HARNESSING MULTIPLE INTELLIGENCES BY INTERACTIVE TEACHING STRATEGIES IN SPECIALTY CLASSES

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Abstract. Starting from the idea that performance in learning depends on motivation and the degree of stimulation each activity offers, we must provide our students with a large range of experiences, in such a way as to include those that will ensure their efficient learning, suitable for their dominant intelligence or intelligences. According to the theory of multiple intelligences, each individual possesses at least nine different intelligences, with different ways of learning and particular ways of expressing the knowledge they accumulate. Each man is a unique combination of abilities in various degrees of development and manifestation. Therefore, teachers should take these differences between their students into consideration and may choose to treat them differently in the teaching – learning – assessing process. For this reason, the present paper aims at analysing some aspects regarding ways to identify behaviours specific for different types of intelligence by systematic observation and also ways to stimulate multiple intelligences by making use of interactive teaching methods.

Keywords: theory of multiple intelligences; interactive teaching; education process.

INTRODUCTION

The theory of multiple intelligences was proposed by Howard Gardner, professor of cognitive theory, education and psychology at Harvard University and professor of neurology at the University of Massachusetts Medical School, USA. The author criticises the unilateral way in which human intelligence is regarded, acknowledged and harnessed. Based on neurological and anthropological studies, he proposes an alternative model called the theory of multiple intelligences. (OPREA, CRENGUŢA – LĂCRIMIOARA, 2007, p. 65). This theory starts from the idea that all people have at least nine different intelligences:

- verbal/linguistic;
- logical-mathematical;
- spatial;
- musical;
- bodily-kinaesthetic;
- interpersonal;
- intrapersonal;
- naturalistic;
- existential.

Gardner defined the first seven in his 1983 paper "*Frames of Mind*" and the other two in "*Intelligence Reframed*" (1999).

Using his theory, the author proved that human intellect is multiple and that any individual is "a collection of intelligences", and the cognitive capacity of a student can better be described through a set of skills or mental abilities, which Gardner called multiple intelligences (HADÎRCĂ, MARIA; CAZACU, TAMARA, 2012, p. 19). In his opinion, each human is a unique combination of these abilities in different forms of development and manifestation. Therefore, teachers can take these differences between their students into consideration and by

using interactive teaching – learning – assessing strategies, they may present their students with methodological alternatives centred on stimulating the different types of dominant intelligences.

Starting from the idea that performance in learning depends on motivation and the degree of stimulation each activity offers, we must provide our students with a large range of experiences, in such a way as to include those that will ensure their efficient learning, suitable for their dominant intelligence or intelligences.

The behaviour specific for each type of intelligence can be identified by systematic observation and can be strategically developed by teachers when the latter notice greater possibilities for improvement in these behaviours.

Table 1

Types of multiple intelligences

Types of intelligence	Specific behaviour
1. Verbal/ linguistic	• rich, well-rounded vocabulary; • effective use of language for rhetoric and poetic expression, and for recalling information; • manifest pleasure for reading, writing and speaking; • careful use of language and sensitivity to the senses, structures and functions of words;
2. Logical - mathematical	• logical analysis of problems, mathematical operations, scientific analysis of tasks; • use of inductive and deductive reasoning; • the student solves abstract problems; understands the complex relations among concepts, ideas and things; • the student operates with models, categories an relations, groups and orders data and interprets them; • the student demonstrates something by schemes.
3. Visual/ spatial	• the student demonstrates visual acuity in perceiving colours, lines, shapes, space and the relations among all these elements; • the student draws to explain something; • the student proves correct visual perception from several angles; • the student thinks in images and is gifted with accurate perception of the visual world and with the capacity of three-dimensional thinking.
4. Musical/ rhythmic	• the student manifests sensitivity to sounds; • the student discerns a variety of sounds in the environment; • the student creates melody and rhythm; • the student explains through melody and rhythm; • the student makes an instrument and uses it for explaining something;
5. Bodily/ kinaesthetic	• the student creates movement for explaining something; • the student controls and interprets body movements easily; • the student mimes with ease; • the student takes pleasure in participating in role-playing; • the student dances etc.;
6. Social/ interpersonal	• efficient interaction with others; • the student creates and maintains group synergy; • the student manifests sensitivity and attention to the behaviour of others in the group; • the student successfully mediates conflicts, manifests leadership and participates in group activities;
7. Intrapersonal	• the student has the capacity to know him/herself and correctly assesses his/her own feelings, motivations, fears, etc.; • the student sets a goal and reaches it;
8. Naturalist	• the student loves and understands nature, flora, fauna, the beauties of the earth;

