EFFECTIVENESS OF INTERDISCIPLINARY PROFESSIONAL LEARNING COMMUNITIES ON TEACHING SELECTED BODY SYSTEMS AND HEALTH-RELATED FITNESS

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ABSTRACT

EFFECTIVENESS OF INTERDISCIPLINARY PROFESSIONAL LEARNING COMMUNITIES ON TEACHING SELECTED BODY SYSTEMS AND HEALTH-RELATED FITNESS

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The purpose of this study was to analyze the impacts of an interdisciplinary professional learning community (idPLC) consisting of a group of different subject matter teachers on:1) teachers' content knowledge and pedagogical content knowledge development processes on selected body systems (skeletal, muscular, cardiovascular, respiratory),health-related fitness (HrF) knowledge, 2) their students' HrF knowledge and physical activity levels, 3) the idPLC teachers' students' views on interdisciplinary teaching approaches. Mixed-method design was adopted. The sample included one sixth grade in two experimental and two control schools ($n_{experimental} =35$, $n_{control} =45$) and different subject teachers teaching these classes in experimental group schools ($n = 10$). Two six-week idPLCs were implemented separately for the experimental groups' teachers. Each idPLC included a facilitator and five different subject matter teachers (physical education, science, English, psychological counseling and guidance, visual arts/Turkish). Qualitative data were collected through idPLC video recordings, semi-structured interviews with teachers, field notes. Findings showed improvement in teachers' content and pedagogical content knowledge of selected body

systems and HrF knowledge through questioning, acceptance, practice, and reflection. Quantitative data were collected by HrF Knowledge Test and PAQ-C through pretest/posttest applications. Findings revealed a significant increase in the experimental group students' HrF knowledge and physical activity levels as compared to the control group ($p<.05$). Focus-group interviews with students, student journals were used to examine how students perceive their teachers' practices. Their teachers used an interdisciplinary approach in their classes. This approach, from the students' view, supported the course's effectiveness, encouraged creative thinking, developed body awareness, and helped make a real-life connection.

Keywords: Interdisciplinary Teaching, Professional Learning Communities, Body Systems, Health-Related Fitness

ÖZ

DİSİPLİNLER ARASI MESLEKİ GELİŞİM TOPLULUKLARININ SEÇİLEN VÜCUT SİSTEMLERİ VE SAĞLIKLA İLGİLİ FİZİKSEL UYGUNLUĞUNUN ÖĞRETİMİNDEKİ ETKİNLİĞİ

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Çalışmanın amacı ortaokulda aynı sınıflara ders veren farklı branş öğretmenlerinden oluşan disiplinlerarası mesleki gelişim topluluklarının (dMGT) 1) seçilen vücut sistemleri (kas iskelet, dolaşım ve solunum), sağlıkla ilgili fiziksel uygunluk (SiFU) alan ve pedagojik alan bilgileri geliştirme süreçlerine; 2) öğrencilerinin SiFU bilgisi ve fiziksel aktivite düzeylerine etkilerini; 3) dMGT'ye katılan öğretmenlerin öğrencilerinin, disiplinler arası öğretim yaklaşımına ilişkin görüşlerini incelemektir. Çalışmada karma yöntem kullanılmıştır. Örneklemi iki deney ve iki kontrol okulunun birer altıncı sınıfında eğitim alan öğrenciler (n_{deney}=35; $n_{kontrol}$=45) ve deney grubu okullarında bu sınıflara ders veren farklı branş öğretmenleri (n=10) oluşturmuştur. Deney gruplarında, altı haftalık iki ayrı dMGT uygulanmıştır. Her bir dMGT'de uzman bir kolaylaştırıcı ve beş farklı branş öğretmeni (beden eğitimi, fen bilgisi, İngilizce, rehberlik ve psikolojik danışmanlık, görsel sanatlar/Türkçe) yer almıştır. Nitel veriler, dMGT video kayıtları, öğretmenlerle yapılan yarı yapılandırılmış bireysel görüşmeler ve alan notları ile toplanmıştır. Verilerin analizinde, sürekli karşılaştırılmalı analiz yöntemi kullanılmıştır. Bulgular öğretmenlerin seçilen vücut

sistemleri ve SiFU bilgilerinin dMGT sürecinde alan ve pedagojik alan bilgilerinin sorgulama, kabul, uygulama ve yansıma süreçlerinden geçerek geliştiğini göstermiştir. Nicel veriler SiFU bilgi testi ve Çocuklar için Fiziksel Aktivite anketi ile ön test/son test uygulamaları ile toplanmıştır. Elde edilen bulgular deney grubu öğrencilerinin SiFU bilgi düzeyleri ve fiziksel aktivite seviyelerinin kontrol grubuna göre anlamlı düzeyde arttığını ortaya koymuştur ($p<.05$). Öğrencilerin dMGT yaklaşımlarını nasıl algıladıklarını daha iyi anlamak için öğrencilerle odak grup görüşmeleri ve öğrenci günlükleri kullanılmıştır. Öğrenciler öğretmenlerinin derslerinde disiplinler arası yaklaşımı kullandıklarını farketmişlerdir. Bu yaklaşım öğrencilere göre dersin etkililiğini, yaratıcı düşünmeyi desteklemiş, beden farkındalığını geliştirmiş ve gerçek hayatla bağlantı kurmalarına yardımcı olmuştur.

Anahtar Kelimeler: Disiplinler Arası Öğretim, Mesleki Gelişim Topluluğu, Vücut Sistemleri, Sağlıkla ilgili Fiziksel Uygunluk

To, My Family

(my mother, father, brother, husband, and my son Seymen Batu)

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LIST OF ABBREVIATIONS

PLC	Professional Learning Community
idPLC	Interdisciplinary Professional Learning Community
HrF	Health Related Fitness
PAQ-C	The Physical Activity Questionnaire for Older Children
MoNE	Ministry of National Education

CHAPTER I

INTRODUCTION

1.1. Background of the Study and Statement of the Problem

Global shifts in the 20th century have influenced not only the international economy, politics, technology, cognitive information, and culture, but also the society we live in (EARGED, 2011). As a result of these changes throughout the world, the Turkish Ministry of National Education (MoNE) has reorganized the overall compulsory education curriculum and its components in accordance with the constructivist education philosophy, which emphasizes active student participation in the learning process. The main reasons of this change stated by the Board of Education and Discipline are (TTKB, 2005);

- to educate individuals who can adapt to an ever-changing world, access and utilize information when necessary,
- to conduct research and ask questions,
- to demonstrate critical thinking,
- to provide practical solutions
- to make prompt decisions

In this regard, implementing student-centered approaches has become the dominant strategy in education. Thus, both experienced and novice teachers must be ready to apply a variety of student-centered teaching methods to meet the needs of today's learners (Kapusnick & Hauslein, 2001). Today's teachers act as learning guides with an interdisciplinary viewpoint, contributing to the development of basic abilities, also known as 21st century skills, in students of all disciplines (MoNE, 2017).

In the literature of education, Dewey's (1938) writings, Piaget's (1975) and his followers' empirical research, and Vygotsky's (1978) socially situated learning theories all emphasize the importance active participation of learners in the educational

process (Lambert, 2006). Another point on which constructivists might agree is the significance of a learner's own background knowledge. Driver et al. (1994) state that the most crucial part of the constructivist approach is that knowledge is not passively passed from one person to another; instead, knowledge is built by the student.

Throughout history, contextual learning has also been recognized for its efficacy by many educators, including John Dewey, Howard Gardner, and Benjamin Bloom (Vars, 2001). An integrative curriculum approach to teaching enables learners to make deeper connections between classroom and real-world experiences (Beane, 1997, as cited in Senn et al., 2019). Integration provides more effective classroom learning by making the lessons more relevant to the students' lives (Hargreaves & Moore, 2000). To achieve integration, interdisciplinary education is preferable as it emphasizes connections and relevance among various subjects (Senn et al., 2019).

According to Klein and Newell describe interdisciplinary as "*a process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline or profession... and draws upon disciplinary perspectives and integrates their insights through the construction of a more comprehensive perspective.*" Bruner (1960, 1966) discussed the significance of students' existing knowledge in the learning process. He advocated for a spiraling curriculum design that would allow students to continue building upon their prior knowledge (Lambert, 2006). As a means to "*handle difficult challenges that cut between traditional disciplines and the potential of new technology,*" interdisciplinary research and practices are generally favored. These approaches make use of creativity, practicality, and a diverse of views, and skill sets (CohenMiller & Pate, 2019).

Specifically, students in the middle school years are naturally interested in their widening range of options. In this period of their lives, students are going through a process of discovery, learning about themselves and their place in the world (Duerr, 2008). In this context, education for teenagers has to be stimulating, interesting, useful, and exciting (Moser et al., 2019). Integrative teaching methods (such as interdisciplinary, multidisciplinary, cross-disciplinary, etc.) can be helpful for middle school students because they can make students more interested, more motivated, and better at what they do (Applebee et al., 2007).

There is a widespread agreement that the interdisciplinary teaching approach is crucial to improve the curriculum at all educational levels today (Jones, 2010). At the same time, the interdisciplinary method has emerged as a critical component of today's curricula and a significant challenge for students (Jones, 2009). The interdisciplinary method synthesizes many disciplines and produces teacher-student partnerships that improve the educational experience as a whole (Jones, 2009). Because it is not enough to say that a curriculum is "*a set of courses or subjects offered by an institution*," as most dictionaries do (Duerr, 2008; Tchudi & Mitchell, 1999), students need their knowledge to be integrated, not to split up (Tchudi & Mitchell, 1999).

Interdisciplinary instruction is a way to help the learners to understand things better by putting different types of knowledge together rather than keeping them separate (Lounsbury, 1992). Integrated curricula attempt to assist students in understanding how different disciplines have an impact on their lives and allow them to study the perspectives of each discipline from a connected perspective (Jacobs, 1989). Integrating many disciplines gives the teaching unit meaning, rationale, and relevance (McBee, 2000). Jacobs (1989) found that students learn better when they combine what they already know with their learning and the lesson's goals.

The integration of knowledge from multiple disciplines in a way that preserves and illuminates a subject's foundational principles is widely held to be the best way to educate students in any given topic (Kaittani et al., 2016). It's an efficient strategy to improve the ability to study; especially for teenagers, who can easily become lost in the maze of education (Duerr, 2008). Students learn more when they are given real-world challenges to solve and the learning experience becomes more efficient when teachers adopt and implement a problem-based approach to instruction (Spintzyk et al., 2016). With respect to this issue, Stübig et al. (2001) found that students recall information better when they can see how it fits into their lives and situations. It is considered that a cross-disciplinary approach facilitates holistic knowledge; hence, interdisciplinarity can aid in the resolution of today's complicated situations (Newell, 2007).

A national educational priority that influences all layers of instruction is reflected in the interdisciplinary model's focus on collaborative learning and applying

critical thinking abilities (Kaittani et al., 2016). Cooperation across disciplines boosts student engagement and active learning, fosters student participation by giving a choice of ways to learn suited to their discipline, and includes an experiential component in applicable areas (Leblanc, 1998).

Nevertheless, students may require a long time to attain sufficient proficiency in interdisciplinary thinking, as it does not occur naturally. Additionally, students need assistance synthesizing two or more fields (Spelt et al., 2009). For this reason, collaboration among students is a crucial component of learning. It allows for the identification of commonalities, the development of common goals, and sharing of unique insights and experiences (Cox, 2001). The ultimate purpose is to enhance student learning. One of the overarching goals is to establish a community for shared decision-making (Scribner et al., 2007) and the collaborative study and improvement of teaching practice among team members (McLaughlin & Talbert, 2002).

As Wallace (2007) points out, "*the basis of most of the successful middle school programs today is interdisciplinary teamwork in middle schools*." The term "interdisciplinary teaming" refers to a teaching strategy in which educators from diverse disciplines collaborate to plan and implement a shared curriculum and shared set of lessons for a set of students (Mertens & Flowers, 2003). This interdisciplinary teaming has helped teachers in many ways, such as providing them more job satisfaction at work and making their communities stronger (Harrison & Bishop, 2021; Robbins & Searby, 2012).

Different types of learning communities are promoted as useful tools for teachers' ongoing professional development (Parker et al., 2021). Continuing professional development and learning communities can help make good on the "promise of improving teaching and learning for both teachers and students in our schools" (Hunuk & Ince, 2013; Ince et al., 2020; Lieberman & Miller, 2008). The goal of both theoretical and practical professional development (Garet et al., 2001) is to help teachers improve their own knowledge and skills so that they can help their students more effectively. In the end, professional learning communities (PLC) are groups of teachers who collaborate often to study, share experiences about best practices, and work on problems they all face as part of their professional development (Dimino et al., 2015). PLC has been defined by various researchers in different ways,

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but they all have a number of shared properties including a focus on collaboration, a shared vision and purpose, a focus on student learning, the use of reflective discussion to help teachers learn more, and constructions and support to make teacher training public and counterproductive (Doan & Adams, 2018; DuFour, 2004).

There are five distinguishing features of PLCs that are outlined by Newmann et al. (1996). A consensus on the group's "*ideas about children and children's ability to learn, school priorities for the use of time and space, and the right roles of parents, teachers, and administrators*" is the first step in creating an effective learning environment (p. 181). Second, there must be a constant and unwavering emphasis on the students' development as learners (p. 182). Third, through reflective dialogue, teachers have "*extensive and ongoing conversations*" with each other about curriculum, instruction, and students' academic growth. The final two features of a PLC are an emphasis on cooperation and the derivatization of practice that makes teaching public (Vescio et al., 2008).

DuFour (2004) suggests that educators regularly assess their efforts to integrate student achievement and teacher cooperation into school culture. Educators, however, must finally conduct an in-depth analysis of the outcomes of their work in terms of student achievement. Bolam et al. (2005) mention that effective PLCs "*have the ability to encourage and support the learning of all professionals and other staff in the school community, with the goal of promoting student learning as a whole*."

The PLC places "*quality teaching*" at the core of adult learning at schools in order to improve student learning (Hord et al., 2009). Educators at all levels must work together to set and carry out priorities for student and teacher learning (DuFour, 2004; Mullen & Hutinger, 2008). These priorities can be exemplified as program improvement, staff development, and shared responsibility; therefore, the collective effectiveness of a PLC depends on how deeply, richly, meaningfully, and intentionally its members learn from each other and act on their specific instructions about what is best for their students' education (DuFour et al., 2008; Johnson & Voelkel, 2019; Stoll et al., 2006). Consequently, members of a PLC frequently share the objective of enhancing student accomplishment by improving their own teaching practices. Their professional development is unified and constant because of their common interests (Vescio et al., 2008).

Interdisciplinary team-teaching, in which teachers from various courses work together to design a curriculum, teach lessons, and evaluate student progress over a period of time, is frequently cited as a technique of interdisciplinary learning (Jones, 2010). It uses interdisciplinary methods when it wants to delve deeper than any single field can provide, or when we want to come up with a solution more efficient than the sum of its parts (Klein, 1996; Lattuca, 2001; Pharo et al., 2013). In such a case, interdisciplinary teamwork has utmost importance as Seashore et al. (2003) found that people are more likely to improve their careers through reflective practice when they work in smaller groups that focus on new curriculum and pedagogy.

Areas where teachers can work together can be established through interdisciplinary teams and PLCs. Teacher collaboration is the best way to describe the essence of the idea because it is a "*systematic process in which teachers work together to evaluate and improve their classroom practice*" (DuFour, 2004). The primary roles of an interdisciplinary instructional team are (a) designing and implementing a multidisciplinary curriculum and pedagogical approach that considers the student's unique developmental needs, (b) creating coordinated interventions and management methods to meet students' learning or behavioral problems, and (c) ensuring that parents are kept in the loop. These are particularly strong teamwork activities in that the achievement of school restructuring initiatives is restricted unless schools are rationalized according to learners' requirements and the educational process (Rowan, 1990).

More creativity is needed in the classrooms so that students are better equipped to deal with the complicated social problems of today and find solutions to them. Courses that cover more than one subject can be considered as a way to meet this need. Students are interested in cross-disciplinary lessons, particularly those that are useful to society (Higgins & Litzenberg, 2015). Davis (1995) found that students think interdisciplinary courses are more challenging and enjoyable than courses in just one field. Both students and instructors think these classes are helpful (Ducoffe et al.,2006; as cited in Hammons et al., 2019).

Interdisciplinary courses are relevant in the real world because they frequently educate students on handling problems using a variety of resources and perspectives. Interdisciplinary teaching approach is exceptionally functional to teach students how

to identify and apply information efficiently to solve issues because it frequently emphasizes the integration of diverse perspectives, teamwork, and the teaching of critical thinking skills (Davis, 1995; as cited in Hammons et al., 2019).

Each individual has unique capabilities in their intellect, which affects their learning style. When multiple intelligences are employed to teach a skill or concept, the resulting learning experience is inherently multidisciplinary (Gardner, 1983). Interdisciplinary teaching enables students with different learning styles to have efficient learning experiences by combining the seeing (visual), hearing (auditory), and doing (kinesthetic) modalities, allowing students to learn best through their individual preferences (Cone et al., 1998). Children learn in an integrative manner and become more active in learning via activities which include body movements (Siegel, 1997). Every child desire to move, play, have fun, and learn. Although children's demand for movement is generally known, the educational system and parents appear to reinforce the idea that seated, undivided attention to the teacher promotes better learning (Hynes-Dusel, 2002).

Considering the teaching process of interdisciplinary physical exercises, minimal effort is required. Numerous abilities and topics in physical education already incorporate advanced scientific and mathematical principles (Howard-Shaughnessy & Sluder, 2015). In addition, brain research indicates that physical activity, such as moving, extending, and walking, can improve the learning process (Jensen, 2000; as cited in Howard-Shaughnessy & Sluder, 2015). Therefore, physical education is an essential component of schooling. Movement experiences provide numerous advantages for children. They work out the entire body, including the mind as well as the muscles; this can support children to establish a lifelong passion for health, fitness, and academic success in all subject areas (Pica, 2014). A common feature in physical education pedagogic literature is that interdisciplinary courses can assist students' learning in other fields (Graham et al., 2010; Fingon, 2011; Mohnsen, 2011).

Learning about the body and its functions is a cornerstone of the primary education curriculum from kindergarten through eighth grade (Çeken, 2020). The content in question may include the relationship between cell-tissue-organ-system-organism, and the structure and functioning of body systems (MoNE, 2018b). For students in between the concrete and abstract stages of learning, the fact that some

issues related to body systems are still abstract may make it harder to learn the subject (Çeken, 2020).

