

OPEN-DOOR TO EVERY PUPIL

Multiple Intelligence Methodology
Educational Approach to Increase Functional Literacy of Pupils



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Functional Literacy of Pupils**

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Multiple Intelligence Methodology – Educational Approach to Increase Functional Literacy of Pupils

(Handbook oriented to policy and decision makers in education to present innovative approaches oriented to potential changes in educational policy in the partner countries – Bulgaria, Greece, Italy and Spain)

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*You tell me, I forget.
You teach me, I remember.
You involve me, I learn.*

Xun Kuang

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Content

INTRODUCTION	6
ADVANTAGES OF THE MULTIPLE INTELLIGENCES THEORY	8
Different entry points	8
Inclusion Special Educational Needs students	9
New approach to E-learning	9
Benefits in second language teaching	9
Involving the families	10
Few additional financial resources	10
Teachers are more motivated and better trained	10
DIFFICULTIES IN THE CURRENT EDUCATIONAL SYSTEMS THAT PREVENT EDUCATION PROFESSIONALS TO INNOVATE IN CLASS	11
Lack of skilled employees within the schools	11
Lack of time for educators due to administrative burden	14
Internal finances/costs was a highly important barrier to innovation	16
Difficulties to obtain government and other grants	18
Role of parent associations to school innovation	19
CONTRIBUTION OF MI METHODOLOGY FOR ACHIEVING BETTER TEACHING AND ACQUISITION OF MORE EFFECTIVE KNOWLEDGE FOR PUPILS	20
Innovation and essence of the methodology of MI in relation with the learning process	20
Basic principles of teaching related to MI methodology – Concept of Multiple Intelligence as a training methodology by H. Gardner and its understanding	22
Why the implementing of MI methodology is important?	25
Teaching process based on MI methodology and transferable skills such as: critical and creative thinking, analytical skills, teamwork, communication skills	26
Organization of the learning environment for effective implementation of MI methodology; how to create a flexible class	27
Why should the MI be considered and brought to attention to experts in education sector	28
GOOD PRACTICES OF IMPLEMENTING MI METHODOLOGY ON REGIONAL AND NATIONAL LEVEL OF EDUCATION – EXPERIENCES OF CANADA, BELGIUM AND FRANCE	29
MULTIPLE INTELLIGENCE METHODOLOGY AND STEAM APPROACH IN EDUCATION	33
CONCLUSION	35
GLOSSARY	36
PROJECT CONSORTIUM	39
AUTHORS	40

Introduction

The methodology of MI is based on a different approach of the traditional learning process, based on modern scientific results from neurosciences and neuropedagogy which gives a new understanding about mechanisms of learning. Knowledge, emotions and skills are developing in unity and are formed by the innate and inherent specifics of the pupils.

Thus MI provides the keystones for educating children to become creative individuals, capable of effective professional realization. This reflects on the increasing of people's capacity for economic and social development on local, national and European levels. It comes possible thanks to a MI – new alternative educational approach that ensures a comfortable, pleasant creative learning environment without stress and aiding children's curiosity to discover the world and their place in it.

A key point is that MI approach is forming step by step the pupil's interdisciplinary way of thinking and understanding about the environment. It forms the first steps to learning based on the comprehensive approach to acquiring knowledge and skills, which later naturally grows into training under the EU program – STEAM, focused on training for creative personal and professional realization with complex knowledge and skills.

Even in today's rapidly changing world, education remains one of the main pillars for building healthy, prosperous, and sustainable societies. Envisioned like so, societies need to be based on inclusive education; education that offers the opportunity to every child to participate in it equally and without facing discrimination due to any reason, be it personality traits, learning style, or possessing a unique set of talents and abilities. Despite their differences, European educational systems of today share a common goal of achieving such inclusiveness in the following years, and while some member states are on the edge of fulfilling this objective, others need to step up their efforts.

Having a unique outlook on human intelligence that celebrates diversity, Howard Gardner's theory of multiple intelligences is a valuable tool to facilitate these endeavors. Thus, after almost 40 years from the development of the theory, now is the most appropriate time for it to be applied within the EU educational landscape.

Important advantage of the MI approach is that it creates a class environment for pupils to develop a set of transferable skills in parallel with learning and acquiring new academic knowledge. MI could be a tool for increasing the quality of education and achieving functional literacy of the people and so to answer the educational priorities of EU policy.

MI approach also creates advantages for the teachers, such as: optimizing their work time, giving areas of creativity to achieve the national educational standards, and motivating professional development. Overall, increased awareness of MI allows the teacher to teach their students how to concentrate better in class. Familiar with the appropriate pedagogical tools, he/ she can better mobilize the attention of students, whose level of distractibility in general is

alarmingly increasing nowadays. Furthermore, the MI approach has the potential to include parents in the education of their children together with teachers and in this way to engage parents to be more responsible in children's' bringing up. The advantage is that this could be achieved in a calm motivated self-organized process.

Implementation of the MI approach in public primary schools does not need additional financial resources, but it needs rearranging the available ones and the focus to be on giving proper knowledge and qualification of the professionals. Current situation at schools recognizes the need of reforms of the teaching process and so a majority of teachers are looking to use different alternative techniques for teaching.

Since national educational systems are defined by the educational policies each member state develops by taking into consideration society's development and overall situation (technological changes, socio-economic context, etc.) – this handbook is addressed to policy and decision makers within Europe. It aims to highlight and prove to them the importance of the Multiple Intelligence Theory and to provoke their interest regarding the integration of Multiple Intelligence approach to the future educational policies.

Advantages of the Multiple Intelligences Theory

When the Multiple Intelligences Theory was presented in *Frames of Mind* (1983), Gardner introduced the very innovative approach to the theory of intelligence which is the idea that intelligence is not set in stone and that can never be changed. Gardner defends that intelligence can be improved with training and education¹.

Additionally, the idea that there are different intelligences and that kids can learn through different styles is a breaking point in education. With the Multiple Intelligences theory we can design more inclusive learning environments that take into account that pupils have different needs and that there are different ways to address them to improve their academic achievement.

Amongst the main advantages of the use of this theory, we can find the following aspects:

- Different entry points to content are included
- Better inclusion of SEN students
- New approach to E-Learning
- Benefits in second language teaching
- New way of involving the families
- Few additional financial resources are needed
- Teachers are more motivated and better trained

Different entry points

The use of multiple intelligences allows for including multiple and different entry points on content. These entry points are what Gardner defines as “windows on the same concept”.² This means that teachers can offer ways of learning inside the classroom that uses different intelligences and therefore:

- The engagement of pupils is higher
- More pupils can access the knowledge
- Learning is adapted to the learners and is therefore more efficient

The result of these advantages is that the education provided using this theory is more inclusive and takes into account the specific characteristics and needs of each of the pupils in the classroom.

1 Gardner, H., 2011. *Frames of mind* (3rd ed.). New York: Basic.

2 Gardner, H., 2011. *Frames of mind* (3rd ed.). New York: Basic.

Inclusion Special Educational Needs students³

According to several studies, the inclusion of Multiple Intelligences theory as the basis while designing the curriculum for the classroom, pupils with Special Education Needs (SEN) can showcase their own abilities that sometimes are underrepresented in the traditional educational system.

“Using MI as a backdrop educators can begin to perceive children with special needs as whole persons possessing strengths in many areas”
(Armstrong, 2000)⁴

The implementation of this theory results in creating a natural environment for SEN pupils and therefore allows schools and special centers to use their human resources in a more efficient way.

New approach to E-learning⁵

In order to implement e-learning in an effective way, the theory of multiple intelligence is utilized. This is especially relevant when we take into account the fact that e-learning is a very heavily text-based approach to education.

Offering different entry points to pupils in an online environment is of great importance, and even more when speaking of e-learning, since this approach will facilitate the learning of students that are otherwise alone.

Benefits in second language teaching⁶

Including and MI approach to second language teaching can bring the following benefits:

- Pupils are more motivated since the activities are more diverse.
- Since language teaching needs a certain degree of repetition of the content, the inclusion of different entry points using the different intelligences can make these needed repetitions more dynamic and engaging.

3 Miski, C. (2018). MULTIPLE INTELLIGENCE THEORY FOR EFL DISADVANTAGED STUDENTS OF NON-FEE PAYMENT SCHOOL. Indonesian Journal Of Integrated English Language Teaching, 3(2). doi: 10.24014/ijelt.v3i2.4701;Rile, L., Ofulencia, M., Decenorio, N., & Tan, N. (2015). Multiple Intelligences of Students with Learning Disabilities: Its Implication for Business Curriculum Development in United Arab Emirates. Procedia Economics And Finance, 23, 894-898. doi: 10.1016/s2212-5671(15)00517-1

4 Armstrong, T. (2000). Multiple Intelligences in the Classroom. 2Nd Edition (1st ed.).

5 Green, C., & Tanner, R. (2005). Multiple intelligences and online teacher education. ELT Journal, 59(4), 312-321. doi: 10.1093/elt/cci060; Mankad, K. (2015). The Role of Multiple Intelligence in E-Learning. IJSRD – International Journal For Scientific Research & Development, 3(5), 1076-1081.

6 Arnold, J., & Fonseca, M. C. (2009). MULTIPLE INTELLIGENCE THEORY AND FOREIGN LANGUAGE LEARNING: A BRAIN-BASED PERSPECTIVE. International Journal of English Studies, 4(1), 119-136. Retrieved from <https://revistas.um.es/ijes/article/view/48141>.

Involving the families

Families can be more involved with their children's education when an approach based on Multiple Intelligences is implemented. This is due to the fact that they can offer their participation in the different areas that are presented since they offer more flexibility.

This also allows for families from different economic, social and cultural backgrounds to be more involved with the education of their children. Schools would therefore not only be inclusive for the individual characteristics of each of the pupils but also of their background.

