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FORMATIVE ASSESSMENT AS A MEANS OF FORMING THE PUPIL'S LEARNING TRAJECTORY

Halyna Voitkiv, Igor Lishchynskyy

The article examines the types of assessment in the modern school. The importance of formative assessment for the formation and development of personality, to achieve the designed learning outcomes, their correction and selection of tasks for individual work by each pupil to improve results is analyzed. Models of teaching in a modern school are described, and those that promote the development of individuals with «growth intelligence», for which formative assessment is used, are identified. The author determines the principles and functions of formative assessment, the methods of formative assessment and the list of most often used methods in practice by teachers. Particular attention is paid to the benefits of using digital tools for formative assessment and to the fact of their active use by teachers, especially in blended learning. The paper proposes to design the assessment process: designing assessment by a teacher in a course and in a topic with the creation of a visualized plan for pupils and designing assessment in class with pupils through joint setting of diagnostic goals, involving pupils in planning learning activities in accordance with principles of systematicity, planning, differentiation. The value of feedback for the formation of an individual educational trajectory is determined and the conditions of its effectiveness are given. The paper notes the importance of both formative and final assessment and their integrated use: formative assessment – to provide feedback and correction of learning, final – to record learning outcomes. Conclusions are made on improving the progress of pupils in learning when planning a course, topic and lesson, which includes assessment planning, with the active position of each, conscious participation in the creation of the educational process, adjusting their own trajectory

Keywords: formative assessment, individual educational trajectory, assessment planning, feedback

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1. Introduction

The assessment process is an integral part of the educational process, which has a significant impact on its quality. The perception of the assessment process as a component of the educational process that ensures its effectiveness depends on the competence of a teacher in this matter. There are different approaches to assessment, which can be grouped into two groups: traditional, which are focused on identifying results, levels of knowledge, for which assessment itself is important, and approaches that are focused on learners, on the personal progress of each. Perception of the disadvantages and advantages of different types of assessment, personal vision of the assessment process by a teacher influences the choice of means for its implementation. But whatever philosophy of assessment you choose, keep in mind that assessment results must be credible and reliable, and that assessment not only measures but also shapes knowledge. Formative assessment is becoming more and more popular with pupils and parents, for whom development and obtaining quality learning outcomes are important.

2. Literary review

There are a large number of publications in the scientific literature on the topic of formative assessment,

in particular, the use of formative assessment in higher education [1], assessment in the general secondary system [1–4]. If in the Ukrainian literature this approach is quite new, and the practice of implementation is tested in more detail in primary school, then in foreign publications it is studied and described quite widely.

According to Swiss researchers, formative assessment is "any assessment that helps pupils learn and develop" [5]. New Zealand scholars claim that formative assessment is a "two-way process between teacher and pupil in order to optimize the learning process", paying special attention to teacher-pupil cooperation [6, 7]. Formative assessment is "teacher and pupil activity that provides information that can be used to correlate the learning process", emphasizing the importance of feedback in the learning process [7].

The effectiveness of formative assessment is considered through the quality of feedback. From the analysis of the literature it becomes clear that formative assessment performs mainly corrective and educational functions - an indicator for pupils, through which they understand what needs to be done to improve personal performance. Formative assessment for a teacher provides the teacher's access to the formation of an individual learning trajectory of a pupil, to improve his/her learn-

ing outcomes: knowledge, skills, competencies, etc. Despite the large number of studies in this area, the issue of conditions for the effectiveness of formative assessment has not been sufficiently studied.

3. Research aim and tasks

The aim of the work is to study the conditions of the effectiveness of formative assessment in the formation of an individual trajectory of a pupil.

To achieve this goal, the following tasks were set:

- to explore the benefits of using formative assessment in the learning process;
- to determine the principles and functions of formative assessment;
- to study the existing and used methods of formative assessment of pupils;
- evaluate the benefits of using digital tools in the implementation of formative assessment;
- to prove the need for joint goal-setting and planning in the implementation of formative assessment and to develop a system of assessment planning in a course.

