

# The Effectiveness of Analogy Learning as a Learning Practice Condition in Primary Physical Education

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## Abstract

Analogy learning is a method of learning which encourages students to abstract new information and match it to already acquired knowledge (Richland & Simms, 2015). This study focuses on the topic of analogy learning and its effectiveness in primary Physical Education (PE) lessons. It aims to explore the perceptions of students and teachers towards the use of analogy learning in PE, as well as the benefits and limitations of this approach. The aims of the study align with the research questions which are the principal impetus for this study. The paper presents the results of a research study that was held in a girls' primary church school in Malta, with students from Grades 1, 3 and 6 participating in either an analogy group (treatment group) or a non-analogy group (control group) during PE lessons. Data was collected through close-ended questionnaires and semi-structured interviews with students and PE stakeholders. The results showed that analogy learning can be beneficial in PE lessons, but it also has limitations. The study also highlighted the need for greater awareness about the use of analogy learning in primary PE lessons.

## Keywords

Analogy Learning, Physical Education, Primary Sector, Primary Students, PE Teachers

## Introduction

"Analogies, it is true, decide nothing, but they can make one feel more at home" (Freud, 1933, p. 182). Through analogy learning, one identifies similarities to facilitate learning. The use of analogies in PE, which is an educational subject focusing on physical activity (PA; Education Bureau, 2022), might provide students with great help as it helps them imagine and reflect critically on the skills being learnt (Shen & Lai, 2014). Nevertheless, there seems to be a dearth of literature about analogy learning and its use in PE lessons locally. This research

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study investigated whether analogy learning aids the students' learning in PE lessons and whether it reduces the use of verbal instructions, especially when teaching new skills.

## Aims of Research

Given the lack of research regarding analogy learning in PE, this study aimed to identify and evaluate if and how analogy learning aids students in the acquisition of new motor skills during primary PE lessons. The primary schooling system is compulsory for children from age five to age 10, covering six years (European Commission, 2022).

Three main research questions guided the research study:

1. How can analogy learning aid in Physical Education lessons?
2. What is the experience of Physical Education teachers and primary school students about the use of Analogy Learning in PE?
3. What are the benefits and limitations of Analogy Learning in relation to Physical Education?

Analogy instructions can be defined as pictorial explanations constructed on movement experiences disconnected from their original context and transferred into a new setting (Meier et al., 2020). An image structurally represents a movement in an analogy, and its effects evoke a mental image (Meier et al., 2020). According to Gentner and Holyoak (1997), "the power of analogy to create similarities makes it a tool for a wide range of purposes, including solving problems, constructing explanations, and building arguments" (p. 32). Some examples of analogy learning that can be used during PE lessons are "float like a butterfly, sting like a bee" (Mitchell & Salsbury, 1999, p. 8). These can teach children how to combine graceful or agile movement with intense physical strength or power. This verbal description can bring a visual mental image to mind, which helps children learn more easily (Van Duijn et al., 2019). Another example is to ask children to "reach up for an apple up in the tree" to teach a jumping pattern (Friedman & Zacks, 2020, p. 1).

## Analogy Learning in Physical Education

Analogy learning carries with it several benefits. Research shows that less working memory is used, leaving room for additional cognitive load and allowing the upkeep of skill over a more extended period (Tse et al., 2016). Tse