Few additional financial resources

When implementing the Multiple Intelligences theory in schools, there are few additional financial resources needed. There are no major changes in the design of the school or the classrooms, and neither are great purchases of materials needed. A school considering implementing this methodology can organize a small scale pilot phase at no cost before implementing it in the whole center.

Teachers are more motivated and better trained

The use of innovative methods and especially those that create an environment that allows them to challenge themselves and approach the classroom from a creative standpoint is a source of motivation and inspiration for teachers.

When teachers are trained in multiple intelligences, they not only improve their skills and knowledge on the topic to later implement in their classes, but let them self-reflect on their own skills and abilities.

As a result, training teachers and implementing the multiple intelligences theory results in more competent, better recognized by society and more motivated teachers.

Difficulties in the current educational systems that prevent education professionals to innovate in class

Lack of skilled employees within the schools

School, through teachers, is expected to teach pupils essential skills for their personal fulfilment, employment opportunities, and the development of active citizenship. According to a Proposal for a Council Recommendation on Key Competences for Lifelong Learning of 2018⁷, these skills for lifelong learning include: Literacy competence; Languages competence; Mathematical competence and competence in science, technology and engineering and; Digital competence; Personal, social and learning competence; Civic competence; Entrepreneurship competence; Cultural awareness and expression competence.

Global trends such as rapid changes in technology, society and demography, as well as challenges like the global warming, require individuals able to adapt quickly to changes in the social and labor environment⁸.

Students are expecting to be provided support for the development of their core and transversal skills, and teachers have the responsibility of transferring these to them. This can only happen if educators themselves are mastering these skills. As a result, teachers' skills and quality level of their training are a significant determinant of students' achievement. Nevertheless, nowadays European schools are facing a shortage of skilled teachers and educators.

On the one hand, a shortage of teachers is affecting the education system. According to the European Centre for the Development of Vocational Training⁹, teachers belong to one of the top 5 occupations in terms of skills shortage in Europe. In addition, this issue is expected to worsen in the following years, as many teachers will retire.

The future demand for educators and their shortage is different across European countries. The platform Skills Panorama¹⁰ of the European Centre for the Development of Vocational Training presents how the demand for education workers will develop in the near future. It displays estimates about the employment growth in 2020-2030 in the education sector for our partner countries: Bulgaria (13.1%), France (0.9%), Greece (16.7%), Italy (1.6%), and Spain

7 COM(2018)24/F1 – EN (annex) (europa.eu)

8 Policy Paper – The importance of transversal skills and competences for young people in a modern Europe – AEGEE-Europe

9 Skill shortage and surplus occupations in Europe (europa.eu)

10 Browse by Sector | Skills Panorama (europa.eu)

(21.9%). At the same time, according to the UN¹¹, by 2030 the most affected countries in Europe by teacher shortage will be Spain, Germany, and Poland.

On the other hand, educators seem not to be trained enough for ensuring high quality training. One of the biggest challenges that the EU is facing is diffusing ICT education. In 2014 the European Commission's report "e-Skills for Jobs in Europe" pinpointed out the worries over a growing shortage of ICT skills all over European population¹². Moreover, policies supposed to help the workforce to absorb these skills showed significant differences between Member States. The report states that in 2013, despite significant improvement at European level, the policies of several countries failed at closing the e-skills gap. With respect to our partner countries, all of them apart France were below the average, with Greece being the worst (given the "e-skills Policy Index" ranging between 0 and 5, Greece totalized 1.5 points against the European average of 2.9).

This issue has been exacerbated by the current pandemic. Due to COVID-19 schools have prolonged their closure indefinitely. Students were the first victims, as many could not access the internet or did not possess technological devices such as laptops or smartphones. For pupils there is an addition impossibility to study on-line alone without somebody helping him/her. Developed countries, as well as the European Union, were not excluded. According to UNESCO estimates¹³, in 2019 the 10% of those who did not have access to digital education were living in developed countries. Teachers were the second victim of schools' closure. They had to switch their courses content online overnight, change their teaching methods without guidelines, rush in search of digital platform to run their virtual classes, find proper technological equipment, and were forced by the circumstances to learn new ICT skills¹⁴. Moreover, few teachers received prior knowledge on distance education, as around 20-30% of European and Asian countries provided this kind of training¹⁵.

Personal, social, and learning competence represents another transversal skill that needs not to be neglected by curricula and educators: according to the report "Strengthening Social and Emotional Education as a core curricular area across the EU" of 2018¹⁶, "*the curricular dimensions of SEE remain largely implicit*" (p.34). In fact, teachers must be previously trained on social-emotional competences in order to build their experience and knowledge on the topic, and transfer it to their classes by creating new learning opportunities. The needs of new alternative teaching opportunities are already clear understanding by teachers in all project partner countries. The results of a comparative field quantitative research carried out as a part of the project show that many teachers are already implementing in their daily teaching activities or are willing to implement teaching methodologies based on alternative educational approaches including the theory of MI. However, a large number of respondents stated that they want to use new technics but did not feel qualified enough to apply them in the classroom. (Fig1.) It is not surprising that results in all partner countries are very similar against the existing differences in between.

11 Where are the worst teacher shortages? | World Economic Forum (weforum.org)

12 e-Skills.pdf (branden.biz)

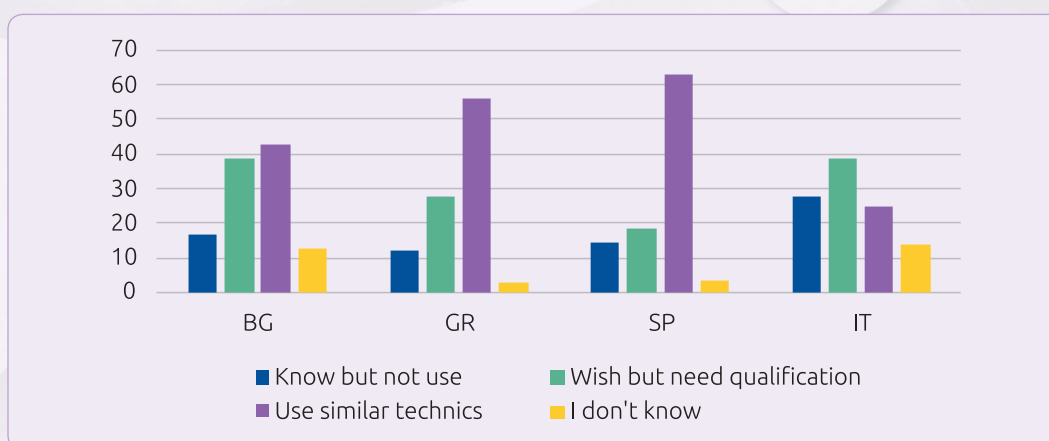
13 New publication on the digital transformation of education and school connectivity (unesco.org)

14 covid19-teacher-teacher-educator-survey.pdf (teachingenglish.org.uk)

15 Distance Learning Experiences of Teachers During Covid-19 Process | EPALE (europa.eu)

16 Strengthening social and emotional education as a core curricular area across the EU – Publications Office of the EU (europa.eu)

Figure 1. Willingness of teachers to use MI and/or other alternative educational methodologies (%)



The needs of possibilities to use new educational approaches has been more strongly realized and discussed by teachers during the current pandemic, as social distance, closed schools, and virtual learning became the rule. In a study conducted in Israel in 2020¹⁷ and appeared in the *European Journal of Teacher Education*, teachers are struggling to be prepared sufficiently to transfer knowledge and practices regarding social-emotional competences.

While new technologies and curricula based on soft skills are emerging, teachers are facing more and more pressure to keep up while carrying on their practice¹⁸. Thus, continuous professional development and improved initial teacher education curricula become imperatives to maximize the benefit for students¹⁹.

Here it is worth to mention about an unexpected obstacle suppressing innovation in teaching. The results of the study carried out as a part of this project reveal a quite different understanding between teachers at primary schools and university professors in pedagogy. While teachers are looking to increase their knowledge and teaching skills in classroom mostly by themselves through internet and various private training courses, the academic community at university states that their curriculums are modern, it provides new academic knowledge and students get information and skills to use modern educational alternative to traditional one techniques. Such existing gap between theoretical knowledge and needs of practitioners for innovative teaching methods is creating a long-term barrier on the qualification of education professionals.²⁰

17 Rethinking teacher education in a VUCA world: student teachers' social-emotional competencies during (tandfonline.com)

18 Structural indicators for monitoring education and training systems in Europe 2020, Overview of major reforms since 2015, Structural indicators for monitoring education and training systems in Europe 2020 – Publications Office of the EU (europa.eu)

19 Dumcius, Rimantas & Whittle, Martin & Huttova, Jana & Siarova, Hanna & Sternadel, Dalibor & Mackonytė, Greta & Jonavičienė, Dovilė & Junas, Povilas & Buinauskas, Darius. (2018). Study on Supporting School Innovation Across Europe. 10.2766/466312.

20 Readiness to implement MI methodology in partner countries, Analytical report of a field study – a part of the MI-NAEE project

Lack of time for educators due to administrative burden

Time should be spent wisely. Educators are supposed to be focused on teaching and learning for the success of their students' future. While it is possible to assume that most of their time goes to teaching, preparing lessons and improving learning methodologies, evidence shows something different.

The 2018 OECD Teaching and Learning International Survey (TALIS)²¹ analyzed the distribution of the time of teachers in the average lesson by dividing it into three categories: teaching and learning, administrative duties, and maintaining order in the classroom. The study shows that in 2018 teaching and learning activities covered, on average for OECD countries, 78% of teachers' working time. The time allocated to teaching and learning is by far the most relevant aspect of instructional effectiveness, as it is closely associated with maximizing the quality of teaching. In general, the allocation of teaching time of educators in the analyzed countries ranges between 65 and 86%.

According to the study, administrative tasks take on average 8% of the time. In some cases, this situation is exacerbated. As schools are demanded to carry on continuous monitoring and accountability tasks and there are fewer administrative resources available, teachers feel often to be overburdened with administrative duties²².

