

Analysis on the Multiple Intelligences of Students from Faculty of Physical Education and Sports

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Abstract: The present research is based on the theory developed in 1983 by the American psychologist Howard Gardner, according to which people possess eight distinct types of intelligence: verbal/ linguistic, mathematical/ logical, visual/ spatial, bodily/ kinesthetic, rhythmic/ musical, interpersonal, intrapersonal, naturalist. The way these multiple intelligences are combined differentiates us as humans, for example, in school, students react differently. Some students are more interested in learning, some are not. This may be due to different types of intelligence. Our research aims to highlight the dominant types of intelligence for second year students, depending on which teachers can adapt their teaching methods. The research was carried out over a period of 3 weeks. The participants in the research are 111 romanian students from National University of Physical Education and Sports, out of which 42 are female and 69 are male. The research methods used are: scientific documentation, questionnaire-based survey (multiple intelligences test was applied), statistical-mathematical method, graphical method. The results of the research provide us important data to see to what extent kinesthetic body intelligence is dominant in students practicing sports and what are the other types of intelligence present in athletes. Finding out the dominant types of student's intelligence can provide us important information according to which we can adapt our teaching methods. Thus, we can conduct our didactic activity in an attractive manner, in which the potential of students is not wasted and feel motivated to learn and evolve in a traditional classroom.

Keywords: Multiple intelligences; students; learning; teaching methods; schools.

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Introduction

American psychologist Howard Gardner, developed a theory according to which people possess not just one type of intelligence, but eight distinct types of intelligence: verbal/ linguistic, mathematical/ logical, visual/ spatial, bodily/ kinesthetic, rhythmic/ musical, interpersonal, intrapersonal, naturalist. The way these multiple intelligences are combined differentiates us as humans and makes us unique. For example, in school, students react differently to stimulus. Some students are more interested in learning, some are not. Some communicate better with others, some not. Some are more attracted by music, some are more interested in mathematics or nature. This may be due to different types of intelligence.

The theory of multiple intelligences creates a great opportunity to apply the theory of multiple intelligences, not just in schools, but in organizations too. According to Weller, businesses can use multiple intelligences theory to structure workshops and training sessions for employees which will enhance teamwork, develop human potential, and foster creativity (Weller, 1999).

Conducting a research on 200 hundred adults, who were tested regarding the multiple intellicences, Visser et al. (2006), using factor analysis saw lower g factor loadings for Bodily-Kinesthetic abilities and higher loadings for cognitive abilities such as: Linguistic, Logical/Mathematical, Spatial, Naturalistic and Interpersonal Intelligence.

Shearer (2004) considers that teaching is more of an art than a science and is interesting to see how multiple intelligences assessment can help benefit students as well for their own personal and professional development. But the theory of multiple intelligences has not just fans, but critics too. According to Shearer (2004), many educators, psychologists, and administrators are resistant to adopting MI because they question both its validity and its efficacy. Critics of MI theory pose two important challenges to its viability. First, is multiple intelligence theory a valid representation of the human mind/brain? Second, how effective is multiple intelligence theory as a basis for improving educational outcomes, learning, and personal achievement? Gardner himself admits in his book „Multiple intelligences. New horizons“ that he had a lot of critics regarding the theory of multiple intelligences (Gardner, 2015).

Cerruti suggests that the theory of multiple intelligences is a conception of the mind which motivated a past generation of teachers and may provide cognitive neuroscientists a framework in which to conduct

rigorous educational neuroscience research. But most of teachers did not recognize that multiple intelligences do not offer an interpretation regarding how an individual child's mind learns nor a description of how cognitive processes actually operate (Cerruti, 2013).

White is another researcher who observes a lack in multiple intelligences theory. Howard Gardner's theory of Multiple Intelligences has a huge influence on school education. But it has a lack of justification on how the intelligences are identified (White, 2008).

Ghorbani et al. (2002) suggested that subtle cultural differences might exist in the processing of emotional information. Conducting a research on multiple intelligences in Poland, having as subjects from Poland and Great Britain, Furnham has found that males have higher self-estimates than females on general, spatial, and also musical intelligence. Likewise, he noticed an apparition of different results between the two cultures (Furnham, Wytykowska, & Petrides, 2006).