et al. (2017) conducted a study to compare whether young children grasp the skill of rope skipping when using analogy learning quicker than when using explicit learning. They concluded that children benefited more from motor learning with analogies than from verbal cues. They also admitted that it might not be as easy as it seems to include analogies when teaching, yet their work suggested that analogies can be rooted in explicit instructions to assist motor learning in children. Masters and Liao (2003) have hypothesized that the analogy makes a motor concept/movement easier to learn, as it chunks the many bits of information that make up the structure of the to-be-learned skill in a way that requires less conscious processing. Using analogies to learn a new motor skill has been shown to improve learning in different settings and various tasks, such as throwing a basketball or even performing a high jump (Friedman & Zacks, 2020). A study comparing the effects of analogy and non-analogical explanations on children's running, galloping, balance and long jump has shown positive results in favour of analogy learning (Chatzopoulos et al., 2020). The results showed that the balance performance of the analogy group had improved remarkably, whereas the non-analogy group showed no notable improvements (Chatzopoulos et al., 2020). In another study, the effectiveness of analogical instruction in acquiring a complex motor skill and performance under pressure was investigated using a modified (seated) basketball shooting task (Lam et al., 2009). Both the analogy and non-analogy groups performed well during the learning phase. However, the non-analogical group decreased performance during a pressured transfer test, while the analogical group performed unaffected (Lam et al., 2009). It is said that when skills are learnt through analogy learning, children have stable performances when under pressure, when faced with conditions where decision-making needs to take place, as well as in dual-task conditions (Friedman & Zacks, 2020; Ramezani et al., 2022; Van Duijn et al., 2019).

Despite these benefits, the literature suggests that analogy learning presents a series of limitations, so teachers sometimes refuse to use analogies as part of their teaching (Ugur et al., 2012). Analogies can easily be misunderstood or be a source of misconceptions (Brown & Salter, 2010). One of the limitations which might be problematic is that the usefulness of an analogy largely depends on whether the learner can associate the skill being learnt with their existing experience, meaning that if the learner cannot associate the analogy being used to their own acquired knowledge, it will not be of any benefit to their learning (Ugur et al., 2012). Analogies may be perceived differently; thus, the

learner might not be able to connect the analogy being learnt to the to-be-learned subject (Heywood & Parker, 1997). If the student cannot understand the subject matter, the encoding time would be increased, and in this manner, a slower learning process would occur (Genc, 2013). There might also be students who find it challenging to use visual imagery, and thus, analogical reasoning might be limited (Dilber & Duzgun, 2008).

Students might find analogies meaningless, as they do not challenge their abilities to learn something new (Duit, 1991). Dilber and Duzgun (2008) also commented that if students are already familiar enough with the subject, they might find that including an analogy is unnecessary information and a waste of time during the teacher's explanation. Holyoak and Thagard (1989) also explained how our prior knowledge of a particular concept can affect the depth to which a particular analogy can be interpreted and understood. Although Glynn commented on the usefulness of analogies during the teaching process, he also shed light on the fact that "analogies are double-edged swords" (1994, p. 11). He explained that, at some point, every analogy breaks down, and when this happens, misconceptions may begin. Since two notions can never be completely similar, differences will always exist among their most important features (Glynn, 1994).

## **Theoretical Framework**

The theories that matched this study's purposes are Structure-Mapping Theory, Constructivism, Cognitivism and Experiential Learning Theory. Each of these theories relates to analogy learning. Gentner (1983) discovered that when analogies are used, a mapping of relations between the to-be-learned skill and previously acquired knowledge takes place. In the Structure-Mapping Theory, the to-be-learned skill or knowledge is referred to as the "target domain", whilst the already-learned skill or acquired knowledge is termed the "source domain" (Haglund, 2013, p. 36; Maharaj-Sharma, 2011, p. 8). Other researchers sometimes refer to the source domain as "base" (Haglund, 2013, p. 36) and "analogue" (Harrison & Coll, 2008, p. 56). Gentner (1983) commented on how the interpretation rules for analogy can be marked from those for other kinds of domain comparisons. This is one of the main theories that relate to analogy learning and how the mind works when using analogies.

In constructivism, Piaget (1976) argued that people construct knowledge based on their ideas and experiences. Constructivists argue that knowledge

is created through the encouragement of real-world problem-solving (BADA & Olusegun, 2015). In problem-solving situations, one is inclined to use one's previously acquired knowledge and use it to solve the current problem at hand. This shows a similarity between Constructivism and analogy learning, as through analogies, one also uses previous knowledge and links it to the newly-learnt knowledge. Thus, constructing knowledge based on previous experiences is vividly done in analogy learning.

