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# Assessing Cognitive and Perceptual Abilities in Imaginative and Mainstream Elementary Schools: A Case Comparison

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**Abstract:** This study investigates the impact of imaginative pedagogy on the cognitive and perceptual abilities of elementary school students aged 7–8, using a case comparison approach. Focusing on a Waldorf school as a case for imaginative education and a mainstream Greek school, the research examines abilities including Spatial, Linguistic, Kinesthetic, Naturalistic, Mathematical, and Musical. The study utilized a mixed method consisting of playful assessment activities and classroom observations to evaluate these abilities comprehensively. The findings reveal that students in the Waldorf school demonstrate significant advantages in the Spatial, Linguistic, Kinesthetic, and Naturalistic areas, attributed to the school's imaginative teaching methods. More specifically, imaginative pedagogy is shown to resonate well with competences related to physical activities, language processing, understanding of the natural world, and visual-spatial reasoning. In contrast, there are no significant differences in Math-Logic and Musical abilities between the two school types, despite the traditional emphasis on language and mathematics in mainstream Greek schools. The study highlights the potential benefits of imaginative pedagogy for holistic cognitive development, suggesting its applicability in mainstream education.

**Keywords:** Waldorf education, imaginative pedagogy, cognitive and perceptual abilities, elementary primary education, holistic learning

## 1. Introduction

The Greek educational system, overseen by the Ministry of Education, is centrally orchestrated by the Institute of Educational Policy (IEP). This might be deemed stifling, providing limited scope for alternative educational methodologies. Greek schools are divided into public and private entities, with private institutions representing 7.5% of all schools [1]. All public schools subscribe to a traditional pedagogical approach, encompassing examinations, grading, a multitude of subjects, and teacher rotation, among other aspects. Some changes were proposed in the last years, such as project-based learning, clubs, etc., but schools are slow in implementing them. This pedagogical approach presents numerous challenges, including fragmented teaching and student anxiety. No flexibility is given for a public school to adopt a completely alternative pedagogical approach. The centralization of the Greek educational system bestows small autonomy upon individual schools [2]. Consequently, public schools that stray from conventional paths are rare or non-existent. In Greece, the IEP, which governs the educational policy of all schools of Greece, public and private, implements the same curriculum to all schools. This prescribed curriculum is the same for students at traditional (mainstream) and alternative schools, since it is governed by this central authority, but private alternative schools can alter the education they provide by extra classes and the way the curriculum is taught. There are some public schools that have an experimental status and can provide a somewhat different curriculum but the sole avenue for a school to implement a true alternative pedagogical approach is to adopt a private status.

With this article, we will try to study imaginative pedagogy as represented by a Greek Waldorf school. We will examine why Waldorf education constitutes an example of imaginative pedagogy. We will compare the cognitive and perceptual abilities of the students of a Waldorf school to the abilities of the students of a mainstream school, utilizing assessment tools grounded in playful classroom activities and observations. The goal is to enhance the understanding of this alternative pedagogical approach, highlighting its potential in fostering an enriched, engaging, and effective learning environment something that is needed in the Greek Educational landscape, at least.

## 2. Literature Review

In this section, we will try to explain why we believe Waldorf education is an example of imaginative education in practice.

### 2.1. Understanding the significance of imagination in education

#### *2.1.1. Kieran Egan's perspective on education through imagination*

A solution to some of the problems of education can be found in the idea of imagination. Imaginative education is a pedagogy that adopts imagination as the main tool for learning. Egan defines it

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as a method of teaching and learning that relies on engaging children's imaginations [3]. Drawing primarily from Vygotsky's work, Egan proposed the development of a curriculum centered on imagination. He categorized educational theories into three primary objectives: socialization, knowledge acquisition, and personal development. Egan argued that the attempt to reconcile these three divergent goals is at the root of the educational system's challenges.

Imagination is regarded as a component for critical thinking along with curiosity and experimental inquiry [4]. Imagination is also a perquisite for being actively creative. As we use imagination when we want to try different solutions to problems, we also use our imagination when we want to be creative, to create a painting, a story, a trinket.

#### *2.1.2. The significance of imagination according to Steiner's holistic approach about education*

Rudolph Steiner viewed imagination as a pivotal aspect of a child's character, integral to their education. Through his lectures, Steiner introduced a comprehensive pedagogical approach with a distinct theory on child development. He outlined a three-stage development model for children and associated imagination with its second phase (from 7 to 14 years). For Steiner [5], the spiritual dimension of children is critical to their development and imagination becomes the link to the physical world. Waldorf schools, which constitute a significant percentage of alternative schools globally, are based on Steiner's pedagogical theories.

### 2.2. Engaging imagination in educational practice

#### *2.2.1. How is imagination central in Waldorf schools*

Dahlin [6] writes that imagination flourishes without the hindrance of screens and other modern diversions in Waldorf schools. The use of technological devices such as computers and smartphones or even television is often discouraged, particularly in the early years. There is a prevailing belief that such devices hinder the growing imagination of children by providing ready virtual experiences instead of letting the children live their own, which is deemed essential for their holistic development [7]. Students in Waldorf schools play with toys made from wood and other natural products which sometimes make themselves. A vital pedagogical technique is the daily writing and drawing of their main lesson book. Students at the early grades in Waldorf schools do not depend on the standard textbook. The drawing of the book compels children to tap into their imaginative abilities. Teachers often tell stories, from fairy tales to historical accounts, without relying on textbooks or visual aids. This encourages students to visualize the narrative in their minds, strengthening their imaginative capacities. Engaging a child's imagination in the classroom is crucial, as it fosters a deeper, lasting connection to the material they are learning [8].

Mavrelos and Daradoumis [9] in a systematic literature review identified and analyzed the key elements that distinguish Waldorf education from more traditional educational models. In this review, they explored Waldorf schools and its strong connection to certain abilities and competences like creativity, language, and art. Art is not a separate subject in Waldorf education but is integrated into everything. Whether it is drawing, painting, music, or movement, students use their imagination to express themselves. Play is often unstructured and outdoors, in a natural setting, especially in the early years. It allows children to invent scenarios, solve problems, and engage with their peers in imaginative ways. Waldorf schools emphasize a strong connection to nature. This connection fosters a sense of wonder and curiosity in children, further fueling their imagination [10]. Nielsen [11], based on Steiner's view of imagination, mentioned seven imagination-based teaching techniques which are central in Waldorf pedagogy and imaginative in nature: drama, exploration, storytelling, routine, arts, discussion, and empathy. Drama integrates role-playing across various subjects, allowing students to use their imagination to assume different roles. With exploration, children harness their imagination to uncover unfamiliar feelings and ideas. Storytelling is not just limited to language classes; this method urges students to imaginatively transport themselves to the settings of the tales being told. Nielsen emphasized the role of routine in regular tasks. He cites Egan to outline the benefits: enhanced precision, consistency, and linguistic abilities [12]. The arts are fundamental to Steiner's teaching approach, going beyond just being a standalone subject. According to Nielsen [11], the union of arts and imagination introduces students to concepts of harmony, beauty, and balance. Instead of merely presenting facts, teachers stimulate discussions around them, like discussing the moon's color. Students are encouraged to think imaginatively, even if their ideas differ from conventional perspectives, thereby honing their argumentative skills. The teacher-student relationship fosters empathy, where the educator stands as a role model, inspiring students to emulate.