4. Materials and methods

The theoretical analysis of psychological-pedagogical and scientific-methodological sources in order to determine learning models, "personality types" that exist in the practice of school education and types of assessment and aimed at the type of personality with "growth intelligence" has been conducted. Regulatory documents have been analyzed to clarify the understanding of the basic concepts of the study, such as "formative assessment", "individual educational trajectory"; "feedback". Approaches to learning have been generalized depending on the type of intellectual intelligence. Methods of formative assessment have been systematized. The conditions of feedback effectiveness in formative assessment by observing the educational process and by means of questionnaires of pupils have been studied. A questionnaire has been conducted according to the "Assessment in my class" questionnaire in order to identify strengths and eliminate shortcomings in the formative assessment of a teacher. The designing of assessment planning at different levels (course, topic, lesson) has been developed in order to have an effective and holistic impact on the formation of an individual learning path of a pupil.

5. Research results and their discussion

The quality of education is a significant condition for the entry of an individual into the labor market, the formation of his/her ability to compete and economic and social status, which is possible today in the implementation of the concept of lifelong learning. The need to learn throughout life changes the understanding of learning processes, teaching approaches and the assessment process. In the fast-paced world of information, individuals with growth intelligence, who are characterized by the belief that the mind can be developed, who are able to accept challenges, who continue to work, despite the difficulties, learned from feedback and responses, who are motivated by the success of others, are successful [8]. Instead, individu-

als, who believe that "intelligence is what you have or don't have", who avoid challenges, give up easily, consider efforts a waste of time, ignore feedback, and feel threatened by the success of others, are difficult to adapt in today's world, have a fixed type of thinking.

Among the variety of models of teaching and learning that reflect the approaches to the organization of interaction between teachers and subjects of the educational process, a teacher should choose models that form the intelligence of growth. The following models are very popular and effective today: the developmental learning model (based on the scientific concept of the same name); the problem-based learning model (the main way is problem-based learning technology); the game learning model (the main tool - didactic game); pedagogical and andragogical learning models (differences of these models follow from the peculiarities of the position, held by a pupil); the personality-oriented model; active and interactive learning models; the self-regulated learning model. It is the formative approach that is used among the current approaches to assessment to form the "intelligence of growth".

Teacher assessment activities are currently being transformed from subject-oriented learning outcomes into activity-oriented and cross-curricular [4], to identify which the assessment, which not only captures the results, but promotes personality development, aims to improve them, is suitable. Formative assessment takes place throughout the learning process or course and, as mentioned above, aims to improve pupils' achievement of learning goals through approaches that can support specific pupil needs [9, 4]. The "key mission of formative assessment" is to support a pupil in learning. It is this help that contributes to pupils' confidence in their own skills, provides guidance and advice at some stages of learning, signals difficulties, provides a dialogue "teacher-pupil", forms a strategy for successful learning [10]. Although formative assessment is still a fairly new type of assessment, it is used in the educational process along with traditional approaches, so the principles and functions that are inherent in the traditional system are also characteristic of formative assessment. The principles of assessment include objectivity, systematicity and consistency, openness (clarity), differentiation, planning [11, 12]. The main functions of assessment according to the traditional system are: controlling and educational, stimulating-motivational and diagnostic-corrective functions [11]. For formative assessment, they can be grouped and presented in general terms as training and corrective functions. It is important to adhere to the principle of systematicity and planning, because it is then that formative assessment will be able to perform training and corrective functions. With the transformation of the education paradigm, assessment continues to play its role, but the importance and understanding of some functions has changed significantly. In the competency approach, a teacher is not the main assessor of pupil achievement. A pupil is the subject of educational activities, so he/she must consciously plan and control his/her own educational activities. And a teacher, as a consultant and tutor,

should help him/her grow and achieve the desired planned learning outcomes.

It is important to emphasize, that the new philosophy of assessment makes it impossible to use it as a means of punishment or motivation. Motivation should be intrinsic, not assessment as a result, but one's own achievements and understanding of their practical subjective significance.