Students in secondary schools are able to make the transition from real-world activities to abstract ones (Charles, 2003). Due to this fact, it is inappropriate to expect children of this age to actively engage in topics that are improper for them. During this time, the inclusion of educational activities appropriates for children's age, ability, perception level, and intelligence areas overlaps with the principle of personal relevance in learning (Çepni & Çil, 2009). Due to its relevance to daily life, the subject matter in question can be incorporated into learning and teaching activities across different disciplines. Getting used to the new situations that children will face in recognizing and adapting to the rapid changes that occur in their bodies during this period is a feature of the developmental process (Çeken, 2020). To teach abstract and difficult-to-understand science concepts in the classroom environment and to reduce or eliminate students' misconceptions effectively (Çetinkaya & Taş, 2018), three-dimensional materials or models, games, demonstrations, and applications for learning by creating analogies can be preferred. In studies examining students' knowledge of health-related physical fitness, it was found that students had a low level of knowledge on this subject (Hunuk et al., 2007), and it has been discovered that the information on subject matter they have is insufficient (Placek et al., 2001; Ince et al., 2020).

Many current Turkish subject matter course syllabi include interdisciplinary teaching because of its widespread acceptance as an effective teaching approach (MoNE, 2018a; 2018b; 2018c; 2018d; 2018e); however, it is also considered that teachers are limited in "connecting the subject matter with other disciplines," as emphasized in the curriculum (Ince et al., 2020). Moreover, a recent PLC intervention study (Ince et al., 2020) in Turkiye has shown that teachers need to develop their content and pedagogical content knowledge especially in "how body works" and "health-related fitness" topics. In addition, Ince et al. (2020) have stated a need for developing physical education teachers' interdisciplinary teaching competencies. Even though interdisciplinary teaching approach is recommended by MoNE (2018b; 2018c;) for all related subject matter courses, more research is needed on the interdisciplinary teaching competencies of other subject matter teachers in Turkish context as well. "Body systems", "health-related physical fitness" (HrF) and physical

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activity topics are included not only within the secondary school physical education program but also they are represented in science curriculum too. Other subject matter courses (Turkish, visual arts, and English) have also connections with these topics in their curricula (MoNE, 2018a; 2018d; 2018e). Therefore, developing interdisciplinary teaching competency of different subject matter teachers is crucial for supporting the student learning on body systems and HrF.

In the present study, an "interdisciplinary professional learning community" (idPLC) approach was adopted to develop different subject matter course teachers' collaboration. Such an approach might also be fruitful for teachers who deal with disciplinary fragmentation, isolation, and competitiveness emerged as the primary barrier to interdisciplinary teaching (Pharo et al., 2013). Moreover, there is a limited number of published models of interdisciplinary teaching methods and applied guides. (Boyer & Bishop, 2004; Pharo et al., 2013; Wallace, 2007).

1.2. Significance of the Study

Teachers working in interdisciplinary teams in middle schools have access to a rich "table of opportunities" (Rottier, 2000) that can be used to create meaningful learning experiences for students and their families through a variety of approaches to curriculum design, teaching strategies, and professional development. Teachers note on a regular basis that they are unable to collaborate with their peers properly due to a lack of time to socialize with them throughout the school day (Collinson & Fedoruk Cook, 2001; Ostovar-Nameghi & Sheikhahmadi, 2016).

Despite having varied definitions and implementations, interdisciplinary teams have become a structural characteristic of many secondary level schools over the past few decades (Cook & Faulkner, 2010). When teachers engage in collaborative activities, such as interdisciplinary teaming, they have access to collective opportunities to share and discuss instructional strategies, experiences, and advances (Havnes, 2009; Shah, 2012). Collaboration among interdisciplinary teams allows teachers to plan the instruction in a more collaborative manner, which is an important aspect of teamwork (McEwin & Green, 2011; Mertens et al., 2010).

There have been a number of strategies in the literature for promoting collaboration over the past decade. Consequently, the quality, efficiency, and

sustainability of professional development opportunities offered to teachers have gained importance. Use of PLC is recommended to support teacher professional development (Parker et al., 2021; Tannehill et al., 2021; Patton et al., 2015). Providing an environment to teachers to maintain professional development enables teachers to assess their own abilities and learn from their peers (Reeves, 2004).

In the present study, it is expected that the idPLC setting would develop "interdisciplinary cooperation," "interdisciplinary perspective," and "interdisciplinary interaction" among various subject matter teachers, and teachers would transfer their learning in the idPLCs' to the classes, and their students might benefit from them with more effective learning on the selected topic.

1.3. Research Questions

The present study tries to answer following research questions;

Research Question 1. How does the idPLC influence the teachers' content and pedagogical content knowledge on selected body systems (skeletal, muscular, cardiovascular & respiratory) and HrF?

Research Question 2. How does the teachers' participation in the idPLCs influence their students' HrF knowledge and physical activity participation level?

   a. Do the teachers' participation in the idPLC increase their students' HrF knowledge?

   b. Do the teachers' participation in the idPLC increase their students' physical activity participation level?

Research Question 3. What do the idPLC teachers' students' views on their teachers' teaching approaches to selected body systems (skeletal, muscular, cardiovascular & respiratory), HrF, and physical activity participation?

1.4. Definition of Terms

Interdisciplinary Teaching: It is a program that combines the methods and content of more than one discipline together to investigate a concept, subject, problem, or experience (Jacobs, 1989).

Professional Learning Communities (PLC): A group of people with a common interest and passion for what they do and learn how to do it better through interaction."(Wenger, 1998).

Interdisciplinary Professional Learning Community (idPLC): Interdisciplinary groups share information and work together to achieve a similar objective through regular communication and collaboration. Every member of an interdisciplinary team has expertise in their course and handles their subject. However, they also share knowledge and work together to get a broader perspective and provide more well-rounded lessons for students (Hall & Weaver, 2001).

Body (Organ) Systems: There are ten body (organ) systems in the human body, including, Skeletal, Muscular, Nervous, Endocrine, Cardiovascular, Lymphatic, Respiratory, Digestive, Urinary, and Reproductive Systems. In this study, "Skeletal," "Muscular," "Cardiovascular," and "Respiratory" systems are selected among those eleven systems because of their primary role in human movement/physical activity, and these systems were in the secondary school physical education and science curriculum.

Health-Related Physical Fitness (HrF): Health-related physical fitness includes children's body composition (height-body weight ratio; body mass index), cardio-respiratory system endurance (also called aerobic or cardiovascular system endurance), muscular strength and endurance, and flexibility (ACSM, 2010)

Physical Activity: Physical activity is any movement of the skeletal muscles that results in energy expenditure (Caspersen et al., 1985). It does not need or imply any specific movement characteristics. This phrase includes all varieties, intensities, and domains (Physical Activity Guidelines Advisory Committee, 2018). It could also be classified as occupational, sporting, conditioning, or home activities, among others, in daily life (Caspersen et al., 1985).

CHAPTER II

REVIEW OF LITERATURE

The first known example of interdisciplinary study is found in Plato's "Politeia," in which the philosopher argues that different branches of knowledge are connected in light of the underlying nature of "reality." (Chrysostomou, 2004).

Dewey, in the previous century, also stated a comparable concept by claiming that compulsory education is ineffective. Dewey argued that even if you force students to show up to class, you cannot make them learn. Therefore, it is the responsibility of educators to plan lessons and activities that will boost the interest of students. Dewey believed that such outcomes would be more likely to emerge from an interdisciplinary strategy (Chrysostomou, 2004; Ellis & Fouts, 2001).

Michel Foucault, influenced by Friedrich Nietzsche, argued that the division of academic fields was more than just a tool to classify and organize information. Furthermore, it was an effective strategy for controlling behavior and social interactions (Moran, 2002).

This hope for academic and social improvement through interdisciplinary research diminished until its significance was revived in the late 1970s by pioneers in the humanities, most notably by Julie Thompson Klein and William H. Newell (Repko & Szostak, 2016). When Klein looked into the background, theory, and taxonomies of interdisciplinarity, he started to wonder what were qualified as researchable topics (Klein, 1996, 2000). With the goal of analyzing interdisciplinary methodology, curriculum, and administration, Newell established the "Association for Integrative Studies" and the journal "Issues in Integrative Studies" to provide a home for professionals working in the field of interdisciplinarity (Repko & Szostak, 2016). As a result of these efforts, social sciences and humanities began to make slow but consistent progress towards interdisciplinary research. In 1972, the OECD issued the

foundational work Interdisciplinarity, which aimed to encourage interdisciplinarity in education and organizational structures of universities based on significant cross-national research (Chettiparamb, 2007).

As early as the turn of the twentieth century, John Dewey discussed the principles that are reflective of interdisciplinary education and a student's experience, which provides a historical grounding for many modern interdisciplinary notions (Dewey, 1913). According to Dewey, a child's education is the sum of their own unique experiences and growth. Dewey pointed out that education could give students the critical thinking skills they would need to participate in a democratic society (Cone et al., 2009; Tomlinson, 1999; Dewey, 1938).

Dewey (1917/1977) suggested that educators shouldn't treat academic and social skills as separate spheres. His progressive age beliefs in valuing students' experiences and allowing for curricular innovation are reflected in his teaching style (Reese, 2011). "A child-centered approach to learning that places significant emphasis on creativity, activities, 'naturalistic' learning, real-world consequences, and, above all, experience," is how the progressive age is best described. He mentioned that educators move beyond the traditional divisions between academic quality and social ability (Dewey, 1917/1977). The progressive ideas of the time are reflected in his focus on the student's experience and curricular innovation (Reese, 2005). In education, the progressive age may be described as "a child-centered approach to learning that places significant emphasis on creativity, activities, 'naturalistic' learning, real-world results, and, above all, experience" (Ellis & Fouts, 2001, p. 23).

As the views of Dewey have been discussed in this section, it is also fundamental to mention the term, constructivism. Constructivism, according to Ellis and Fouts (2001), is a more modern learning culture linked to the expansion of the interdisciplinary framework. Based on this theory, a student's learning experience can only be truly transformative if it is also genuine. Gardner's (1983) theory of multiple intelligences seems to lend support to the concept of an interdisciplinary approach to education, which advocates breaking away from standard pedagogical methods and teaching in novel ways, such as by using methods that combine two or more disciplines in a single lesson. According to Gardner's theory of multiple intelligences, students may be smart in many different ways. These include, but are not limited to, the ability

to think visually, move their bodies, and follow a rhythm. The theory proposes that there are a variety of ways that students may think and comprehend, and that these differences in approach, together with differences in learning style and subject area background, all have an impact on how much students learn (Tomlinson, 1999). Therefore, curricular integration has the potential to have a big effect on student learning when it is combined with interesting learning experiences and takes students' different types of intelligence into account (Cone et al., 2009; Tomlinson, 1999; Dewey, 1938).

As Jacobs (1989) states, "a more meaningful, less fragmented, and interesting experience for students" may be achieved with an interdisciplinary methodology (p. 10). The concept of isolated curriculums with shared material is foreign to the human mind. Although most people's brains work in a similar fashion, human intelligence and the way that people learn are remarkably diverse; "hence, education is multi-faceted with intrinsic choices and possibilities for a learner, supporting optimal learning." (Fogarty & Pete, 2009).

The issues including an understanding of child development, learning theory, and the goal of education to cultivate successful citizens contributed to the evolution of curricular integration as we know it today (Cone et al., 2009). Integration is a great way to keep students interested and active in class and show them the connections between subjects that are usually taught separately (Wiggins, 2001; Mathison & Freeman, 1998). This promotion of discipline dates to 387 BCE, when, under Aristotle's sway, the classical division of knowledge was enacted on the basis of a hierarchy of disciplines, with philosophy at the top, the physical and natural sciences below it, and all other specializations descending in importance (Moran, 2002; as cited in Tripp & Shortlidge, 2019).

When designing a curriculum, an integrated approach draws on the foundational work of Winslow (1939) as well as the more contemporary contributions of Bloom and Gardner to look for overlaps and synergies between and within disciplines to enhance students' understanding. Cognitive, affective, and psychomotor learning were identified by educational psychologist Benjamin Bloom in the 1950s. With the help of Bloom's taxonomy, educators began stressing the value of higher-level thinking and learning. Teachers that use an integrated approach to education

provide their students with a wide range of learning opportunities and help them feel like they belong to a learning community (Burnaford et al., 2001; Cone et al., 2009).

It was the Social Science Research Council, in the early 20th century, that popularized the word "interdisciplinary" as a bureaucratic term for the encouragement of research that draws from several fields (Frank, 1988). At the same time, the general education movement became prominent. Its goal was to educate the individual as a "whole", and it put a lot of emphasis on how important it was to include people in postsecondary education (Klein, 2005).

According to Klein (2000), "the question of knowledge has been defined by disciplinarity for most of the twentieth century." She also states that "metaphors of knowledge have moved from the static logic of a foundation and structure to the dynamic qualities of a network, a web, a system, and a field" over the course of this century. As a result, researchers have started to mention that we are entering a post-disciplinary era in which the whole concept of disciplines is dissolving (Rosamond 2006; Turner 2006, p. 184).

In Turkey, all lesson curricula were updated by the Ministry of National Education in 2018. Unlike the 2013 curriculum, students are expected to construct the knowledge in their own minds. In addition, it is emphasized in 2018 curriculum that students express themselves visually, verbally, and in writing; do activities in cooperation with their peers in the school environment as much as possible; create models and products; design projects; introduce products; and look at problems from an interdisciplinary perspective (MoNE, 2018a, b, c, d, e).

Another difference in the role of the teacher in the 2018 curriculum is to take the guiding role and bring the students to the level of being able to develop products, make inventions, and think at a higher level; to gain an interdisciplinary perspective (MoNE, 2018b).

Interdisciplinary goals have been added to all topics in the new school curriculum, and instructional paradigms have been developed in which shared goals are sought through subject connection. This new curriculum's main goal is to structure the lessons in a way that promotes "internal cohesion" and "unified development of subjects."

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2.1. Interdisciplinary Learning

The rapid development of technology has led to a thriving global economy requiring its residents to have 21st-century skills. This set of competencies includes the creative, collaborative, critical, communicative, and teamwork skills that students will need to succeed in a globalized society (Christie, 2000; Song, 2011).

According to studies conducted by Caine & Caine (1994), the brain is more likely to retain information when it is used in the context of a problem or activity rather than merely memorizing isolated pieces of data. These kinds of creative solutions are fostered through an interdisciplinary curriculum (Akins & Akerson, 2002). The primary purpose of education is to provide students with the knowledge and abilities they'll need to deal with the inevitable challenges of life (Hatch & Smith, 2004). Curriculum integration is often cited as a promising strategy for such a purpose (McBee, 2000).

Integrated curricula are designed to teach students the interconnectedness of several academic fields and to give them opportunities to investigate the perspectives of these fields from a unified viewpoint (Jacobs, 1989). The connection between different fields provides the aim, rationale, and relevance of the instructional unit (McBee, 2000).

Even though "interdisciplinary teaching and outreach efforts were completely overlooked" (Creamer & Lattuca, 2005, p. 6; as cited in Lindvig & Ulriksen, 2019) and interdisciplinary education is viewed as a "black hole" (Mansilla, 2005, p. 18), a discipline in any area of study that is somewhat separate from other areas of knowledge and has its group of practitioners (Nissani, 1997).

In an effort to arrange the variety of interdisciplinary work forms into a logical framework, several authors and organizations have proposed and shown classifications that offer various terms such as "multidisciplinary," "pluridisciplinarity," and "interdisciplinarity" (Lattuca, 2003; Nissani, 1997; OECD, 1972). Keeping with standard English usage, the prefix "multi," derived from the Latin word for "many," multus, can signify "many" (as in "multimillion"), "much," "multiple," and "more than one" (as in "multiparous"). Thus, the term "multidisciplinary" describes a set of practices that draw from several different academic fields (Alvargonzález, 2011). The

term, "multidisciplinary" refers to the use of information from several fields of study without crossing over into any of them (Choi & Pak, 2007).

The prefix "inter" comes from the Latin word for "among," as in the term "international," or "together," as in the word "interchange," which means "mutually" or "reciprocally." (Alvargonzález, 2011). Thus, interdisciplinarity is defined as a practice that occurs within or between established academic fields (Alvargonzález, 2011). With the use of interdisciplinarity, we may examine, synthesize, and reconcile the connections among various fields of study (Choi & Pak, 2007).

The Latin prefix "trans" can be translated as "across," "beyond," "transcending," "through," and "change," among other meanings. Taking these definitions into account, we may say that transdisciplinary is the study of what is beyond, between, and across academic fields (Alvargonzález, 2011). Similarly, Choi and Pak (2007) state that transdisciplinary goes beyond the usual limits of the scientific, social, and health sciences by putting them together in a humanity setting.

Considering the classification of interdisciplinarity, OECD's categorization is the most popular of its kind (1972, pp. 25-26). There are four distinct types of interdisciplinary studies discussed here. These include:

1. Multidisciplinarity is the conjunction of several fields of study, often with no apparent relationship. For instance, music + mathematics + history (OECD, 1972). Each field provides a piece of the jigsaw for multidisciplinary research projects. However, neither the study procedure nor the final results include this consideration. The outcome is a parallel view of a particular subject from many disciplinary viewpoints (Menken et al., 2016).

2. Pluridisciplinary refers to the juxtaposition of many disciplines, which are presumed to be approximately connected. E.g., mathematics + physical education.

3. Interdisciplinary is a term that describes the interaction between two or more disciplines. This interaction can vary from the simple exchange of ideas to the reciprocal integration of organizational concepts, techniques, processes, epistemologies, terminologies, and data, resulting in structuring research and teaching in a relatively wide field. An interdisciplinary group is comprised of individuals trained in diverse fields of study (disciplines) with distinct concepts, vocabulary,

methodologies, and data. The individuals in an interdisciplinary group work on a single topic with constant communication.

4. Transdisciplinary refers to creating a shared set of principles across different fields of study (OECD, 1972). Transdisciplinary research (Menken et al., 2016) uses the ideas of people outside of academia and science to come up with ground-breaking new ways of doing things.

Interdisciplinarity, in contrast to multidisciplinarity, is integrative: it contrasts and modifies the knowledge of other disciplines (Klein, 1996). Interdisciplinarity can be best understood as the combination of unique elements from two or more disciplines, and in academic discourse, it often pertains to four domains: knowledge, research, education, and theory (Nissani, 1997). Interdisciplinarity can help solve today's complicated problems because it is thought that a cross-disciplinary approach helps people gain a complete understanding of things (Newell, 2007).

2.1.1. Research

The ultimate goal of an interdisciplinary study is to learn about whatever slice of reality is represented by the complex system under study. It is generally agreed upon in the natural and social sciences that each field studies a unique collection of interconnected factors (Newell, 2001). These factors are readily identifiable as system components. If any discipline has any coherence, then the variables on which it concentrates should be more intimately and linearly connected to one another than to the factors examined by other disciplines (Newell, 2001). There is a reason that complexity is often paired with interdisciplinary work. The existence of complex systems and phenomena is a precondition for interdisciplinary research. The object of research must have several dimensions, yet all these dimensions must fit together for the interdisciplinary method to make sense. If the issue is not complex, a narrow focus will be sufficient for research. If it has many parts but no overall structure, a multidisciplinary approach is essential (Newell, 2001).