Chan conducts a research in 2003, having as subjects gifted students from China: six hundred and thirty-nine students. Students' responses on the research conducted by Chan, indicated that intense involvement, perfectionism, unchallenging schoolwork, multipotentiality, and parental expectations could be relatively common problems among gifted students, and also reported the problem of poor interpersonal relationships. He also found that specific adjustment problems were found to be associated with specific intelligences of the participants at the research. So, Chan saw a complex relationships between adjustment problems and giftedness or multiple intelligences for this gifted children (Chan, 2003).

Applying multiple intelligence in schools, Kornhaber noted that this helps increase the standardized test scores, improves student behavior, increases parent participation and implies improvement for students with disabilities (Kornhaber, 2004).

Vaughan goes further and talks about the existence of another type of intelligence: "the spiritual intelligence which can be developed relatively independently. Spiritual intelligence calls for multiple ways of knowing and for the integration of the inner life of mind and spirit with the outer life of work in the world. It can be cultivated through questing, inquiry, practice and also spiritual experiences" (Vaughan, 2002).

Marjorybanks conducted a research on 400 children, with the age of twelve to see the relation between academic achievement, intelligence and creativity. The results obtained showed that the hypothesis which suggests that beyond a certain level of intelligence academic achievement is related increasingly to creativity and ceases to be related strongly to intelligence, was

not supported. For some areas of academic performance the results suggest an alternate proposition, that creativity ceases to be related to achievement after a threshold level of intelligence has been reached. It was also found that at high levels of verbal ability, non-verbal ability and creativity appeared to have differential relations with academic achievement (Marjorybanks, 1976).

According to Kornhaber people learn in a variety of ways, complements existing educational beliefs (constructivist; progressive; hands on), educators already use some of the practices of multiple intelligences and this provides framework for organization of practice and extends practice. Regarding the changes that resulted after adopting the multiple intelligences theory in the act of teaching in schools, The author notes that if the school is constructivist at the beginning, the adoption of multiple intelligences extends their existing practices. But if the school is fairly traditional, adopting multiple intelligences theory is fostered, and marks changes in the curriculum (Kornhaber, 2004).

As far as applying the theory of multiple intelligences, Barrington (2004) states that universities were sceptic in applying this theory in tertiary education. Universities have been slow to accommodate this diversity in their teaching/ learning strategies and Multiple intelligences theory could reduce the gap between students and teachers views. As the matter of the results obtained by Barrington after conducting workshops on multiple intelligence, in which students were active and enthusiastic, the researcher considers that this is a useful pedagogical tool for higher education and multiple intelligence should be considered an inclusive pedagogy (Barrington, 2004).

Stevens and Macpherson offer ever since the year of 2007 a very interesting approach on how to teach in schools according to multiple intelligences that students have, and explain who we can use each intelligence in the act of teaching:

- Verbal/ Linguistic intelligence: can be used creative storytelling; learning by listening too, telling or talking about imaginative stories. For instance, this can be made by using creative writing, speculative fiction, campfire stories, books that students are interested in: for instance, Harry Potter by J.K. Rowling; Real world work stories which include - group norms, role playing, creative process, presentation stories like - "Sailing in a sailboat" (when times is rough, throw people overboard);