Feedback is a powerful moderator that improves learning. Feedback is effective when it contains a response on the results (can be point, descriptive, specific); when pupils study; when a teacher provides information on how and what a pupil understands and does not understand; when a teacher understands and suggests strategies that help a pupil to improve; when a teacher helps a pupil understand the goals of learning. It is feedback that provides access to an individual learning trajectory of a pupil. In the Law of Ukraine "On Education" "individual educational trajectory – personal path of a pupil ..., which is formed, taking into account his/her abilities, interests, needs, motivation, opportunities and experience, based on the choice of the pace of education, methods and teaching aids" [13]. There is a great variety of methods of assessment, recommended to a teacher, for example: mini-review; analytical issues; directed decoding; application maps; weekly reports; scale; reflection; portfolio analysis; take and pass; inner/outer circle; newspaper headline, etc. [14]. In practice, oral interrogation, brainstorming, Bloom's chamomile, testing, subject dictations, reflection, etc. are more used. Convenient methods for conducting formative assessment are the use of digital tools - tests that allow each pupil and teacher to see a result, compare it with correct answers with further instructions to work to eliminate gaps. Surveys can also be conducted anonymously to work together on responses and learn from each other. When selecting assessment methods, a teacher should be guided by their compliance with the purpose of assessment.

In the practice of blended learning and in the era of digitalization of society, it is convenient to use digital tools Mentimeter, Kahoot, Rebus, Poll Everywhere and others to carry out assessment [1]. The use of digital tools has its advantages:

- absence of subjective attitude of a teacher to a pupil;
- quick verification of program results;
- simultaneous involvement of a large number of pupils;
- speed of surveys;
- no fear of making mistakes and getting a negative mark;
- teacher receiving statistical information to provide feedback.

Systems for testing and diagnostics, which implement artificial intelligence algorithms, are able to analyze pupil actions, give recommendations, generate

tasks depending on the level of knowledge of a particular pupil, perform intelligent control of sending tasks, etc. For example: the system can show that most part of a class does not answer questions on a topic, or draw teacher's attention to the fact that pupils answer simple questions well, but do not know how to solve problems.

The purpose of training involves the development of the internal state of a pupil, but the results of training can be judged only by external manifestations. Diagnostic purpose and diagnostic goals should be stated in order to provide quality feedback.

The goal is set diagnostically in the case when it is possible to unambiguously draw a conclusion about the degree of its implementation and build a well-defined didactic process that guarantees its achievement in a given time [8].

Given the above, the organization of the educational process can be represented by the following stages:

- setting diagnostic goals of training;
- Learning planning based on an exact definition of a desired standard;
- preliminary assessment of pupils' potential and specification of educational goals, taking into account real opportunities;
- division of learning into separate reproducible training modules;
- formative assessment of intermediate results to provide feedback and correct the course of learning;
- final assessment of a planned learning outcome.

Implementing this technological chain, a teacher gets the opportunity to guide the learning process, as well as ensures the achievement of an end result. It should be noted, that learning objectives should reflect planned learning outcomes in a system of clearly identifiable activities that can be qualitatively or quantitatively assessed using a variety of assessment-oriented learning objectives. Assessment will be formative only if its results are immediately used to identify new ways and forms of learning [9, 14–15].

As for the final assessment, it is conducted in order to establish the compliance of pupils' knowledge with the norms and requirements of educational standards and states the fact of pupils' learning, ie the extent, to which they have mastered the material they were taught. The final assessment focuses on the learning outcome [11, 13]. Table 1 shows an example of assessment planning, and Fig. 1 – visualizes a scheme for orientation in the types of assessment activities (formative (yellow) or final (blue)) in order to actively participate and learn at an individual pace.

The organization of the educational process is a technological cycle that includes the planning of educational activities, the direct implementation of educational activities, assessment of pupil achievement, analysis and assessment of educational activities for correction in further planning.

In general, the teacher's activity can be represented in the form of a cyclogram (Fig. 2)

Table 1

Planning results and assessment activities				
No. of learning outcome	Test	Written work	Practical task	Oral response
1	+		+	
2			+	+
3	+	+	+	
4	+	+	+	+