Cognitivists argued that learning should be done by discovery and information processing, which results in questioning skills and problem-solving skills. The term "scaffolding" (Williams et al., 2009, p. 1257) describes how one learns new skills by scaffolding knowledge on previously learnt knowledge. The Theory of Transfer is related to cognitivism, which was discovered by Thorndike and Woodworth (1901). In the theory of transfer, a transfer between the learning and the test situations occurs in the brain, causing similarities. The more similarity, the better the transfer of knowledge is (Thorndike & Woodworth, 1901). Using analogical explanations and examples is also a way of promoting scaffolding, as students are asked to scaffold the new information on information that has already been learnt and stored (Williams et al., 2009).

Lastly, the Experiential Learning Theory, suggested by Kolb in 1984, claims that learners must be actively engaged by presenting them with concrete experiences, such as role plays, field trips and lab experiments (Kolb & Kolb, 2018). After the students participate in the concrete experience, they are asked to join personal or group reflections to discuss their experiences (Kolb & Kolb, 2018). Thus, they apply what they have learnt to their own life and create knowledge from their experiences. As mentioned within the previous theories, experiential learning theory can also be linked to analogy learning. Through analogies, one must also apply the previously learnt knowledge to understand the newly learnt knowledge quickly. This means that students use their current knowledge and match it with what is being learnt by reflecting on their previous experiences and using them to learn new things.

## **Methodology and Methods Used for the Research Study**

The research methodology used for this project was "mixed methods" research (Shorten & Smith, 2017, p. 74), as both qualitative and quantitative methods were used. Mixed methods research (MMR) acts on the strengths of qualitative and quantitative methods and uses them for data collection and

analysis (Shorten & Smith, 2017). One of the advantages of using MMR is that the researcher is given a wider choice of data collection tools and analysis rather than sticking to just one of the approaches. Due to this, the study could have fewer restrictions to it.

The research philosophy is how the researcher makes assumptions, shaping how they look at their study (Saunders et al., 2015). Interpretivism and post-positivism are the two research paradigms used for this research study. For this research study, we used three research instruments, which are experimental study, interviews and questionnaires.

### ***Experimental Study Used in the Research Study***

An experimental study was conducted with students coming from grade 1 (age 5), grade 3 (age 7) and grade 6 (age 10), which consisted of regular PE lessons. As in other studies of this type, the study participants were divided into two groups, from which the control group received standard treatment. In contrast, the treatment group (sometimes called the experimental group) received the treatment the researcher is interested in (Thomas, 2020). In the research study, two classes per grade were taking part in this study, one following PE lessons with analogy learning and the other with standard PE lessons without reference to analogy learning methods. An advantage of experimental study is that it presents the researcher with a high level of control over the study and allows the opportunity to quickly combine this method with other research methods (Gaille, 2017).

### ***Interviews Used in the Research Study***

Interviews are the most popular research method used by social scientists. Interviews offer researchers a flexible research tool that can provide valuable data (Alamri, 2019). However, one disadvantage of using interviews is their propensity to be time-consuming, particularly when transcribing them after they have been conducted (Alamri, 2019). In all, the research study consisted of 12 interviews, five of which were conducted with primary PE teachers from a church school, one with a PE stakeholder within the Education Department, and another six with the students participating in the experimental study (one student from each class).

**Table 1**

*Data Collection Timeframes*

<b>Month</b>	<b>Data Collection Phase</b>
November Week 2/3	Conduct interviews with teachers
November Week 3/4	Conduct interview with educational stakeholder
December Week 4/5	Design lessons for the project (experimental study) using analogy and non-analogy learning
January Week 1–4	Conduct project (experimental study) with students and complete questionnaires after each lesson
February Week 1/2	Conduct interviews with students

**Questionnaires Used in the Research Study**

In a questionnaire, a sample from a given population is examined (Young, 2016). According to Groves et al. (2009), a population is a group of objects or subjects the researcher investigates. All the students (n=127) participating in the experimental study were also asked to fill in a short close-ended questionnaire related to their PE lessons after each PE lesson. The idea behind these questionnaires was to compare the students’ answers between the two groups and between grades and seek to understand whether analogy learning is effective during PE lessons. The questionnaires had to be explained if and when the students required clarification (mainly for grades 1 and 3). The data collection phase is summarised in Table 1.