While these methods are interconnected, each stands unique. Nielsen, to further connect Waldorf schools and imagination, researched these methods in his study about students in the 7–14 age group, as Steiner suggested that these children are most responsive to imaginative stimuli. More specifically, he chose 83 3$^{rd}$ and 4$^{th}$ class students from three schools, collected ethnographic and contextual data, and "measured" imaginative moments via hermeneutic phenomenological procedures. Nielsen suggested that the advantages of an imagination-driven education arise not from the educational environment but from the interaction between educators and learners. He further suggests that these imaginative techniques might transcend the boundaries of Steiner's methodology. Nevertheless, it is noteworthy that Steiner institutions remain the primary bastions where imagination lies at the pedagogical core.

#### *2.2.2. Assessing abilities of students of imaginative schools*

Recent research has explored how educational methods based on imagination impact students' abilities. In a comparative study between students attending imaginative schools and traditional schools, Mavrelos et al. [13] reported that students from imaginative schools had a higher estimation of their language and intrapersonal abilities. 103 students aged 8 and 9 years old from two Greek schools, one Waldorf and one mainstream, participated in the study, completing an abilities self-assessment instrument. Eight main and twenty-four associated skills were assessed and statistically significant results in favor of the Waldorf students were obtained for the language, intrapersonal, and artistic abilities.

### 2.3. Cognitive and perceptual abilities

Recent research has highlighted the significant impact of cognitive and perceptual abilities on academic performance in school settings. Tikhomirova et al. [14] found that information processing speed is a critical predictor of fluid intelligence, working memory, and number sense, which together influence academic achievement in elementary students. Bjorklund [15] emphasized the role of schooling in development, noting that while schooling positively impacts cognitive growth, age remains a stronger factor. Notably, reading and number processing are key areas influenced by school environments. Demetriou et al. [16] demonstrated that reasoning ability strongly predicts academic

success, particularly in secondary education, where cognitive self-evaluation and self-representation also play a significant role. Kraft [17] and colleagues identified that teaching practices focused on group work, inquiry, and problem-solving enhance students' complex cognitive skills, contributing to better performance in math and science assessments.

Finally, Peng and Kievit [18] highlighted the bidirectional relationship between academic achievement and cognitive abilities, particularly noting that high-quality schooling fosters cognitive and academic development, especially in children from disadvantaged backgrounds.

There is a noticeable gap in the literature regarding the impact of different types of schooling—specifically, alternative versus traditional educational models—on the development of Cognitive and Perceptual Abilities. While some studies have explored the general effects of schooling on cognitive development, few have directly compared how these different educational approaches foster or inhibit cognitive and perceptual skills or even competencies for that matter. This gap suggests a need for more focused research on how the distinctive characteristics of alternative education models (such as Montessori, Waldorf, or other systems) versus traditional schooling environments influence the development of these abilities in students.

In this article, we used as the basis for the abilities assessed Howard Gardner's theory of Multiple Intelligences (MI). The MI theory suggests that intelligence is not a singular construct but a collection of distinct cognitive abilities. Gardner identified several intelligences, each representing different ways of processing information and solving problems. The abilities under study in this research align with a "weak" version of Gardner's framework of intelligences, particularly Bodily-Kinesthetic, Linguistic, Logical-Mathematical, Naturalistic, Spatial, and Musical intelligences.

A study which provides empirical evidence, for the "weak" version of the MI theory, is described in Castejon et al.'s work [19]. In this article, the researchers argue that the MI are not as distinct from one another as Gardner claimed but on the other hand not amalgamated to one as the opponents of the theory would suggest. The findings are more in line with the "weak" version of the theory described in Gardner [20] where he recognizes that the degree of correlation among intelligences is yet to be determined. The "weak" version permits a degree of correlation between the MI but is different from the g version of intelligence where "g" or the general intelligence factor dominates all abilities. The MI approach can enhance student outcomes by addressing different learning styles and intelligences [21]. Also, it is a theory that is still discussed up until this date that teachers must be informed of [22].

The abilities we measure—Bodily-Kinesthetic, Linguistic, Logical-Mathematical, Naturalistic, Spatial, and Musical—align closely with the Gardner MIs.

#### *2.3.1. Bodily-Kinesthetic MI*

Bodily-Kinesthetic MI refers to the capacity to think in movements and to use the body in skilled and complicated ways for expressive and goal-directed activities. There is a sense of timing, coordination for whole body movement, and use of hands for manipulating objects. In this study, RQ1 examines whether students in imaginative educational settings (such as Waldorf schools) demonstrate superior Bodily-Kinesthetic ability compared to students in mainstream schools.

#### *2.3.2. Linguistic MI*

To think in words and to use language to express and understand complex meanings. Sensitivity to the meaning of words and the order among words, sounds, rhythms, and inflections. To reflect on the use of language in everyday life. RQ2 explores whether this imaginative approach enhances students' linguistic abilities compared to their mainstream counterparts.

#### *2.3.3. Logical-mathematical MI*

To think of cause-and-effect connections and to understand relationships among actions, objects, or ideas. To calculate, quantify, or consider propositions and perform complex mathematical or logical operations. It involves inductive and deductive reasoning skills as well as critical and creative problem-solving. RQ3 asks whether there are measurable differences in Logical-Mathematical ability between students in imaginative and mainstream schools.

#### *2.3.4. Naturalistic MI*

To understand the natural world including plants, animals, and scientific studies. To recognize, name, and classify individuals, species, and ecological relationships. To interact effectively with living creatures, discern patterns of life and natural forces. RQ4 investigates whether this focus on nature leads to higher Naturalistic ability in students attending imaginative schools.

#### *2.3.5. Spatial MI*

To think in pictures and to perceive the visual world accurately. Thinking in three dimensions and to transform one's perceptions and re-create aspects of one's visual experience via imagination. Working with objects and art. RQ5 asks whether this emphasis on art and creativity results in stronger Spatial abilities in students attending imaginative schools compared to mainstream students.

#### *2.3.6. Musical MI*

To think in sounds, rhythms, melodies, and rhymes. To be sensitive to pitch, rhythm, timbre, and tone. To recognize, create, and reproduce music by using an instrument or voice. Active listening and a strong connection between music and emotions. RQ6 explores the musical abilities of imaginative school students compared to mainstream schools.

