to accomplish certain tasks, to the state of being able to accomplish those tasks.

Implementation of the instructional design in physical education lesson requires five steps: Analyze – analyze learner characteristics, tasks to be learned; Design – develop learning objectives, choose an instructional approach; Develop – create instructional or training materials; Implement – deliver or distribute the instructional materials; Evaluate – make sure the materials achieved the desired goals.

This work is trying to present each step of this process and to find out the role instructional design is playing in the physical education lesson.

Keywords: instructional design, physical education, ADDIE model, objectives.


1. Introduction

Instructional Design falls under the area of forecast, encountered in educational management, beside prognosis and scheduling activities in view of elaborating the strategy for approach in the teaching process (Reiser, R.A.& Dempsey, J.V. 2012).

Design is closely connected to the organization, management, coordination and control of the actual activity.

Design represents the anticipation and preparation of teaching and educational activities based on a procedure system, expressed in training programs differentiated according to the performance increase (Smith, P.L.& Ragan, T.J. 2004).

As a process instructional design is the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction. It is the entire process of analysis of learning needs and goals and the development of a delivery system to meet those needs. It includes
development of instructional materials and activities, and tryout and evaluation of all instruction and learner activities.

2. Theoretical basis

The education design of the teaching process represents the combination of actions and procedures engaged in the education/training activities in accordance with the goals set at the system and process levels, in view of ensuring its social functionality in terms of management, entirety, optimum efficiency, strategy. From managerial point of view, teaching design blends prognosis and projection, planning and scheduling, this being due to the special complexity and increased difficulty of the activity (Merrill, M. D., Drake, L., Lacy, M. J., Pratt, J. 1996 ).

The peculiarity of the teaching design activity highlights the importance of planning - scheduling - materialization of training/education which targets optimal use of an essential material resource: actual time-frame set for learning, in school and extracurricular environment. From this perspective, teaching design is carried out as:

a) overall design, which covers the entire period of a level, stage, learning cycle, aiming, in particular, the elaboration of teaching plan and general criteria for the elaboration of training programs;

b) structured design, covering the period of one year, semester or an actual teaching/learning activity, aiming, in particular, the elaboration of training/education programs and the criteria for the operationalisation of general and specific objectives of training/education programs.

The teaching design activity consists in two operations applied globally and gradually (Cerghit, I., 1980):

A. Definition of the criterion of optimality of the training/education plan or programs, this operation being carried out:
   a) in absolute terms by reference to standards of competence and performance established as informative – formative objectives, structured on maximum, medium, minimum levels;
   b) in relative terms, by reference to set standards, as concrete objectives, at school level, in various moments of their progress.

B. Analysis of components of the training/education program or plan, this operation being achievable by establishing links between:
   a) undertaken teaching objectives;
   b) appropriate teaching contents for each level of teaching plan – programs – activity;
   c) strategies of teaching-learning-evaluation, adjustable to various internal and external learning conditions.

What does projection include in terms of instructional design?

1. Inclusion of the respective activity in the system of lessons/school or in the thematic plan.
2. Setting objectives in terms of content and the longer-term result of training. Avoidance of scattering in too many and detailed objectives that lose their operational value.

3. Selection, logical structuring, essentialization of content and implementation of a logical sketch, without clumps and zigzags.

4. Elaboration of strategy, i.e. the methods and articulated means according to objectives.

5. Prefiguring evaluation according to objectives.

Instructional Design represents the art and science of creating instructional environment, as well as the means, required to help the pupil or student evolve from the incapacity to solve certain tasks to the level where he/she is able to carry them out.

Instructional Design is the systematic process of turning general principles of instruction and learning into learning plans and training and to create the instruments required for training (Morrison G., 2010).

Robert Gagné in 1985 classified the types of learning outcomes. To identify the types of learning, Gagné asked how learning might be demonstrated. These can be related to the domains of learning, as follows:

**Cognitive Domain**
1. Verbal information - is stated;
2. Intellectual skills - label or classify the concepts;
3. Intellectual skills - to apply the rules and principles;
4. Intellectual skills - problem solving allows generating solutions or procedures;
5. Cognitive strategies - are used for learning.