- Logical/ Mathematical intelligence: Stories about Logical/Mathematical Processes, Learning from stories about a process or discovery, for instance accounts as the story of a business, forensic Accounting; or how a person made a particular and very important discovery; or you can imagine that you are at the top of a big mountain and you have to derive the surface area;
- Visual/ Spatial intelligence: Comics, Graphic Novels • Learning by reading or drawing narratives that can include complex plots and characters in order to facilitate understanding of a particular concept;
- Physical examples from math - Board games - Videos - Art and optical Illusions - Use of visuals in Biology - "Second Life" (online, virtual environment) – the visual analyze;
- Body/ Kinesthetic intelligence: Learning through dance in a variety of styles that can tell a story • e.g., Ballet, Capoeira, Tai Chi and others, Stretch breaks.
- Musical/ Rhythmic intelligence: "setting words to music; learning by associating concepts with music or rhythms as a memory aid (this can include songs, poetry, dub poetry, rap, - nursery rhymes (poetry)
- Use Stravinsky to teach about Irish potato famine - Sing Christmas carols to teach Chemistry - Create a bank of links - Have students bring in music (often political) - Eminem (unemployment) - Play historical songs";
- Interpersonal intelligence, by using biography, learning by linking people through the details of personal life (for instance, "biographies of historical figures, past and current cultural heroes, Text - Diaries of Anne Frank • Film - Gandhi • Epic Poem - Homer • Participants also suggest: - Stories about small business - Exploit student skills to improve whole class! - Public archives (keep track of children) - Biography - "Learning lives UK" – Letters";
- Intrapersonal intelligence: by using journaling technique: learning by writing your own personal reflections and experience, your stories in a systematic way. (paper, electronic journals, video recordings, blogs, vlogs, podcasts, instagram stories, and so on;
- Naturalistic intelligence: using fables; learning easier by using tales or stories in which animals or imaginary creatures tell or play out stories with a strong moral (for example: stories from indigenous traditions and first nations, historical moments turned into a fable, telling the moral of the story also is necessary) (Stevens & Macpherson, 2007).

Our research aims to highlight the dominant types of intelligence of second year students, depending on which teachers can adapt their teaching methods

Methodology

The research methods used are: scientific documentation, questionnaire-based survey (multiple intelligences test was applied), statistical-mathematical method, graphical method.

Participants

The participants in the research are 111 students, out of which 42 are female and 69 are male.

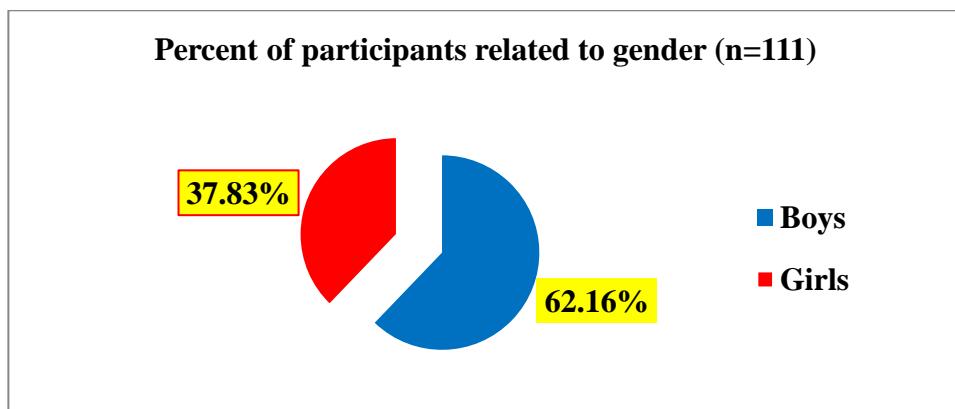


Figure 1. Percent of participants at the research related to gender

Source: figure arising from the original research activity

First, 117 students participated at our study, but because 6 of them did not answer at all the items, we had to exclude them from our research. All 6 students who did not answer at all the items are boys. Most of them are boys (62.16%). Girls represent 37.83% of the respondents. The age of the participants is between 19 years old and 26 years old (students in the second year, level 1 of university studies and students from first year, level two of university studies: master students).

Instruments

We used the Test of Multiple Intelligences Inventory of Howard Gardner, comprising 79 items. The types of items are verbal items with two answer options: yes and no. If the item fits with the way of thinking and acting, the respondent answers with „Yes”. Each item fits a certain type of intelligence and has a distinct number from 1 to 8. At the end of the interpretation, we collected the answers with yes for each of the eight types of intelligences and so we found out for each respondent to what extent each type of intelligence characterizes them.

Procedure

The research was carried out over a period of 3 weeks: one week in November 2019 (for 59 students, face-to-face, in group at university classes) and two weeks in April 2020, (for 58 students, individually, online).

Results

The results of the research provide us important data to see to what extent kinesthetic body intelligence is dominant in students practicing sports and what are the other types of intelligence present in athletes.