As discussed above, the six abilities—Bodily-Kinesthetic, Linguistic, Logical-Mathematical, Naturalistic, Spatial, and Musical—are critical components of Gardner's MI theory and are influenced by the type of pedagogical approach employed. This study seeks to explore how imaginative pedagogy, as exemplified by Waldorf education, impacts these abilities in comparison to mainstream education. This will lead us to the research questions.

## 3. Research Aims

### 3.1. Context and objectives

Previously, we outlined the fundamentals of imaginative education, giving our take on why Waldorf education exemplifying a robust model of this approach. We also touched upon the current challenges plaguing contemporary education systems, highlighting the paradox of having increased resources yet achieving diminished outcomes, particularly in the Greek educational context. This issue is potentially attributable to neglected facets of education, such as fostering emotional growth, imagination, and spirituality, while prematurely emphasizing technical skills from a young age. We also reported some of the key elements that set Waldorf education apart from conventional educational systems.

This paper, recognizing imaginative Waldorf education as a distinctive and potentially effective alternative to conventional educational strategies, seeks to delve into the outcomes that

distinguish it, with a close view on student abilities and provide empirical validation for them via methodologies that include assessment. For that reason, we aim to examine Waldorf education's impact on nurturing diverse cognitive abilities, thereby offering an interesting proposal to mainstream education.

By achieving these objectives, the study aims to contribute to a deeper understanding of the efficacy and potential advantages of imaginative Waldorf education, providing valuable insights to everyone involved.

## 3.2. Research questions

The null hypothesis we tested is the following:

> There is no significant association between students' abilities and the type of school they attend, imaginative or mainstream.

The hypothesis was split into six research questions, one for each ability, the first research question (RQ1) being:

> Is there a significant relationship between students' Bodily-Kinesthetic ability and the type of school they attend, imaginative or mainstream?

Each subsequent research question is related to a different ability, so the second research question is about the Linguistic ability and type of school (RQ2), the third about the Logical-Mathematical (RQ3), Naturalistic (RQ4), Spatial (RQ5), and Musical (RQ6).

# 4. Methodology

This research follows a mixed approach combining quantitative data from assessments with qualitative data from observations and interviews. The mixed methods approach was chosen in order to harness the strengths of both quantitative and qualitative research. The quantitative method provided us with measurable, generalizable data on how these two different types of schooling impact cognitive and perceptual abilities. Meanwhile, the qualitative methods, mainly the naturalistic observations, offer deep, contextual insights into why these educational environments influence the students as they do. By combining these approaches, the study can achieve a comprehensive understanding. As in Greece, there is only one Waldorf school we are limited to case comparison approach to examine the cognitive and perceptual abilities of students in two distinct educational settings: a Waldorf school and a mainstream Greek school. The mainstream school was selected for its representative educational practices. Data were collected through standardized assessments of spatial, linguistic, kinesthetic, logical-mathematical, musical, and naturalistic abilities. Additionally, extensive classroom observations were conducted to capture the educational environment and teaching methods in each school. These observations provided qualitative context to the quantitative assessment results. Owing to the nature of our study, we could not conduct a strict experimental research as it would have required interfering with the students' regular schooling. Hence, this research adopts a causal-comparative approach, retrospectively comparing two groups with the aim of uncovering any potential relationships between the variables: the pedagogical method implemented in their schools and its impact on the students' abilities.

## 4.1. The schools

### *4.1.1. School A—the Waldorf school*

The first group of students came from a Greek elementary school that employs imaginative teaching methodologies (School A). Rather than strictly adhering to a singular pedagogical approach, School A draws inspiration from Steiner's educational philosophy and attempts to harmoniously integrate it with the prescribed curriculum outlined by the Greek IEP. The school community emphasizes learning through experience, art, nature, and handcrafting. Core subjects like literature, mathematics, and foreign languages are taught in conjunction with drawing, music, gardening, storytelling, and more.

During our visits at the school, we noted a distinct contrast in school life compared to other Greek schools, both inside and outside the classroom. The relationship between teachers and students was marked by a blend of personal engagement, respect, and democratic principles. Students enjoyed greater freedom to explore and experiment, in the schoolyard and in the class. The experience in the class was less rigid than those in traditional settings; students could freely pose questions and even leave the classroom without explicit teacher permission, though this did not seem to diminish the teacher's authority or role. Teachers informed us that they adhere to Steiner's educational philosophy, albeit not dogmatically, and collectively share responsibility for the school's operations. This collaborative approach was evident when we sought to discuss the ongoing research; rather than liaising solely with the principal or class teacher, as was the case in School B, we were required to consult with the entire teacher board.

In Greece, schools that subscribe to such alternative educational methods are few and invariably private [1]. These alternative institutions form a relatively small portion compared to the overwhelming majority of public schools—those governed by the Greek Ministry of Education—and private schools that implement traditional educational methods.

### *4.1.2. School B—the mainstream school*

The second group of students in our study comes from one mainstream public school (School B).

Mainstream schools in Greece also adhere to the Greek IEP prescribed curriculum. It is customary for teachers to teach the same class for two years, with specialized educators stepping in for specific subjects like foreign languages and information technology. Predominantly, language and mathematics are deemed the most crucial subjects. In addition, this curriculum includes history, arts, physical education (PE), and more. However, primary education in Greece grapples with issues such as a bloated syllabus, inadequate emphasis on developing critical thinking, and reluctance towards adopting modern educational techniques among other challenges [23].

School B is a typical primary school in a large Greek city. Decisions are made by the Teachers' Council, as in School A, but in reality, they are determined by directives from the Directorate of Education to which they belong, in contrast to the increased autonomy that School A possesses. This reflects the administrative centralization governing the Greek educational system, which imposes a form of uniformity on public schools. This uniformity also stems from the use and pivotal role of the textbook for each subject provided by the IEP, which in every public school is the reference point for each course. This was the biggest pedagogical difference between the two schools; the teachers in school B were adhering to the official textbook much more than in school A.

The school's infrastructure was at a satisfactory level compared to other public schools. The number of students per class was similar to that of School A, but there were two classes as opposed to the one in the first school. As for the quality of education generally provided by public schools, it is characterized by the primary focus on students' acquisition of knowledge, the lesser importance of the school's pedagogical character, and the reduced significance of art

within it compared to school A. In school B, the teachers reported that their school is well equipped compared to other public schools, with experienced teachers staying at the same school for many years and all teacher positions filled from the start of the school year.