Taking a European perspective with respect to time spent, on average educators in eastern European countries are managing in a more effective way their teaching and learning time (with Baltic countries being on the top of the list). In fact, they spend less time than the average in administrative tasks and keeping order in the classroom. On the other hand, Mediterranean countries (such as Italy, Malta, Portugal, and Spain) spend more time in administrative tasks and in controlling disruption in class. Thus, around 20% of teachers' time is designated to something different than teaching and learning. (Table 1)

Table 1: Teachers' time spent in teaching and learning, partner countries studied from OECD report, %

COUNTRY	Average proportion of time teachers report spending on actual teaching and learning in an average lesson
Bulgaria	83,8
Italy	78,0
Spain	75,3
France	74,7

21 TALIS 2018 Results (Volume I) Teachers and School Leaders as Lifelong Learners <https://doi.org/10.1787/1d0b-c92a-en>

22 Dumcius, Rimantas & Whittle, Martin & Huttova, Jana & Siarova, Hanna & Sternadel, Dalibor & Mackonytė, Greta & Jonavičienė, Dovilė & Junas, Povilas & Buinauskas, Darius. (2018). Study on Supporting School Innovation Across Europe. 10.2766/466312.

Beyond spending time in the class, teachers are expected to learn. Nevertheless, their time available for this activity is quite limited. According to the MENTEP project²³, teachers cannot find enough time to train themselves and learn new skills to be transferred. In fact, on average its 11 partner countries show that less than 10% of educators' time can be apportioned to training.

Innovation and quality in education systems can be achieved through the increase of their financial capacity either by obtaining governmental grants or subsidies and other financial resources.

Teachers have also to spend their working time planning and preparing lessons. According to the OECD study²⁴, on average, between 2013 and 2018, teachers are spending more hours teaching and fewer hours planning lessons. In 5 years, the hours spent every week for teaching rose from 19.3 to 19.9, while those spent for preparing the lesson decreased from 7.1 to 6.5. For the EU countries studied by the OECD report, time spent teaching and preparing lessons is lower than the OECD average (19.2 and 6.4 hours per week).

Table 2: Teachers' time spent in teaching and preparing lessons, partner countries studied from OECD report, %

COUNTRY	Teaching (2018)	Individual planning – lessons' preparation (2018)
Bulgaria	19,9	7,5
Spain	19,6	6,2
France	18,3	7,0
Italy	16,8	5,1

Educators' time to learn and innovate the content and the teaching methods in their classes can be limited also by the requirements dictated by national curriculum. In a survey conducted by the European Commission – Joint Research Centre and the Institute for Prospective Technological Studies²⁵ on the introduction of creative activities school, teachers were asked whether they had too much content from the curriculum to cover leaving limited time for other activities. The results show that in 15 Member States out of 27 educators are generally rushing through the content without time to dive deep into the material. This means that time is an essential aspect that can hinder innovative processes of curricula re-design and up-to-date teaching methodologies²⁶.

Today, ten years later teachers of the project target group stated similar problems: they haven't enough time for lessons' plan preparation as well as enough time to go deeper into the academic subjects. They haven't enough time to work so to achieve desired results about functional literacy of the pupils. Their appeals to policy makers in education sector are summarized in the next Box.

23 MENTEP_Executive-Summary.pdf (europa.eu)

24 TALIS 2018 Results (Volume I) Teachers and School Leaders as Lifelong Learners <https://doi.org/10.1787/1d0b-c92a-en>

25 Creativity in Schools: A Survey of Teachers in Europe (2010)

26 Jonker, Herma & März, Virginie & Voogt, Joke. (2020). Curriculum flexibility in a blended curriculum. Australasian Journal of Educational Technology. 36. 68-84. 10.14742/ajet.4926.

While it is not the purpose to suggest ways to reduce disruptions in classes, common understanding is that educators should be less burdened by administrative duties and supported in finding enough time for their own training and for the practice of innovative pedagogies in the classroom. *Teachers' time is precious, and the more it is dedicated to the improvement of quality of teaching the better.*

The teachers' appeal in primary school to policy and decision makers in education:

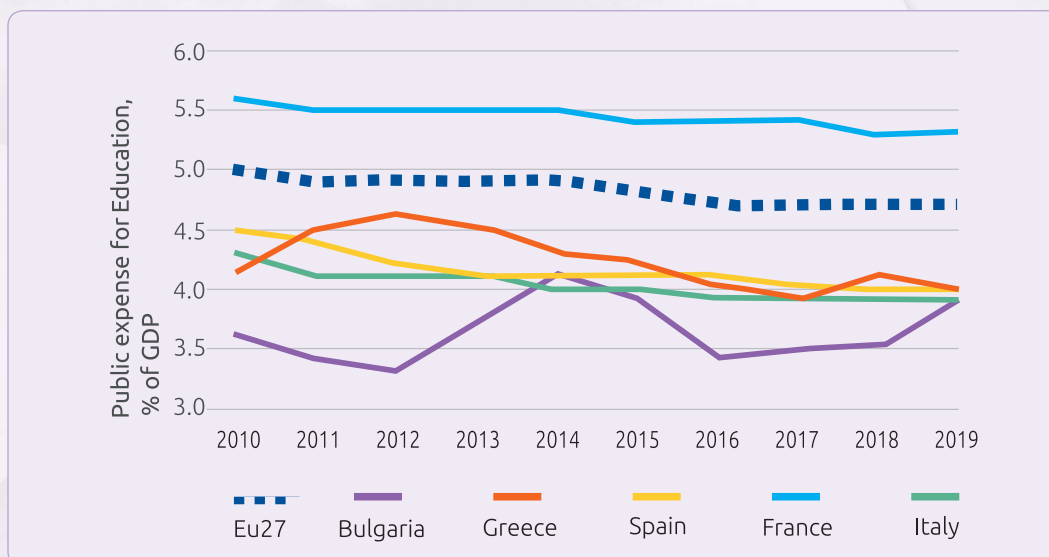
- The number of pupils in class to be reduced – up to 15-20 pupils
- Teachers to have more freedom to use various teaching and training methods in the frame of the national programs and standards;
- Teachers to have more time for pre-lesson preparation
- Training courses giving knowledge about emotional intelligence, Multiple Intelligence and tools for using it in class to be organized;
- Teachers periodically to be informed about neurosciences, brain functionality and behavioral acts related to pedagogical methodologies;
- To train teachers to be “actors” in class
- To establish new system for salary determination, credits depending on selected criteria motivating them to look for implementing different training approaches.
- To change the class environment – to establish flexible classroom
- To create a policy for motivating parents for collaboration with teachers and to take part in education of their children.

Internal finances/costs was a highly important barrier to innovation

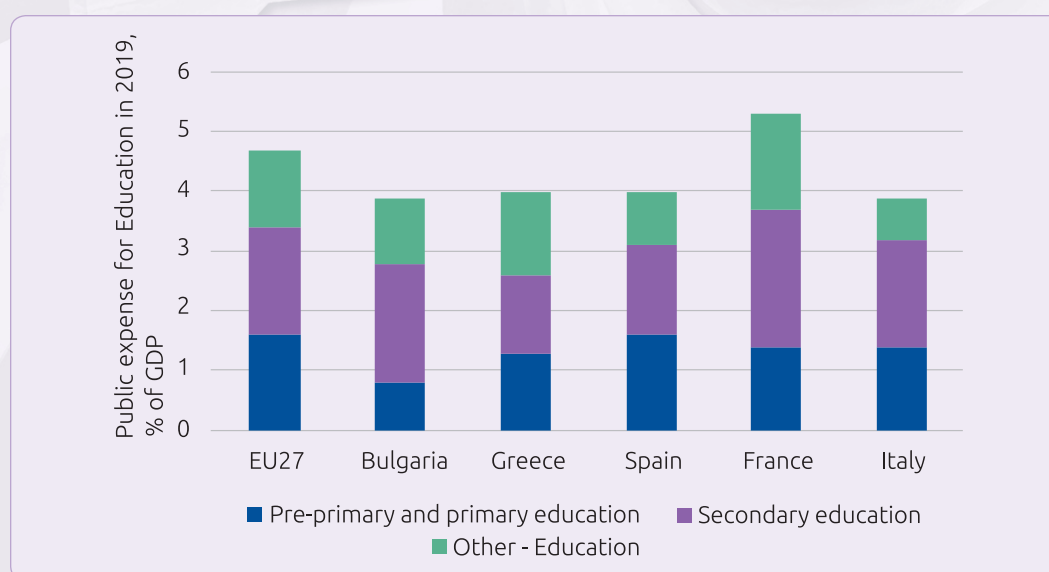
Financial resources and financial autonomy are an important element to consider when dealing with the innovation capacity of schools.

Common sense suggests that the more resources are committed for education, the higher the quality of teaching and the students' achievements in terms of educational output. Nevertheless, we can observe that most of our partner countries have consistently allocated limited resources to their education system. If we take into consideration the percentage of GDP set aside for education from 2010 to 2019 in Bulgaria, France, Greece, Italy and Spain and compare them against the EU27 average, we can observe that, with the exception of France, it is lower than the European average²⁷. Moreover, data seem to suggest that public expenditure on education has seen a slow decline. The only exception is Bulgaria, that saw an allocation continuously oscillating between 3.3 and 4.1% in 10 years with a peak in 2014. (Figure 2)

27 [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Total_general_government_expenditure_on_education,_2019_\(%25_of_GDP\).png](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Total_general_government_expenditure_on_education,_2019_(%25_of_GDP).png)



Looking closely at the subdivision of public funds for education, in 2019 the majority of partner countries allocated most of their resources, in line with the EU27 average, to the pre-primary, primary and secondary school, with a focus on the secondary one. The only exceptions are Spain and Greece, which allocated the same or higher level of resources to the pre-primary and primary school with respect to the secondary school. (Figure 3)



Quality in education is not only a matter of degree of public investment. Financial capacity and autonomy are essential for schools to be effective and to achieve higher standards: they mean formulating the school budget and allocating it according to its own need. In fact, increasing decentralization on financial resources can improve the quality of education by promoting change, by decreasing the drop-out rate and by boosting students' educational outputs²⁸. Though, in many OECD countries schools' resources are controlled at regional and national level, dictating strictly expenditures' ceilings and/or fixed allocation of resources.