	• the student recognises and classifies different species and breeds, grows plants and/or raises animals, collects plants and/or animals and defends their interests; • the student uses the magnifying glass and the binoculars for observation; • the student draws/takes photos of objects from nature, etc.
9. Existential	• the student reflects on human experience, on life, on human knowledge.

By applying the theory of multiple intelligences in the education process, the curriculum is organized around the seven abilities: linguistic, logical-mathematical, bodily – kinaesthetic, spatial, musical, interpersonal and intrapersonal (GARDNER, 1991).

Basically, what Howard Gardner's theory proposes is a change in the teacher's perception of the student. Thus, the student must not be regarded as an element in a mass of children, who has to be aligned with the average and brought to the same level as the entire class. The student must be regarded as unique, with his/her own abilities, possibilities and rhythm.

Knowing what the student is best at, what he/she likes doing, how he/she learns best and which are the ways to stimulate him/her, the teacher can propose adequate methods and techniques in the education process. The results will be fast to appear, after less effort and the student will start to take pleasure in learning.

Teaching in relation with the student's strong points actually implies that the teacher is aware of these strong points and adapts teaching strategies to the student's particularities.

Learning according to students' strong points requires that they are aware of their own aptitudes, talents, skills and that they use them to compensate the lack of others or the fact that others are less developed or manifest. The theory of multiple intelligences promotes the existence of a variety of different ways of teaching: orally or through writing, but also through music, drawing or movement (OPREA, CRENGUŢA – LĂCRIMIOARA, 2007, p. 75).

Teaching/learning which are suited for the students' strong points lead to reaching targets in a pleasant and easy way. "Students can learn anything if the approach to the subject is made through methods that are compatible with the strong points of their learning style; the same students will fail to learn if the subject is approached via methods that are incompatible with the strong points of their learning style" (DUNN, R., 1990, p.18).

MATERIALS AND METHOD

The aim of the present research is to apply Howard Gardner's theory of multiple intelligences, starting from the idea that each student has his/her own perception of, style of and attitude towards learning and therefore each student requires an individualized approach, which is different from others'.

For this purpose, the objectives set for the research were: selecting intelligences and stimulating them by using interactive teaching strategies.

The paper is the result of systematic observation made during teaching practice at Colegiul Naţional Bănăţean in the first semester of the 2013 – 2014 school year. The Biology students at the Faculty of Agriculture were involved in the realization of this study. They observed the activity of students from two classes: 7 A and 7 B, during their Biology classes.

When designing the class activity, the teacher can observe several work models:
- grouping the students according to their dominant type of intelligence and giving each group a different task, related to this type of intelligence;
- grouping the students randomly and giving all groups the same task, the solving of which will involve the different types of intelligences the students have;

- working with the entire class, but giving students a group of tasks which will require in turn certain types of intelligences or groups of intelligences;
- giving a complex task to each student, which will require all his/her types of intelligence

Knowing the theory of multiple intelligences and aiming at making the best out of every student's potential by exposing them to various situations, which will give them the opportunity to perform and be intensely motivated in the field where their capacities are more evident, the teachers can create multiple models for active learning.

As an example, we chose to present the application of this method in a biology class where the circulatory system was being taught to students in the 7th form.