In school B, the teachers of the classes where the research took place appeared less closely connected to students than the teacher in school A, perhaps due to the fact of shorter teaching stints with the same class. Specifically, the teachers were in their second year with the same group of students, compared to School A where the teacher was with the same class since kindergarten. The most striking pedagogical difference in School B lay in its adherence to the official textbook, supplemented by additional exercise sheets that teachers had sourced independently, citing inadequacies in the textbook. That was unlike School A, where the educational approach was more flexible as we did not observe any instances in School A where students engaged in written problem-solving exercises or related activities. The courses in School B were generally more rigid.

## 4.2. Participants

Our study sample comprised 64 second-grade elementary students, as detailed in Table 1.

The number of participants was restricted due to the limited availability of schools in Greece employing imaginative teaching methods; only one such elementary school exists. The assessments utilized in this study were specially designed for students in the lower elementary grades, up to eight years old. For that reason, we selected second-grade students for our research, to guarantee a minimum of two years' educational experience in their respective schools, as we thought that the impact of each educational method will not be noticeable in the first grade.

Concerning the socio-economic backgrounds of the students, we were unable to collect data due to reservations expressed by the principals and parents of both schools involved in the study. This reluctance aligns with a general hesitancy within the Greek public to provide data, even for statistical purposes [24].

The mainstream school in our study is a public institution, typically serving students residing in the surrounding area. As is customary, public schools in Greece accommodate a diverse array of socio-economic backgrounds, with low- to medium-income families being predominant. Conversely, the imaginative education school, being a private institution, generally attracts students from medium- to high-income families. Both schools are situated in adjacent northern districts of Athens, areas that, as per the Hellenic Statistical Authority, surpass the national average in terms of degree holders and employment levels. More specifically, the district hosting School A slightly exceeds that of School B in these metrics.

**Table 1**
**Sample distribution**

| Demographic variables | | Frequency (n) | Percentage % |
|---|---|---|---|
| School Type | Imaginative | 25 | 39 |
| | Mainstream | 39 | 61 |
| Gender | Male | 28 | 44 |
| | Female | 36 | 56 |
| Imaginative | Male | 10 | 40 |
| | Female | 15 | 60 |
| Mainstream | Male | 18 | 46 |
| | Female | 21 | 54 |
| Total | | 64 | |

## 4.3. Ethical considerations

The study was done in compliance with the guidelines established by the IEP. An explanatory letter detailing the research was distributed to the parents via the administrations of both schools, and written consent was subsequently obtained. The letter described the procedure and that the participants had the right to withdraw from the study at any time. No names and other personal data were collected. Every student was given an id, and the class teachers were responsible for assigning the ids to the students.

## 4.4. Data collection

### *4.4.1. Quantitative tools and techniques*

For our study, we used two activities-based abilities assessment tools as a guide to design/implement our evaluation activities. The first is the Spectrum battery [25], created by the Project Spectrum team at Harvard Graduate School of Education. Suitable for children until the age of 7–8, this battery encompasses 15 activities spread across seven knowledge domains: language, math, music, art, social understanding, sciences, and movement. The term "Spectrum" aptly symbolizes its intent to identify a range of intellectual proficiencies in children.

The second is "Bridging" which was developed by Chen and Gardner [25]. It is suitable for students up to the age of 8. It bears similarities with the Spectrum assessment (Chen was a member of the Spectrum team also), such as investigating children's varied cognitive strengths, employing interesting activities, and emphasizing observation along with documentation. However, it distinguishes itself from the Spectrum assessment by centering on the application of intellectual competences in school subject areas instead of intellectual domains, like language and literacy, numbers and geometry, sciences (natural, physical, mechanical), performing and visual arts.

Both tools are standardized established assessment tools, that have been widely used and validated in previous research [25]. After meeting with the schools' administrators, our main concern was not to drastically change the school's daily routine. For that reason, we jointly selected and, in some cases, modified the activities we believed were more appropriate to the task.

The activities we used were the "Obstacle Run" (Bodily-Kinesthetic) and "Reporter Activity" (Linguistic) activities from Spectrum and the "Solving Pattern Block Puzzles" (Logical-Mathematical), "Assembling a Nature Display" (Naturalistic), "Drawing a Self-Portrait" (Spatial) and "Playing an Instrument" (Musical) activities from Bridging. Each activity had its own form which the raters used to score the activity. A brief description of the activities related to each ability follows.

### *4.4.2. Bodily-Kinesthetic*

The activity we used in order to assess the Bodily-Kinesthetic was the "Obstacle Course" from Project Spectrum. Children were asked to run an obstacle course made from a number of obstacles. The obstacles were: climbing a ladder, walking on a beam high above the ground, jumping from a ladder, walking on a beam low on the ground, etc., (Table 2). The children did the course twice, first in a lower level of difficulty and then in a higher. For example, in their second run they were not climbing a ladder but a plank. The raters gave a score from one to three to each student according to the scoring criteria.

**Table 2**
**Description of the assessment activities**

| Ability | Activity | Items rated |
|---|---|---|
| Bodily-Kinesthetic | Obstacle course | Climbing a ladder, walking on a beam high above the ground, jumping from height, walking on a beam low on the ground, crawling through a tunnel, jumping |
| Linguistic | Reporter activity | Entry to activity, narrative coherence, expansion of main events, complexity of vocabulary, use of connectors, sentence structure |
| Logical-Mathematical | Solving pattern block puzzles | One-to-one correspondence, part-whole relations, size match, shape match |
| Naturalistic | Nature display | Scientific inquiry, developing a working theory, communicating results, environments and organisms, properties of objects and materials, relationships between structure and function |
| Spatial | Drawing a self-portrait | Representing the human body and setting in two dimensions, using shape, line, color, and shading in representation |
| Musical | Playing an instrument | Participation, response to music, musical qualities |

*4.4.3. Linguistic*

The activity used was the "Reporter Activity" from Project Spectrum, more specifically the "Weekend News". This is similar to the "Dictating a Story" from Bridging. For the "Weekend News" activity, the children were asked to recall and describe their weekend or a recent trip or activity they had.

*4.4.4. Logical-mathematical*

The activity used was the "Solving Pattern Block Puzzles" from Bridging. Children were asked to arrange pattern blocks on preprinted puzzle sheets to try to cover successively more difficult puzzle forms.

*4.4.5. Naturalistic*

The activity used was the "Assembling a Nature Display" from Bridging. In this activity, children were invited to classify a variety of objects from nature into different categories of their own. The objects were collected by the children during a school excursion.

*4.4.6. Spatial*

The activity used was the "Drawing a Self-Portrait" from Bridging. In this activity, the children created a self-portrait showing themselves at home.

*4.4.7. Musical*

The activity used was "Playing an Instrument" from Bridging. In this activity, children used instruments to accompany music. There was a disparity between the two schools for this assessment since the students at school A used violins while the school B students used makeshift instruments.