This has the potential of hindering the role of schools in supporting their innovation²⁹.

28 Decentralised decision making, privatisation and student performance – SCHOOL FACTORS RELATED TO QUALITY AND EQUITY RESULTS FROM PISA 2000, (2005) untitled (oecd.org)

29 Dumcius, Rimantas & Whittle, Martin & Huttova, Jana & Siarova, Hanna & Sternadel, Dalibor & Mackonytė, Greta & Jonavičienė, Dovilė & Junas, Povilas & Buinauskas, Darius. (2018). Study on Supporting School Innovation Across Europe. 10.2766/466312.

Improving quality in the education sector means investing in schools with a long-term perspective. European countries should take it into consideration when planning the resources dedicated to education and try to reverse the current downtrend. In addition, even though financial autonomy has demonstrated to be effective in improving quality and innovation in schools, still several levels of public authority exist between Government resources and local schools³⁰.

Difficulties to obtain government and other grants

Institution for which the difficulties in obtaining government grants or subsidies were a highly important barrier to innovate

Beyond existing traditional funding mechanisms, additional financial resources can have a positive impact on schools' innovation. Developing and implementing innovative teaching methodologies or proposing new content for the curricula requires ad-hoc financial support.

These extra sources of financing are available for schools from different authority levels. At the European level several funds and instruments support funding innovation, such as the European Social Fund, the Erasmus+ programme or eTwinning, while at the national and regional level there are numerous grants for schools and prizes for virtuous teachers. Finally, civil society organizations can participate through funding solutions to the development of their local realities.

Among several challenges to fund innovation in schools with respect to these findings, three appear as highly significant. First of all, as mentioned before, *the availability of these funds*. According to a survey conducted by the Innovation Cluster for Entrepreneurship Education project³¹, some of the main causes of limited entrepreneurship education in its partner countries' schools (Belgium, Estonia, Finland, Italy and Latvia) has to be attributed to the lack of funding and of support from the local administrations. This situation can be translated to any pedagogical innovation proposed by schools. Moreover, austerity measures have speed up the cutting of these additional funds³², while in many European countries schools are still trying to cope with the fulfilment of their basic needs, such as the renovation of their premises, the purchase of ICT appliances, etc.

Secondly, *the continuity of funded innovation depends strongly on the original financing sources*. Once funding programmes are over, it is difficult for schools to ensure the financial sustainability of their innovative projects. Having a long-term horizon is essential for innovative applications, as it provides enough time to experiment and allocate funds flexibly.

Finally, obtaining *extra funds requires in-house expertise*. Schools need to have the capacity to attract these resources and manage them accordingly. Only teachers and institutions that are at the same time innovative and able to write and present proposals have superior chances to win. This means that schools in difficulty might not be able to access extra funds through competitive grant schemes, fostering rather than curbing inequalities³³.

To sum up, funding mechanisms supporting innovation are essential to help schools to

30 Financing schools in Europe, Mechanisms, methods and criteria in public funding Financing schools in Europe – Publications Office of the EU (europa.eu)

31 icee-eu.eu/component/attachments/?task=download&id=623:ICEE-final-report (icee-eu.eu)

32 *Curriculum reform in Europe. The impact of learning outcomes (europa.eu)

33 Supporting School Innovation Across Europe – Study on supporting school innovation across Europe – Publications Office of the EU (europa.eu)

come up with new pedagogies and curricula. To facilitate access to financing, all authority levels are demanded to carefully design and expand the funding supply.

Role of parent associations to school innovation

Synergies between schools and parent associations including family members of pupils are an essential element for the promotion of a cooperative and successful educational environment.

The encounter between families and public education helps to bridge differences and find common ground for the best interest of pupils. The higher the differences between these two actors, the higher the need for cooperation. In fact, accountability and transparency between the parties are essential in the education system to promote trust and coordinated improvement.

The active engagement of parents, through a bottom up approach that will ensure that their concerns and suggestions are taken into consideration from the school environment, is paramount for the achievement of school innovation.

In Europe, at school level, it is common to find systems that allow parents participation in the local school system through participatory bodies. Despite having, generally, a minority representation, parents can participate in decisions regarding the daily management of the school³⁴. The engagement of parents in school activities presents several benefits. It prevents potential resistance and fight back prejudice, favours an environment of mutual collaboration, opens opportunities for improving parenting and ultimately improve pupils' wellbeing and social skills³⁵.

Though, the same ones can inhibit innovation by pushing towards risk mitigation. If there is a consistent lack of communication between the parties and there is not shared goals or visions, parents, can substantially influence schools' ability to promote innovation. This might arise from emphasizing traditional beliefs in the education sector and resulting in resistance to change³⁶.

The continuous learning of teachers, including their training on soft skills along with the lightening of their administrative burdens are two of the most crucial parameters for ensuring soft skills development of pupils-learners.

In order to actively involve parents and have an impact in children learning, it is essential to go beyond the usual top-down approach based on periodic parent meetings and school-family communications, and adopt a bottom-up approach to engage actively parents and listen to their concerns and suggestions³⁷. Moreover, the new pedagogical approaches imply active cooperation between teachers and parents, which is an element of achieving the desired level of functional literacy and personal development of the child.

34 The Role of Parents in the Education Systems of the European Union The Role of Parents in the Education Systems of the European Union (sel-gipes.com)

35 Strengthening social and emotional education as a core curricular area across the EU – Publications Office of the EU (europa.eu)

36 Burns, T., Köster F. (2016), Governing Education in a Complex World, Educational Research and Innovation, OECD Publishing, Paris.

37 Strengthening Social and Emotional Education as a core curricular area across the EU, A review of the international evidence

Contribution of MI Methodology for achieving better teaching and acquisition of more effective knowledge for pupils

The methodology of MI is based on a different understanding of the learning process, based on modern scientific results from neuroscience and neuropedagogy. The learning process is understood as a complex of perception and acquisition of new knowledge by the pupil. Moreover, in parallel with learning and acquiring new knowledge pupils develop their transferable skills and socialization behavior under the directions of the teacher. Knowledge, emotions and skills are developing in unity and are formed by the innate and inherent specifics of the pupils. The MI approach is forming step by step a pupil's interdisciplinary way of thinking and understanding about the environment. It forms the first steps to learning based on the comprehensive approach to acquiring knowledge and skills, which later naturally grows into training under the EU program – STEAM, focused on training for creative personal and professional realization.

The idea of using different techniques for teaching to make the learning process more effective is not new. The appearance of “innovative schools” is a reply to such policy understanding for education. The different and innovative aspect of the MI methodology is that it ensures using a large set of innovative techniques (some of them well known already) aiming to better the teaching process in a systematic and complex way in which every pupil is the center and leading of the teaching process.

Innovation and essence of the methodology of MI in relation with the learning process

The innovativeness of the methodology is based on a new understanding about creating an equal environment in class. The focus is on the individual abilities of pupils to accept and understand new information. These individual abilities have two components – innate and trained and they form individual preferences and characteristics of everybody to learn, cognize and awareness the new information and its memorization. A key element of the methodology is the theory of multiple intelligence (MI) created by H. Gardner.³⁸ According to the theory each individual has his own dominant profile of capabilities, through which it is easier to perceive and memorize new knowledge. Gardner named these capabilities intelligence. There are 4 main principles ensuring the equal training environment:

1. Each individual has 8 types of intelligence, developed to varying degrees according to their lifestyle and environment;

38 Gardner, H., 1999. *Intelligence Reframing: Multiple Intelligence for the 21 Century*, Basic Books, N.Y.

2. Each type of intelligence can be developed throughout the life of the individual. However, the level of development that is achieved is different;
3. Each individual can be intelligent in a different way with one type of intelligence dominating;
4. All types of intelligences are in constant interaction and determine preferred interaction with the environment.

The alternative point of MI methodology to traditional educational methodology is that the teacher includes in the teaching process all types of intelligence to activate different pupils' channels for perception of new information. This is the main difference of the classical style of teaching, which is based mainly on two types of intelligence in Gardner's understanding – linguistic and logical-mathematical.

Spectrum project offered an alternative approach to assessment and curriculum development for the preschool and early primary years. Project Spectrum's work was based on the belief that each child exhibits a distinctive profile of different abilities, or spectrum of intelligences. These intelligences are not fixed; rather, they can be enhanced by educational opportunities such as an environment rich in stimulating materials and activities. The Spectrum approach emphasizes identifying children's areas of strength and using this information as the basis for an individualized educational program.

(source: <http://www.pz.harvard.edu/projects/project-spectrum>)

The main advantages of using the MI methodology are for both the teacher and the pupils.

ADVANTAGES FOR TEACHERS:

- Achieves higher efficiency in learning the material for everybody in class;
- Creates equality for each pupil in the class for perception and understanding the new knowledge;
- Masters and maintains pupils' attention throughout the class;
- Creates a pleasant and stimulating learning atmosphere for pupils in the classroom;
- Has and keeps control over the learning process through autonomy;
- Once the teacher has mastered the teaching techniques, the preparation time of the lessons is reduced;
- Teaching process becomes more creative and stimulating for self-qualification and increasing competences;
- The teaching process becomes an inspired and imaginative process, resulting in the establishing of a toolkit of innovative techniques that ensures higher success and effective achievement of functional literacy of pupils.