**Data Analysis**

Thematic Analysis was used as it is flexible, and it is a good “method for identifying, analysing, and reporting patterns (themes) within data” (Braun & Clarke, 2006, p. 79). Upon completion of the interview process, the transcripts were meticulously examined and analysed in order to commence the coding stage. Pertinent sections were duly highlighted, and from these highlights, themes were identified. The questionnaire responses were evaluated, while the experimental study was analysed based on the researcher’s observations and

notes. On scrutinizing the data obtained from all three research instruments, it was ascertained that the outcomes were consistent. Consequently, the findings were amalgamated to derive the final results for the study.

### ***Ethical Considerations***

Ethical procedures were followed throughout the research process. Ethical clearance was granted by the Institute for Education (IfE), the Secretariat for Catholic Education and the Ministry for Education, Sport, Youth, Research and Innovation (MEYR). All participants signed a consent form confirming that they could stop their participation at any time, and that they understood that they will not come to any harm and that their identity was protected. To enhance the reliability and validity of the study, a reflexive journal was kept by the researchers for recording reflections and thoughts, while interviews and questionnaires were piloted to test their practicality.

### ***Limitations of the Research Study***

The timeframe of the experimental study was initially planned as a six-week project, but due to unplanned school activities, the project ended up being a four-week project. This caused some limitations. If the experimental study had been six weeks long, or even a bit longer than that, it would have generated more results to analyse. Working with children also had its limitations. The experimental study took place during the students' regular PE lessons, and thus, a 40-minute lesson twice a week was found to be quite a short time to deliver all that was planned, especially with the younger grades. Moreover, one has to remember that working with children depends on the mood and productivity levels of the students. This might have also affected the collection of data.

Finding primary PE teachers who work in a church school was challenging and took quite some time. This delayed the data collection process and the writing of the analysis section. Time constraints were also a limitation, as most of the interviews conducted with the students had to be done during school hours, and being able to find a free slot with each student respectively took work. Moreover, conducting the interviews with the teachers was also challenging due to other commitments during work hours.

### **The Voice of the Research Participants on Analogy Learning**

The results answered the main research questions proposed for this study. With the use of thematic analysis, the following themes were elicited:



**Table 2**

*Research Questions in Relation to Themes*

<b>Research Questions</b>	<b>Themes</b>
Research Question 1: How can analogy learning aid in Physical Education lessons? Research Question 2: What is the experience of Physical Education teachers and primary school students about the use of Analogy Learning in PE?	Theme 1: The experience of Physical Education teachers and primary school students on analogy learning
Research Question 3: What are the benefits and limitations of Analogy Learning in relation to Physical Education?	Theme 2: The benefits of analogy learning in Physical Education
Research Question 3: What are the benefits and limitations of Analogy Learning in relation to Physical Education?	Theme 3: The limitations of analogy learning in Physical Education

Code names were given to the interviewees in this study to keep the interviewees' privacy and anonymity throughout the process. These are explained further in Table 3 below. The table shows the code names that will be used from this point forward when referring to the stakeholder or any of the teachers or students throughout the rest of this research study.