*4.4.8. Scoring*

For each activity, the scoring instructions detailed in each method were followed. For example, for the kinesthetic activity the two raters used the obstacle course observation sheet to assess the children as they ran through the course. A sample of the scoring sheet for the kinesthetic assessment is included in Appendix A. They gave a score from 1 to 3 for each station to each student. Then during the analysis, the mean for each station and the overall mean for each child were calculated. The same method was used for each activity. The raters scored each activity, and then, the means were calculated.

*4.4.9. Qualitative observations*

For the qualitative component of the study, a naturalistic observation design was employed. This approach allowed us to observe the students, in an unobtrusive fashion, in their natural educational settings. This provided us with authentic insights into their behaviors, interactions, and learning processes without the interference of controlled experimental conditions. By observing the students at both traditional and alternative schooling settings, the study captured the nuances of how these environments support or hinder cognitive and perceptual development. The naturalistic observation design thus offered a rich, contextual understanding of the educational experiences that quantitative methods alone could not provide.

*4.4.10. Themes, coding, categories and patterns*

Each rater maintained a detailed journal during classroom visits, where they recorded key observations, interactions, and their reflections on pedagogical practices. The raters used detailed, descriptive notes, taken during the observations, in order to capture the context of the educational work done and documented their thoughts in journals to help identify patterns and themes during later analysis. To ensure that the process was valid, feedback was sought from teachers regarding the accuracy and relevance of the observations. This step helped us to validate the findings by confirming that the interpretations aligned with the participants' perspectives. Also, through the journals kept throughout the observation process, the raters documented their own biases, assumptions, and potential influences on the data collection and interpretation. This ongoing self-awareness process helped us to minimize the impact of the subjectivity on the study's outcomes.

After the collection of the data, we used an inductive approach to analyze them and extract the themes. The qualitative data from the two raters were first of all reviewed to ensure a deep understanding of the context and content. Then, the data were cross-referenced to identify specific behaviors, codes, and patterns. For example, one such observation was the importance of the handwritten main lesson book in the Waldorf school. Both raters noted in their journals that this practice appeared to foster deeper engagement and creativity in the students, compared to the textbook-based instruction in the mainstream school. This observation was codified under the theme Pedagogical Tools and Methods.

After we identified the themes, we cross-referenced them with our quantitative data. For example, the higher scores of Waldorf

students in the Spatial ability corresponded with the qualitative observation of their active use of the handwritten main lesson book, which was under the theme Pedagogical Tools and Methods. The themes derived from the journals were crucial for interpreting the quantitative results as we will explain in the findings from observations section.

## 4.5. Procedure

The mainstream school was selected because of our previous good working relationship and willingness to participate. In Greece, there is an unwillingness to participate in studies other than completing a questionnaire, especially when these studies include activities with students.

The test activities were selected jointly by our team with the schools' principals and class teachers. Many activities were considered and tested. The main concern was that the activities be integrated into the schools' daily routine without big changes to what the students were used to. For that reason, activities which could be done in a group were chosen. The activities chosen were translated into Greek and adjusted to each school characteristics.

The school's administrations assumed the task to communicate with the parents after they were informed by our team about the protocol to be followed regarding consent.

Two members of our research team observed the classes during the school year in order to better know the students and the daily rhythm of each class. These members were responsible for administering and rating the assessment activities. They were experienced in the use of the assessment tools, and they rated the children simultaneously during the ability assessments. Rater 1 was responsible for administering the activity and for rating, and the other was helping with the administration and also rating. The teachers of each class were also present, helping with the administration. As we mentioned earlier, the activities were chosen, jointly by the research team and the class teachers because they could be easily incorporated in each class schedule. The activities took place in two parts. Each part lasted a week for each class and included approximately three activities. The activities took place at the end of the school year in order for the students to have attended a whole year in that grade. The original scoring system of each activity was used with slight modifications. Since there were two raters, we used inter-rater procedures to assess the reliability of the ratings. Each rater assigned a score to each student for each activity. Then, the mean of the scores given by each rater was calculated and that was the score of each item assessed. Inter-rater reliability was calculated by calculating the Pearson product moment correlation coefficient. Each value was above 0.75, which showed good inter-rater reliability.

## 4.6. Data analysis

A total of 64 students completed the assessment activities. Since in Greece there is only one primary school which adopts an imaginative pedagogical approach, some limitations arose from the number of students participating. All age-eligible students from this school partook in our research. A more substantial participant pool might have yielded more robust findings.

We conducted a *t*-test for independent samples on each of the six abilities constructs using SPSS. The *t*-test is suitable if we want to know if two populations have equal means on some quantitative variable. The independent variable for the *t*-test was the school type, either imaginative or mainstream, while the dependent variables were the activities scores. The independent samples

**Table 3**
**Kolmogorov-Smirnov for normality**

| | School type | Test statistic | df | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|
| Kinesthetic | 1 | 0.144 | 25 | 0.195 |
| | 2 | 0.081 | 39 | 0.200* |
| linguistic | 1 | 0.161 | 24 | 0.110 |
| | 2 | 0.133 | 39 | 0.079 |
| Mathematic | 1 | 0.168 | 23 | 0.093 |
| | 2 | 0.136 | 35 | 0.099 |
| Naturalistic | 1 | 0.146 | 23 | 0.200 |
| | 2 | 0.137 | 39 | 0.063 |
| Spatial | 1 | 0.137 | 25 | 0.200 |
| | 2 | 0.125 | 39 | 0.128 |
| Musical | 1 | 0.158 | 23 | 0.140 |
| | 2 | 0.123 | 37 | 0.171 |

*t*-test requires some assumptions. First, that the observations are independent. This often holds if each row of data represents a different person and it is true for our case. The independent variables comprise two separate student groups, with each student exclusively belonging to one group and each row of data representing a different student. Second assumption is that the dependent variable follows a normal distribution in each subpopulation. And finally, the third assumption is that both subpopulations are roughly equal or have equal variances on the dependent variable. To determine if the variables follow a normal distribution, we employed the one-sample Kolmogorov-Smirnov test for each group, revealing that the dependent variables adhere to a normal distribution (Table 3). The Kolmogorov-Smirnov test examines if scores are likely to follow some distribution in some population. If $p < 0.05$, then we must reject the null hypothesis of normal population distribution.

Since the result of the Kolmogorov-Smirnov test in each case was $p > 0.05$, every variable is normally distributed.

About the third assumption, the number of students in school B participating was larger. Consequently, since both groups were not equal, we conducted a Levene test to determine the homogeneity of variances for each dependent variable. The result of each test (>0.05) showed that the variances were equal, and for that reason, we reference the "Equal variances assumed" result from SPSS, using the Welch-Satterthwaite method (Table 4).