ADVANTAGES FOR THE PUPILS:

- New knowledge is accepted by pupils in an easy, enjoyable, accessible and even fun way
- New knowledge is easier to be remembered;
- Creates a sense of free choice during the learning process and a sense of self-importance;
- Creates a sense of fair and deserved evaluation by the teacher and classmates
- Forms transferable skills in parallel with the acquisition of new knowledge like: ability to express and affirm personal opinion, critical thinking, team working and communication skills, etc.
- Lack of stress based on permanent competition and rivalry in the learning process
- Developing a dialogical personality – forms the ability to evaluate and to understand the different opinion without rejecting it.

Basic principles of teaching related to MI methodology – Concept of Multiple Intelligence as a training methodology by H. Gardner and its understanding

The new concept of “multiple intelligence” created by H.Gardner introduces a new understanding of the educational approach and learning process itself. According to Gardner, human cognitive competence is better described by terms such as „ability“, „capability“, „mental skill“, which he named “intelligences”. Everyone has all of these skills, but developed up to a various level, and people differ themselves by the levels of development of their skills and their combinations. „I am convinced, – Gardner said, – that this theory of intelligence is more human and more truthful than the existing others ones; it reflects more adequately human „intelligent behavior“. Theory is particularly important for education.”³⁹

Gardner’s definition of intelligence includes three components:

- A set of competencies that allow the individual to solve problems throughout life
- Ability to create a real product and/or a service valid for a specific culture;
- The ability to set tasks and to find solutions, as well as to acquire new knowledge.

H. Gardner identifies the following eight types of intelligence based on their specific characteristics. They are:

Linguistic Intelligence (L)

WORD Smart

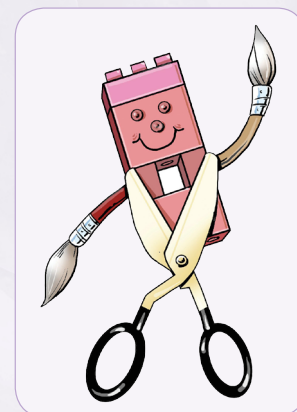
The ability to express ideas by words: capability to speak, to read, to listen; to write and express by telling stories, proverbs, poems, using both – written and oral expression.



Visual-Spatial Intelligence (S)

PICTURE Smart

The ability to notice, to recognize and to virtually change parameters (shapes, colors, sounds) of virtual pictures, based on a real images: capability to „see“ them in a wide range of the 3-Ddimensional space; to be able to recognize and have fun with different shapes, colors and pictures, to paint, to have a good orientation, to easy navigate in sketches, road maps, diagrams and graphics, but also to be able to dream, to watch movies.



39 Gardner, H., 2006, Multiple Intelligences – New Horizons, Basic Books, p. 15-17

Logical-mathematical Intelligence (LM)

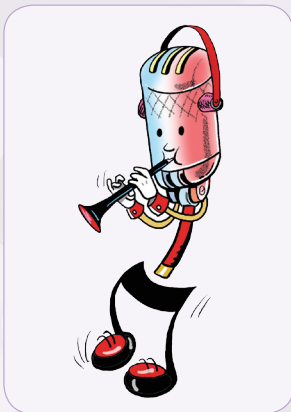
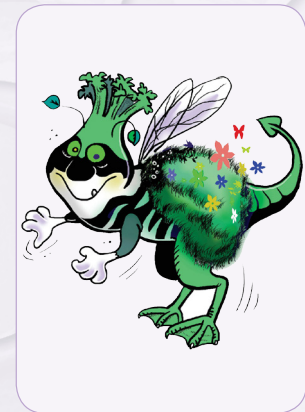
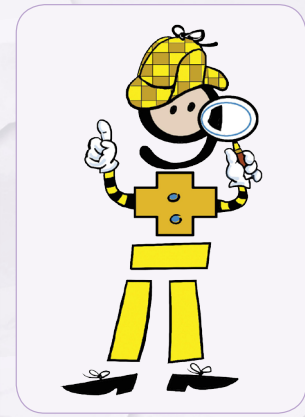
NUMBER Smart

The ability to think logically; to perform mathematical calculations, to arrange, to solve mathematical tasks, also the ability to organize, analyze and manage time, the time as well as the ability to think and reveal causal connections.

Naturalist Intelligence (N)

NATURE Smart

The ability to perceive and to feel nature – the animate and the inanimate world; the ability to distinguish different representatives of the environment in detail by assessing them in relation to their positions and survival, the ability to engage in and to feel convenient in natural areas (biophilia). The ability to observe, recognize, identify and classify plants, rocks, to try to understand nature and respect it, to have an ecological approach in actions aimed at protecting the environment. It is also the ability to categorize and classify nature objects or data according to their characteristics. These individuals are gifted in recognizing natural patterns.



Bodily-Kinesthetic Intelligence (BK)

BODY Smart

The ability to express oneself through the body or through their body parts, the ability to express in a clear and precise way like: touch, movement, express forms of their problems and their relevant solutions by combining mind and body; persons with deftness and dexterity, high ability for assembling and disassembling objects.

Musical Intelligence (M)

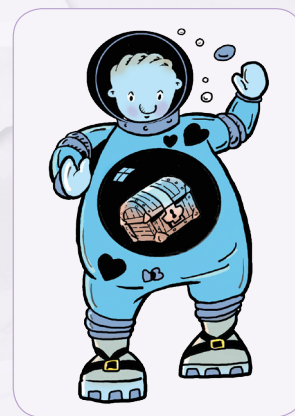
MUSIC Smart

The ability to perceive, to evaluate, and to compose music through rhythms, tones, and modulations. The ability to be sensitive to sounds, rhythm and music: to sing, to play a musical instrument, to beat time, to whistle; the capability to be sensitive to emotional messages of music and to the surrounding natural sounds like birdsong.

Intrapersonal Intelligence (I-)

SELF Smart

The ability to know and evaluate yourself: to be able to take advantage of the strengths and to take into account the shortcomings, to set personal goals and to achieve them, to be responsible of the actions, to be able to motivate yourselves.



Interpersonal Intelligence (I+)

PEOPLE Smart

The ability to understand others and their intentions, to be able to interact with others in an appropriate way: to integrate and adapt easily, to exchange ideas, to prevent and resolve conflicts, to regulate interpersonal relationships, to organize and lead others



Implementing the Theory of Multiple Intelligence in Practice⁴⁰

Most important issue the MI to be implemented in practice is the development of the toolkits for giving teachers knowledge how to use the methodology during teaching in class. Such technics are developed and they include:

- Special tests are designed tailored to the age of the learners the teacher to identify the strengths of the pupils in class and so to know the spectrum of their dominant profile of intelligence;
- A set of criteria for revealing and monitoring the pupils behavior, aimed at determining his/her profile, which could help teachers in organizing and presenting the subject knowledge are developed;
- A set of directions to develop an individual teaching strategy oriented to each learner in class and to organize the process of presenting the new information are developed;
- To achieve more effective learning parents could be involved in understanding the strengths of their children and to create a corresponding behavior at home;
- Pedagogical techniques for easy memorization and assimilation of knowledge in accordance with the dominant profile of intelligence of pupils are designed and are available to be used by teachers.

⁴⁰ There are numerous studies investigating the achieved results of students that are studying using MI methodology trying to understand the reasons for identified success of the students. The scope of these studies are increasing during the years but it is a fact that MI methodology facilitate learning process. Campbell, L., Campbell, B., 1999. Multiple Intelligences and Student Achievement (Success Stories from 6 schools), Association for Supervision and Curriculum Development, Alexandria, VA, USA.

Why the implementing of MI methodology is important?

One of the key issues of the implementation of the methodology of MI is that children do not sense any stress during learning and feel comfortable to always express their opinion and questions. As Goldstein has pointed out: "The human brain is designed to sense, process, store, perceive, and act on information from the external and the internal environment. All of these complex systems and activities work together for one overarching purpose – survival". When experiences are traumatic, the pathways getting the most use are those in response to the trauma; this reduces the formation of other pathways needed for adaptive behavior. Trauma in early childhood can result in disrupted attachment, cognitive delays, and impaired emotional regulation that can lead to impairment later in life (Perry, 1995). Scientists identified that these nearly permanent limited potential abilities of a trauma child are provided by undevelopment of the neurons and networks of neurons in many brain structures responsible for cognitive and emotional abilities. Stress is one of the most common traumas for the child starting from early age.

The chronic, prolonged traumatic experiences have the potential to alter children's brains, which may cause longer-term effects in areas such as:

Attachment:	Trouble with relationships, boundaries, empathy, and social isolation
Physical Health:	Impaired sensorimotor development, coordination problems, increased medical problems, and somatic symptoms
Emotional Regulation:	Difficulty identifying or labeling feelings and communicating needs
Dissociation:	Altered states of consciousness, amnesia, impaired memory
Cognitive Ability:	Problems with focus, learning, processing new information, language development, planning and orientation to time and space
Self-Concept:	Lack of consistent sense of self, body image issues, low self-esteem, shame and guilt
Behavioral Control:	Difficulty controlling impulses, oppositional behavior, aggression, disrupted sleep and eating patterns, trauma re-enactment. ⁴¹

Thus trauma (stress) during this stage of child development can have a significant impact on learning, social relationships, and school success. MI methodology is based on reducing stress during the learning process in class and outside.

41 Cook, et al., (2005). Complex trauma in children and adolescents. In *Psychiatric Annals*, 35(5), 390-398

Teaching process based on MI methodology and transferable skills such as: critical and creative thinking, analytical skills, teamwork, communication skills

Forming transferable skills today is recognized as an important component of education. It is obvious nowadays that people with highly developed transferable skills are well professional realized employees, active citizens, and good parents. Transferable skills become more and more important for economic and social realization of people.

The methodology of MI makes it possible to form these transferable skills in parallel knowledge acquisition. Most of the MI implementation tools are training like “learning by doing” that means that there exists natural conditions for the formation of transferable skills of the pupils during learning.

Pupil forms his transferable skill step by step during solving different tasks given by the teacher around every topic of the standard educational program. Most visible it could be recognized when pupils have to work in groups. Everybody as a member of a group is involved in conditions to solve the specific task and to achieve the result. Members of the groups have to look for a solution together, so they are placed in a situation *to work in a team*.