Table 1. First 3 scores for dominant types of intelligences for students from National University of Physical Education and Sports (Romania)

Type of intelligence	Number of students	Percent of students	Numer of students	Percent of students
	Feminin gender (n=42)	Feminin gender (n=42)	Male gender (n=69)	Male gender (n=69)
verbal/ linguistic	0	0	6	8.69%
mathematical/ logical	7	16.66%	15	21.37%
visual/ spatial	6	14.28%	9	13.04%
bodily/ kinesthetic	19	45.23%	29	42.02%
rhythmic/ musical	7	16.66%	13	18.84 %
interpersonal	12	28.57%	19	27.53%
intrapersonal	10	23.80%	4	5.79%
naturalist	5	11.90%	0	0

Source: data resulting from own research

Analyzing the first three scores obtained by students from National University of Physical Education and Sports, we observe differences between genders. The most present intelligence is, as we were expected the bodily/ kinesthetic intelligence, due to the fact that our respondents study at a university based on physical education and sports. In second place for both girls and boys is the interpersonal intelligence, this shows that our students are sociable persons and related good with others. In the third place, is the intrapersonal intelligence for girls. As the matter of boys, in the third place is mathematical/ logical intelligence.

Table 2. Rank of types of intelligences for students from National University of Physical Education and Sports (Romania) related to gender

Type of intelligence	Number of students		Rank of students	
	Feminin gender (n=42)	Feminin gender (n=42)	Male gender (n=69)	Male gender (n=69)
verbal/ linguistic	0	7	6	6
mathematical/ logical	7	4	15	3
visual/ spatial	6	5	9	5
bodily/ kinesthetic	19	1	29	1
rhythmic/ musical	7	4	13	4
interpersonal	12	2	19	2
intrapersonal	10	3	4	7
naturalist	5	6	0	8

Source: data resulting from own research

What surprises us is that the least present type of intelligence, for girls is the verbal, linguistic intelligence. To be honest, we did not expect this, because in the physical education and sports field we consider that the ability to express yourself in a verbal/ linguistic manner is very important in order to convince the people around you to change their lives in a good way and to improve their quality of life. This might explain the fact that a lot of our students write their papers with several grammar mistakes, but unfortunately we notice this is as being a general problem for our students, not just for girls. A possible solution probably is that we could encourage and help them more to express their opinions and beliefs and convince them to be more attentive at classes. As the matter of boys, the naturalist intelligence is not their strong point. We could organize more classes in the

middle of nature, so that we might improve their level of naturalist intelligence.

Discussions

We recommend that the teaching to be done according to the multiple intelligences theory propose to keep and this is why we recommend the following:

As far as that goes for the verbal/ linguistic intelligence, we propose creative storywriting and storytelling at classes of pedagogic disciplines, having as assignment to create a story about the sports they like, to imagine that they are already physical education teachers, coaches or parents and they have to address the story to a child which is not more than 7 years old about how to play a certain sport they like, helps students from the University of Physical Education and Sports to develop the verbal/ linguistic intelligence. Also, role playing could be a good approach to develop the verbal/ linguistic intelligence for students to create a scene in which they play the role of the parents, children, teachers, athletes and try to understand some fears they have or to motivate people to give up to a sedentary life and do physical activities and sports. Also, debates regarding problems that affect students could be organised. Another interesting role play, in order to teach students about self-esteem, about the importance of studying, having goals, motivation and career opportunities, we use in Counseling and guidance classes and which is received with enthusiasm by students is to imagine them that they are in future, after 10 years when they already got their master degrees, are successful, happy people and they are invited to the graduation ceremony of the National University of Physcal Education and Sports to transmit to the graduates a motivational speech for the generation from the year 2030.

The logical/ mathematical intelligence of the students from the Faculty of Physical Education and Sports could be developed by introducing in classes assignments for students in which they have to find solutions for problems they observe in daily life: for instance to find possible solutions for promoting fair play in sports competitions and to reduce doping, or how to convince an adolescent or someone to quit smoking and adopt a healthy life, how to convince someone give up to a sedentary way of life and be active, how to write projects in the physical and sports area (students already have a usefull class about the management of programs). Introducing in classes fun games with crosswords can help develop the logical/ mathematical intelligence (we used this year at students at the Counseling and guidance

discipline activities in which students had to solve crosswords in order to find out about the topic of discussion for the lesson or to find a hidden message about the lesson they learned, and students responded very good at this activity, being something new and unusual for a class, so their attention was captivated and they gave very good feedbacks about the activity they had to do. Creating escape rooms could help students develop their logical/mathematical intelligence and the visual/spatial intelligence too.