Designing an interdisciplinary research can be carried out in several ways. Interdisciplinary research can be characterized as a team or an individual expert (scientist or otherwise) that integrates methodologies, knowledge and skills, theories, views, and diverse disciplinary knowledge bodies to develop novel solutions and

increase understanding in unexplored problem areas (Lam et al., 2012; Menken et al., 2016).

2.1.2. Education

When we look at interdisciplinary education, Nikitina (2006) advocates for three approaches: contextualizing, conceptualizing, and problem-centered. "Contextualizing," as the first strategy, "is a means of embedding any item in the fabric of time, culture, and human experience." The second approach, "conceptualizing," includes "finding basic ideas that are important to two or more disciplines (for example, "change," "linearity," etc.) and developing a rigorous, measurable relationship among them." The third approach, problem-centering, "involves enlisting the knowledge and modes of thinking in many disciplines (i.e., biology, chemistry, political science, and economics) to examine complex real-life problems" (such as water pollution, genetic engineering, or AIDS in Africa) that require a variety of fields of study to solve.

Learning goals with IdT are expected to involve three facets: (1) acquiring interconnected and scientific information; (2) learning how to behave; and (3) learning to transfer knowledge to new contexts (Spintzyk et al., 2016). Thus, the goal of this method is to give students the basic skills they need to be able to use what they learn in the classroom in the real world (Berck & Graf, 2003; as cited in Spintzyk et al., 2016).

Interdisciplinary learning has been associated with complex concepts of knowledge, learning, and inquiry, as well as increased motivation and involvement among students (Magolda, & King, 2004). Some of the processes in interdisciplinary learning include evidence-based reasoning, sophisticated causal thinking, temporal and spatial representations, and critical argumentation. These processes have been extensively examined in research.

The purpose of interdisciplinary learning is to improve students' understanding of several disciplines by bringing them together in a single educational experience (Cone et al., 1998). "Integrative learning" is the more inclusive term. It is an umbrella phrase for structures, tactics, and activities that span several divisions, such as high school and college, general education and the major, introductory, and advanced

levels, classroom and extracurricular experiences, theory and practice, and disciplines and areas. Integrative learning is a subset of "multidisciplinary" studies that develops links across disciplines and interdisciplinary domains (Klein, 2005).

Multiple topic areas provide content that supports interdisciplinary learning. Integrated skills and knowledge comprise the specialized material supplied in numerous subjects. Skills are the talents or techniques that a learner acquires and employs to perform an action or illustrate a notion or idea, like throwing, measuring, and sketching. In addition, by "knowledge," we understand the ideas, principles, theories, and beliefs that are foundational to any field of study. There is no single paradigm that can capture the variety of possibilities for conveying interdisciplinary learning (Cone et al., 1998).

Particularly prominent in middle schools, interdisciplinary teaching organizations evolved as an important part of the middle school movement that began in the 1960s (Clark & Clark, 1994). Academic instructors of core subjects (e.g., language arts, social studies, math, science, and reading) are the most common form of interdisciplinary teams and are responsible for providing the needed academic teaching to a small number of students (often 100 or more). Teachers of topics not included in these teams (electives, explanations, physical education, etc.) may choose to work together or create their own group (Crow & Pounder, 2000). A common position for school administrators is that of consultant or advisor to every group (Crow & Pounder, 2000).

It's important to put one's own stamp on interdisciplinary planning. Lesson plans might include the teacher's personal experiences, life events, travels, and cultural activities, as well as media such as magazine and newspaper articles, radio shows, and television shows (Heck, 1980). Because the world beyond the classroom walls may be a valuable resource for students' education, it is important to move outside the classrooms (Spodek, 1972; as cited in Heck, 1980).

2.1.3. Theory

Interdisciplinarity is advantageous to students or project teams due to the integration of knowledge, understanding, methodology, and viewpoints obtained from many disciplines by the teaching or research team (Chynoweth, 2006; Klein & Newell,

1997). Therefore, it differs from "multidisciplinarity" which is a concept that often does not depict disciplines as interacting parallels but rather as separate bodies of knowledge and methods (Chynoweth, 2006; Klein & Newell, 1997). Interdisciplinarity is different from the "disciplinary model," which divides academic research into separate islands of soft, hard, applied, and pure cognitive subjects (Chynoweth, 2006).

It should also be noted that the recent rise in awareness of interdisciplinary research has resulted in many people wondering if there is any connection between integrative learning and interdisciplinary approaches (Augsburg & Madison, 2013).

OECD (1972) categorizes its empirical data on three criteria related to the interdisciplinary teachings' aims involved. As a starting point, we can investigate the "intersections and boundaries" of various academic fields (p. 52). The second aim includes adjusting educational institutions to meet the political and economic demands of a nation. The third option is to add real-world experience to the classroom by working on projects outside of schools. OECD (1972) asserts, however, that actual working conditions and events have a greater impact on what type of research or teaching program is set up than do a priori goals, no matter how well specified they may be (p. 43).

2.2. Advantages of Interdisciplinary Learning

What students learn is enriched and augmented by interdisciplinary activities (Cone et al., 1998). According to Wasley (1994), teachers may make their lessons more applicable by incorporating real-world examples and contexts into their lessons, thus going beyond the borders of traditional subject areas. Also, an interdisciplinary method is reflective of real life, in which we are frequently required to use knowledge from different fields (Cone et al., 1998).

Piaget (1969) argued that in order for children to make the transition from theoretical notions to real-world applications, they need to engage in concrete, practical, and active learning experiences. Children gain knowledge of the world through their play and exploration. Movement is a natural and effective approach to conveying thoughts and demonstrating knowledge. The more varied a child's

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movement experiences are, the more likely he or she is to become skilled at utilizing movement as a way of communication and learning (Fraser, 1991).

Gardner (1983) says that each person's preferred method of learning is influenced by the intelligence(s) in which they succeed. When multiple intelligences are used in the classroom, the lesson automatically becomes a study of the subject from different points of view.

Interdisciplinary approaches to education allow students to learn according to their individual strengths by combining the visual, auditory, and kinesthetic modes of learning (Cone et al., 1998). Because of this, as a component of an interdisciplinary curriculum, physical education provides students with the foundational kinesthetic learning opportunities. As a result, it will strengthen students' capacity to learn not only movement but also other subjects via movement (Cone et al., 1998). It promotes analytical thinking, originality in the classroom, and a new way of looking at education among educators and students alike (Duerr, 2008).

An interdisciplinary cooperation teaching model improves students' theoretical and practical understanding (Crow & Pounder, 2000). More specifically, primary roles of an interdisciplinary instructional group are as follows: (a) creating and implementing an interdisciplinary curriculum and teaching strategies based on the child's developmental needs; (b) creating organized interventions and management techniques to address student achievement and/or behavioral problems; and (c) communicating with parents in a unified fashion (Rawon, 1990; as cited in Crow & Pounder, 2000).

When properly executed, interdisciplinary education helps students increase their learning. It also gives teachers more agencies and results in a more expertly managed school environment (Petroelje Stolle & Frambaugh-Kritzer, 2014). However, because an interdisciplinary approach takes more time and resources than a more traditional one, the school must be willing to allocate funds for it (Ackerman, 1989).

According to researchers, students who read below grade level (Gaskins et al., 1994), students who are gifted (Vars & Rakow, 1993), and students who are average benefit from an interdisciplinary approach. Moreover, higher-order cognitive abilities like problem-solving, critical thinking, and the capacity to apply diverse perspectives

are developed through interdisciplinary study, making students better prepared for jobs and citizenship (Newell, 1990; Hursh et al., 1983; Newell & Green, 1982).

2.2.1. Advantages for Teachers

Interdisciplinary unit design allows instructors to go beyond their subject areas and develop a more applicable curriculum to their school students (Petroelje Stolle & Frambaugh-Kritzer, 2014). Interdisciplinary units provide a richer and more critical curriculum based on a better understanding of core concepts, allowing instructors to transform their own mindsets from viewing information as an end result to viewing it as a means to an end.

Interdisciplinary teams consist of teachers from a number of topic areas that collaborate to plan, instruct, and assess students using a range of content, instructional methodologies, and learning tools (Clark & Clark, 1994; Hamm et al., 2021). Interdisciplinary teams provide teachers with the opportunity to work on common educational units, enabling students to draw connections across many academic fields (Harrison & Bishop, 2021). Teamwork is good for teachers in many ways, for instance helping them grow personally and professionally, giving them social support, and making them happier at work (Fairman & Mackenzie, 2014; Shah, 2012).

When secondary teachers are responsible for constructing interdisciplinary units, teacher isolation is reduced, and a professional atmosphere is developed in which colleagues share decision-making authority and collaborate in novel ways (Erb, 1995; as cited in Petroelje Stolle & Frambaugh-Kritzer, 2014). According to research comparing teachers in different types of work arrangements, teachers who work in teams show higher levels of intrinsic motivation, growth satisfaction, job satisfaction, sense of competence, and professional dedication than their non-teaming colleagues (Crow & Pounder, 2000). Teachers can benefit from one another's knowledge of their instructional goals, curriculum, pedagogical competence, student motivation, and styles of learning through collaboration. Because of this, educators are inspired to identify the logical relationship between subjects and design integrated lessons that are more than just loosely related. (Jacobs, 1989)

Teaching and learning results benefit from teachers working in teams to better coordinate and integrate the curriculum (Mertens & Flowers, 2003). It promotes

educators' giving students knowledge that is both meaningful and relevant, as well as learning experiences and situations that are both authentic and consistent (Chen et al., 2007). Chen et al. (2007) mention that interdisciplinary education gives teachers a chance to work together and ties together different subjects.

Collaboration among teachers in the form of teams or groups has been shown to improve both productivity and student learning because it encourages individuals to take ownership of their work and the outcomes of the group (Crow & Pounder, 2000). Therefore, teachers may have to take more responsibility for and control over how and what their students learn (Pounder, 1999). This strategy may be especially helpful in high schools, where teachers' workload and students' educational backgrounds are often separated. It is because teachers and students don't understand or take responsibility for students' overall learning (Crow & Pounder, 2000).

2.2.2. Advantages for Students

The multidisciplinary method has several advantages that help students build the necessary lifelong learning abilities they'll use in their future studies. The interdisciplinary method is a team-taught improvement in student performance, a combination of methodology and pedagogy, and a necessary capability for lifetime learning (Jones, 2010). Interdisciplinary lessons can be a great way to achieve these goals for students who want to take what they learn and apply it to their lives (Duerr, 2008).

Knowledge gained in the classroom can be applied to real-world situations, which can strengthen students' interest in learning (Chen et al., 2007). students can also get a better grasp of abstract ideas by practicing higher-level cognitive skills like making inferences, putting things into groups, and solving problems (Chen et al., 2007).

Students who engage in interdisciplinary learning are better equipped to assess problems from a variety of angles, frame them in a global context, identify with and advocate for the interests of a wide range of stakeholders, and deal effectively with ambiguity and complexity (DeZure, 2010; as cited in Willermet et al., 2013) Interdisciplinary learning will improve students' cognitive abilities such as flexible

thinking (Ackerman, 1989), higher-order thinking (Ackerman & Perkins, 1989), and critical thinking (Field et al., 1994).

Moreover, according to the research of Newmann and Associates (1996), the study defined authentic achievement as comprising four components that support enhanced student performance: higher-order thinking (HOT), in-depth knowledge, relevant dialogue, and linkages beyond the school.

Interdisciplinary education presents students with new ways of looking at familiar topics, stimulates debate and discussion, exposes them to the complexities of real-world problems, and challenges them intellectually (Willermet et al., 2013). Students who have education with an interdisciplinary approach, which supports the development of higher-level thinking abilities and an integrated pedagogy, are highly sought after by prestigious universities and corporations (Jones, 2010).

According to Piaget's theory of cognitive development (1952), students learn best when they are given several opportunities to draw connections between different areas of knowledge. Incorporating concepts from other disciplines into lessons encourages student engagement and helps educators break down barriers between subject areas. As a result, they may "learn how to learn" and build abilities that will serve them well throughout their lives (Manning & Bucher, 2005, as cited in Duerr, 2008). Interdisciplinary learning also makes people more motivated because it arouses their attention (Lattuca et al., 2004). Having high motivation will also help them learn better.

Interdisciplinary courses create a more diverse pool of knowledge from which to draw, a wider range of design, teaching, and assessment methods, and a larger pool of potential classmates from which to find a good match. Moreover, they also create an environment more conducive to risk and experimentation, which tends to foster student engagement (Klein, 1996). It gives students the ability to synthesize information by investigating subjects and concepts from numerous viewpoints (Moser et al., 2019).

According to Newell (1994), students who take interdisciplinary classes are better able to evaluate expert evidence, deal with confusion, recognize and avoid bias towards other groups and ideologies, think creatively, and are more receptive to new ideas. With the help of these classes, students can reach a certain level of cognitive

maturity and they can make connections between subject areas and grasp main themes. Because of the way they've developed emotionally and socially, they're able to empathize with others and see things from other perspectives (Duerr, 2008).

Even though there are numerous positives to interdisciplinary learning, including increased student knowledge and accomplishment across all subject areas and improved communication skills, there are also some challenges, such as integration confusion and time-consuming curriculum planning (Jones, 2009).

2.3. The Process of Interdisciplinary Teaching Models

Educators and students who have participated in an interdisciplinary course were the subjects of several publications that detailed their takeaways from the experience. Organization (Epstein, 2004; Malik & Malik, 2011), clear and consistent communication (McLaughlin & Talbert, 2006; Malik & Malik, 2011), assessment (Jorn et al., 2009), continuing professional development (McLaughlin & Talbert, 2006; Malik & Malik, 2011), and reflective thinking (McLaughlin & Talbert, 2006; Malik & Malik, 2011) are the five big ideas that best show the components of interdisciplinary teaching process.

For an interdisciplinary unit to be successful, it is crucial that all classrooms working together have a common understanding of the goals and activities of the other classrooms involved (Duerr, 2008). Nielsen (1989) said that it would be helpful to help young students integrate their knowledge and make clear connections across themes, topics, and subject areas by using a conceptually oriented approach to creating and implementing curriculum.

Over the past decade, professionals in the field of curriculum development have been able to identify a number of different models that use an integrated approach (Cone et al., 1998). Teachers could adopt a specific model (Cone et al., 1998) to organize their thoughts about the possible depth of interdisciplinary engagement in a lesson or unit. This would help them figure out how much interdisciplinary engagement there could be.

An even more complex model, with ten different repetitions throughout a continuum, was offered by Fogarty (1991). Different repetitions start with a dive into certain fields of study (fragmented, connected, and layered models) and progress to

more comprehensive frameworks that span multiple disciplines (sequenced, shared, webbed, threaded, and integrated models). Models that work within individual learners (the "immersed model") and amongst networks of learners mark the conclusion of the spectrum (the "networked model"). Fogarty thought that these models would be a good starting point for teachers when making courses that encourage students to make connections between different ideas.

Each of Fogarty's frameworks is useful. However, as there are so many options, it might be difficult to know where to start (Cone et al., 1998). Cone et al. (1998) have tried out many different methods of interdisciplinary instruction and settled on three models that fall on a spectrum from basic to advanced (Figure 1).
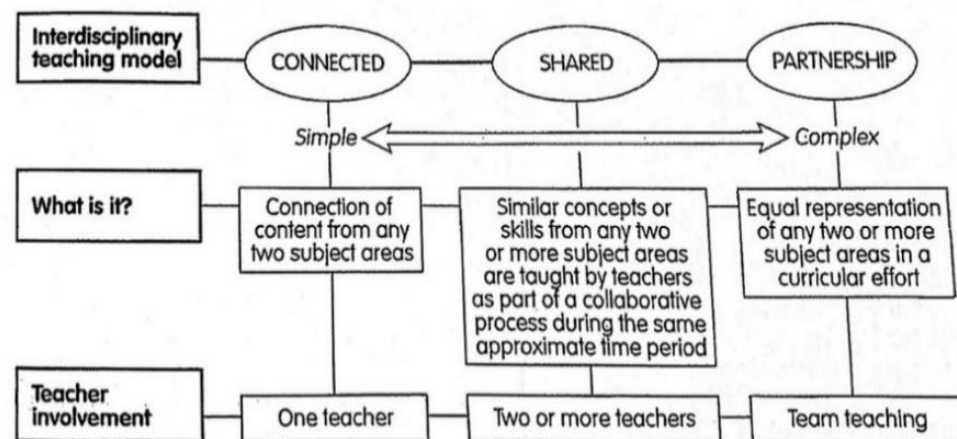
Figure 2. 1 A comparison of three selected interdisciplinary teaching models*
Adapted from Cone et al. (1998).

The *connected model* takes a simple approach, using material from one field to enhance instruction in another (Cone et al., 1998). Skills, subjects, and concepts from the physical education curriculum are at the core of the learning experience in the connected model. Such an approach includes information from another subject area used to enrich, broaden, or supplement the experience. Because of its familiarity, this approach is often adopted by educators. who like the freedom it provides in terms of lesson preparation, class scheduling, and topic selection. This model may be utilized as follows:

- When teaching a new skill, topic, or idea, a teacher can use information from another subject to help explain or show the new skill, topic, or idea.
- A teacher can use the connected model to get a student interested in a class and show how the information being taught is important.
- Using a skill from another subject area, the connected model may enrich a lesson.

Lessons from physical education can be used to add to or build on skills, themes, and ideas taught in other classes.

With the *shared model*, instructors from different disciplines work together to teach a unit that stresses the integration of knowledge and skills learned in both disciplines. The model necessitates that all educators agree on the knowledge, skill, or idea to be taught, as well as the schedule for doing so. Presentations in both classes may occur at the same time, or one topic may need to be presented a little bit earlier than the other depending on the calendar. The shared model assists students in comprehending how abilities, subjects, and concepts may be applicable across disciplines. Observing teachers presenting similar concepts in other classes on a parallel timeline reinforces the students' learning in a meaningful way (Cone et al., 1998). This model may be utilized as follows:

- to facilitate the initial stages of teacher collaboration. The teachers review the curriculum they want to implement throughout the year and identify common skills, subjects, and concepts. Once the topic has been determined, the teaching sequence is aligned to provide the unit's common lesson simultaneously.
- different teachers may select a broad topic for a grade level or schoolwide project. Teachers in all disciplines can teach various facets of the concept. A topic, however, may not be of similar significance in every field.
- to choose a talent, topic, or notion from one subject area to incorporate into the other subject area.

On the other hand, the more ambitious *partnership approach* offers a method for combining information from several disciplines (Cone et al., 1998). Learning occurs concurrently across all disciplines thanks to the integration of skills, content, and concepts from several disciplines. Teaching is cooperative and is frequently carried out using a paradigm based on team instruction. Teachers co-teach in the same

classroom at the same time, cooperating to present agreed-upon content throughout the curriculum. This model may be utilized as follows:

- to show how important it is to learn about connections between topics that would otherwise be taught separately.
- to offer teachers the possibility to reorganize or refocus lesson plans in order to give students a new perspective on the material.
- to make it easier for everything to come together at one event. All school community members, including teachers, students, and support staff, participate fully in events of this nature.