During separate steps to solve the task pupils have to use different skills, such as: to reveal in understandable way the conditions of the task and to outline possible ways to reach a solution, so they are required *to think analytically and critically, to hear and to listen, to perceive and to comprehend the opinion of all group members*. It means that the pupil has to know how: to hear other people’s opinion, to have a dialogue and to reach a common opinion. In the last phase of group work – pupils must present the decision they have reached. For this purpose, they select who to present the achieved results, to decide the best way to present the results: as a text, as text and visualization, as text, visualization and action, etc. So, during deciding the set of presentation’s forms of their results pupils learn themselves to communicate effectively, to evaluate the audience of their presentations and according to it to select the most appropriate forms. An important element is training the skills to delegate the rights to present the result of a joint activity with his personal participation to another member of the group and so their joint achievements be presented in the best way. Effective teaching requires appropriate uses of assessment of the team work. The primary purpose of assessment is to aid development and learning rather than to sort, track or label.

Each task assigned to a pupil or a group of pupils by the teacher in parallel goes together by a process of forming a different range of skills. It is important for the teacher:

(1) to select the tasks in accordance with the individual dominant profiles of pupils’ intelligence in each group, (2) gradually to complicate the tasks that require together increasing the new knowledge and also enlarging the variety of skills to be developed.

As a result – a large set of transferable skills is developed during every single task by practicing MI methodology. The skill of the teacher to manage and control the learning process invisible to the pupils needs the teacher to have additional knowledge and qualification, which could be obtained through short-term training courses and/or a Curriculum to be involved in pedagogical disciplines at universities.

MI methodology creates environment pupils to acquire academic knowledge and in parallel to form transferable skills.

Organization of the learning environment for effective implementation of MI methodology; how to create a flexible class.

Learning environment is a key element of effective implementation of the MI methodology. The interior of the classroom is important as much as the difference of the traditional organization curriculum around pivotal topics it is. Open learning space means possibility for flexible seating and writing locations and spots, integration of technological learning tools and multimedia, creative dynamic overall learning environment. Open learning space intends process of learning to be delivered in various ways such as: lecture, presentation, team working, experimentation, challenge, discussion and exploration. Establishing open learning space has two main aspects – forming movable and dynamic interior and creating innovative ways of teaching directed to holistic teaching-learning approaches for teachers and learners.

In general, these changes could be recognized in the modern today concept about a flexible class.

The flexible class means (see pictures as examples):

- Possibility for controlled (regulated by the teacher) movements of pupils during class, according to the performance of specific tasks.
- Readiness of the teacher to change power position and to take the role of facilitating the process as a mentor;
- Possibility to rearrange the school desks (writing tables) depending on the organization of teaching and work individually and / or in group. The rearrangement to be possible to be carried out by pupils themselves under the control by the teachers.
- Establishing an environment stimulating learning through objects, made by pupils, texts, drawings, etc. that support the learning process; the designed walls of the classroom with different materials are mobile and could be a part the assessment pupils' process.
- The teacher at the beginning of school year to determine the dominant profiles of intelligence of each pupils in the class and so to organize each lesson , respectively the design in the classroom in accordance with them and create conditions for the overall personal development of the pupil.
- Parents are allowed (motivated, even required) to participate in helping the teacher when it is possible for stimulating the creative process during class or in extracurricular activities.



A key worth function of a flexible class is important to activate teachers' creativity and imagination.

Last but not least is that establishing a flexible class could become a reality with a limited extra financial resources. In school financial flexibility could cover the costs for equipment for the flexible class.

All of these possible enhancements illustrate how classroom changes can positively support teaching practices by enhancing pupils' engagement in the learning process. Today MI methodology could be the leading systematic educational approach for innovation changing in education. But it is not the only effective pedagogical methodology. It could be an effective tool on a par with other pedagogical methodologies that mobilize and motivate pupils to develop a desire for education and to have good self-esteem both in school and in life.

Why should the MI be considered and brought to attention to experts in education sector

The methodology based on multiple intelligences is not the only effective pedagogical methodology. It is not in itself an universal educational recipe. But it could be an effective tool on a par with other pedagogical methodologies that mobilize and motivate pupils to develop a desire for education and to have good self-esteem both in school and in life.

MI methodology is important to be introduced to educational system because it could help to overcome the following key social issues:

- To increase functional literacy of learners on national level;
- To create friendly environment learners with SEN to be integrated in universal class
- To form transferable skills of learners in parallel with getting new academic knowledge;
- To reduce stress and to prevent possible long-term traumas of child during learning by creating comfortable and pleasant teaching environment that motivate learners for self-education;
- To motivate teachers for self-qualification and creativity practice;
- To distribute schools budget more effective and related to school needs;
- To motivate active and responsible collaboration of parents about the education and upbringing of their own children.

Good practices of implementing MI methodology on regional and national level of education – experiences of Canada, Belgium and France

*“Teachers bring enthusiasm and varied teaching and assessment approaches to the classroom, addressing individual learners’ needs and ensuring sound learning opportunities for every learner”.*⁴²

The declaration clarifies the approach that the Canadian school system focuses on MI.

This section of the Handbook develops an approach to the strategies related to MI in schools in the French and Canadian schools. The contribution is related to countries that, also for their specific and cultural connections and partially for their common language, have experienced many projects and indications on how and why the specific needs of the students have to be considered and faced.

Just for presenting a case, the Ontario mathematics curriculum recognizes that pupils do not learn mathematics in the same way and require the use of variety in instruction and assessment.⁴³ Additionally, the health and physical education curriculum for Grades 1-8 states that elementary schools in Ontario *strive to give every pupil opportunity to learn in ways that are suitable to their unique needs and strengths.*

From the national Canadian practice, we can learn how not only in Ontario, but everywhere in Canada, the school system shows awareness of the diversity that exists among the learners, as well as the need for differentiation in the ways in which they instruct and assess their performances and learning achievements. What is defined as “differentiated instruction (DI)” recalls flexibility in the teaching methods and approaches and, in particular, different and personalized assessment strategies with the (expected) results to meet all (or the maximum potentially possible) learners’ individual needs. Educators in Canada are expected to use MI in their teaching to address all learners’ needs, which not only include a range of learning styles in their classrooms, but also a range of intelligences or multiple intelligences (MI). While learners must be recognized for their learning preferences (surrounding environments, timing, etc.), teachers must also understand individual learners’ learning capacities in a variety of categories, meaning their MIs⁴⁴.

42 Gov. of Ontario, Ministry of Education, The Ontario Curriculum Grades 1-8: Mathematics, 2005. This curriculum policy is replaced by the The Ontario Curriculum, Grades 1-8: Mathematics, 2020 that is inspired by the same principle, p. 5

43 Ontario Ministry of Education, 2005

44 Prashnig, B., 2005. The power of diversity : new ways of learning and teaching through learning styles. Moorabbin, Vic : Hawker Brownlow Education

In Canada the teachers have been trained for developing specific activities and to be made aware of the MI implications. In order to supplement classroom work, the Canadian educational system suggested using simulation activities as “role playing, debating, and simulation software”, indicating that they have all the potential to integrate multiple intelligences in the classroom.⁴⁵

MI theory has become a new methodological approach used in many school settings and in Belgium⁴⁶. The aim is to awaken the pupils’ capacity to memorize school material in their own way. It also serves to restore and develop the pupils’ self-confidence, to teach him how to learn and how to reason.

Françoise Roemers-Poumy, an elementary school teacher with more than 25 years of practice created the „Octofun” pedagogy in 2013⁴⁷. Components of this pedagogy are MI theory and positive psychology. She presents the eight forms of intelligence, calling them „energy balls”. The aim is child to understand that he/she possess all of these „powers”. Some are dominant, others are less developed, and the teacher’s efforts should be directed toward all of their development.

In Belgian schools that apply this methodology, decide to implement it in a parallel way with traditional lessons Several lessons per week pupils are grouped according to their dominant intelligence profiles and teachers adapt their teaching according to these pupils. Teachers rearrange the way of presenting lessons differently and explaining material considered complex in a more interactive way⁴⁸.

In France the MI has been investigated more at academic level and the inclusion of practices like Problem and Project based learning are not uniform in all the schools.

An experience has been carried out in the University of Grenoble investigating how the learner’s level of achievement is not solely influenced by the way he/she is taught, but by a nest of correlations, resulting in each individual being influenced by an immediate and a proximal environment. The human capability to act effectively in a nest of correlations constitutes the modern definition of intelligence and precisely Gardner’s Multiple Intelligences Theory (MI)⁴⁹. This article reflects on the results of a pilot study carried out to investigate whether there is a relationship between MI theory and language sustainability among learners taking an English course. 220 second-year science learners were randomly chosen for two experimental groups (MI theory-based teaching) and a control group (teaching based on their textbook). The main

Analysis of the approach to the strategies related to Multiple Intelligence in the French, Belgium and Canadian schools, that have experienced many projects and indications on how and why the specific need of the pupils have to be considered and faced. The three countries identified a general introduction of ideas directly or indirectly related to Multiple Intelligence introducing learning outcomes approaches and they have a common trend addressed to enhance flexibility, which is intended to open up more personalized learning paths, contributing to a more learner-centred system with the aim to consider the role of MI in the learners carriers.

45 Educational Broadcasting Corporation, 2004b, pp. 4-5

46 www.octofun.org

47 La pédagogie des OCTOFUN – Guide méthodologique pour les enseignants – Edité par “Octofun – 2018.

48 Cahour,F., 2016. Le VIF, 16/06/ (<https://www.levif.be/actualite/la-theorie-des-intelligences-multipl-le-futur-de-la-pedagogie/article-normal-513205.html>).

49 Barrington, E. 2007. "Teaching to student diversity in higher education: how Multiple Intelligence Theory can help". Teaching in Higher Education Journal, 9/4: 421-434.

results showed a statistically significant difference between learners' continuous assessment marks. Also, the results of learners' final exam showed a statistically significant difference between the experimental and control groups.