With the help of visual/ and spatial intelligence, we can present to students from Faculty of Physical Education and Sports clips with moments where athletes in limit situations, who are helped by other athletes to finish the race. Thus, we teach students about moral values which sports promote, like fair play. For instance, at Olympic Games which took place in Barcelona, in 1992, the British athlete Derek Redmond who was the favoured to medal in the Olympic 400 meters sprint. When he had just 150 meter left of the race, he got injured and was helped by his father to finish the race. He received standing ovation from 65.000 people who were at the stadium, and we believe conquered the heart and respect of many more. He reached to finish the last meters alone. Although, he was officially disqualified, this moment is a memorable one, teaching us that no matter how hard it is, you must never give up. This example is good for interpersonal intelligence too, because it teaches us to help others in need. Students from Physical Education and Spots Faculty, can be advised to watch games, and work with programs that study the movement of the athletes. For instance, in our university students at computer aided training classes, learn how to work with a very usefull tool named Kinovea, which is a video player for sports analysis.

For body/ kinesthetic intelligence, especially in the period of the social isolation given by the pandemic of coronavirus, we believe that a possible alternative for making physical activities in the times when, for our safety we were not allowed to get outside homes for much time to recommend to students the virtual games which they can play with the help of game consoles: PlayStation, Xbox 360, by playing sports games. If they have a kinect sensor, is better, because they are not static, they actually do physical activities. But playing games very much time could lead to other problems such as gaming disorder, so we have to be attentive not to fall in this trap. Teachers had to find solutions very fast for continuing the act of teaching after schools were closed, physical education teachers too. For instance, they continued trainings and classes via platforms like Zoom, and children were able to do the physical training with the help of the physical education teachers or instructors. For instance, my third years old son

attended at the karate classes twice a week with the karate instructor from kindergarten, via Zoom platform. Watching other children doing the same thing, was a mobilising factor. Some parents did the exercises along with their children, and after each class we felt more optimistic and relaxed, and energized. So, practicing physical activities and sports has a multitude of benefits that contributed to help keeping people healthy even in hard times, as the coronavirus pandemic. Our University could create a sensory path garden which stimulates not just the body / kinesthetic intelligence, but the five senses: hearing, seeing, touching, smelling, tasting and so stimulating the multisensorial memory.

For improving musical / rhythmic intelligence, in addition to the suggestions provided by the two authors above, we suggest play motivational songs to teach about motivation, or songs about famine, protecting the world, respecting human rights, being a better person, in order to teach the students about human rights, and respecting the nature (for instance: „Heal The world“ -Michael Jackson, „Earth Song“ – Michael Jackson, „Man in the mirror“ – Michael Jackson), songs that reduce stress and provide calm and to teach students about the balance about emotional states („Only time“ – Enya, „Return to innocence“ – Enigma), songs that motivate and give an optimistic state of mind and to teach about motivation, („Don't worry, be happy“ – Bobby McFerrin, „Somewhere over the rainbow“ – Israel Kamakawiwo), for teaching our students to continue, and never give up, no matter what obstacles appear, we recommend songs like „Don't give up“- played by Sarah Brightman and Gregorian.

In addition to the examples offered above, for interpersonal intelligence, we suggest for teaching students from physical education and sports through interpersonal strategies to use: biographies of important athletes who succeeded high performances, poems and stories about improving the quality of life, movies about exceeding the limits and finding the best in people: „Forest Gump“, with Tom Hanks as leading actor, movies about dreaming with eyes open and which we can teach students to establish goals: for instance watching movie „Cast away“ with Tom Hanks as „Big“, with Tom Hanks as leading author, the movie „The pursuit of happiness“, having as leading actor Will Smith. For teaching about the biography of a great athlete, teachers could use the movie „Ali“, with actor Will Smith as leading actor, about the life of the world boxing champion Muhammad Ali (name at birth was Cassius Clay). Playing boardgames which have as topic the emotional intelligence, is also a fun way to develop multiple intelligences.