### *4.6.1. Data integration*

After analyzing the qualitative and quantitative data, the results were brought together to identify points of convergence and divergence. This involved comparing the themes from the qualitative data with the statistical findings from the quantitative

**Table 4**
**Levene test for homogeneity of variances**

| | Imaginative N | Mainstream N | Levene test |
|---|---|---|---|
| Kinesthetic | 25 | 39 | 0.399 |
| Linguistic | 24 | 39 | 0.821 |
| Math-Logic | 23 | 35 | 0.217 |
| Naturalistic | 23 | 39 | 0.476 |
| Spatial | 25 | 39 | 0.949 |
| Musical | 23 | 37 | 0.710 |

**Table 5**
**Differences between students of imaginative school versus students of mainstream school**

| | Imaginative | | Mainstream | | | | | |
|---|---|---|---|---|---|---|---|---|
| | M | Standard deviations | M | Standard deviations | df | ta | pb | Cohen's d |
| Kinesthetic | 2.6236 | 0.18817 | 2.4915 | 0.24174 | 62 | 2.316 | 0.02 | 0.59 |
| Linguistic | 2.362 | 0.4538 | 2.054 | 0.4767 | 61 | 2.541 | 0.01 | 0.66 |
| Math-Logic | 7.09 | 1.240 | 6.63 | 1.573 | 56 | 1.176 | 0.24 | 0.32 |
| Naturalistic | 5.35 | 1.613 | 4.28 | 1.806 | 60 | 2.333 | 0.02 | 0.62 |
| Spatial | 6.520 | 1.6168 | 5.359 | 1.5934 | 62 | 2.828 | 0.01 | 0.72 |
| Musical | 6.500 | 1.7056 | 6.243 | 1.8395 | 58 | 0.540 | 0.59 | 0.14 |

data to see where they supported or contradicted each other. The main objective of the observations and the qualitative analysis was to identify the possible reasons for the results we got from the quantitative part of our research. The themes that emerged from the qualitative data provided insights that clarified the statistical findings, helping us to understand the results more fully.

## 5. Results from the Assessment Activities

Table 5 outlines the findings from our study. Mean scores ($M$) and standard deviations are displayed, for the various abilities between students in imaginative and mainstream schools. The results of the $t$-tests are provided alongside the effect size, which have been measured using Cohen's $d$.

The findings suggest significant differences between the imaginative and mainstream groups across multiple abilities. More specifically:

### 5.1. RQ1—Bodily-Kinesthetic

The first research question is about the relationship between the Bodily-Kinesthetic ability and the type of school (imaginative vs. mainstream). The results from the assessment activity indicate that students in the Waldorf school significantly outperformed the students of the mainstream school ($t(62) = 2.316$, $p = 0.024$, Cohen's $d = 0.59$), suggesting that imaginative pedagogy provides advanced physical coordination and body movement skills.

### 5.2. RQ2—linguistic

About the second research question, the results of the activity showed significant differences between the two groups, with Waldorf students scoring higher ($t(61) = 2.541$, $p = 0.014$, Cohen's $d = 0.66$). This suggests that the Waldorf school's focus on oral storytelling and active participation in language activities fosters stronger linguistic abilities.

### 5.3. RQ3—math-logic

For the Logical-Mathematical ability, the "Pattern Block Puzzles" assessment did not reveal a statistically significant difference between the two groups ($p = 0.24$), suggesting that while imaginative pedagogy may have advantages in other areas, it does not necessarily impact mathematical abilities in the same way.

### 5.4. RQ4—naturalistic

About the fourth research question, the results revealed significant differences ($t(60) = 2.333$, $p = 0.023$, Cohen's $d = 0.62$) for the Waldorf students. This aligns with the Waldorf school's emphasis on nature, outdoor learning, and environmental exploration.

### 5.5. RQ5—spatial

The spatial ability assessment revealed that students in the Waldorf school performed significantly better ($t(62) = 2.828$, $p = 0.006$, Cohen's $d = 0.72$). This supports the notion that imaginative pedagogy, which emphasizes artistic expression, is particularly effective in developing spatial reasoning.

### 5.6. RQ6—musical

The results for the sixth research question did not show significant differences between the two groups ($p = 0.59$). This may be due to differences in the types of instruments used in the two schools, as described earlier in the methodology.

## 6. Findings from Observations

### 6.1. Teacher-student relationship

The teacher in the Waldorf school accompanies the class for a much longer period, ideally for 7 to 8 years, compared to traditional schools, where a teacher typically stays with the children for up to 2 years. The impact of this practice was evident in our observations in both schools. The relationship that had developed between the children and the teacher appeared much more complex than the corresponding relationship in the traditional primary school. This particular teacher had followed the children from their kindergarten years, initially as an observer and assistant to the kindergarten teacher. The intention, obviously, was to develop a foundation relationship. Unfortunately, this is not the case in traditional Greek schools, where a new teacher appears at the beginning of the year, and a relationship must be developed alongside all the educational activities that take place during the school year. The problem is not just administrative or financial but a lack of recognition that such a relationship is essential or more correctly a lack of acting on this recognition. Beyond the administrative issues arising from the centralized handling of educational matters, there is also a lack of this philosophy in the Greek educational system—that children have specific psychological and emotional needs and must trust and bond with the teacher. The frequent changes of teachers in the traditional educational system, stemming from non-educational reasons, are perhaps the biggest disadvantage compared to Waldorf pedagogy.

### 6.2. The handwritten main lesson book

Another feature we observed, which impressed us, was the main lesson book in Waldorf schools. While in traditional schools, the textbooks for each subject, which are numerous, serve as the primary reference point for each lesson, the approach in Waldorf education takes a different character. There is not the dependency

on textbooks found in traditional schools. Indeed, in traditional schools, the textbook of each subject plays a paramount role, perhaps even more so than the teacher, with the lesson revolving around it. This means that the book, often not comprehensible to students, replaces the teacher who becomes a servant to it, tasked with explaining and following it. The image of small children struggling with their heavy bags, going to school in the morning, is typical of Greek mainstream schools. In Waldorf schools, at least for the main lesson, this is replaced by a notebook created by the students themselves. We were particularly struck by the row of the official IEP textbooks neatly arranged on a shelf. The significance of a book created by the students themselves is evident to any educator. The value of personal experience cannot be replaced by any ready-made book, no matter how well-written it is (and in the Greek example, this is not always the case). In their notebook, students write down a few key points from each day's lesson and also draw an image related to the day's lesson. In this way, they experience and make the day's lesson their own, rather than being passive recipients of a book's content, avoiding rote learning, another well-known shortcoming of Greek Education. When writing and drawing become tools for the student rather than ends in themselves, it is easier to explain the better results achieved by students of School A in drawing and painting. The importance of personal experience in understanding needs to become more the domain of the overall Greek educational model, something that, despite efforts to introduce with initiatives such as free time, projects, and the creative activities zone, is not applied as it should be. The concept of the singular textbook, a remnant from previous decades, is still dominant.