To conclude, according to Cone et al. (1998), these models will guide teachers as they define their goals for interdisciplinary instruction. These frameworks are intended as guidelines for meaningful integration rather than exhaustive models applicable to every possible multidisciplinary educational setting.

2.4. Collaboration in Interdisciplinary Teaching

It's crucial to involve school administrators, parents, students, and colleagues in the early phases of planning and to keep them informed as the process evolves, since their support may make the growth and success of an interdisciplinary curriculum possible (Cone et al., 1998).

2.4.1. School Administrators

Getting the administrator's support for interdisciplinarity in the classroom is crucial for success (Robbins & Searby, 2012). When attempting to involve more students and educators in the interdisciplinary program or keep it going for longer periods of time, the administrator may be a helpful collaborator. Administrator are great resources if teachers need to adjust the schedule, arrange for group planning time, or get funding for supplies and tools. Therefore, involving the administration in the process of curriculum development is suggested. Administrators are not required to participate in team meetings but should get updates on planning progress. Their suggestions for additional help or redirected funds can improve the project's progress (Cone et al., 1998).

Studies consistently find that school administrators are accountable for around a quarter of the entire impact on student achievement (Leithwood et al., 2004). Counselors, special education instructors, and even administrators from the middle school might contribute to solve students' problems by consulting with the fundamental interdisciplinary teams (Robbins & Searby, 2012).

2.4.2. Colleagues

Once a group of colleagues have finished working together on a project, they try to find ways to keep working together in the future. There are some strategies for developing teamwork between colleagues as follows: a) Start quick conversations regarding the subjects students are learning; b) Share details about your current course load with your colleagues; c) Invite your colleagues to take part in your class; d) Establish a weekly or monthly regular meeting with colleagues to sustain interest and continue sharing ideas informally; f) Just drop them a note to let them know what you've been up to (Cone et al., 1998).

2.4.3. Students

The success of any interdisciplinary learning opportunity is based on the engagement of students in the activities. Choosing and designing engaging and relevant lessons is absolutely important, but teachers may have to clarify to students the rationale behind combining one or more disciplines and the advantages that will arise from the lesson. Teachers can help them move skills and knowledge from one topic to another by planning activities that give them a reason to ask questions, push them, and give them a chance to succeed (Cone et al., 1998).

2.4.4. Parents

Parents can play a big role in making sure that interdisciplinary learning experiences go well. Many parents may not know the meaning of "integrate subjects," so they will appreciate hearing about the goals and activities so they can support teachers' efforts at home (Cone et al., 1998). Hoover-Dempsey and Sandler's (2005) model of parental engagement places special emphasis on the factors that influence parental decisions to get active (Hoover-Dempsey, 2005).

Middle school interdisciplinary teams are capable of supporting parents in each of the three areas indicated by Hoover-Dempsey and Sandler (1995). By clearly outlining parental duties and assisting parents in achieving higher levels of effectiveness, middle school teams may introduce parental confidence in their capacity to help their middle school child. The second element, parents' views of invitations from others, is an additional variable that middle school teams can increase parental involvement. The final element is parental judgments of time, energy, skills, and knowledge, which comprise parental perceptions of life context (Robbins & Searby, 2012)

Team-teaching, in which educators from different fields work together to create a curriculum, deliver lessons, and evaluate student progress over the course of several months to many years, is frequently cited as a study of interdisciplinary learning (Jones, 2009). Even though many experts in the field of interdisciplinary studies disagree on whether or not the method of "team-teaching" is the most effective way to help students learn (Jones, 2009), teachers working together across disciplines in middle schools have access to a rich "table of opportunities" (Rottier, 2000, p. 214). These can be used to create meaningful learning experiences for students and their families through a wide range of approaches to curriculum planning, teaching strategies, and professional growth opportunities (Robbins & Searby, 2012).

One of the key functions of middle school multidisciplinary teams is to contact and include parents in curriculum creation and implementation based on the youth's developmental requirements (Conley et al., 2004). Effective middle school interdisciplinary teams involve parents as educational partners, and techniques to achieve this objective should be systematically applied (Carnegie Council, 1989; as cited in Robbins & Searby, 2012).

2.5. Interdisciplinary Teaching in Physical Education

Movement experiences provide numerous advantages for children. For instance, they work out the entire body, including the mind as well as the muscles; this can help children establish a lifelong passion for health, fitness, and academic success in all subject areas (Hatch & Smith, 2004; Placek & Patton, 2002).

Physical education is a powerful tool for helping people adapt to environmental impacts, and this adaptation may be linked to a wide range of biological, psychological, social, physiological, and other aspects (Rodić, 2014). Exercise is not merely a matter of biology; it is also a mental and conscious act and a deliberate action, which suggests following the same rules that govern human psychological activity.

Physical education is an ideal subject for inter-disciplinary study (Solomon & Murata, 2008). It primarily focuses on acquiring movement concepts and skills, although content from another topic may be used to supplement, expand, or enhance that learning (Cone et al., 1998). However, physical education class could be a key part of interdisciplinary teaching because students can try new things and use their imaginations in physical education classes. For instance, students can learn things like physics, math, history, and art through movement (Kalyn, 2005; as cited in Papaioannou et al., 2020).

As examples of interdisciplinary learning in physical education (Mohnsen, 2011; Patterson, 2004), thematic connections and real-world applications of sports history, measuring elapsed time or specific tolerance, keeping track of and charting heart rates, and effective communication and teamwork among team members may be helpful to students.

Students can learn critical thinking skills through physical education if they have a positive experience of their own progress and growth. In addition, students can start to see critical thinking links not only in physical education but throughout the curriculum (Marlett & Gordon, 2005). For integrative processes in science, which are represented in the scientific and technological advancement of society and include the teamwork of diverse professionals, it is crucial to take an interdisciplinary approach to education (Rodić, 2014).

The importance of physical education has been more readily acknowledged when it is seen as a means to impart fundamental abilities in other subject areas in interdisciplinary teaching (Christie, 2000; Rikard, 2008). Cone & Cone (1998) propose a multi-faceted integrated teaching method that calls for the cooperation of the ordinary classroom teacher, the music teacher, and the physical education teacher to support theme-based student learning that integrates democratic principles, music, and physical education (dance).

As Dewey (1933) argued, education should be viewed as a whole. For Dewey, education is more meaningful when it was grounded in the actual world. When students see how what they've studied in PE relates to what they've learned in other classes and to real-world scenarios, their interest in learning increases (Cone et al., 1998; Mavropoulos et al., 2004).

Moreover, educators can facilitate student learning more efficiently when they structure courses around integrative themes, concepts, and skills. This way of teaching is different from a subject-based approach because it stresses the importance of finding connections between different fields (Konukman & Marx, 2009).

Interdisciplinary approaches in physical education can be helpful because they let students use their interests and previous knowledge. This may encourage students who have lack of interest in physical activity to get more involved (Konukman & Marx, 2009).

Advocates see physical activity as a powerful tool for introducing kids to abstract principles taught in other disciplines in circumstances that are integrative, concrete, and authentic. The fundamental goals of physical education, such as developing an understanding of movement, mastering motor skills, and increasing health-related fitness, would be complemented and enriched by interdisciplinary instruction (Chen et al., 2007). Benefits of interdisciplinary teaching in physical education include (a) recognizing physical education as a vital element of the school curriculum and reducing its marginalization, (b) bringing physical education and teacher educators together to develop meaningful links between concepts and abilities in each discipline, and (c) inspiring learning outcomes in physical education as they maintain relationships between physical education and other school subjects (Cone et al., 1998).

2.6. Professional Learning Communities

Professional Learning Communities (PLCs) are based on the theories of social constructivism and situated learning (Zahedi et al., 2021). The area of proximal development is crucial to social constructivism because it describes the gap between the results of an individual's learning when working alone and when working with more skilled individuals (Vygotsky et al., 1978). Teachers, according to this theory,

will work more effectively when they are able to collaborate and assist one another rather than work alone (Gee, 2008).

The situated learning theory also supports social constructivism in such a way that people acquire expertise in their fields through conversations with colleagues and reflections on their experiences in the field (Cobb & Bowers, 1999). In addition, the emergence, rebuilding, and transmission of such knowledge are rooted in these communities of practice and further fostered by collaborative social relationships (Lave & Wenger, 1991). PLCs encourage educators to create and refine this kind of context-specific knowledge through dialogue, introspection, and joint problem solving (Zhang & Sun, 2019).

The concept of PLC is built on a business sector principle regarding the organizational capacity to learn. Adapted to the field of education, the model of a learning organization was transformed into that of a learning community (LCs) that aimed to foster collaborative work cultures among instructors (Thompson et al., 2004). PLCs use a learning organization theory that is common in business and apply it to the educational setting (Parker et al., 2021).

This professional community has been described in a variety of ways (Lomos et al., 2011). The descriptions include "norms of collegiality" (Little, 1982), "professional community" (Louis et al., 1996), "learning community" (McLaughlin & Talbert, 2001; as cited in Lomos et al., 2011), and "professional learning community."

The term "community" has been overused in recent years (Patton et al., 2005), and PLC, as an umbrella term, has also become largely disregarded (Armour et al., 2015; Watson, 2012). PLC and communities of practice (CoP) are the primary theoretical constructions used to characterize learning communities (Ruona & Blankenship, 2007; Vangrieken et al., 2017). Consequently, understanding what they are and how they work is essential.

PLCs, communities of learners, school communities, teacher communities, and CoP are all names for learning communities that appear in the education literature (Parker et al., 2021). Even though learning communities can take on variety of forms, they all commitment to education, cooperation, and self-reflection (Kosanovich & Foorman, 2016).

CoP is a community of practitioners who share an interest in learning and improving their profession, as espoused by situated learning theory. People need to be invested in a common goal and willing to share their expertise to achieve success (Wenger, 1998). According to situated learning theory, learning interpretation is founded on social practice and promotes sociocultural differences via the everyday interactions of individuals who share the same experience (Lave & Wenger, 1991). So, learners are part of communities that share the same activity, knowledge, and the building of a shared repertoire of sources (Lave & Wenger, 1991; Wenger, 1998).

Both theoretical and practical, that supports the use of communities of practice to facilitate learning in educational and informal settings (Barab et al., 2002). CoPs are recommended to support teacher professional development (Tannehill et al., 2020; Patton, Parker et al., 2015; Goodyear & Casey, 2015).

According to Supovitz (2002), there are three essential elements to create a flourishing CoP in a classroom context. "First, the CoP must mutually engage on the task at hand. Second, they communally negotiate the contours and focus of their joint enterprise. And third, they develop a set of shared repertoires to effectively address their work (Supovitz, 2002).

Teachers who participate in LCs have more confidence in their pedagogical practices and an enhanced capacity to identify and meet their students' individual educational needs. In addition, teachers have incorporated educational policy and subject-area expertise into their lessons and pedagogy through the use of learning theories and cutting-edge technological tools (Vescio et al., 2008).

PLCs are a method of enhancing teachers' expertise and knowledge through a collaborative effort in small groups united by common interests (Kosanovich & Foorman, 2016). PLCs enable educators to collaborate and share effective methods with each other (Schaap & de Bruijn, 2017). In addition, teachers are encouraged to reflect on their own practices; their students' views about education are strengthened; and a sense of shared mission and accountability is fostered (Tam, 2015; Zhang & Sun, 2019).

Stoll et al. (2006) define a PLC as "a group of people who share and question their practice in an ongoing, reflective, collaborative, inclusive, learning-oriented,

growth-promoting way." The main goal of PLC is "to improve teachers' effectiveness as professionals for the benefit of their students."

It is clear that the term "professional learning community" comes from the idea of a "learning organization", even though the term "professional learning community" seems to have come from teachers and people who support schools (Stoll et al., 2006).

The PLC idea rests on two more principles (Parker et al., 2021). The first presumption is that we gain information through our everyday activities. Second, in order to have better education of both themselves and their students, teachers must engage in critical reflection on such information (Vescio et al., 2008).

A PLC is defined by the following five basic features: (a) a supportive group with shared leadership, (b) where individuals share values, vision, and objectives; (c) there is collective learning and application; (d) there is shared individual practice; and (e) there are both physical and human supporting circumstances (Vangrieken et al., 2017).

The literature stresses the importance of student learning as the PLC's ultimate goal (Bolam et al., 2005). As noted by Vescio et al. (2008), reflective discourse and a "clear and constant focus on student learning" are two factors that contribute to "extensive and continual conversations among instructors concerning curriculum, instruction, and student growth"

When the literature on PLC is examined, the professional learning community has been shown to have a positive effect on both changes in teachers' practices (Schneider & Kipp, 2015; Tam, 2014; Murphy, 2015; Chou, 2011; Huggins et al., 2011) and improved students' achievements (Chou, 2011; Huggins et al., 2011; Saunders et al., 2009; Williams, 2013).

Teachers, administrators, and other members of the community must work together to make decisions. Such a decision-making process will have a positive impact on student and teacher learning in the areas of school reform, professional development, and accountability (DuFour, 2004a; Mullen & Hutinger, 2008; R. B. DuFour et al., 2008).

Teacher-learning communities use collaborative problem solving, data-driven decision making, and continuous improvement to boost student learning (Vescio et al., 2008). Many participants in PLCs have a common interest in raising academic

outcomes for their students through enhanced pedagogical skills. Since they all have this common interest, their training and education may flow together naturally and in conjunction (Vescio et al., 2008).

Recent studies have shown that PLCs improve teaching. PLCs contribute to teaching by fostering greater pedagogical and disciplinary content knowledge among educators and a shift in emphasis from teacher relations and job satisfaction to student learning (Dogan et al., 2015). Researchers in this field discovered that classroom teachers who shared responsibility for their students' academic growth were more likely to actually see that responsibility carried out (Louis et al., 1996).

Particular focus is given to PLCs as promising strategies for enhancing teachers' professional development and, consequently, students' academic achievements (Owen, 2014). Pounder's (1999) research showed that teachers who worked in teams had much higher levels of student understanding, general satisfaction, professional dedication, and teacher efficacy.

Some research has validated some features of PLCs, including supportive leadership, an emphasis on teaching and learning, and database-based debates (Zahedi et al., 2021). Leadership has a substantial impact on the collaborative nature and efficacy of PLC implementation and, hence, on its impact on student learning (Burns et al., 2017; Zhang & Sun, 2019). Successful PLCs also exhibit an emphasis on teaching and student learning (Dogan & Adams 2018; Mu et al. 2018) via collaborative research of curriculum, lesson design, and judgments about classroom practice (Ronfeldt et al. 2015). Last but not least, productive PLCs are characterized by collaborative analysis of student learning data to guide discussions and lessons (Burns et al. 2017).

It is also useful to mention five essential traits of an efficient PLC offered by Bolam (2005). These are

- shared values and vision.
- collective responsibility for students' learning.
- reflective professional inquiry.
- collaboration was focused on learning.
- individual and group professional learning is encouraged.

2.6.1. Establishing Professional Learning Communities

When it comes to establishing professional learning communities (PLCs), there are no inflexible rules. Teachers from a single grade level or across grade levels can participate in a PLC. In middle schools, where division of labor is frequent, PLCs can be organized by topic area. PLCs might include educators from throughout a school district. (Kosanovich & Foorman, 2016).

The term "professional learning communities" was created to describe a new type of learning organization in the field of education by Dufour and Eaker (1998). Teachers who teach the same or similar courses or have students in the same grade level can form a learning community (Armstrong, 2010). For an effective PLC, its participants need to hold frequent, scheduled meetings (Battersby & Verdi, 2014). The notion of a PLC has gained significant attention in the educational world since Hord's foundational research in 1997 (Zhang & Pang, 2015). A decade and a half of study into school revitalization and reform inform Shirley Hord's (2004) model of professional learning communities.

Various studies on the characteristics of effective PLC have revealed opinions on the issue (Burns et al. 2018, DuFour, 2004; Hord, 1997). There are generally between five and eight qualities used in PLC models to characterize the interaction between different members (Burns et al., 2018). DuFour and Eaker (1998) identified seven characteristics of an effective PLC: cooperatively working toward common goals; collaborating on student learning; adapting best practices for student achievement and school practices; showing a cycle of inquiry; promoting continual improvement through system processes; and concentrating on outcomes (as cited in Burns et al., 2018).

Similarly, Hord's (1997) model for PLCs identifies five characteristics: (1) mutually supportive and shared leadership; (2) collective innovation; (3) mutually held ideals and goals; (4) mutually supportive environments; and (5) mutually shared personal practice. DuFour (2004) presents a new model of PLCs that identifies six characteristics all successful PLCs have in common. (1) a commitment to learning; (2) a culture of collaboration that emphasizes trust and respect; (3) group investigation of best practices; (4) a focus on acting; (5) a dedication to continual development; and (6) a concentration on achieving desired outcomes. In both models, group dynamics

and the creation of an environment of trust seem important. But it turns out that such PLC environments can be run successfully.

Building communities and working together effectively requires an abundance of trust in one another. Trust and cooperation have been found to go hand in hand. More specifically, researchers have found that greater levels of trust result in greater levels of cooperation (Demir, 2015; Kalkan, 2016).

The creators of PLC model's creators also stress the significance of curricular shifts and the roles played by the administration, parents, and community in fostering a supportive learning environment (Ruona & Blankenship, 2007). School principals play an important role in ensuring that PLCs are effectively put into practice (Johnson & Voelkel, 2019). The capacity of the principal to create an environment that encourages teachers to collaborate across subject areas and grade levels is crucial to the success of professional learning communities (Chrispeels et al., 2007). The principal is responsible for promoting a learning environment and a culture of collaboration among instructors at all times (Donahoe, 1993). To maintain effective PLCs, it is essential that the principal takes the initiative to remove any obstacles that may arise (Johnson & Voelkel, 2019).

Successful PLCs center their efforts on improving student outcomes and use student data to inform discussions about how to best meet those outcomes at their schools and throughout their systems (Reynolds, 2016). Principal leadership had a beneficial effect on student learning, with PLCs playing a mediating function in increasing teacher learning, which is directly linked to student achievement through meaningful learning (Huggins et al., 2011; Park et al., 2018).

2.6.2. Professional Learning Community Facilitators

Members of the professional learning community must have the capacity to facilitate their own education and carry out processes. The entire professional learning community, or just one or more people, can acquire and practice these abilities. Facilitators should be able to open and close meetings, process learning through activities, provide and receive feedback. They should also come to a consensus on matters pertaining to the professional learning community (Easton, 2015).

A facilitator or team leader could facilitate the team's learning of a new topic using professional development tools designed to guide the team through the material

(Dimino et al., 2015). For selecting PLCs, facilitators are as flexible as the rules for creating PLCs. The ideal facilitator is a teacher with extensive experience teaching literacy and excellent interpersonal and presentational skills. Facilitators should also be seen as school leaders and have strong interpersonal skills to connect with their adult students (Dimino et al., 2015). Instead of focusing on teachers' acquiring pedagogical expertise, facilitators have to struggle with them to change their everyday experiences and address fundamental structural issues (Parker et al., 2021).