In addition, for developing the intrapersonal intelligence of students, knowing that intrapersonal intelligence is about what motivates students for success, knowing their feelings and thoughts, their fears, we suggest teaching by reading passages of books which are well known as containing personal reflections and experiences, like the book „Living to tell your life“, written by Gabriel Garcia Marques. For students from Faculty of Physical Education and sports, we recommend biographical books of great athletes: „My story“ - Usain Bolt & Shaun Custis, „Open. Autobiography“ – Andre Agassi; „My autobiography“ - Alex Ferguson, „My story“ - Rafael Nadal & John Carlin, „Roger Federrer. In search of perfection“ by Rene Stauffer, „Letters to a young gymnast“ – by Nadia Comaneci, the romanian gymnast who is the first gimnast in the world to take a perfect 10. Another useful tool is the book for teaching students from Physical Education and Sports about survival techniques, we could read and analyse the book „Survival Handbook. How to reach your goal, overcome obstacles and harden your character“ – author Bear Grylls, this book is useful for students who have a developed naturalistic intelligence too. Also, for intrapersonal intelligence, we recommend motivational clips (for instance, students can wath the motivational speech of the actor Denzel Washington at the graduation ceremony of the University of Pennsylvania).

For developing the naturalistic intelligence of students, we suggest teaching by using stories with a moral: for instance „The story of the deaf frow“ who was trapped in a pit and because she wasn't able to hear the words that other frogs adresed to her, by telling her that she could never succeed, she did not give up and tryed to jump till she succeeded to save herself from the pit. For promoting moral values and fair play for and students from the Faculty of Physical Education and Sports and accepting that we are different, we recommend the moral story about „The story of the ugly duck“, who was rejected by other ducks because she was different (she was a swan) and all stories which promote moral values and to be honest and correct. Our university offers the opportunity for students to develop their naturalistic intelligence by organising training stages at the mountains for learning to ski, and survival techniques, and at seaside for swimming. The potential of the naturalistic intelligence is huge, students would take classes in nature, in parcs for instance. This can be completed by organising classes in adventure parcs, building mountain trail zip lines, climbing lines and excursions for teambuildings. The potential of our country is huge, Romania having an adventure park in a salt cave from Harghita, the first one from Europe. As a result, students could write journals about their experience in nature (so they develop the verbal /

linguistic intelligence) or make movie clips about their experience (in this case they develop other types of intelligence too.

Conclusions

Finding out the dominant types of students' intelligence can provide us important information according to which we can adapt our teaching methods. Thus, we can conduct our didactic activity in an attractive manner, in which the potential of the students is not wasted and feel motivated to learn and evolve in a traditional classroom.

Although the theory of multiple intelligences is not new, we believe is helpful to be applied in kindergartens, schools, highschools and universities from Romania. We consider that this subject could be a starting point for a new research regarding the level of applying multiple intelligences in the act of teaching in schools, highschools from Romania, and universities also.

By knowing the types of multiple intelligences and knowing the students we work with, what their interests are, what their dominant types of intelligence are, it helps us to adapt our teaching techniques so that student learn in the most useful and attractive way for them.

What Howard Gardner wants to show by the theory of multiple intelligences is that we can teach the same content using different methods. A student's effort to learn can turn into a song. A student's effort to prepare for the session can turn into a theatre play. A lesson in a sport can be the subject of a trailer, a short video clip to be made by students. Learning survival techniques can be turned into a brochure to be made by students; convincing some people to give up the sedentary lifestyle or promoting fair play in sports can be interesting subject of moral stories or short video clips, trailers to be made by students who want to send the message that the practice of physical activities influences the quality of life in the best way possible.

Due to the results obtained, we believe that we should extend our research in order to apply this inventory at a larger scale, for most of our students in order to obtain a clearer view of the types of intelligence of our students.

Authors' Contributions

All authors contributed equally to this article and should be considered as main authors.

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