**Affective Domain**
1. Attitudes - are demonstrated by preferring options;

**Psychomotor Domain**
1. Motor skills - enable physical performance;

According to Gagné, learning occurs in a series of learning events. Each learning event must be accomplished before the next in order for learning to take place. Similarly, instructional events should mirror the learning events:
- Gaining attention: To ensure reception of coming instruction, the teacher gives the learners a stimulus. Before the learners can start to process any new information, the instructor must gain the attention of the learners. This might entail using abrupt changes in the instruction.
- Informing learners of objectives: The teacher tells the learner what they will be able to do because of the instruction. The teacher communicates the desired outcome to the group.
- Stimulating recall of prior learning: The teacher asks for recall of existing relevant knowledge.
- Presenting the stimulus: The teacher gives emphasis to distinctive features.
- Providing learning guidance: The teacher helps the students in understanding (semantic encoding) by providing organization and relevance.
- Eliciting performance: The teacher asks the learners to respond, demonstrating learning.

- Providing feedback: The teacher gives informative feedback on the learners' performance.

- Assessing performance: The teacher requires more learner performance, and gives feedback, to reinforce learning.

- Enhancing retention and transfer: The teacher provides varied practice to generalize the capability.

Instructional Design capitalizes the actions and operations of forward-looking objectives, contents, learning strategies, evaluation tests and, particularly, relations between them, on the background of a way to organize the educational process (Gagne, R.M.&Driscoll, M.P., 1988).

The implementation of instructional design involves five steps, the so-called ADDIE model: analysis, design, development, implementation and evaluation.

Analysis – analysis of learner's characteristics and of the tasks to be learned;
Design – setting objectives;
Development – creation of instructional materials;
Implementation – distribution of instructional materials in line with requirements;
Evaluation – ensuring that the resulting materials are useful in meeting the pursued targets.

![ADDIE model](image)

3. **The role of instructional design in physical education lesson**

As an extension of the ADDIE model, shown above, steps in the teaching design can be configured, those steps actually being the answer to four concrete questions, always formulated in the same order:

- **Step I** - answers the question 'what will I do?' and refers to stating the pursued educational objectives;
- **Step II** - answers the question 'what will I do with?' and refers to the available educational resources;
Step III - answers the question 'how will I meet the set objectives?' and requires precise determination of educational strategies appropriate for meeting the objectives;
Step IV - requires the implementation of a system for assessing the effectiveness of the carried out activity, in order to answer the question 'how will I know if the results are as initially intended?'

Each of these steps requires a series of operations adjusted to the specifics of the physical education activity.

3.1 - Specifying objectives

Objectives for the physical education activity are structured on three categories (Colibaba, E.D., 1996):
- framework objectives
- benchmark objectives
- operational objectives

The first two categories of objectives are formulated at the level of physical education programs, thus, each framework objective is associated with two or more benchmark objectives.

In order to achieve the benchmark objectives, the teacher can organize various types of learning activities. The teacher may choose some of these activities or develop custom activities. Benchmark objectives are met with the help of content units. The teacher selects from the list of 'learning contents' those content units which intercede attainment.

The operational objective specifies noticeable behaviour, required by the action aimed at achieving a more comprehensive objective, as well as the specific objective (reference) or general objective (framework). The formulation of an operational objective must be clear and consistent within the alternation of approach in lesson or lesson cycle, concurrently being subject to the provisions of the specialized curriculum, ensuring the achievement of the benchmark objectives and framework objectives.

Setting operational objectives involves a number of operations which must be taken into account in practice (Epuran, M.& Horghidan, V., 1994):
- correction of physical skills which have not been properly apprehended
- improvement of physical, cognitive, learning, progress, development skills
- new acquisitions

The enunciation of operational objectives should include verbs which indicate observable behavior. Thus, several authors, who have studied this aspect, offer us a list of these verbs to facilitate the implementation in physical education:
- For cognitive objectives: to define, recognize, to express, to interpret, to reorganize, to explain, to implement, to develop, to restructure, to evaluate, to compare
- For affective objectives: to accumulate, to choose, to combine, to conform, to practice, to play, to help, to encourage, to harmonize, to organize, to manage, to resolve, to withstand
For psychomotor objectives: to identify, to recognize, to discover, to reproduce, to imitate, to achieve, to demonstrate, to execute, to coordinate, to apply, to turn to, to synchronize, to improve, to modify, to diversify, to interpret, to improvise, to anticipate, to form

Physical education can tackle, during the class, several types of objectives, according to its specificity (Dragnea, A. & Mate Teodorescu, S. 2002):

- Objectives of morpho-functional development – shall be carried out as a priority at the beginning of the lesson, within the link of selective influence of the musculoskeletal system and must:
  - to show the main body positions (sitting up, lying down, sitting down, leaning, hanging) and their derivatives;
  - to correctly execute imitatively exercises for various muscle groups and body segments;
  - to show basic positions and derivatives thereof for various body segments.