2.6.3. Professional Learning Communities in Physical Education

The use of learning communities as a method of continuing professional development has been widely adopted in the field of physical education (Patton & Parker, 2017). In addition, learning communities have been supported as a way to address the shortcomings of conventional continuing professional development by encouraging teacher agency and consistent collaboration among in-service educators, pre-service educators, and teacher educators (MacPhail & Lawson, 2020).

2.6.4. Interdisciplinary Professional Learning Communities

The interdisciplinary approach emphasizes collaborative learning and the development of critical thinking abilities (Schwager & Labate, 1993; Siter et al., 1994). Traditional professional development is not always sufficient, and instructors "require one-on-one and group chances to receive and offer assistance, and more simply, to discuss the meaning of change." (Fullan, 2007). The notion of teacher collaboration is best described as "a systematic process in which instructors work together to assess and enhance classroom practice."

Depending on factors including available funding, class size, grade-level organization, and certification requirements, an interdisciplinary team of instructors might include from two to five members (Mac Iver & Epstein, 1993). Core interdisciplinary teams may also include middle school support professionals, including counselors, special education teachers, and administrators, to help handle student difficulties (Crow & Pounder, 2000).

Teachers can work together more effectively in interdisciplinary teams and professional learning communities. Teachers can understand their own skills and those

of their peers more effectively when they have a dedicated location to conduct professional development. When they work together on projects, they will have a more positive outlook on the school atmosphere (Flowers et al., 1999), a higher level of professionalism (Gatewood et al., 1992), and a more collaborative attitude toward working together (Mills et al., 1992).

The existence of teams in a school is one of the initial organizational steps toward enhancing student achievement through a greater sense of belonging (Jackson & Andrews, 2000; as cited in Wallace, 2007). As Wallace (2007) puts it forward, interdisciplinary teams in middle schools are "the basis of most of the effective middle-level programs today". In the same way, Boyer & Bishop (2004) claim that its framework is a potent agent of transformation in the face of the modern difficulties encountered by middle schools. The overall goal of the middle school interdisciplinary team is to create smaller and more collaborative learning communities within the wider context of the middle school. Therefore, it aims to engage teenage learners in ways that an individual teacher is less capable of doing (Wallace, 2007).

Planning together is a great way for educators to build relationships and trust with one another. Therefore, collaborative planning is essential for interdisciplinary teaching partnerships to succeed (Hernandez & Brendefur, 2003; Manning & Saddlemire, 2000). Scholars agree that dividing up teaching duties is a crucial part of any productive interdisciplinary team (Hernandez & Brendefur, 2003). Scholars also say that for interdisciplinary education to work, teachers need to work together by sharing materials, making common curricula, and making changes to meet the needs of students from different fields (Cone et al., 1998).

Sharing responsibility also enables teachers to engage in ongoing dialogues in which they communicate their thoughts, lesson progress, and pedagogical approaches. Thus, educators can encourage one another as they experiment with novel pedagogical approaches. The sense of community and mutual respect among educators is enhanced when responsibilities are shared (Hernandez & Brendefur, 2003; Murata, 2002).

Researchers have found that collaborative planning is essential to the growth of productive interdisciplinary relationships (Hernandez & Brendefur, 2003). Teachers could have opportunities for self-reflection and collaboration throughout the planning process. Teachers engage in reflective dialogue. It can be defined by scholars as a

conversation based on teachers' knowledge of integrated programs, interdisciplinary teaching techniques, and students' reactions to integrated learning (Hernandez & Brendefur, 2003; Manning & Saddlemire, 2000).

Teachers from different branches in a school meet regularly as a team known as an "interdisciplinary teacher team" (ITT). Such a team addresses a wide range of topics related to education, including classroom management, student engagement, and interdisciplinary lesson planning (Havnes, 2009). However, successful interdisciplinary teams are not formed randomly. They are the result of careful preparation, intelligent leadership, knowledgeable and eager teachers, and ongoing evaluation and revision (Clark & Clark, 1997). Interdisciplinary team organization is a method of faculty organization in which a group of teachers shares (1) the same class of students; (2) the responsibility for making plans, trying to teach, and assessing the curriculum and classroom instruction in more than one academic area; (3) the same timetable; and (4) the same physical space within the school (George & Alexander (2002); as cited in Wallace, 2007).

According to Clark & Clark (1997), to maximize the available opportunities, teachers in interdisciplinary groups must represent their instructional strategies. They achieve it by taking into account how they manage time, divide students for instruction, and organize the curriculum:

Time flexibility. The unique potential to organize time more freely is presented by interprofessional collaboration. This can be achieved on condition that the same students are scheduled to be team members in consecutive sessions.

Grouping Practices. Because of the extended period of time, team teachers can divide students into smaller and larger groups for lessons. Using creative time-management strategies, teachers can have a large class watch a video while working with smaller groups to provide more individualized lessons.

Curriculum Integration. Interdisciplinary teams provide fertile ground for educators to collaborate on removing the barriers and limiting assumptions of traditional subject-based teaching (Clark & Clark, 1995). Teams can benefit from systematic planning when developing an interdisciplinary curriculum in order to give students more opportunities for exploration and innovation, shift their focus from passively absorbing information to actively synthesizing and applying it, and promote

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the use of a broader range of resources. The growth of interdisciplinary curricula also provides educators more chances to collaborate with one another and exercise their ideas.

Appropriate instructional strategies Teachers must trust their students' innate capacity to learn and then give them the kind of demanding, engaging, fun, and equitable learning experiences that will bring out the best in them (Epstein & Salinas, 1992). Learning by doing is a crucial strategy for getting there.

2.7. Interdisciplinary Content Knowledge and Pedagogical Content Knowledge

Teachers from different branches face a variety of pedagogical problems when attempting to teach interdisciplinary topics (Yang, 2009). These pedagogical challenges are as follows (Morris, 2007; Oliver & Plewes, 2002):

- Subject and teacher isolation because of the program's structure;
- Too much information to "cover" in the field leads to a disorganized presentation;
- Students may struggle with a topic because they lack the disciplinary acculturation essential to fully engage with the course material. This may appear as a lack of familiarity with academic terminology, language, and modes of inquiry.
- Struggle to find a balance between the topic's two disciplinary dimensions (the students' major field and the field from which the subject "serves");
- low levels of engagement and interest among students leading to poor attendance rates; and low-quality education.

The pedagogical competence of their teachers has been recognized as the main factor influencing students' academic performance and levels of motivation (Baumert et al., 2010; Hattie, 2009). High-quality teachers are experts in their fields who are proficient in a variety of methods and knowledge for teaching subject-specific knowledge to students (An, 2016). Shulman (1987) puts this knowledge into three different groups: pedagogical knowledge, which includes how the classroom is set up, how lessons are planned, and how they are taught; content knowledge, which is an understanding of the subject's content; and pedagogical content knowledge, which includes ways to get students interested in these ideas and help them learn them. To

determine what educators, know about creating scientifically literate people, we turn to their pedagogical knowledge. When the question, "How should we think about the knowledge that evolves in the brains of instructors, with particular emphasis on content?" is asked, there are three types of content knowledge that Shulman (1986, p. 9) recognized. Briefly, Shulman (1987) defines " pedagogical content knowledge " as "the merging of content and pedagogy into an awareness of how particular topics, problems, or concerns are organized, represented, fitted to the different interests and abilities of learners, and presented for teaching" (p. 8).

In addition to what Shulman mentioned, Cochran (1991) took a different approach and discussed teacher-specific content knowledge. Cochran (1991) was concerned with how instructors applied their pedagogical knowledge (what they know about teaching) to their content knowledge (what they know about what they are teaching).

There has been a great deal of study, discussion, and revision of content knowledge and pedagogical content knowledge -related concepts throughout the past three decades (Cochran et al.,1991; Borko &Putnam, 1996; Ball et al., 2008; Mishra & Koehler, 2006; Ward & Ayvazo, 2016; Kim et al., 2018; Ward et al., 2015). On the other hand, in An's study (2016), the pedagogical content knowledge is called "interdisciplinary pedagogical content knowledge" because it is based on interactions between different subjects (see Figure 1. 2).
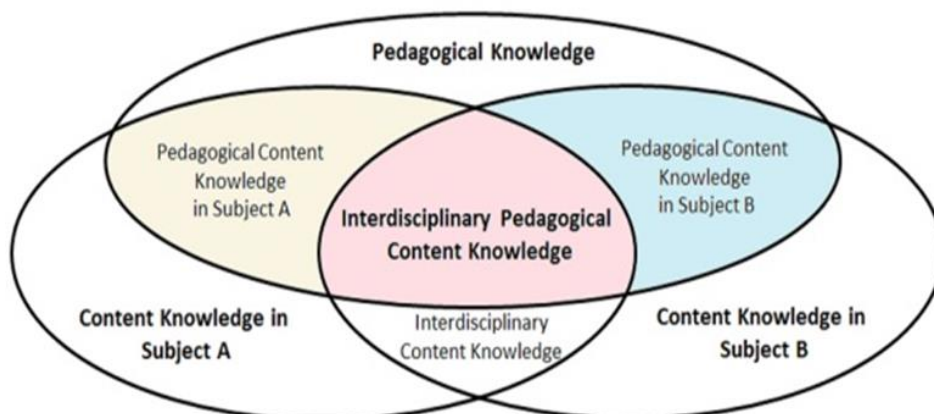
Figure 2. 2 Interdisciplinary pedagogical content knowledge (ipck)*

(* *Adapted from An,2016*)

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Teachers with interdisciplinary pedagogical content knowledge can: (1) recognize knowledge connections within and between specific subjects and develop lessons based on such connections; (2) use pedagogical methods and interdisciplinary themed activities to address content areas from multiple subjects at the same time; and (3) use interdisciplinary considerations that include an understanding of the representation of concepts using themes across cues. Hence, five different subjects were gathered based on their interactions with each other; interdisciplinary pedagogical content knowledge was also used in the present study.

It is necessary for interdisciplinary scientific education to have instructors that are able to employ a variety of instructional strategies. It requires teachers who recognize that students must learn how to learn, which is more important than covering a syllabus (Holbrook, 2000).

Implementing the interdisciplinary approach in the curricula and pedagogical content knowledge of interdisciplinary courses would not be an easy task, but it is educationally desirable (Yang, 2009). The teacher faces a significant challenge in guiding students to reconcile the potentially divergent perspectives and ideals connected with the disciplines, as well as to integrate the subject's dual aspects in terms of content and methodology (Allen, 2005).

Crucial elements of teacher transformation within the setting of PLCs include teachers' knowledge and practices, teachers' emotional qualities, and students' learning (Guskey, 2002; Desimone, 2009). Therefore, the definition of teacher changes the adoption of new methods of instruction, the use of different resources, the introduction of a new curriculum, or even just the introduction of some fundamental changes to the way classes are conducted and the surrounding physical environment (Guskey, 2002).

2.8. Fitness for Health and Body Systems

Many experts in the field of physical education have argued that physical education's ultimate purpose is to help young people develop healthy routines for lifelong exercise and physical activity (Smith & Claxton, 2003). Physical education programs should aim to "promote lifelong physical education activity," as stated by Corbin (2002). Moreover, physical education is recognized as an essential instrument for fostering community wellness (Smith & Claxton, 2003). Body composition,

cardiorespiratory fitness, muscular strength and endurance, and flexibility are the four cornerstones of health-related fitness (ACSM, 2010).

The "Body Systems" unit, which is included in the "Living Things and Life" learning area of the science course curriculum, was prepared based on the spiral programming approach. The process started with the "Let's Solve the Riddle of Our Body" unit in the 4th and 5th grades and continued with the "Body Systems" unit in the 6th and 7th grades. It concludes in the eighth grade with the "Reproduction, Growth, and Development " unit. " Thus, the unit of body systems has an important place among the subjects of science lessons (Çetinkaya & Taş, 2018).

It's clear that science education, including all its sub-branches such as physics, biology etc., needs to be taught and learned in a more integrated, cross-disciplinary way (Holbrook, 2000).

2.9. Interdisciplinary Professional Learning Community Studies

The research using interdisciplinary professional learning communities is limited (Boyer & Bishop, 2004; Robbins & Searby, 2013; Terry et al., 2018). Studies using the interdisciplinary teaching method were generally conducted between two courses (Mahanin et al., 2017; An, 2016; Pietsch et al., 2014; Akins & Akerson, 2002). There are few studies that include physical education in interdisciplinary teaching (Cecchini & Carriedo, 2020; Papaioannou et al., 2020; Spintzyk et al., 2016; Papaioannidou et al., 2015; Chen et al., 2007).

The literature is divided into two sections: teacher development and student outcome. In this section, studies in the literature will be examined under two headings: teacher development and student outcome.

2.9.1. Teacher Development

According to the latest studies in literature, in the interdisciplinary teaching method, teacher development has an important place. For instance, in their research, Terry et al. (2018) investigated the ways in which a PLC was used to assist teachers as they trialed a blended learning approach to their curriculum. Seven academic members from various fields took part in the study. During each meeting, surveys and interviews were conducted, meeting notes were used, and all group members were

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given the opportunity to express their experiences with the blended learning class. Six of the seven teachers taught full-time in the face-to-face format, while one taught full-time online. One of the face-to-face educators who taught full-time had two years of online teaching experience. The PLC gathered once every month for one hour in an informal roundtable setting. According to results there were five themes emerged. These are support, collaboration, comfort, student experience, preparation. Professional learning communities might be the channel for fostering academic collaboration and sustaining mutual support in higher education.

Chen et al. (2007) analyzed how a physical education teacher and a second-grade teacher collaborated to create and conduct an interdisciplinary unit and highlighted variables that contributed to their collaboration. Two teachers and 37 students took part in this study. Data were collected by audiotaping the teachers' planning sessions, interviewing the teachers, and videotaping the interdisciplinary lessons, and there was no intervention. According to the findings, the instructors' collaborative planning centered on providing students with integrated and pertinent learning experiences. Long-term cooperative work experiences, a shared pedagogical philosophy, and trust in each other were credited for the instructors' successful interdisciplinary teaching.

Hernández and Brendefur (2003) examined how math and vocational-technical education (VTE) teachers from eight locations across the United States worked together to create a single, authentic, integrated mathematics curriculum unit. All of the chosen teams spent a week at a summer institute in the first two years. During the first summer institute, teachers received technological support that helped them learn about integration, standard implementation, and curriculum building. If certain circumstances are met, it appears conceivable for interdisciplinary teams of mathematics and VTE teachers to develop high-quality integrated curriculum modules. Particularly, it found that team dynamics, teachers' values, and school support were essential to sustain successful cooperative curriculum design work.

Sel (2022) used an action research model to improve the instruction of elementary school teachers by including financial literacy in an interdisciplinary approach to teaching social studies. The teaching of social studies was integrated with the disciplines of technology and mathematics from an interdisciplinary teaching

method. In this framework, a cyclical teaching process was developed by researchers and teachers in partnership. They contributed to the development of a variety of instructional competences, including the development of interdisciplinary skills, the successful use of information technologies, the observation of the impacts of interdisciplinary, and the creation of original materials and activities.

In Turkey, Akyol (2015) aimed to assess the opinions of sixth, seventh, and eighth grade math teachers regarding the cross-curricular approach included in the math curriculum. 12 math teachers involved from Burdur in this study. The qualitative method was used. Acccording to findings, due to the complexity of the curriculum, the shortage of time, the exam anxiety of the students, and the teachers' haste to complete their lectures, they did not provide enough time for cross-curricular integration.

An (2016) investigated how elementary preservice teachers' mathematics–science integrated teaching practices evolved as a result of their participation in exemplary interdisciplinary activities with diverse themes spanning school curriculum. 28 elementary preservice teachers were participated. The intervention and data collection for the current study occurred over the course of one semester and 13 weeks. In particular, pre-surveys were provided in weeks one and two, followed by an eight-week intervention in weeks three through eleven, and then post-surveys were provided in weeks 12 and 13.

Cassidy & Puttick, (2022) aimed to investigate how a science teacher and an engineering teacher implemented an interdisciplinary curriculum designed to benefit teachers in both fields. Before the implementation, teachers attended a three-day professional development program over the summer. Teachers participated actively in the learning process, had firsthand exposure to the interdisciplinary learning and modeling method designed for their students, and learned firsthand about some of the issues they might face in the classroom. Results showed that both teachers' enactment aligned with the overarching curricular goals. Teachers learned the content of fields outside their field of expertise.

Gürkan (2019) investigated the interdisciplinary teaching techniques of science, mathematics, Turkish, and social studies teachers. In the province of Adana, 35 instructors from three distinct secondary schools with diverse socioeconomic backgrounds participated in the study. It was discovered that scientific and social

sciences can be tied to one other and to art lessons in the teaching process, and that interdisciplinary teaching has a favorable effect on pupils. It was also discovered that teachers require direction, proper knowledge and abilities, teamwork, and instructional strategies or plans in order to practice effectively.

2.9.2. Student Outcome

Teachers from different departments work together to form smaller learning communities inside the larger school structure, where they design lessons for, teach, and assess students. Boyer and Bishop (2004) described and analyzed young adolescents' perspectives on productive interdisciplinary teamwork. There were 77 middle schoolers representing three different schools—qualitative methods. This study sheds light on the numerous advantages that students on effective teams believe they have. The students discussed long-lasting relationships and a democratic learning environment that respected their opinions and empowered them as students. They described a welcoming climate that fostered their self-assurance and leadership development.

A few studies have studied students' development, including physical education lessons in an interdisciplinary teaching method. For example, Papaioannidou et al. (2015) examined the impact of an integrated program of Greek traditional dance, history, and geography on the satisfaction and motivation of elementary students. One hundred twenty-six students in grades four through six participated in the study. Duda and Nicholls' (1992) questionnaire was used to assess student satisfaction during class; Guay, Vallerand, and Blanchard's (2000) questionnaire was used to assess student motivation. The intervention program takes four weeks, with twice-weekly classes. The experimental group participated in a total of eight interdisciplinary folk-dancing classes. In comparison, the control group participated in eight traditional folk-dancing classes, in which the students were taught simply the kinetic form of each performance. These results support the notion that an interdisciplinary program involving traditional Greek dance and topics from history and geography decreases the rates of extrinsic motivation and amotivation, while simultaneously increasing students' satisfaction, intrinsic motivation, and identified regulation.

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Spintzyk et al. (2016) examined the efficacy of interdisciplinary teaching in science (biology) and physical education in terms of student knowledge improvement. 141 German sixth-grade students participated in this study. A knowledge test that was developed and used by a researcher. Students were instructed to participate in the intervention for three hours per week over six weeks. An experimental group receives interdisciplinary teaching instruction, whereas a control group receives subject-related instruction. It indicates a significant growth in knowledge with the test group when compared with the control group, $p < .01$.