**Table 3***Participant Code Names*

<b>Participant</b>	<b>Code Name</b>
Stakeholder	S
Primary PE Teacher #1	PT1
Primary PE Teacher #2	PT2
Primary PE Teacher #3	PT 3
Primary PE Teacher #4	PT 4
Primary PE Teacher #5	PT 5
Grade 1 Student   Analogy Group	Sgrade1AnalogyGrp
Grade 3 Student   Analogy Group	Sgrade3AnalogyGrp
Grade 6 Student   Analogy Group	Sgrade6AnalogyGrp
Grade 1 Student   Non-Analogy Group	Sgrade1Non-AnalogyGrp
Grade 3 Student   Non-Analogy Group	Sgrade3Non-AnalogyGrp
Grade 6 Student   Non-Analogy Group	Sgrade6Non-AnalogyGrp

## **The Experience of Physical Education Teachers and Primary School Students on Analogy Learning**

The first theme that emerged from the research study was the experience of PE teachers and primary school students on analogy learning. Most of the teachers interviewed for this study were familiar with analogy learning, yet they were not fully aware that there is a term for it and that it is an actual teaching method. The students chosen for the semi-structured interviews were unfamiliar with analogy learning, yet, with some simple examples, they managed to understand what this concept is all about. On the other hand, the students participating in the experimental study were not given any information in order to reduce the probability of the students becoming biased, which might affect the questionnaire results.

Although PT1 did not answer what Analogy Learning is, after a short explanation, they could grasp the concept and admitted that they naturally use it without knowing. They stated that it is of utmost importance, especially within the primary years, as at that age the students do not understand “a

lot of technical stuff" (PT1), and using familiar words helps them understand things better. The use of familiar words means that the students can refer to their previously learnt knowledge. Constructivists believe that one constructs knowledge through previously learnt ideas and experiences (Bereiter, 1994). Thus, if an educator uses technical and non-familiar words, the students will need help constructing new knowledge. Analogy learning helps the educator make use of familiar words with the students. PT2 and PT5 also mentioned this argument, with PT5 exclaiming that, "especially in the younger ages, I think it's mhux [not] the only way ta', but most of the explanations should be like that."

S mentioned that analogy learning is a way of explaining things to students. PT2 also commented that, as soon as they explain with analogies, "verbal cues go down the drain" (PT2), as analogies are grasped much quicker. PT1 also remarked how using analogies helps the students, as the teacher has to talk less while explaining. If one refers back to the literature, Chatzopoulos et al. (2020) commented that, when using analogy learning, working memory will be used less. Since children have a restricted working memory capacity, it was theorised that children would eventually perform better in movement skills when taught with analogies. In constructivism, it is suggested that teachers should dialogue with their students rather than impose information on them, as dialogue helps students construct their knowledge better (Bates, 2022). This might be the reason why students favour analogy examples over the use of verbal cues. In the course of the experimental study, it was noticed how, as soon as the students are presented with an analogical example, such as simply referring to the relay baton as a "magical wand" (grade 3) or "gallop like a horse" (grade 1), the students were attracted and engaged with what was said right away, while also understanding what needs to be done, resulting in less verbal cues from the teacher in order to explain. From the questionnaire data of grade 1 students, the example of "gallop like a horse" helped 44% of the analogy group, and 35% of the non-analogy group said it would have helped them. From the grade 3 students, 67% of the analogy group said that the "magic wand" example helped them use the baton more comfortably. In comparison, 48% of the non-analogy group stated that this example would have made them more comfortable.

PT4 supported this argument, as she stated that teaching skills could be very complex, so analogy helps simplify the explanations. This was also noted in the literature, as it was said that PE teachers face a problem when trying to teach skills to beginner learners, mainly children (Ramezani et al., 2022) and that

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they try to choose the most accessible mode of delivery to tutor their students, by creating a safe environment for their students to learn (Aktepe & Coskun, 2014). This is linked to cognitivism, as cognitivism suggests that educators try to accommodate their students by providing them with the most appropriate teaching methods (McKenna, 1995).

PT3 also mentioned that she finds it easier to introduce the lesson and each activity using analogies, and that she uses the children's prior learning to transfer skills successfully. In cognitive scaffolding, the teacher uses the students' prior learning to teach new concepts (Flick, 1998). PT4 and PT5 also mentioned that one should compare things to the students' experiences and use their experiences to teach them. PT3 believes that teachers should go down to their students' levels and stay up-to-date on new trends to understand what their students are following nowadays. This is in line with the concept of experiential learning (Kolb, 1984), in which the teacher also has to go down to the students' levels in order to be able to come up with projects and lessons that the students can engage with.