### 6.3. Oral expression

The superiority in Linguistic skill demonstrated by the students of School A also can be explained by other elements we observed during our stay there. The teacher displayed a remarkable ability in the spoken word. Often, the teacher would read from a storybook and recite. The best part was that the students did this too, seemingly imitating the style of their teacher to some extent. Most students appeared to have a capability in spoken language and storytelling. We did not observe this to the same degree in the traditional school, where children were usually only heard when reading from the book.

### 6.4. Games, play, and nature

Another striking feature was the word games the children played. In general, play was present in all aspects of the lesson, whether in language or mathematics. There was a sense that play was a part of everything, especially in the younger grades. This was more apparent during recess, when the relatively small yard was filled with children. The play was not goal-oriented or organized like sports but had a more exploratory character. As soon as the children left the classroom, they changed their shoes for boots and explored every corner of the yard. It was more a play with nature, with the environment. This was aided by the yard's design, dominated by wood and soil, in contrast to the cement-dominated yard of the traditional school. In general, the architecture of the school was more natural, more organic than that of the traditional school building. Their relationship with nature seemed to be stronger. This connection with nature is a fundamental element of Waldorf pedagogy. This was also evident in the trips the children went on, the first one to a mountain destination near Athens, involving hiking, away from urban environments, whereas the other school had only one excursion to a shopping mall.

### 6.5. Movement and physical activity

The difference in the approach to movement was evident even in the PE class. It made an impression to us that at the Waldorf school, one of the activities the children did was similar to the kinesthetic assessment activity from the Spectrum method. Specifically, the obstacle course described in the Spectrum assessment method was a frequent PE activity conducted by the children in the schools enclosed gymnasium-dance hall. It is possible that this is the reason, for this specific ability, the students of the Waldorf school performed better. In contrast, the students of the traditional elementary school usually participated in team sports activities such as volleyball, basketball, or football during their PE classes. This took place in the courtyard, in a space that might not have been suitable for such activities. Generally, in both schools, there was the presence of physical activity, but in the traditional school, this was manifested in a more chaotic manner, with running and chasing during the break. In the Waldorf school, there was also movement, but it was calmer, and the play was more about exploration than release, it was more creative. In both schools, there existed the transition from the relative calm of the classroom to the intensity of the break.

## 7. Discussion

The current study endeavored to examine the potential differences in certain abilities between students attending schools following an imaginative pedagogy compared to those educated schools following a more mainstream one. The results provided us with some insights, which may offer suggestions for the educational theory, curriculum, and practice.

### 7.1. Spatial, linguistic, kinesthetic, naturalistic abilities flourish in an imaginative setting

The differences observed in these specific abilities suggest that schools which employ an imaginative pedagogy might provide a more holistic environment that can nurture various cognitive and perceptual abilities. Even though it is difficult to label a school as imaginative [26], some schools employ imaginative teaching methods such as Drama, Storytelling, Exploration, Routine, Discussion, and Empathy [11]. Waldorf schools can be considered as schools who employ such methods. Teachers in Waldorf schools employ various techniques such as oral instruction, writing, drawing, singing, and role-playing in teaching the main lesson and the other subjects, math, art, music, movement, languages [10].

Imaginative pedagogy seems to particularly resonate with competences associated with physical activities (Kinesthetic), language processing (Linguistic), understanding the natural world (Naturalistic), and visual-spatial reasoning (Spatial).

### 7.2. Spatial ability (RQ5)

Indeed, the higher scores for the Spatial ability (RQ5: $t(62) = 2.828$, $p = 0.006$, Cohen's $d = 0.72$) observed among students at School A are to be expected. In the Spectrum and Bridging assessment activities, the Spatial ability is mostly related to art and the ability to process visual images. In Waldorf schools, the significance of art is paramount, cutting across various subjects from geography to history, a trend consistent even beyond the early educational levels [27]. During our visit there, the importance of art was evident in every subject. Students, using colored pencils crafted from natural

materials, sketched the day's main lesson onto the pages of the textbook they were themselves making. The interleaving of art and imagination is a characteristic of Steiner's educational philosophy [11] and is also evident in other imaginative educational suggestions [28]. Notably, Lazear [28] identified imagination, as being closely associated with the Spatial ability, which embodies artistic talent. At its core, art is inherently linked to imagination [26].

## 7.3. Linguistic ability (RQ2)

Egan identified oral language as a component of the imaginative toolkit [29]. Schools that follow the imaginative pedagogy prioritize the development of oral communication. Such skills are vital not just in language classes, but across all subjects. This is evident in our results (RQ2: $t(61) = 2.541$, $p = 0.014$, Cohen's $d = 0.66$). Cunningham and Carroll [30] discussed the method Steiner schools use to teach phonics to children, characterizing it as an analytical technique that incorporates games and emphasizes the sight and positioning of letters within familiar words. They observed that Steiner students typically demonstrate enhanced reading skills and a higher level of maturity. That was also evident during our visits there. Discussion between the children and the teacher was the main tool for exploring each subject. Discussion between the children was also allowed and encouraged without hurting the pace of the lesson. Nicholson [31] highlights the Steiner schools' emphasis on discussion, resembling a "Socratic" dialogue, along with the inclusion of storytelling and recitation. Dahlin [6] notes that students create their own textbooks, something that we also witnessed, drawing from both oral and written feedback from their teachers. Ashley [32] emphasizes the storytelling prowess of Waldorf educators, stating they have a richer tradition compared to mainstream schoolteachers. At the end of the lesson, if extra time was available the teacher would take a book and read a story from it, sometimes continuing from a previous point reciting in a melodic and acting voice. Recitation and choral speaking are commonplace in their curriculum. There was a marked difference in reciting abilities between teachers of the two schools. Another contributing factor to the superior results at School A could be attributed to the assessment activity, which required children to recall past events. Recollection of prior day's activities is an established learning technique in Steiner educational settings.

## 7.4. Naturalistic ability (RQ4)

Naturalistic ability (RQ4: $t(60) = 2.333$, $p = 0.023$, Cohen's $d = 0.62$) was the third ability where the results in favor of school A were deemed statistically significant. Woods et al. [10] mentioned the prevalent use in Steiner school in England, of natural resources and tools, such as toys, craft materials, and pencil cases, while deliberately excluding plastics. The same study points out the emphasis on environmental education, with activities like gardening, ecological studies, woodland tasks, landscape projects, and plant reproduction. This was also the case in School A, which although located in an urban setting, the effort to mimic a more natural environment is evident. The building is prominently furnished with wooden elements, and although the structure itself is not expansive, it boasts a spacious yard. Here, children swap their regular shoes for boots to engage in play, interacting with mud, rocks, snails, etc., as they explore their surroundings. In contrast, School B features a more conventional, concrete-heavy design. Its yard, while standard, lacks the natural flooring found at School A, depriving students of the opportunity to play in a more organic environment. Additionally, students often engage in field trips to farms, actively participating in caring for farm animals, as noted by Friedlaender et al. [33]. During the second week of our visit to School A, the students in the class we observed were eager to recount their weekend adventure. They had spent it in a nearby mountain cabin, complete with hiking activities. In contrast, the teachers at School B informed us that their students usually go on single-day excursions, often to another city. The difference between the approaches to nature between the two schools is evident. It seems that in school A nature plays a central role. Richter and Rawson [34] state that the Waldorf curriculum's nature-centric approach was ahead of its time, predating the current focus on ecological concerns and sustainable development.