In other study, Cuervo (2018) evaluated the efficacy of two pedagogical approaches to teaching and learning musical composition in a music lesson in secondary school: the more common teacher-centered approach and an interdisciplinary teaching approach. In the study, 30 students and four teachers participated. Pretest and posttest questionnaires were used in the study. An interdisciplinary team carried out the intervention in the experimental group by using elements of natural science, technology, music, and art. One weekly session (50 minutes) for each subject was set aside for teachers to coordinate their work with the same group of students. In addition, the teachers got together once a month to discuss the project's progress and share their thoughts on its overall direction and results. The control group was exposed to the same musical content as everyone else, minus the specialized interdisciplinary backing. Experimental group participants had improved their composition skills, we mean their ability to explore sound, awareness of musical elements for composing, and their degree of flexibility. The integrated features of the program enhanced the student's self-sufficiency, self-confidence, and creativity and motivation. Additionally, interdisciplinary learning enhanced critical thinking abilities.

Cecchini & Carriedo's study offers a fruitful example of implementing an interdisciplinary method. The researchers (2020) aimed to investigate the impact of an interdisciplinary educational method that integrates physical education and mathematics on light and moderate–vigorous physical activity (PA), sedentary behavior, and subtraction learning. Forty-six students in the first grade participated in the implementation. An accelerometer was used to measure the physical activity level of students for four weeks. One group (n = 23) spent three weeks learning physical

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education and math separately in accordance with the conventional approach to curriculum design (in regular lessons). In contrast, the other group (n = 23) spent three weeks learning Physical education and math lessons using an interdisciplinary approach in which the time spent on each subject was combined. The integrated teaching unit and traditional groups improved their knowledge of subtraction significantly after intervention, ($p < .001$). Students from the integrated teaching unit group achieved higher levels of light, moderate vigarous, sedentary behaviour physical activity than students from the traditional groups ($p < .001$).

In Turkey, Boyraz and Serin (2017) investigated the impact of science instruction delivered through games and physical activities using interdisciplinary teaching methodologies on students' science success and retention. Participants were 82 third-grade children from a public primary school. The pretest-posttest control group design was preferred, and data was collected by an achievement test and an education portal achievement (EPA) test in the study. In all groups, the education time lasted five weeks. The experimental groups attended their lessons in the school garden, while the control group attended their lessons in the classroom. In addition, every lesson in the experimental groups included game-based physical exercises and accompanying resources. In contrast, teaching materials for the control group consisted mostly of a web-based education site and a course book. The results revealed that a course in games and physical activities that used interdisciplinary teaching strategies may be used to improve student science achievement and information retention.

Akkins & Akerson (2002) evaluated how well an elementary teacher intern was able to assist her children understand the distinctions and links between language arts, science, and social studies. Action research design was used. Teacher developed and implemented interdisciplinary curriculum throughout 13 weeks. Students saw the interdisciplinary connections between linguistics and science and linguistics and social studies, but not between physics and history. Among the implications are clear disciplinary training and inter-disciplinary links. The preservice teachers' interdisciplinary knowledge of using science-themed activities as instructional approaches for teaching mathematics had remarkable changes across all four science

content areas including physics, chemistry, biology, and environmental and space science.

Gero (2017) aimed to the purpose of which is to monitor how students' perspectives on scientific and engineering integration develop over time through the lens of interdisciplinary education. Students (16) participated from elective course. Notwithstanding the challenging nature of interdisciplinary teaching, the number of students who reported a desire to teach interdisciplinary classes in the future increased significantly during the course of the study.

Korkmaz and Konukaldı, (2015) examined how adopting a topic-based, interdisciplinary approach to teaching impacts student achievement in elementary science. Eighty-three pupils from a private elementary school in Antalya's Muratpaşa district participated in the study. The pretest - posttest control groups as quasi-experimental models was used. In the context of the study, in cooperation with the field teachers of different disciplines (Turkish, visual arts, social studies, science and technology, information technologies, music, physical education, guidance, foreign language -English and German-) working at the practice school, for an academic year 7th grade. Class level - studied four themes for solving daily life problems. Students in seventh grade science who participate in interdisciplinary thematic teaching approaches to integrating the concepts and techniques of other disciplines into their own science have significantly higher achievement in statistics than students who do not participate in such integrative activity, as measured by teacher guide book activities.

The purpose of this research was to analyze the impact of an interdisciplinary approach on mathematical achievement and classroom attitude. One hundred and ninety-three students (97 boys and 96 girls) aged 9 to 11 from 10 different schools participated in the study. Eight plans for physical education classes that integrate both physical activity and mathematics were developed. According to the findings of this study, combining the teaching of mathematical principles with an interdisciplinary approach in physical education classes is a feasible alternative (Kaprinis et al., 2009).

Mahanin et al., (2017) examined the utilization of an interdisciplinary learning activity task to build students' knowledge in mathematics, specifically on the issue of scale drawing application. The results indicated an improvement in the students'

performance, and they were able to construct their mathematical knowledge through group collaboration.

Portnoy et al. (2020) developed The Mayaguez Campus of the University of Puerto Rico is developing general education courses that combine the sciences, technology, and the humanities in order to address the need for integrative skills that encompass the confines of a single discipline in order to resolve the complex problems that define the contemporary world. Three professors, a music theorist, a physicist, and a mathematician, taught an unusual and interdisciplinary course on the relationships between music, mathematics, and science. The course was developed for a general audience with minimal requirements, and hence attracts a very diverse student body. Every meeting began with 30 minutes of music education, during which musical theory and practice were introduced and constructed from scratch, followed by 50 minutes of alternating mathematics or science (usually physics).

Table 2. 1

Recent Studies about Interdisciplinary Teaching Model

Study	Subject Context	Participants	Data collection instruments	Intervention	Findings
Akyol, (2015)	Math and cross-curricula	12 Maths teachers	Qualitative Study • Interview	No	• Associates mathematics with daily life. • Mathematics out of being an abstract course
Akins and Akerson (2002)	Arts, science and social studies	26 students (4th grade; 10 girls and 16 boys)	Action research Student interviews, observer logs, journal notes, students' 'connection' journals, student work, and her record and planning book	Yes	• Students' awareness of connections between the disciplines • Relate these connections to real-world • Take an active part in their learning • Students were engaged in group projects that required them to apply their knowledge to real life problems.
An, (2016)	Math and Science	28 elementary preservice teachers	Qualitative Study • Pre-and-post data collection from open-ended surveys	Yes	• The preservice teachers' interdisciplinary knowledge of using science-themed activities as instructional approaches for teaching mathematics had remarkable changes across all four science content areas including physics,

Study	Subject Context	Participants	Data collection instruments	Intervention	Findings
					chemistry, biology, and environmental and space science.
Boyraz and Serin (2017)	Science and Physical education	82 students (3rd grade)	Quantitative Study • Achievement Test • Educational Portal Achievement Test	Yes	• The science achievement of the experimental groups in which science concepts were taught during and at the end of the activities were significantly higher than that of the control group.
Boyer and Bishop (2004)		77 middle level students	Qualitative methods	No	• Long-term relationship • Democratic learning environment that honored their voices and enpowered students as learners.
Cecchini and Carriedo, (2020)	Math and Physical education	46 first-grade students	Quantitative Study • Knowledge test • An accelerometer for 4 weeks to measure their physical activity levels	Yes	• The integrated teaching unit and traditional groups improved their knowledge of subtraction significantly after intervention, p <.001, • Students from the integrated teaching unit group achieved higher levels of light, moderate vigarous, sedentary behaviour physical activity than students from the traditional groups p <.001
Chen et al., (2007)	Math and Physical education	2 teachers, 37 students	• Audiotaping the two planning sessions. • Videotaping the interdisciplinary lessons. • Interviewing the teachers.	No	• Characteristics of collaborative planning processes • Characteristics of shared teaching responsibilities • Characteristics of the teachers' personal attributes for successful collaboration.
Cuervo, (2018)	Natural Science, Technology, Music and Art.	30 students (13-14 years) 4 teachers	Quantitative study • Pre- and post-test questionnaires • Survey	Yes	• Experimental group participants had improved their composition skills, we mean their ability to explore sound, awareness of musical elements for composing, and their degree of flexibility • The integrated features of the program enhanced student's self-sufficiency, self-confidence, creativity & motivation. Additionally, interdisciplinary learning

Study	Subject Context	Participants	Data collection instruments	Intervention	Findings
					• enhanced critical thinking abilities. .
Cassidy and Puttick, (2022)	Engineering and Science	21 teachers (6th grade)	Qualitative Study • Classroom observation • Fieldnotes • Video and audio recordings, • Teacher implementation logs, • Interview	Yes	• Both teachers' enactment aligned with the overarching curricular goals. • • Teachers learned the content of fields outside their field of expertise.
Daniel et al., (2022)	Science and other disiplines	18 trainees 6 mid-career faculty, 9 early careers researchers	• Surveys of participants • Field notes from workshop • Observations • Artifacts from the workshop	Yes	• Disciplinary Differences • Professional Integration • Collaborative Practice • These participants reported a high sense of belonging to their professional community
Gero (2017)	Science and Engineering Education	16 Students (undergraduate students)	• Questionnaires • Semi structured interview • Observation	No	• İnterdisciplinary learning improves understanding of the subject matter.
Gürkan (2019)	Science, Math, Turkish and Social studies	35 teachers	Qualitative study • Semi structured interviews with teachers through "Demographic Characteristics Form" and "Interdisciplinary Teaching Practice Evaluation Form"	No	• Teaching process related to establishment of ınterdisciplinary relations • The factors affecting the ımplementation of ınterdisciplinary ınstruction • The ımportance of establishing ınterdisciplinary relationship • Effects of ınterdisciplinary ınstruction on students
Hernández and Brendefur (2003)	Math and Vocational -technical education	20 instructors and curriculum specialists	• Application materials. • Preliminary Instructor Survey • Individual & Team Interviews. • Classroom Observations.	Yes	• Team dynamics, teachers' values, and school support were essential to sustain successful cooperative curriculum design work.

Study	Subject Context	Participants	Data collection instruments	Intervention	Findings
			• Consulting Documentation • Curriculum Review Form. • Documentation of Feedback and FollowUp.		
Korkmaz and Konukaldı, (2015)	Turkish, Visual arts, social science, science, music, foreign language (English, German) & Phy. Educ..	83 students (7th grade)	Quantitative Study • Academic achievement test • Science attitude scale • Focus group interview form for teachers	Yes	• Students in seventh grade science who participate in interdisciplinary thematic teaching approaches to integrating the concepts and techniques of other disciplines into their own science have significantly higher achievement in statistics than students who do not participate in such integrative activity, as measured by teacher guide book activities.
Kaprinis et al., (2009)	Math and Physical education	193 students (aged 9-11 years)	Quantitative Study • Questionnaires	Yes	• Students of the experimental team had statistically significant higher scores in lesson satisfaction, intrinsic motivation, & also in specific math test. • Students of experimental group had lower scores in ego orientation, extrinsic motivation & amotivation.
Mahanin et al., (2017)	Mathematics, English, Art, Geography	43 secondary schools students	Quantitative Study • Knowledge test • Students' Journal	Yes	• Interdisciplinary learning activities improved student achievement, and they were able to construct mathematics knowledge through group collaboration.
Özçelik and Semerci, (2016)	Science, Math and technology	60 students (8th grade)	Quantitative Study • Mathematic achievement test	Yes	• The interdisciplinary approach improved students' academic achievement in volumes of geometric shapes, but it had no effect on problem-solving skills,
Papaioannou et al., (2015)	Physical education \History and Geography	126 students (4th grade)	Quantitative Study • The Situational Motivation Scale	Yes	• The experimental group in interdisciplinary program increased significantly the levels of motivation (p<.005)

Study	Subject Context	Participants	Data collection instruments	Intervention	Findings
			• The assessment of satisfaction in the physical education less • The assessment of satisfaction in the PE lessons, the Duda and Nicholls's (1992)		• The experimental group in interdisciplinary program enhanced significantly their "satisfaction", "intrinsic motivation", and "identified regulation" (p<.005)
Papaioannou et al., (2020)	Physical education and Physics	487 students (Aged 13 years)	Quantitative Study • The Situational Motivation Scale • The assessment of satisfaction in the physical education lessons, the Duda and Nicholls's (1992)	Yes	• The intervention increased the students' autonomous motivation and satisfaction in physical education and decreased the students' amotivation. (p<.001) • Physical education is an appropriate context to implement interdisciplinary teaching and, through this innovation, to increase students' autonomous motivation in physical education and possibly in school.
Portnoy et al., (2020)	Music, Science, and Mathematics	55 undergraduated students	Satisfaction Survey The final projects	Yes	• Interdisciplinary perspective increased students' engagement in their learning • Students integrative and critical thinking skills by examining the links between the arts, sciences, and mathematics.
Sel (2022)	Social studies & Technology/ Mathematics	Three elementary schools (3 teachers)	Action Research • Semi-structured interview forms • Reflection forms • Learning products	Yes	• Problems experienced in teaching financial literacy • Providing educational advantages for students • Development of instructional competencies
Spintzyk et al., (2016)	Biology and	141 students	Quantitative Study	Yes	• It indicates a significant growth in knowledge with

Study	Subject Context	Participants	Data collection instruments	Intervention	Findings
	Physical education	(6th grade)	• Knowledge test		the test group when compared with the control group.
Terry et al., (2018)	Math, English, Psycholog, Business, Physics, Biology	7 faculty members from different disciplines	Qualitative Study • Surveys, • Faculty interviews • Meetings notes	Yes	• Support • Collaboration • Comfort • Student experience • Preparation

2.10. Summary of the Literature Review

When the historical development of interdisciplinary teaching is examined, it emerges as a student-centered approach. The separation and fragmentation of disciplines are among the issues that make learning difficult. At the beginning of the twentieth century, educators began to turn towards curriculum integration to prevent this fragmentation. This disciplinary fragmentation in schools begins in the secondary school period. This disciplinary fragmentation in schools begins in the secondary school period. At this point, when it is desired to increase student success in secondary schools, interdisciplinary teacher communities are seen as a critical period in educating students by addressing the student's social, emotional and cognitive needs.

Clarity in the interdisciplinary teavhing method literature supports the importance of collaboration with the school administrator, other subject matter teachers, students and students' families so that interdisciplinary teacher communities can benefit middle school children. Teachers, administrators, and other members of the community must work together to make decisions. Such a decision-making process will have a positive impact on student and teacher learning in the areas of school reform, professional development, and accountability (DuFour, 2004a; Mullen & Hutinger, 2008; R. B. DuFour et al., 2008).

When the literature on PLC is examined, the professional learning community has been shown to have a positive effect on both changes in teachers' practices (Schneider & Kipp, 2015; Tam, 2014; Murphy, 2015; Chou, 2011; Huggins et al., 2011) and improved students' achievements (Chou, 2011; Huggins et al., 2011; Saunders et al., 2009; Williams, 2013). Recent studies have shown that PLCs improve teaching. PLCs contribute to teaching by fostering greater pedagogical and

disciplinary content knowledge among educators and a shift in emphasis from teacher relations and job satisfaction to student learning (Dogan et al., 2015).

Most of the empirical studies in the literature establish an interdisciplinary link between the two disciplines. It is seen that only a few of them can connect with physical education and sports lessons. There is not enough research on how to use the interdisciplinary teaching method in schools. In addition, it has been determined that there are not enough empirical studies on how to apply the interdisciplinary teaching method among teachers. In response to this gap, in this study, idPLCs have been created in order to increase teachers' content and pedagogical content knowledge on selected topics and to observe the change in their students. In this study, a model is created so that the interdisciplinary teaching method can be applied in schools by collecting data with idPLCs meetings, individual and focus group interviews, field notes and questionnaires.

CHAPTER III

METHODOLOGY

This section presents the study's design, variables, participants, intervention, data collection instruments, data collection procedure, data analysis, researcher's role, and limitations.

3.1. Design of the Study

A mixed methods research design was used in this study. As a method, "it focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies" to understand research problems (Creswell & Plano Clark, 2007). Creswell (2012) explains that these designs allow researchers to build on the qualitative and quantitative traditions of research, allowing them to receive a more comprehensive response to sophisticated research questions.

The convergent parallel mixed method design was preferred to obtain the answers to the study's research questions (Figure 3.1). The convergent design happens when a researcher gathers and analyzes qualitative and quantitative data during the same phase of the research process. The results are combined into an overall understanding (Creswell & Plano Clark, 2007; p. 77). According to Morse (1991), the goal of the convergent design is to collect disparate, but complementary data on the same subject to understand the research problem better.

The aim of the qualitative aspect of the current study was to examine the following research questions (research questions 1 & 3):

Research Question 1. How does the idPLC influence the teachers' content and pedagogical content knowledge on selected body systems (skeletal, muscular, cardiovascular & respiratory) and HrF?
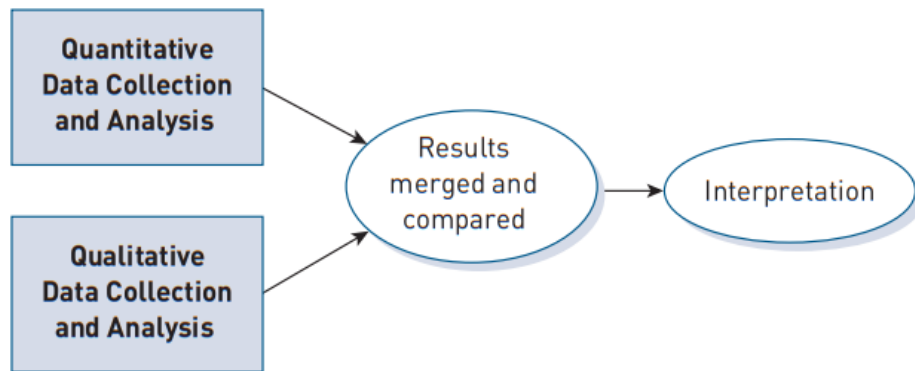
Figure 3. 1. The convergent mixed method design *(Creswell & Plano Clark, 2011)*

Research Question 3. What are the idPLC teachers' students' views on their teachers' teaching approaches to selected body systems (skeletal, muscular, cardiovascular & respiratory), HrF, and physical activity participation?

The quantitative aspect of the study aimed to examine the following research question (research question 2):

Research Question 2. How does the teachers' participation in the idPLCs influence their students' HrF knowledge and physical activity participation level?

Table 3. 1

The Quasi- Experimental Designs

Groups	Pretest[*]	Intervention	Posttest*
Experimental groups	P_1	X	P_2
Control groups	P_1		P_2

Note. X= Interdisciplinary Professional Learning Communities Implementation

*Applied for HrF knowledge Test, PAQ-C

To this end, a quasi-experimental (pre-post design) between-group design was constructed (Creswell, 2012) (Table 3.1). In the first stage, two experimental and two control schools, one 6th grade class, are selected, and their subject matter course teachers are identified. Selected experimental and control group 6th grade class students completed HrF knowledge test and physical activity level questionnaire as the pre-tests.