S, PT2, PT3 and PT4 all revealed how analogy learning evokes the imagination and how this might be one of the main reasons students connect well with analogy learning. PT3 noted how, through analogies, she ensures the students have time to pretend play during PE lessons, which goes hand in hand with evoking the students' imagination. According to Piaget (1976), constructivists believe that, from a very young age, children use pretending to understand the things going on around them; therefore, by engaging in pretend play, students have a greater chance of understanding. Shen and Lai (2014) also wrote about how analogical techniques help problem-solving ideas through the use of imagination. During the experimental study, games were included to help students to imagine. Sometimes, they were asked to imagine that they were at the beach running in shallow water or that they were birds in a nest. As soon as these examples were mentioned, the students' excitement levels flared up, and they became excited to play the game or do the exercise right away. This sense of excitement was not seen as much with the non-analogical group. The students used to lack imagination; thus, they used to look at the game or the exercise as it is and not imagine the game or exercise in any other way. The shallow water exercise given to grade 6 students helped 84% of the analogy group remember that they needed to pick up their feet while running. None of the students said it did not help, while the other 16% of the class was unsure

if it helped. Lacking imagination, only 15% of the non-analogy group thought this exercise would help them; 50% said it would not help them. The same goes for the grade 3 students with the "birds in a nest" example. About half (48%) of the analogy students said that the exercise helped them understand the relay game better, 24% said it did not help, and 29% were unsure. From the non-analogy group, 61% of the class was unsure whether this exercise would have helped, 6% said it would not help, and 33% said it would have helped. Sgrade3AnalogyGrp, Sgrade6AnalogyGrp and Sgrade6Non-AnalogyGrp all commented on how imagination makes learning better and more manageable. When prompting Sgrade3AnalogyGrp to remember what was done during the lesson and it was recapped that a lot of imagination had been used, she immediately uttered: "That the clouds are like that pinkness softness ... Yes, and I remember the squirrels." These are all examples that were given throughout the experimental study. For example, to help the students land safely while jumping, the example of "fluffy clouds" was given to them. This example helped 50% of the students in the analogy group and would have helped 81% of the non-analogy group students.

Through the observations during the experimental study, it was felt that students became more enthusiastic about learning when they could imagine and drift off to their imaginary world. When teaching the grade 6 students how to run correctly, they were asked to "run high" or "run low" and see which one felt better. To help them imagine, the analogy group students were asked to pretend that "you are a puppet on a string, with someone pulling your head's string" to help them run high, and pretend that "you are an old lady" when running low. During the non-analogy group's lesson, these examples were not given. One of the students said of their own accord that "they are like an old lady" when running in a low position. This means that when given a chance, the students imagine things independently. Over half (56%) of the grade 6 analogy group and 30% of the grade 3 analogy group said that this example helped them understand better the terms "run high" and "run low".

In comparison, 35% of the grade 6 non-analogy group and 50% of the grade 3 non-analogy group thought it helped them. The analogy group showed more motivation during the lesson and participated wholeheartedly, while the non-analogy group sometimes got bored or lost, especially during the explanations. One has to keep in mind that, throughout the experimental study, the same (or similar) games and exercises were conducted. However, the wording for

explanations was changed. This made it easier to pinpoint similarities and comparisons. PT3 also discussed that they became more engaged when games were turned into reality, compelling the students to enter an imaginary world.

### **The Benefits of Analogy Learning in Physical Education**

S, PT2 and PT4 discussed how they noticed that analogy learning helps students with attentional or behavioural problems. S said, "It might be that, with students with behavioural issues, this might even help more". PT2 also said that, "some who suffer with maybe listening or attention; once they hear a word or something that they can relate to and they know about, they can learn it quickly".