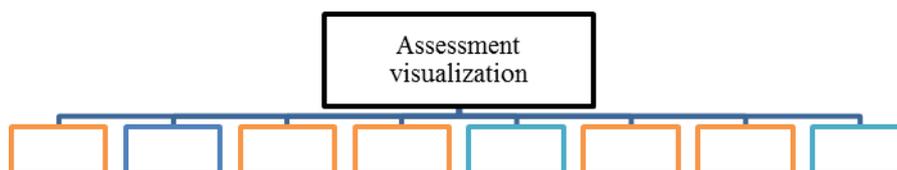


Fig. 1. Visualization of assessment types

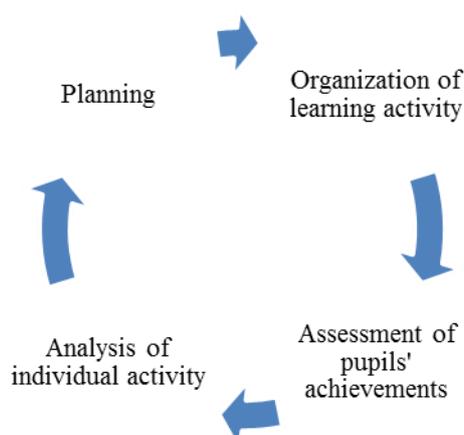


Fig. 2. Scheme of teacher's activity in the educational process

Planning is the first stage of teacher's and pupil's activity. Planning can and should be done at several levels:

- the whole course;
- thematic section, module;
- lesson.

The main principle, used in planning, is planning from the end. First of all, a teacher must determine what results he/she expects after completing the study of a particular part of a course. The planned results are related to the answer to the key question "What will pupils learn (know and learn to do) after studying this part of the course?" Learning objectives are the expected learning outcomes. Learning objectives should be focused on the pupil's activities and formulated, starting with the words "Pupil can ...". Learning objectives are the basis for determining the assessment criteria. After defining learning objectives and ways to test their achievement (assessment), a teacher plans activities. Teacher planning is based on expected results.

Planning and assessment organize the learning process and are interconnected. When planning a thematic section, it is immediately determined how the assessment will be conducted, when which type will be used (after completing a certain part of a course), when planning a lesson – how the formative assess-

ment will be carried out (during the mastering of educational material).

It has been investigated, that in non-compliance with the principles of systematicity and planning, without setting diagnostic goals for a lesson and lack of assessment planning, pupils are not oriented in their own learning activities, are simple performers of lessons, not active participants in their own learning process or builders of own development trajectory, do not understand what results they should achieve and, accordingly, do not plan their activities to achieve them. During the experiment, the teacher carried out assessment planning in the course, which was reported by a visualized scheme to pupils, pupils were involved in setting diagnostic goals and planning assessment in class. As a result of observations, an increase in pupil activity, an increase in the number of requests to the teacher to explain the failed task (in the formative assessment), greater concentration in the implementation of the "final task" for mark have been traced.

The study of the effectiveness of formative assessment for the formation of an individual learning trajectory took place within the subject of physics in classes of physical and mathematical profile, where there was a motivation of pupils to study physics. Prospects for further research are to study the possibilities of formative

assessment in physics lessons as a means of motivation to study in non-profile classes.

7. Conclusions

1. The article explores the benefits of using formative assessment in the learning process, namely – increasing pupil activity in learning through the ability to improve their own results after diagnosis and feedback; pupils' awareness of the importance of results, not mark as an indicator

2. In the implementation of formative assessment it is particularly important to adhere to the principles of planning and systematicity, and the most important func-

tions in the educational process – the training and corrective function.

3. The main methods of formative assessment in practice are testing and oral interviews, although the literature describes a large number of techniques.

4. There is a good tendency to increase the use of digital tools for the formative assessment of pupils.

5. Joint goal setting and planning of the learning process contributes to better orientation of pupils in the learning process, in the formed results, and assessment planning contributes to the timely detection and correction of results, the formation of an individual learning trajectory of each pupil.

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Halyna Voitkiv, PhD, Associate Professor, Department of Physics and Teaching Methods, State Higher Educational Institution “Vasyl Stefanyk Precarpathian National University”, Shevchenka str., 57, Ivano-Frankivsk, Ukraine, 76018

Igor Lishchynskyy, PhD, Associate Professor, Department of Physics and Teaching Methods, State Higher Educational Institution “Vasyl Stefanyk Precarpathian National University”, Shevchenka str., 57, Ivano-Frankivsk, Ukraine, 76018

**Corresponding author: Halyna Voitkiv, e-mail: h.voitkiv@gmail.com*