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Then, selected teachers participated in a six-week idPLC. All idPLC interaction was video recorded; the researcher took field notes during the meetings. Experimental group teachers' students' activities/work samples/journals were also collected. After the idPLC program, experimental and control group 6th grade class students completed HrF knowledge test and physical activity level questionnaire again as a posttest. Semi-structured interviews were conducted with teachers, and focus group interviews were conducted by randomly selected students from the experimental group teachers' classes (Table 3.2).

Table 3. 2

The Overall Research Design of The Study
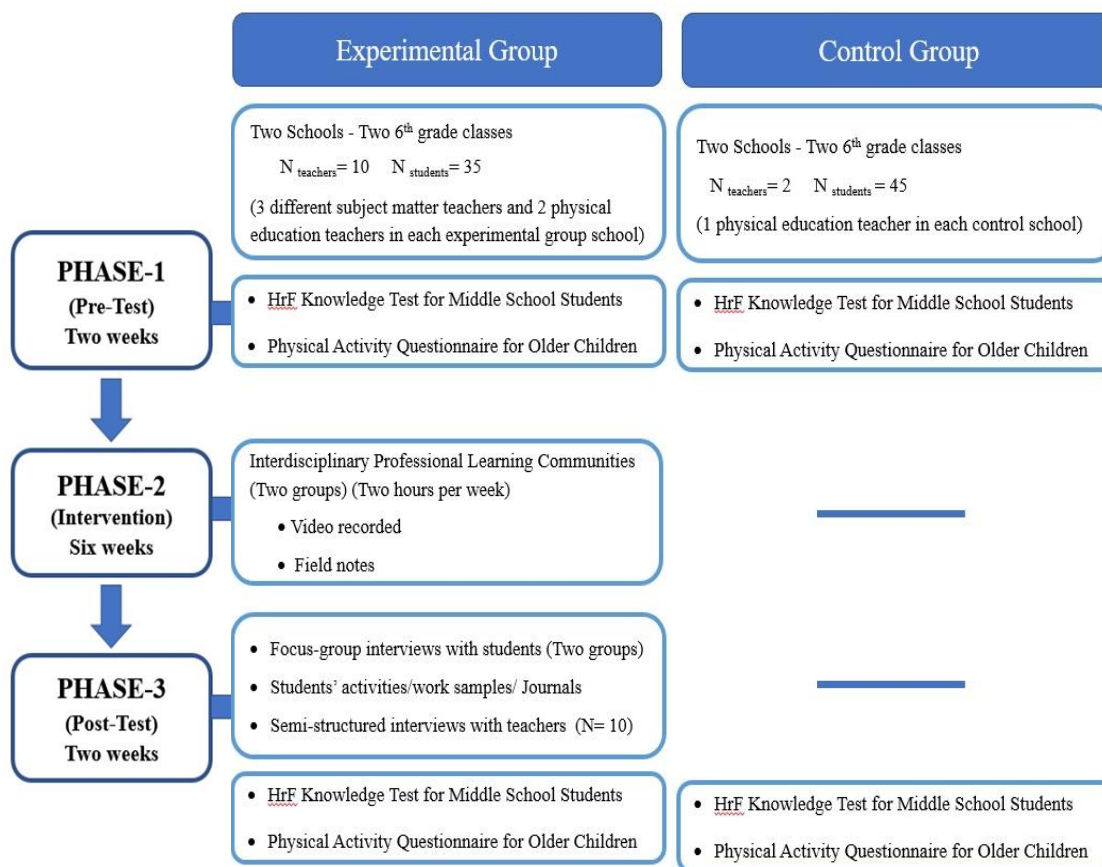
Research question 1 data obtained from fully transcribed video and voice recorded text of six-week idPLC meetings, researcher field notes during idPLC meetings, semi-structured interview with teachers, and a peer examination with the idPLC facilitator at the end of each idPLC meeting. Research question 2 data was

obtained from the students' pre- and post-test HrF knowledge and physical activity participation data. Research Question 3 data obtained from the focus group interviews with students and collected students' activities/work samples/journals.

3.2. Participants

The study participants were from four secondary schools in Ankara with a similar socioeconomic setting. When two secondary schools were chosen from the Etimesgut district, the other two were chosen from the Çankaya district. Two schools were assigned as experimental and two as control schools. Two 6th-grade classes were selected from each experimental and control school. Then, experimental school classes' different subject matter course teachers were contacted and invited to study. Five subject matter teachers from each school (overall ten teachers from two experimental schools) accepted to participate in the idPLC program. In control schools, only selected class's physical education teachers were contacted. They informed only about pre- and post-test HrF knowledge and physical activity level data collection from their selected classes.

3.2.1. Experimental Groups

3.2.1.1. Teachers. The inclusion criteria for these teachers was teaching a subject matter course to the same 6th-grade class. In one of the experimental schools, physical education, science, English, Turkish, and guidance and psychological counseling teachers; in the other experimental schools, physical education, science, English, visual art, and guidance and psychological counseling teachers participated in the idPLC program.

The experimental group teachers' demographic information is presented in Table 3.3 and Table 3.4. For the first and second experimental groups, teachers' ages ranged from 44 to 58 years and 34 to 40 years, respectively. Experimental school one teachers' teaching experience ranged from 20 to 35 years, and experimental school two teachers teaching experience years ranged from 7 to 15 years.

3.2.1.2. Students. Overall, 35 students from two schools participated in the experimental groups, and 18 and 17 students from the first and second experimental schools, respectively.

Table 3. 3

Teachers' Demographic Information in The First idPLC

Teachers	Branches	Gender	Age	Years of Teaching Experience
Teacher 1	Physical education and sport	Female	44	20
Teacher 2	Science	Female	55	28
Teacher 3	Foreign language (English)	Female	48	23
Teacher 4	Native language (Turkish)	Female	57	35
Teacher 5	Psychological counseling subject	Female	58	23

Table 3. 4

Teachers' Demographic Information in The Second idPLC

Teachers	Branches	Gender	Age	Years of Teaching Experience
Teacher A	Physical education and sport	Female	35	10
Teacher B	Science	Female	40	15
Teacher C	Visual art	Female	35	7
Teacher D	Foreign language (English)	Female	38	15
Teacher E	Psychological counseling subject	Female	34	11

3.2.2. Control Groups

For two control schools, two physical education teachers selected the same district as the experimental schools in Ankara. One physical education class was used in this study. The teachers in the control groups followed their regular classes during the study period. There were, overall, 56 students in the control groups, and 19 and 37 of them were from the first and second control school, respectively.

3.2.3. idPLC Facilitator

The study's facilitator was a 53-year-old man with 26 years of experience as a university lecturer with experience in teaching physical education at the secondary school level. The facilitator has a Ph.D. in Educational Sciences, specializing in curriculum and instruction. He has offered a physical activity class with an

interdisciplinary teaching approach to undergraduate students for 16 years. The facilitator has extensive experience creating, directing, and facilitating instructional practices and establishing and maintaining opportunities for professional growth for educators. (See, for example, Hunuk et al., 2013; Kılıç, 2019; Mehrtash, 2021; İnce et al., 2020; Sarıkaya, 2022). In this study, the same facilitator facilitated the idPLCs of both experimental groups.

3.3. Intervention (idPLC)

The idPLC meetings were conducted in the experimental groups at a university research lab. Audiovisual educational technologies have been installed in the laboratory. The idPLCs were organized according to teachers' free time after school. The meetings were two hours per week for six weeks.

Among the five subject matter course teachers in idPLC, science course and science teacher were at the core of the idPLC at the beginning of idPLC meetings. The reason for this preference was related to the 6th-grade school curricula. Selected body systems and health-related (including physical activity) topics were in the earlier weeks of the academic year at 6th-grade classes in the secondary school program. All schools followed the same program and used the same educational materials MoNE in Turkey provided. Selected body systems (skeletal, muscular, cardiovascular & respiratory) are directly related to human movement, HrF, and physical activity, which are also students' core aspects of well-being. Moreover, HrF and physical activity of students (as a crucial part of overall well-being) were also represented in all other subject matter courses in the secondary school curricula as a primary or secondary topic of interest (as a topic, field of practice or component that the progress of students should be followed) in various units of courses throughout the year. In addition, selected body systems are among the challenging topics in 6th-grade science curricula. Therefore, idPLCs designed as science lessons supply explanations for how body systems work together to "move the body" and "how physical activity improves those body systems." In this context, a physical education lesson transfers this knowledge into practice by visualizing the content of the theoretical science lesson. The other lessons supported these two lessons focused on developing the student's overall well-being and the specific subject matter priorities.

The facilitator led the discussions at each meeting. In the first week, the content and purpose of the program were shared. The interdisciplinary teaching method, the teaching programs of represented subject matter courses/teachers, and the shared learning outcomes in this program were discussed. In the second week, interdisciplinary content knowledge was discussed on "skeletal, muscular, cardiovascular & respiratory systems, health-related fitness, physical activity and well-being" and the burden of implementing such a program. Moreover, the facilitator shared sample lesson videos that used interdisciplinary learning methods. In the third, fourth, and fifth weeks, pedagogical content knowledge (how to teach) on "the body systems, health-related fitness, physical activity, and well-being" were discussed. Practices made in each subject matter lesson, such as joint program preparation, measurement and evaluation, and use of technology, were shared with the group. General evaluations and reflections about the entire program were shared in the sixth week. The six-week idPLC program's overall content is presented in Table 3.5.

PLCs communities of learners, school communities, teacher communities, and communities of practice (CoP) are all terminology used in the education literature to describe learning communities (Parker et al., 2021). They recognized that PLC and CoP are the most often used theoretical frameworks for defining learning communities (Vangrieken et al., 2017). A PLC must possess five essential characteristics: (a) a cooperative group with shared leadership; (b) individuals who share interests, vision, and targets; (c) a culture of group learning and adaptation; (d) shared individual practice; and (e) conditions that are both physically and psychologically supportive (Vangrieken et al., 2017).

idPLCs was designed according to our aims: (a) to make teachers knowledgeable about the interdisciplinary teaching method, (b) Incorporating body systems and health-related fitness information into the curriculum using an interdisciplinary approach to education, so allowing teachers to share their teaching strategies and experiences, (c) to give different branch teachers a chance to assess their interdisciplinary lesson. The facilitator guided the idPLCs' meetings.

Table 3. 5

The Overall Content of the Six-Week idPLC

Week	Topic
1	✓ An Introduction to the Program's Goals and Principles ✓ Discussion on the "Interdisciplinary PLC" ✓ Discussion on the different sixth-grade branches' curriculum ✓ Discussion of similar learning outcomes that occur in different sixth-grade branch lessons
2	✓ Evaluation of the previous week ✓ Discussion on Interdisciplinary Content Knowledge of "skeletal, muscular, cardiovascular & respiratory sytems, HrF, physical activity, and well-being" ✓ Discussion on the burdens of an interdisciplinary teaching method on teachers
3	✓ Evaluation of the previous two weeks ✓ Discussion on Interdisciplinary Pedagogical Content Knowledge of "selected body systems, HrF, physical activity, and well-being" (Instructional Alignment, Unit & Lesson Plan Preparation) ✓ Discussion on the common terminology used in interdisciplinary courses on "selected body systems, HrF, physical activity, and well-being." ✓ Discussion on Interdisciplinary Pedagogical Content Knowledge of "selected body systems, HrF, physical activity, and well-being" (Teaching Styles, Use of Technology, Measurement & Evaluation)
4	✓ General evaluation. (After the first interdisciplinary course) ✓ Discussion on Interdisciplinary Pedagogical Content Knowledge of "selected body systems, HrF, physical activity, and well-being" (Teaching Styles, Use of Technology, Measurement & Evaluation)
5	✓ General evaluation. (After the second interdisciplinary course) ✓ Discussion on Interdisciplinary Pedagogical Content Knowledge of "selected body systems, HrF, physical activity, and well-being" (Teaching Styles, Use of Technology, Measurement & Evaluation)
6	✓ General evaluation of the overall program experience.

3.4. Data Collection Instruments

This study's data collection instruments were divided into two sections: (1) quantitative and (2) qualitative data collection instruments. The data collection instruments associated with each research question are presented in Table 3. 6.

3.4.1. Quantitative Data Collection Instruments

This study's quantitative data were gathered using two different instruments: "The Health-Related Fitness (HrF) Knowledge Test" and "The Physical Activity Questionnaire for Older Children (PAQ-C)."

A. HrF Knowledge Test for Middle School Students. The "HrF Knowledge Test" adapted into Turkish from the "Superkids-Superfit Knowledge Test" (Mott et al., 1991) by Ince and Hunuk (2013), was used to determine the students' level of physical fitness knowledge about health. It is 36-item multiple-choice paper and pencil test. Every question is worth one point. As a result, the test was graded on a scale of 36 points. The content of this physical activity knowledge test is compatible with the secondary school physical education lesson's "health-related physical fitness parameters" and the science lesson's "systems in our body" units' learning outcomes (see Appendix E).

Table 3. 6

Data Collection Instruments and Analysis for Each Research Question

Research Questions	Data Collection Instrument	Data Analysis
Research Question 1. How does the idPLC influence the teachers' content and pedagogical content knowledge on selected body systems (skeletal, muscular, cardiovascular & respiratory) and HrF?	Video-recorded six-week idPLCs Semi- structured interviews with teachers Field Notes	Constant Comparative Analysis
Research Question 2. How does the teachers' participation in the idPLCs influence their students' HrF knowledge and physical activity participation level? *Research Question 2.a.* Do the teachers' participation in the idPLC increase their students' HrF knowledge? *Research Question 2.b.* Do the teachers' participation in the idPLC increase their students' physical activity participation level?	HrF Knowledge Test for Middle School Students Physical Activity Questionnaire for Older Children	Paired Sample T-Test
Research Question 3. What are the idPLC teachers' students' views on their teachers' teaching approaches to selected body systems (skeletal, muscular, cardiovascular & respiratory), HrF, and physical activity participation?	Focus- group interviews with students Students' work samples and journals	Constant Comparative Analysis

Hunuk and Ince (2008) applied "iteman" analysis to examine whether items work as intended. They reported item difficulty ranged from 0.24-0.90, with an ordinary p-value of 0.60, and discrimination ranged from 0.04-0.54. The questionnaire's reliability value was 0.68.

B. The Physical Activity Questionnaire for Older Children (PAQ-C). In order to determine the student's level of physical activity, the " The Physical Activity Questionnaire for Older Children (PAQ-C)" which is adapted into Turkish from the 'Physical Activity Questionnaire for Older Children (PAQ-C) (Kowalski et al., 2004) by Erdim et al., (2019), was used. The PAQ-C is a self-administered questionnaire that assesses overall moderate-to-vigorous physical activity levels throughout the school year and is completed after seven days of physical activity (see Appendix F).

The PAQ-C consists of 10 items. The PAQ-C questionnaire items comprise the first item that collects information on participation in various activities and sports (activity checklist); items 2 to 7 assess physical activity level, respectively: physical education class, recess, lunch, right after school, evening, and weekends. Items 8 and 9 determine, respectively, the frequency of physical activity and the frequency of physical activity according to days. The last item asks the children whether they have a condition that has affected their participation in physical activity.

Every item is scored from 1 (low physical activity) to 5 (very high physical activity), and the average score represents the PAQ score. However, if children answer yes to the tenth question, the questionnaire is regarded as invalid. The questionnaire's item internal consistency was 0.77, but the test-retest correlation was 0.91 (Erdim et al., 2019).

3.4.2. Qualitative Data Collection Instruments

Four methods were used to collect qualitative data for the current study: Video-recorded six weeks of idPLCs meetings, interviews with teachers, focus-group interviews with students, students' work samples and journals, and researchers' field notes.

A. Video- Recorded Six- Week idPLCs meetings. The video recordings of the six-week idPLCs meetings were provided as the primary data source, and the participants' permission was obtained. The primary purpose of these meetings was to

model how the interdisciplinary teaching method can be applied with the idPLC in schools' environments. The second aim was to assess teachers' content and pedagogical content knowledge through their sharings and reflections in the meetings.

B. Interview. The interviews allow us to receive as much information as possible directly from the participants' perspectives and gain an in-depth and holistic perspective on a particular topic (Patton, 2014). A semi-structured interview form was used to learn the teachers' thoughts and opinions about the method, activities, and experiences during the instruction designed according to the interdisciplinary teaching method (see Appendix G). All subject matter course teachers in the experimental groups (n = 10) participated in the semi-structured interview after six-week idPLC meetings. The semi-structured interview form consisted of 16 questions that were designed in an open-ended format. A digital voice recorder was used to record all of the interviews.

Moreover, a focus group interview was performed with the six students randomly selected in each experimental group at the end of six-week idPLC meetings. During the focus group interviews, a combined approach was included (Patton, 2014). The focus group interview consisted of seven questions, and two separate focus groups were asked the same questions. Every student had an opportunity to respond to the question. A digital voice recorder and video recorder were used to record the focus group interviews (see Appendix H).

C. Field Notes. Field notes are the written version of an observation, similar to interview transcripts (Merriam & Tsdell, 2016; p. 149). Field notes can take many different forms, but they always include explanations, direct quotations, and observer statements (Merriam & Tısdell, 2016; p. 161). Field notes are the most crucial component of the subsequent presentation of qualitative analysis (Lofland, 1971; p. 102). Additionally, "writing field notes is an onerous task, but field notes constitute the basis for the data upon which the study is based: no field notes, no data" (Schensul & LeCompte, 2012; p. 20).

As a researcher, I took field notes as a nonparticipant observer at each idPLC meeting (Merriam & Tsdell, 2016; p. 149; Creswell, 2012; p. 462). Field notes were made to record what was prevalent, the types of social dialogues that occurred in the idPLC, and any actions that took place during idPLC meetings. Field notes have been

used to understand teachers' interdisciplinary pedagogical content knowledge better, conduct peer reviews, and provide information to back up interview results (see Appendix I).

D. Students' Work samples/ Journals. A journal is a written record of one's thoughts and feelings about a particular topic or event (Solomon & Murata, 2008). Journaling's benefits were outlined by Elbow (1997): Maintaining student interest and participation in class, contributing to the discussion by offering comments, enabling students to take an active role in their education, aiming to help students become understanding in the learning processes of our students.

Students in the experimental groups prepared diaries in which they discussed the connections they made between weekly topics and lessons. The diaries were kept in the classroom by the teachers of the psychological counseling and guidance weekly topics and lessons. A few questions and guidelines were prepared for students to remember. At the end of the intervention process, the researcher examined those journals (see Appendix J).

3.5. Data Collection Procedure

Data was collected over 12 weeks during the spring semester of the 2021–2022 academic year. These weeks began with a pretest, followed by an idPLC intervention lasting, a posttest, and lastly, teacher interviews, and concluded by student focus group interviews (Table 3.7).