The research group⁵⁰ intended to answer the question "Does using a Multiple Intelligence approach in teaching have a significant effect on English sustainability among second-year undergraduate (L2) science learners?". They discovered and proved that using an MI-based approach to teaching has a positive effect on the learners' activity and in-class participation. The results of the study show that the learners in the experimental group had higher performance in their final exams than those in the control group. As the final exam sheets are randomly corrected by a team of teachers and the papers are anonymous, there is not a high possibility of a Pygmalion effect. However, the limitation to a fill-in-the-blanks style of testing is that the testing is not coherent with the teaching, i.e. in a course where the teaching is based on MI theory, the testing should as well be MI theory-based.

The study concluded that integrating Multiple Intelligences into curricula aims at explaining the diverse manifestations of intelligence within learners. Creating environments that foster individual as well as group potential might help individuals make a lasting change in the way they perceive and deal with their environment. Consequently, using an MI approach to language teaching might be able to boost sustainability in an individual learner's knowledge of language and language competence.

Canada and France have been engaged in curriculum reforms including learning outcomes and a competence-based approach in VET curricula. The scope of these reforms is to introduce learning outcomes and competences in the curricula. Both countries identified a general introduction of ideas directly or indirectly related to MI introducing learning outcomes approaches. And they have a common trend addressed to enhance flexibility, which is intended to open up more personalized learning paths, contributing to a more learner-centered system with the aim to consider the role of MI in the learners' careers.

MI Learning outcomes increase flexibility through personalization of curricula and the autonomy granted to teachers to develop and implement learning programs.

In general a better awareness about MI introduces learner-centered teaching methods conceptual issues behind outcome-oriented policies and practices in the nine examined countries. It highlights the key role played by learning outcomes in curriculum reforms and brings evidence of important changes in national curricula. However, the analysis of the curricula in VET institutions provide only hints about the implications of outcome-oriented curricula on learning processes. To analyze the extent to which learning-outcome approaches may contribute to more learner-centered VET systems in France and Canada is necessary to see how the countries have adopted the learner's perspective and analyze at micro-level how outcome-oriented curricula may influence teaching and learning practices, learner achievement and the progression of learners within the education and training system.

Concerning the Kindergarten and the introduction of MI perspectives in Canada and France (4 and 5 years old) the experiences are addressed to mix the pupils in each class, remaining with the same teaching team for their full two years before moving on to first grade.

The Ontario Ministry of Education (2017) projects intends to develop for all children a

50 Salena Molaie, 2015., Les stratégies, l'engagement et l'ergonomie cognitive comme leviers pour l'enseignement / apprentissage des langues, Vol. 35 N° 1

personalized support to their social, emotional, and cognitive development; improving their reading, writing, and math skills; smoothing their transition to first grade; helping them achieve long-term academic success; and ultimately building a stronger future economy. This is shown also by the large-scale monetary investment – over \$1.4 billion and growing and the pioneering nature of this early childhood initiative make it significant not only in Canadian education but even in the global early childhood sphere.

In general, it is obvious that early childhood education is very important for the personal development of everybody. MI theory is one of the existing pedagogical methodologies that manage to engage kids and children to learn, to keep their curiosity to understand the world around, so to grow and realized themselves based on their strengths.

Analyzing the process of implementation of MI methodology in Canada, France and Belgium there is a similar factor that direct this process. In all countries there is a permanent collaboration between academic community investigating different areas of individual's mechanisms of learning and memorizing and professionals in education that transfer these results into practical tools. Based on these collaboration is directing education policy priorities.

The pointed above examples about implementation of MI methodology show also that to achieve effective results of its implementation there has to be common understanding on political and government level.

Multiple Intelligence Methodology and STEAM approach in education

In the last couple of years the abbreviation – STEM has much traction in the field of education. Many schools, teachers, even politicians have been using the term in relation to innovation in the educational process.

STEM comes from the first letters of **S**cience – **T**echnology – **E**ngineering – **M**ath.

It was introduced back in the 90's in the educational system in the US. Without having one specific name used as the “father” of STEM term, the name of Charles Vela, founder and director of Center for the Advancement of Hispanics in Science and Engineering Education (CAHSEE), comes ahead as one of the first educators, who used and apply this term, as we know it today. Afterwards, back in 2001, Rita Colwell from National Science Foundation (NSF, USA) has adopted the term officially.

Today there are many different variations of this abbreviation with added letters and disciplines. STREM (adding Robotics), STEAM (adding Arts), STREAM (adding both – Robotics and Arts), STEEM (adding Economics), to name a few.

The general concept is to bundle together different disciplines in science, technology, engineering and math in order to make it easier for students to understand the link between all these various topics. In the conventional educational system, as an example, students have class in mathematics, then in biology and then in informational technologies. Students should “switch” not only between topics but also classrooms, way of thinking, understanding and of course teacher. So STE(A)M appears in response to modern perceived needs for effective learning and personal development.

When Gardner introduced the Multiple Intelligence theory back in 1983, he identified 8 types of intelligences, which all people have and can develop in various ways. Learning, as an integral part of our development is also affected depending on how we learn best.

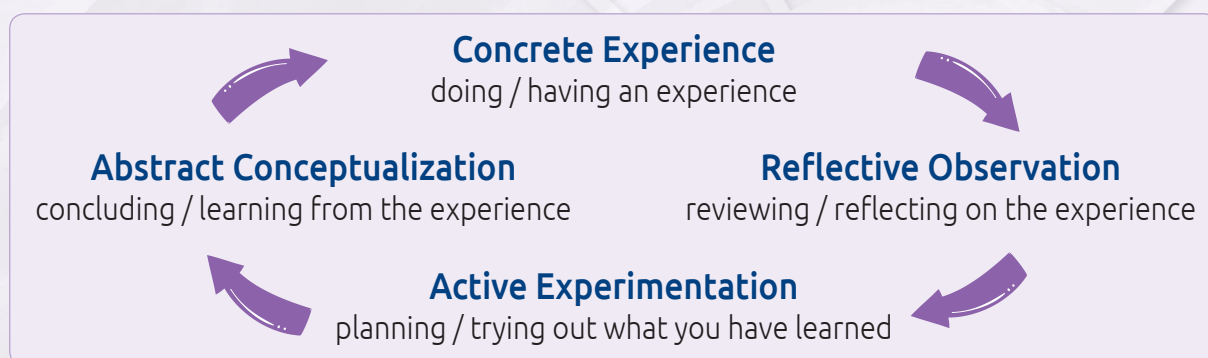
The implementation of STE(A)M methodology helps teachers in their day to day work and preparation of materials and programs for the students. Teachers from various disciplines could prepare projects together in an interdisciplinary approach.

STE(A)M approach unlocks creativity not only among pupils, but also among teachers.

Through this approach students not only learn new information in various ways such as – practical experiments, challenges, hands on approach, but also have the chance to present and apply what was discussed with the teacher. There are many examples for collaboration between math and science classes, engineering and robotics, programming and arts.

About the same time as Gardner, another great scientist and educator – David Kolb introduces his Experiential Learning Cycle⁵¹ (1984).

1. Concrete Experience - a new experience or situation is encountered, or a reinterpretation of existing experience.
2. Reflective Observation of the New Experience - of particular importance are any inconsistencies between experience and understanding.
3. Abstract Conceptualization reflection gives rise to a new idea, or a modification of an existing abstract concept (the person has learned from their experience).
4. Active Experimentation - the learner applies their idea(s) to the world around them to see what happens.



Kolb argues that each individual's effective learning experience covers four major steps:

- Concrete experience (doing / having an experience)
- Reflective Observation (reviewing / reflecting)
- Abstract Conceptualization (concluding / learning from experience)
- Active Experimentation (planning / trying out)

Both MI theory and Kolb's theory could be used as a fundament for creating engaging classes at school for the students. Taking under consideration the 8 different types of intelligences and these four stages through which effective learning could be obtained and putting them together in STE(A)M approach could unlock a very practical, holistic and active educational classroom.

STE(A)M is not only a methodology through which a teacher or a school can create curriculum for these main disciplines, but is also a mindset, which cultivates critical thinking, practical application of knowledge and collaboration between students, teachers and law makers.

In the last years there were some critics, who argued that math and science professionals and jobs are widely available and we do not need special focus on these disciplines but as stated above STE(A)M – not only tries to address these main areas of studies, but also to create a new general approach to education, teaching and participating at the classroom.

MI and STE(A)M as complementary methodologies have the potential to improve the learning process and to unlock practical and applicable knowledge for all students in various age groups at school.

51 McLeod, S. A. 2017. Kolb -Learning styles. Simply Psychology, October, 24

Conclusion

The discussion of presenting of an alternative educational approach is not accidental. It is bottom-up initiated processes provoked by the perceived needs of changing the teaching process by educators. The worth item is that the development of MI methodology goes in an evolutionary way. Thus it continuously accumulates the new academic and practical knowledge which results in unceasing upgrading the MI methodology.

It is very important the introduction of the MI methodology to the educational system because it could help to overcome some of the current difficulties and lacks and so to meet the EU priorities for increasing the quality of education.

It is worth to say that MI allows these changings to be in a system way not as it is implementing currently – detached, partially and on the individual initiative of individual educators.

MI approach is open space for inventing various training techniques and a way to bring back the high prestige of the teacher's profession in the society, to make it attractive and interesting for pursuing such professional career.

Although major changes require time to be implemented, it is never too late to start working towards them. The topics analyzed in this Handbook can be the starting point for policy discussions in Europe, regarding the acceleration of achieving an inclusive and effective education overall.

Policy Direction (Option) 1:

Schools to have greater autonomy and extra resource allocation for implementing new training approaches, such as MI and STEM, for achieving personalized pupils' education.

Policy Direction (Option) 2:

Provision of high quality training to teachers regarding knowledge and skills to teach the pupils' acquisition of new academic knowledge and in parallel forming transferable skills, including the cooperation with the universities and research entities.