## 7.5. Bodily-Kinesthetic ability (RQ1)

In line with various facets of Waldorf pedagogy, the kinesthetic method (RQ1: $t(62) = 2.316$, $p = 0.024$, Cohen's $d = 0.59$) is seamlessly integrated into the curriculum of school A. Examples include children illustrating the number eight during a eurythmy session, adopting weaving as a calming activity and for instilling balance [32] or enacting Galileo's trial through role-play [8]. Year-end drama performances are viewed as channels for expression and fostering connections, as are dance recitals and athletic events [10]. The higher results from School A might be influenced by their distinct curriculum. During our visits, we observed that the activities students engaged in during their PE lessons closely mirrored the assessment tasks for the kinesthetic ability. This could have influenced the higher score of these students compared to the students of school B. In contrast, students at School B typically participated in sports such as volleyball and basketball during their PE sessions. This suggests that students at School A may have been more accustomed to the assessment tasks, giving them an advantage and so the statistically significant difference between the two schools may come from a potential bias However, the fact that the physical training program of school A was similar to the assessment activity also raises the possibility that School A's PE approaches might be more relevant than those of School B in terms of PE and kinesthetics.

## 7.6. Absence of marked differences in math-logic and musical abilities

### *7.6.1. Logical-mathematical ability (RQ3)*

The lack of significant differences in these two areas prompts an intriguing query. In mainstream Greek schools, language and mathematics are often prioritized over other subjects and highly emphasized by both teachers and parents even though the results in the OECD's Program for International Student Assessment are disappointing. We did not see a similar result in the linguistic ability (RQ2) maybe because School A, as part of the Steiner tradition, places a significant role in oral teaching. As far as mathematics are concerned perhaps the traditional teaching methods, which might place a heavier emphasis on structured learning, are equally effective.

### *7.6.2. Musical ability (RQ6)*

The previous assumption may not be applicable to Musical ability (RQ6), as observed during our visits. The assessment conditions varied significantly between the two schools, potentially influencing the results. In School A, students used violins during their music lessons, and each student had their own violin for practice. Consequently, their assessment involved playing these violins. In

contrast, School B's music lessons focused more on singing and textbook activities. For their assessment, students used makeshift rhythmic musical instruments to complete the exercise. This difference in instructional methods could have made School A's assessment more challenging for its students.

### 7.7. Comparison with previous research

This research presents more substantial findings compared to the results previously reported by Mavrelos et al. [13]. In their earlier study, statistically significant outcomes were indicated for both language and intrapersonal abilities, along with Artistic Design, a subscale of spatial ability. However, this current research has revealed statistically significant results across kinesthetic and naturalistic abilities as well. It is noteworthy that both studies concur on the significance of linguistic abilities, yet more robust findings have emerged concerning spatial ability in this research. Although this study did not evaluate personal abilities, it did reveal an advantage related to the kinesthetic and naturalistic abilities. The enhanced clarity of these outcomes might be attributed to the research's assessment approach, which was activity-based, differing from the self-assessment questionnaires employed in the prior research.

### 7.8. Limitations

This study did not fully account for the socio-economic and educational background of the students' families, something that could have a significant impact on their abilities. That comes from an unwillingness to share that information with us. Although efforts were made to understand the school environments, the fact that one school was private while the other public might have introduced variables not fully captured in the study. On the other hand, this study did not have the scope to fully isolate these effects from other variables such as family influence and prior exposure to similar educational techniques.

It is essential to note that while these findings are significant, they are based on a limited sample size from a specific geographical location (Greece). Further studies encompassing broader populations and diverse cultural contexts would be valuable to validate and expand upon these findings.

## 8. Conclusion

In conclusion, this study found significant differences in the Bodily-Kinesthetic, Linguistic, Naturalistic, and Spatial abilities between students in imaginative and mainstream schools. However, no significant differences were observed in Logical-Mathematical or Musical abilities. These findings underscore the potential of imaginative pedagogy in nurturing certain abilities. While traditional methods remain effective in certain domains, there is a clear indication that a more balanced approach, incorporating imaginative elements and a holistic approach, might offer a more rounded educational experience. One could surmise that an imaginative approach to teaching, which often incorporates stories, role-playing, exploration, and art, tends to cater to and develop these abilities more than traditional methods. The challenge for modern education is to integrate the best of both worlds, ensuring students are equipped with a diverse set of skills to navigate the complexities of the 21st century. Education stakeholders, from policymakers to school administrators and teachers, might want to reassess the importance they give to alternative teaching methods, especially if they are aiming for a holistic development of students.

## Ethical Statement

This study does not contain any studies with human or animal subjects performed by any of the authors.

## Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

## Data Availability Statement

The data that support the findings of this study are openly available in Mendeley Data at http://doi.org/10.17632/y2hkn43sd8.1.

## Author Contribution Statement

**Emmanouil Mavrelos:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – original draft, Writing – review & editing. **Thanasis Daradoumis:** Conceptualization, Writing – review & editing, Supervision.

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## Appendix A. Sample from the scoring criteria for the Obstacle Course assessment, long jump obstacle:

### LONG JUMP

1 = does not prepare body for jumping movement; does not use arms to propel body forward; extension of lower body at takeoff is limited; does not keep feet together; may end up stepping instead of jumping; length of jump is short.

2 = completes the jump, but does not prepare fully for jumping movement; exaggerated or insufficient crouch before jumping; loses balance when jumping, lands with legs splayed, or both; insufficient use of arms to propel body forward; jump is medium length.

3 = jumps successfully with strength; propels body with arms and torso; keeps feet together before and after jump; jump is long, with emphasis on horizontal distance.

### BALANCE BEAM

1 = has difficulty maintaining balance; frequently slips or steps off beam; needs to hold adult's hand; seems hesitant and tentative; may only shuffle feet; body tends to be rigid.

2 = has some trouble balancing; approach is tentative, but uses strategies to regain balance; may step off beam to prevent falling; wobbles; alternates or shuffles feet, or both.

3 = moves forward while maintaining balance; walks straight across without hesitating; looks ahead; alternates feet; body is relatively relaxed.