Throughout the experimental study, it was noticed that, with the analogy group, there was a decrease in the number of students who used to speak a lot during the lesson and an increase of attention during the explanation. On the other hand, the non-analogical groups lost focus after the first few words of the explanation. Sgrade1AnalogyGrp herself admitted that when analogies are used, "I was listening better." In the previous theme, Sgrade3AnalogyGrp and Sgrade6AnalogyGrp mentioned how they felt calm and relaxed when their teacher uses analogical examples. Feelings of calmness and relaxation may also result in better behaviour from students.

Throughout the observations during the experimental study, it was noticed that some students from the analogy group, who do not practice any sports, or who try to come up with excuses during their PE lessons, participated more throughout those four weeks and were even understanding things better. This change of heart from certain students could have also occurred as they knew they were participating in a study, which could have made them act differently. On the other hand, there was not much difference in students from the non-analogical groups, meaning that using analogies might help students look at PE differently. PT3 also sustained this argument by stating that,

It makes students love [the] subject. Even those who might be maybe struggling with weight, [or] are not the sporty type. They don't train any sports. But, once you start going into their world, making them have fun, laugh, enjoy it, you start [to] slowly get them on board. (PT3)

## The Limitations of Analogy Learning in Physical Education

Although most of the teachers as well as the PE stakeholder had listed numerous benefits linked towards analogy learning in PE lessons, they all spoke about some limitations of using analogies. Both S and PT3 mentioned that some teachers might need more energy and imagination to use such techniques. Thus, S said, it "depends on the deliverer's initiative to really come up with interesting similarities and interesting topics".

Although PT4 thinks that lack of thinking from students is something that shows that they cannot be bothered, this was not the case in the experimental study. In theme 3, Sgrade1AnalogyGrp and Sgrade3Non-AnalogyGrp said that they dislike imagining a lot, as they believe that imagination does not help them much. Therefore, some students need to overcome this dislike and be encouraged to use their imagination. This might be the reason why the questionnaire data had a mixture of results when asked whether particular examples would have helped them imagine more, as not everyone likes to use imagination or think. Thus, analogies might not always be the proper technique for all students in this context. In one of the questionnaires, the grade 1 analogy students had to answer the following question, "Did you understand better what personal space is when I told you that you are 'aeroplanes' and that you can crash if you bump into someone else?" Only 39% of the students said this imaginary situation helped them, while 5.6% said it did not help, and 55.6% of the class said they were unsure. As for the non-analogy grade 6 group, students had to answer the question, "Do you think that if I had given you the example of 'running is like water going down a river, smooth and keeping the same pace', it would have helped you run better for a longer distance?", only 16% of the class said that this example would have helped, while 55.6% said that it would not help them and 28% of the class said that they were not sure.

## Relevance of the Research Topic and the Outcomes

The literature gap noted previously has been partly tackled throughout this study. Consequently, this research study is of great significance, as it can guide PE teachers and educational stakeholders to improve the quality of PE lessons, especially within the primary sector.

This study might also inspire other PE teachers to explore further the concept of analogy learning or any other practice conditions to improve the quality of their delivery during PE lessons, always keeping in mind that the students are to benefit from it all.

## Recommendations for Policymakers

This research study helps to inform policymakers about the need for a better investment in PE teachers by allowing them to keep growing in their field. This could be done by delivering more CoPE sessions to PE teachers related to their subject, and providing incentives and opportunities to encourage PE teachers to keep furthering their studies. Moreover, educational courses aimed at training of innovative PE teachers should include practical teaching methods and ideas to help teachers explore and search for delivery modes that can be helpful and insightful for their students throughout their lessons.

## Notes on Contributors

**Maria Ellul** has taught Physical Education in a Maltese primary church school for four years. In 2019, she obtained a B.Sc. (Hons) in Sports, Exercise and Health with First Class Honours. She also read for a Master of Education in PE from 2020 to 2023. Besides teaching, Maria is also a Nursery Head Coach of a Swimming Club in Malta. Her areas of research are Physical Education, Analogy Learning, Primary Education, Teaching Methodology and Sports Psychology.

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