The teaching progress was focussed both on assimilation of knowledge and skills specific for the subject, and on developing the attitudes and mechanisms of personalized, conscious and efficient learning, which students can apply also to other different contexts in life, not only in school.

Instructional event of the lesson: getting familiarized with the new knowledge.

Sequence in the teaching process: Class, composed of 24 students, is divided into 4 homogenous groups (6 students in each group). Each group is given a task.

The teaching strategy involved:
- Teaching methods: conversation, explication, problem solving, exercise, role play.
- Teaching aids: flipchart sheets, markers, blood pressure monitors.
- Class organization: frontal, grouping.

The lesson was staged in the following way:

I. GETTING STUDENTS'ATTENTION (5 minutes)

The teacher announces dividing the class into 4 groups of 6 students each. Then the teacher informs the students about the skills in the lesson.

II. GROUP WORK (30 minutes)
1. Giving tasks and dividing the students in groups (10 minutes)

The groups are made according to each student's aptitudes, in the following way:

Group I – "Painters";

Group II – "Writers";

Group III – "Mathematicians";

Group IV – "Doctors and patients".

Each group is given a work sheet with the tasks required of them, as well as the necessary materials. Thus:

"**Mathematicians**" have to solve mathematical problems related to the quantity of blood in the human body and the quantity of plasma in the human body.

"**Writers**" are required to write an article on the hygiene of the circulatory system.

"**Painters**" are told to draw the scheme of the large and small loops of blood circulation.

"**Doctors**" will measure the blood pressure and the pulse of their "patients" and will write down the values they find. After that, they will compare them to the normal values and then, with the help of the "patients", they will draw conclusions.

2. Individual task solving (5 minutes).

3. Discussing individual tasks in groups. Every student will report on his/her work (5 minutes).

4. Discussing the task as a whole (10 minutes). A representative of each group presents the group's task solutions in front of the class.

III. PRESENTING AND ASSESSING THE RESULTS OF THESE ACTIVITIES. CONCLUSIONS (15 minutes)

RESULTS AND DISCUSSION

In the example given above, the teacher kept in mind each student's aptitudes when deciding on work sheets which contain tasks that can be solved by predominant use of a type of intelligence, namely:

➢ **Visual/spatial intelligence –** the capacity to form a mental model of the spatial world, being able to operate with such a model, i.e. solve problems and develop products with the help of spatial representations and images.

Group 1 – "Painters" draw the scheme of small and large blood circulation.

➢ **Verbal/linguistic intelligence** – the capacity to solve problems and develop products with the help of the linguistic code.

Group II – "Writers" write the article on the hygiene of the circulatory system.

➢ **Logical - mathematical intelligence** – the capacity to operate with models, categories and relations, to group and order data, as well as to interpret them.

Group III – "**Mathematicians"** compose and solve problems about the quantities of blood and plasma in the human body.

➢ **Interpersonal intelligence** – the capacity to solve problems and develop products by knowing and interacting with others.

Group IV – "**Doctors and patients**". Each student in this group measures the blood pressure and the pulse, then writes down the values thus obtained and compares them to the normal ones.

CONCLUSIONS

After this teaching experiment, the following conclusions can be drawn:

- Use of methods whereby the students' multiple intelligences are challenged leads to harmonious and efficient intellectual development of the students, brings them closer to biology and ensures a relaxed and attractive teaching/learning environment.

- When teachers use interactive teaching strategies in class to stimulate multiple intelligences, the students understand that they are intelligent, they will gain more trust in their own abilities, will become more aware of their strong points. They will become more aware of their weaknesses as well, which they can compensate for with personal ways of dealing with information.

- When they reflect on their own intelligence, students will know how to coordinate their entire cognitive process for learning and expressing the results of their learning in a personal, characteristic way.

- If they know the intelligence profile of students, their weaknesses and strengths, teachers can easily decide on the best strategies for differentiation and individualization.

- After every lesson, students will be richer in spirit, with a larger horizon, able to get to know the world and themselves on a deeper level.

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