- Psychomotor objectives – targets the area of physical skills and physical capabilities, on the background of improvement of the workload capacity
  - to achieve and maintain top speed in motion;
  - to achieve and maintain optimum speed for take-off;
  - to execute in optimum conditions the beat - take-off phase of the long jump;
  - to demarcate;
  - to execute impulsion of the ball perpendicular to the ground (in dribbling);
  - to improve the technique of jumped ball shooting to the goal;
  - to improve the technique of hitting the ball with the hand (volleyball);
  - to maintain a constant tempo in the running on a predetermined distance or duration;
  - to create a concatenation of elements;
  - to correctly use of the acquired skill;
  - to execute a number of pull-ups, push-ups, sit-ups;
  - to be capable of a fast physical response to a sound signal;
  - to execute as many repetitions as possible of a physical exercise in a given time;
  - to execute in a specific rhythm exercises combined with various segments;
  - to improvise a physical response for a given theme;
  - to imitate a certain behavior;
  - to physically reproduce an attitude;
  - to diversify the physical responses;
  - to use the physical acquisitions to solve a problem.

- Cognitive objectives – perceive the ability to know themselves through physical abilities and discover the environment through specific actions of physical education:
  - to identify physical responses for various situations;
  - to explain various exercises subordinated to certain objectives;
  - to memorize and perform, at an optimal level, a complex of movements;
  - to know the ways to solve standard situations;
- to apply the regulation specific to a sports discipline;
- to participate in solving a collective task;
- to identify the situation favorable for the initiation of a counterattack;
- to discover new possibilities to make the most of the physical abilities;
- to observe and evaluate own performances or performances of colleagues;
- to elaborate a program of selective influence of the musculoskeletal system, independent, with objects, partner or music.

- Affective-social objectives – meet the need to relate with other partners or with the environment:
  - to collaborate with fellow classmates to solve a physical situation;
  - to make the most of the existing space in the indicated actions;
  - to translate a theme into gestures;
  - to express by means of physical skills certain states and emotional experiences;
  - to understand a physical message;
  - to help other colleagues while practicing some elements of increased difficulty;
  - to act independently or in team to solve a game situation;
  - to protect the integrity of the opponent in a confrontation of the game;
  - to comply with the regulation specific to a sports discipline.

3.2 – Analysis of educational resources
The second stage of the teaching design offers the opportunity to analyze all types of resources available to the teacher and have been classified as follows:

a. The learning potential – refers to the mechanisms of learning, skills, memory capacity, the bio-physical level proven by the group of students;

b. The contents of the teaching process – refers to the information, resources, provisions of the specialized curriculum;

c. Material resources – represented by the place where classes are held (classroom, outdoor), teaching materials, objects and specific facilities;

3.3 – Elaboration of educational strategies
The third stage should aim at streamlining the selection of teaching methods, operating systems, work groups and practice manners, according to the set objectives. This stage also includes and the core element of the physical education activity – control over the amount of given effort.

3.4 – Establishment of an evaluation system
The fourth and last stage of teaching design is imposed by the constant need for monitoring the process development, in order to make the necessary corrections, following a formative (continuous) or summative evaluation.
Evaluation can be defined as the process which allows identification of the level of compliance with the set objectives, in order to prevent delays, to timely find them, identifying and setting the necessary measures to prevent school failure, or in our case, sport failure (Tudor, V. 2005).

Assessment of participants to physical education based on a criteria system which must include:
- participant's progress as compared to the initial level;
- physical performance evaluated based on certain standards or in comparison with the results of the other participants;
- the level of physical development;
- the quantity and quality of accumulated elements;
- the ability to apply knowledge in competitions, in independent activity or daily life;
- ability to exercise independently physical activity;
- the level of theoretical knowledge;
- participant's attitude toward physical education.

In view of an objective estimate of the lesson, evaluation in the physical education class must take account of the following aspects (De Landshreere, G., 1975):
- effort in class;
- the content of the lesson;
- selected form;
- lesson progress.

4. Conclusions

The main direction of the design consists in the projection, prefiguration of the teaching activity according to the final expected results. Objectives need to be set out at macro-system level in order to define the limits for both the teacher and the student (or sportsmen), as well as the steps to be taken.

Instructional design helps the teacher (or the trainer) be interested not just into entry and results of the educational system, according to the classical scheme - Stimulus - Response, but also in the relation between the Stimulus - Response components.

Due to the design of the training process, the teacher is able to thoroughly distinguish the detail aspects of the group and individual activity, to find solutions, alternatives at the right time. Design's contribution is also obvious in terms of innovation of school training, which requires selection, organization, creative use of human and material resources.

REFERENCES