Policy Direction (Option) 3:

Promote and motivate parents' active engagement in the personalized pupils' education through an innovative framework.

Glossary

Attention Deficit Hyperactivity Disorder: ADHD is a disorder marked by an ongoing pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development (source: <https://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd/>)

Dyslexia: Dyslexia is a learning disorder that involves difficulty reading due to problems identifying speech sounds and learning how they relate to letters and words (decoding). Also called reading disability, dyslexia affects areas of the brain that process language.

(source: <https://www.mayoclinic.org/diseases-conditions/dyslexia/symptoms-causes/syc-20353552#:~:text=Dyslexia%20is%20a%20learning%20disorder,the%20brain%20that%20process%20language>)

Flexible class – a classroom with opportunities for quick, easy and frequent changes of interiors related to the nature of the specific activity based on the organization of the curriculum of the topics; allowing conducting a class outside the school building – in the yard, in the garden near the school, etc., which is a regular rather than an episodic event. In recent years it has gained great popularity due to its impact on the learning process and at the initiative of teachers – funds have been raised to provide the necessary interior and teaching aids.

Inclusive education (definition by UNESCO): The inclusive education means that all children – no matter who they are – can learn together in the same school. This entails reaching out to all learners and removing all barriers that could limit participation and achievement. Disability is one of the main causes of exclusion; however, there are also other social, institutional, physical, and attitudinal barriers to inclusive education. Inclusive education systems, which is a core part of the fourth Sustainable Development Goal (SDG4) and the 2030 Education Agenda, respect the diverse needs, abilities, and characteristics of all children and youth, and is free of all forms of discrimination. Inclusive education systems can in turn foster societies that are more inclusive. (source: <http://www.iiep.unesco.org/en/inclusive-education>)

Intelligence is defined as general cognitive problem-solving skills. A mental ability involved in reasoning, perceiving relationships and analogies, calculating, learning quickly... etc. Earlier it was believed that there was one underlying general factor at the intelligence base (the g-factor), but later psychologists maintained that it is more complicated and could not be determined by such a simplistic method. Some psychologists have divided intelligence into sub-categories.

Intelligence given as a term by Gardner is: Intelligence is a “biopsychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in the culture’ (H. Gardner, Gardner, H., 1999. Intelligence Reframing: Multiple Intelligence for the 21 Century, Basic Books, N.Y. ,33)

This formulation has distinctive features:

- Intelligence is not a singular capacity;
- An intelligence is rooted both – in human biology (brain, genes) and in human psychology (mental process);

- While concepts of intelligence typically valorized problem-solving, the definition incorporates the creation of products, ranging from works of art to technological inventions;
- All intelligence may only be expressed or valorized in certain loci at certain time. (p. 208)

Types of Intelligences (H. Gardner):

Number Smart (logical/mathematical intelligent): Having the ability to recognize patterns, work with abstract symbols, such as numbers and geometric shapes, and see relationships or connections between separate pieces of information. (Armstrong, 2009. Multiple intelligences in the classroom)

Word Smart (verbally/linguistically intelligent): Having the ability to use language effectively, whether orally or in writing. (the same source as above)

Picture Smart (visually/spatially intelligent): Having the ability to perceive and depict the visual-spatial world accurately. Being sensitive to shape, line, color, form, and space and the relationships that exist between them. (the same source as above)

Music Smart (musically intelligent): Having the ability to perceive, discriminate, transform, and express musical forms. Being sensitive to rhythm, pitch, melody, and timbre of music. (the same source as above)

Body Smart (bodily/kinesthetically intelligent): Having the ability to use one's hands and body to express ideas and feelings or to produce and transform objects. Possessing remarkable physical skills, such as coordination, balance, and dexterity. (the same source as above)

People Smart (interpersonally intelligent): Having the ability to perceive and respond to the moods, intentions, and feelings of other people. Being sensitive to facial expressions, voice, and gestures; being able to respond effectively to those cues. (the same source as above)

Self Smart (intrapersonally intelligent): Having the ability to self-reflect effectively. Knowing oneself well and acting on the basis of this self-knowledge. This includes having an awareness of one's inner moods, intentions, motivations, temperaments, and desires. (the same source as above)

Nature Smart (naturalistically intelligent): Having the ability to know about and relate well to one's natural surroundings. Being sensitive to nature and one's place within it, being able to nurture and grow things, and easily caring for and interacting with animals. (the same source as above)

IQ test: An IQ test is an assessment that measures a range of cognitive abilities and provides a score that is intended to serve as a measure of an individual's intellectual abilities and potential. IQ tests are among the most commonly administered psychological tests. (source: <https://www.verywellmind.com/how-are-scores-on-iq-tests-calculated-2795584#:~:text=An%20IQ%20test%20is%20an,most%20commonly%20administered%20psychological%20tests.>)

ISCED: The International Standard Classification of Education (ISCED) belongs to the United Nations International Family of Economic and Social Classifications, which are applied in statistics worldwide with the purpose of assembling, compiling and analysing cross-nationally comparable data. ISCED is the reference classification for organizing education programmes and related qualifications by education levels and fields. ISCED is a product of international agreement and adopted formally by the General Conference of UNESCO Member States. (source: <http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf>)

Metacognition: In psychology, metacognition refers to the activity of thinking about one's own mental processes. (source: <https://www.collinsdictionary.com/dictionary/english/metacognition>)

Metacognitive-Evaluation: A facet of metacognition, during which students determine how successful the strategy they used was in helping them to achieve their learning goal. (source: <https://cambridge-community.org.uk/professional-development/gswmeta/index.html>)

Neurotypical or NT, an abbreviation of neurologically typical, is a neologism widely used in the autistic community as a label for non-autistic people. It refers to anyone who does not have any developmental disorders such as autism, developmental coordination disorder, attention deficit hyperactivity disorder or obsessive compulsive disorder. (source: <https://en.wikipedia.org/wiki/Neurotypical#:~:text=Neurotypical%20or%20NT%2C%20an%20abbreviation,label%20for%20non%2Dautistic%20people.>)

SEN: Special Educational Needs is a legal definition and refers to children with learning problems or disabilities that make it harder for them to learn than most children the same age (source: <https://www.nidirect.gov.uk/articles/children-special-educational-needs>)

Skills panorama: The skills Panorama is an online central access point for data, information and intelligence on skill needs in countries, occupations and sectors across EU Member States. It is an initiative of the European Commission aiming at improving EU's capacity to assess and anticipate skill needs, helping education and training systems be more responsive to labour market needs, and better match skill supply and demand across the EU. (source: <https://www.cedefop.europa.eu/en/events-and-projects/projects/skills-panorama>)

STEAM (Science, Technology, Engineering and Math) – STEM education, is the learning school subjects through an integrated approach. It's learning science, technology, engineering, and math as one, and in parallel also forming skills of critical thinking, problem-solving, exploratory learning, working in a group, that go hand-in-hand with those subjects that make STEM education valuable. STEM educational approach means academic knowledge to be related hands-on and relevant learning experiences. EC established EU STEM Coalition, the EU's network of national STEM platforms (<https://www.stemcoalition.eu/>)

Transferable skills (soft skills) – transferable skills are those skills that are formed at different periods of development of the individual and become abilities that accompany him (transferable and manifested in different life situations) throughout life. These skills generally correspond to the types of intelligence given by H. Gardner of the individual, but are constantly growing and improving. Such transferable skills are: ability to think critically and critically perceive new information, ability to work in a team, ability to express oneself clearly, ability to argue and defend one's own opinion, ability to hear and perceive different (person, opinion, behavior) , ability to lead and be a leader, etc.

Project consortium

GIS-TC Foundation is a non-profit independent public non-governmental organization based in Sofia (Bulgaria) with mission to stimulate transfer knowledge from academic institutes to SMEs and vice versa since 2000 year. Today GIS-TC is a network of 29 Centers for knowledge transfer that is initiating and stimulating the innovation in different areas: natural, social and engineering research and development. As an Erasmus+ project coordinator GIS-TC works for innovation in educational sector like presenting innovative alternative educational methodologies to public schools and gives new knowledge and skills to teachers to ensure the achieving of better functional literacy of pupils and increasing the quality of education.

Athens Network of Collaborating Experts (ANCE) is a non-governmental, non-profit organization based in Athens, Greece. It was established in 1996 by a group of Greek experts in international development cooperation and technical assistance and today has succeeded to create an extensive network of collaborators and volunteers for the promotion of sustainable development and the support of vulnerable social groups in the European Union and the developing countries.

DEFOIN – Desarrollo para la formación e inserción SL (Training for Develop and Integration) was born in 2009 with the idea of promoting the Training for Employment and Insertion of employed and unemployed workers. Today DEFOIN is a training center with a large experience in the design, implementation, development and evaluation of training programs at national, regional and local level.

Fondazione Hallgarten Franchetti Centro Studi Villa Montesca, Città di Castello, Italy.

Experimental workshop for pilot projects on new didactic methods and pedagogic perspectives addressed to various educational levels and to support students with special needs. Among its objective the Foundation promotes a democratic space of education and supports the educational inclusion of students with special, personal and social needs. The Foundation enhances the European cooperation in the fields of education, audio-visuals and culture, building on the valorisation of diversity.

J&MSynergie is a profit company. Its main mission is related to development innovative alternative pedagogical methods, training and communication with adolescents, as well as implementation of specific methodologies related to multiple intelligence theory.

Technokrati – is an educational centre using the natural state of children's mind – creativity, curiosity, imagination and transforms that into real practical knowledge. Working with children and youth aged 7 to 16 by focusing on practical workshops in science (renewable (green) energy) and technology (robotics, programming, 3D and etc.). The programs also cover non-technical topics such as: teamwork, self awareness, taking responsibility and critical thinking. Overcoming the chasm between children and technology happens in a friendly atmosphere where wrong questions do not exist.

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