In the intervention phase, experimental groups' teachers participated in an idPLC. The Middle East Technical University's Department of Physical Education and Sport in the Faculty of Education hosted the six-week intervention session. In this stage, with teachers' approval, the researcher recorded six-week idPLC meetings on the video recorder. These meetings were held in a lecture lab at a university that was set up with audiovisual tools for teaching and learning. All members of the experimental group and the facilitator attended these gatherings.

For two weeks, the researcher gathered with the experimental groups' teacher outside without a facilitator. We exercised, ate, and drank coffee together when discussing interdisciplinary teaching implementation. The researcher took regular notes during these meetings.

The researcher interviewed the teacher and students for two weeks after the intervention was over (ten weeks later). While two focus group interviews with two groups of students were conducted, all ten teachers conducted semi-structured interviews in their school environments.

Table 3. 7

Data Collection Procedures

Duties	Weeks	Groups	
		Experimental	**Controls**
Creation of groups	05.05/ 01.10.21	3 Schools	3 Schools
Ethical Permission	29.09.2021	✓	✓
Pretests		HrF Knowledge Test / PAQ-C	HrF Knowledge Test / PAQ-C
First idPLC Meetings	4/8.10.21	Video- Recorded Field Notes	-
Second idPLC Meetings	11/15.10.21	Video- Recorded Field Notes	-
Third idPLC Meetings	18/22.10.21	2 Schools	2 Schools
Forth idPLC Meetings	27.10/04.11.21	Video- Recorded Field Notes	-
Fifth idPLC Meetings	08/12.11.21	Video- Recorded Field Notes	-
Free Meetings		Field Notes	-
Free Meetings		Field Notes	-
Sixth idPLC Meetings		Video- Recorded Field Notes	-
Posttests		HrF Knowledge Test / PAQ-C	HrF Knowledge Test / PAQ-C
Students Focus Group Interviews	28.12.2021	Interview Form	-
Teacher Interviews	27/31.12.21	Interview Form	-

3.5.1. Ethical Procedure

At the beginning of the study, Middle East Technical University's Human Research Ethical Committee approval was obtained (see Appendix A). Students and their parents provided their written approval to engage in the study before they could take part in it. Prior to the intervention, permission was granted from each school's administration and the District of National Education to gather data from each school

(see Appendix B). Teachers participating in the research filled out the voluntary participation form.

3.5.2. Creating of Groups

Months before the study began, familiar physical education teachers were negotiated. Some shared this study with other subject-matter teachers and invited the researcher to their schools to discuss it in detail. When the schools were visited, the study was first shared with the principals and then with the other subject matter teachers. The most challenging part of the study was the inclusion criteria for teachers: teaching the same subject matter course to the same 6th-grade class.

3.6. Internal, External Validity and Trustworthiness

This section presents the study's internal and external validity (for the quantitative portion) and trustworthiness (for the qualitative portion). For the convergent mixed methods design to be valid, both quantitative (e.g., concept) and qualitative (e.g., triangulation) validity must be established for each database (Creswell & Creswell, 2018). Validity refers to the degree to which we measure what we intend to measure, whereas reliability refers to the independence of the researcher (Bakker & van Eerde, 2015).

3.6.1. Internal Validity

Internal validity shows that any observed relationship between multiple variables must have a clear meaning and is not due to something else (Fraenkel et al., 2015; p. 167). Potential threats to internal validity and possible measures for them are briefly mentioned in this study. These can be subject characteristics, mortality, location, history, data collector characteristics, data collector bias, and implementation.

The threat posed by subject characteristics implies that there may be unintended differences between study participants related to the independent variables (Fraenkel et al., 2015; p. 168). For this study, all schools participated voluntarily. With the demographic survey, we obtained more information about participants. Moreover, to determine if there is a statistically significant difference between the control and

experimental groups, the researcher compared the students' pre-test scores on the PAQ-C scales and HrF knowledge test.

Mortality (the loss of subjects) refers to the fact that some participants may leave the study for various reasons, such as illness or family relocation. The best way to deal with mortality is to eliminate or at least reduce the number of participant losses in a study (Fraenkel et al., 2015; p. 168). Having successfully completed the process with no loss of participants, this threat has been controlled.

The threat of location means that you may get different answers depending on where you collect your data (Fraenkel et al., 2015, p. 170). In this study, data were collected in the same environment and same classroom to control this threat.

The history threat was the biggest issue for this study. Unexpected and unplanned events may occur at any point during a study, potentially altering the results (Fraenkel et al., 2015; p.180). When the researcher collected data, the Covid-19 pandemic period ended. As a result, if a participant was infected with Covid-19, the researcher arranged for that participant to participate in the study online to avoid a historical threat.

To eliminate threats from data collector characteristics and data collector bias, the researcher prepared an instruction with some rules for collecting data for teachers. Unintentional advantages gained by the experimental group through treatment may bias the findings (Fraenkel et al., 2015; p.180). For this study, the experimental and control groups were informed about the study's aim and content before implementation, which might make it easier to eliminate this threat.

3.6.2. Trustworthiness

Qualitative validity is how far the researcher goes to make sure the results they get are correct. Qualitative reliability is how much the same researcher uses the same methods for all their projects (Gibbs, 2007). Credibility or internal validity (Merriam & Tısdell, 2016), external validity or transferability (Merriam & Tısdell, 2016), dependability, reliability, consistency (Merriam & Tısdell, 2016), and confirmability are four methods proposed by Lincoln and Guba (1985) to enhance the reliability of qualitative research.

First, credibility, which is related to internal validity, depends on how well the study's findings correlate with reality (Merriam & Tısdell, 2016). For this study, two strategies were used to ensure credibility: triangulation and peer review. Triangulation is probably the best-known method for enhancing a study's internal validity (Merriam & Tısdell, 2016). According to Denzin's (2009) definition, triangulation has four types: the use of multiple methods, multiple sources of data, multiple investigators, and multiple theories to explain the findings. In the present study, triangulation of data was utilized to validate and cross-check conclusions. The researcher triangulated multiple data collection sources, such as video-recorded meetings, semi-structured interviews with teachers, field notes, focus group interviews with students, and student work samples/ journals. A seasoned qualitative research professional provided input and advice at each stage of the analysis process, from developing the preliminary codes to writing up the findings.

Another method for credibility is peer debriefing (Creswell & Miller, 2000; Lincoln & Guba, 1985). In this study, while the facilitator led in the idPLC meetings, the researcher was in the meetings and took field notes while participating in discussion. After the idPLC meetings, they discussed what worked and what did not work in the meetings.

To increase trustworthiness, transferability was used as another method. According to Merriam and Tisdell (2016), detailed, thick descriptions and maximum variation are two ways to increase the transfer of the results of a study to a different environment. Without offering any interpretation or commentary, the researcher provided a detailed account of the study's participants, environment, and collected data. Direct quotations for the codes acquired were included to reinforce the results' trustworthiness. (Yıldırım & Şimşek, 2016)

Keeping the original data from the research and preserving the interviews are two ways to assure dependability and prevent information loss (Maxwell, 2013). The researcher was consistent in every aspect of the study, from planning to data collection to analysis and interpretation. In addition, the researcher clearly outlined each stage of the study and included an example lesson plan in the Appendix L for other researchers to use in other school contexts, making the results more trustworthy. In addition, the

researcher's function was specified in the study. The study includes a literature review that provides context for the data.

3.7. Data Analysis

Data analysis methodology for the study's qualitative and quantitative parts are presented below.

3.7.1. Qualitative Data Analysis

The constant comparative data analysis technique (Glaser & Strauss, 1967) was used to analyze the video-recorded and completely transcribed six-week two-idPLC meetings, semi-structured interviews with teachers, and researcher field notes for the first research question. Moreover, the focus group interviews with the students and the students' journals were analyzed also using constant comparative data analysis technique for the third research question.

In the constant comparative data analysis technique, four-step method for coding and analyzing data was used in this study (Strauss & Corbin, 1998). The methods were microanalysis, open, axial, and selective coding. The first stage of microanalysis entailed looking at the transcribed data line by line to develop initial codes. Open coding, the second phase, entails giving names to ideas and establishing and expanding categories according to their characteristics and features (Strauss & Corbin, 1998). In order to facilitate the open coding procedure, the researchers used MaxQDA 22 in this work. This is one of the applications used to save, organize, and retrieve qualitative data (Meriam & Tisdell, 2016). Data were categorized using open coding by categorizing terms, adding opinions, and developing codes. To use as starting codes, the researcher derived unique, descriptive labels from each data set. Coding labels were created to classify comparable words into more general and relevant groups. After a large number of codes were collected, they were sorted and cataloged to look for repeating structures. Then, the researcher used axial coding to put the codes into groups based on how they related to other ideas and sub-concepts. The researcher used this information to answer the study's questions. After open coding, axial coding "reconstructs data in new ways by generating links across categories" (Savin-Baden & Major, 2013). The researcher was able to reduce the

number of codes into manageable pieces by classifying them. Categories are essential; they help the researchers speed up their work by letting them group, combine, and combine information. By using selective coding, the researcher was able to turn codes and classifications into themes that describe the information in each data source. As a theme was a unifying idea in the data, finding themes was crucial to data analysis, as Savin-Baden & Major (2013) stated.

3.7.2. Quantitative Data Analysis

Paired sample t-test was used for the analysis of HrF knowledge and physical activity pretest and posttests. The assumptions of independent observation and normality were verified before any inferential analysis was performed (Field, 2009). The alpha level is set at 0.05. SPSS version 26 was used for all data analysis (Table 3.6).

3.8. The Role of the Researcher

It is believed that the researcher's role, competencies, personal beliefs, assumptions, and biases are particularly important in terms of reliability throughout the process, as can be understood from the issues mentioned on how measures are obtained concerning the validity and reliability threats of the research. Therefore, it is necessary to describe the researcher's actions from the beginning of the process (research design) to the finish (reporting).

Before the study started, the researcher had individual and collective meetings with all the subject matter teachers. The researcher explained the purpose and process of the study in detail and invited them to participate. The researcher also made a WhatsApp group with the teachers of the experimental groups to enable them to ask questions that came to mind in a friendly way.

In this study, the researcher's role included interviewing each participating teacher and student, compiling and evaluating the resulting data, and writing up any observations the researcher had about shifts in instructors' methods or the content of their work. During this stage of the study, the researchers' role was that of a non-participant observer, whose responsibilities included videotaping the meetings, taking notes, and ensuring everyone were comfortable. The researcher visited schools for

physical education and sports classes where the teachers taught with an interdisciplinary method. The researcher took field notes and videotaped the last lesson.

3.9. Limitations

1. This study was limited to four secondary schools, 6th -grade classes and their different subject matter teachers in Ankara province.
2. The interdisciplinary content was limited with skeletal, muscular, cardiovascular & respiratory sytems, HrF, physical activity, and well-being.
3. In this study just, physical education lessons were observed, in other subject matter lessons did not observe in the classroom.
4. Only physical education and sports lessons were measured and evaluated.

CHAPTER IV

RESULTS

This chapter presents the findings on the idPLC teachers' content and pedagogical content knowledge on selected body systems and HrF; idPLC teachers' students' HrF knowledge and physical activity participation level; and students' view on their teachers' teaching approaches. Findings for each study research question are presented in order.

4.1. The Result of the First Research Question

Research Question 1. How does the idPLC influence the teachers' content and pedagogical content knowledge on selected body systems (skeletal, muscular, cardiovascular & respiratory) and HrF?

This research question is examined through interviews, field notes, and fully transcribed six-week idPLCs video record data. Findings indicated that teachers' content and pedagogical content knowledge on selected body systems and HrF knowledge develop through questioning, accepting, practicing, and reflecting (see Figure 4.1). Findings of each central theme (questioning, accepting, practicing, and reflecting) and their categories are presented through the six-week idPLCs meetings below (see Figure 4.1).

4.1.1. Theme 1: Questioning

Teachers' "Questioning" of interdisciplinary teaching mainly existed in the first and second idPLCs. In the first of the idPLCs meetings, the group met, and the facilitator shared the purpose, content, and tentative program flow with the participants. At the same time, the curriculum of the currently adopted secondary subject matter courses was examined, and similar learning outcomes with different

subject matter courses were discussed with the group. In the second idPLC meeting, discussions were held on interdisciplinary content knowledge on selected body systems (skeletal, muscular, cardiovascular, and respiratory), HrF, physical activity, and wellbeing, and how these topics were represented in the content knowledge of each subject matter course. In addition, the burdens and responsibilities that the interdisciplinary teaching method would create for teachers were discussed. Moreover, in the second meeting, the facilitator shared a video of exemplary interdisciplinary teaching combining physical activity, science, history, and art (teaching quality dance by integrating different subject matters:

(https://www.youtube.com/watch?v=hzkL_LSro0s).
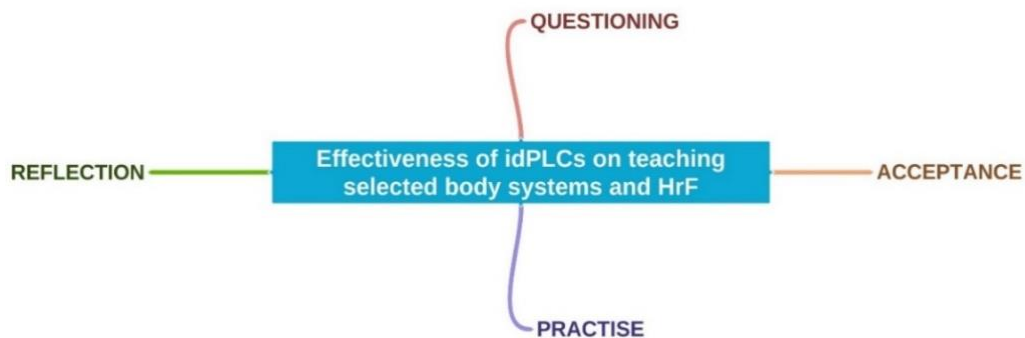
Figure 4. 1. Emerged themes

Three categories emerged for the theme of questioning, including A) Policies related to interdisciplinary teaching, B) Teacher competence in interdisciplinary teaching collaboration, and C) Suitability of work/school setting for interdisciplinary teaching (Figure 4. 2).

Category 1. Policies Related to Interdisciplinary Teaching

Three sub-categories were created in the policies related to the interdisciplinary teaching category. These include "lack of expansion of the curriculum,"; "policies limiting education," and "policies on interdisciplinary teaching."
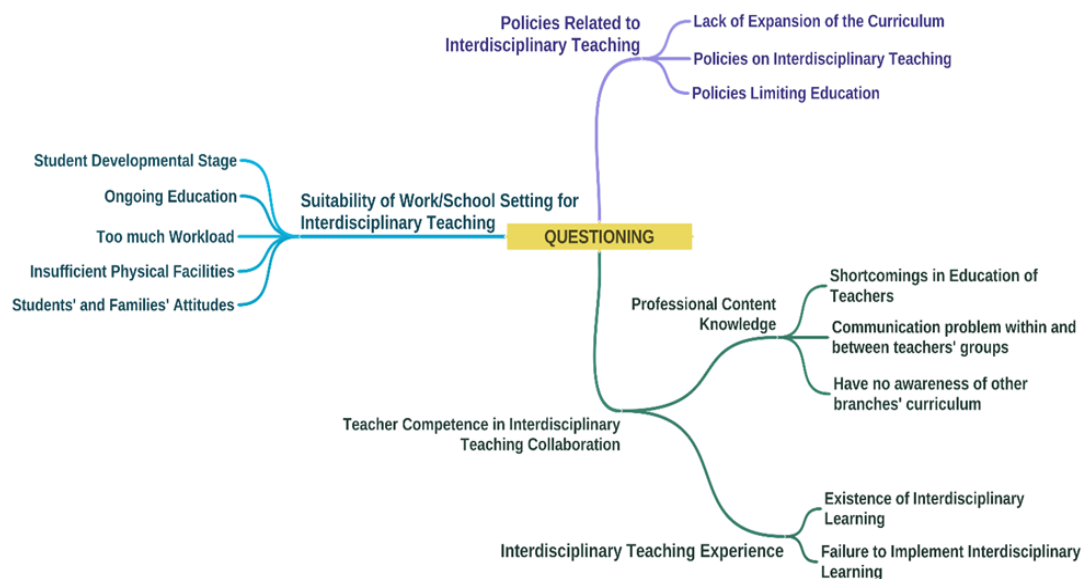
Figure 4. 2. Hierarchical categories/ sub-categories/ codes display of questioning theme

In the category of policies related to interdisciplinary teaching, teachers expressed their views ***on the lack of expansion of the curriculum***. The participants stated that they could not interact with the same topic within the academic year simultaneously with other subject matter teachers because they could not change or stretch the curriculum. This is valid for subject matter teachers other than physical education and visual arts classes, which have a more flexible program. The teachers also said that from 6th to 8th grade, some subjects in the curriculum of their branch courses did not go in a complementary order. In this issue, participants stated the following:

> *"...There is a curriculum we have prepared. Apart from that, you cannot go out much. There are some difficulties at work." (Science teacher, idPLC-1 meetings)*

> *"...Hazırladığımız bir müfredat var. Onun dışında çok çıkamıyorsunuz. Biraz işte sıkıntılar oluyor." (Fen bilgisi öğretmeni, dMGT-1 toplantıları)*

> *"Now, teacher, I will say something here. We are talking about a transition between disciplines. A lesson does not have a unity in itself. For example, I have to give the 6th grade the inflectional suffixes. It is in the curriculum. We say that there are additional verbs. "He doesn't know the verb. He will learn it at 7, and I'm trying to make him feel this suffix at 6. This kid doesn't know the verb. The verb conjugations remain in the air. I try to explain it simply, but I doubt how much they understand. A lesson doesn't even have a consistency within itself." (Native language teacher, idPLC-1 meetings)*

"Şimdi hocam ben burada bir şey söylicem. Disiplinler arası geçişten söz ediyoruz. Bir dersin kendi içinde bir bütünlüğü yok. Örneğin ben 6. Sınıfa konum çekim eklerini yapım eklerini vermek zorundayım. Müfredatta var. Orada diyoruz ki ek fiil ekleri de çekim ekidir. Çocuk ek fiili bilmiyor, fiili bilmiyor 7 de öğrenecek ben 6 da bu eki ona sezdirmeğe çalışıyorum. Fiil çekim ekleri havada kalıyor. Basite indirgeyerek anlatmaya çalışıyorum ama ne kadar anlıyorlar ondan şüpheliyim. Bir dersin kendi içinde bile bir tutarlılığı yok." (Türkçe öğretmeni, dMGT-1 toplantıları)

"We come across in English a lot. Not only is it victory, I start explaining to children as if they know what I tell them. They look and then I realize that they give importance to this in Turkish. I ask, they learn, the English always go first. I mean, it's very bad, but unfortunately that's the way it is. " (Foreign language teacher, idPLC-2 meetings)

"İngilizce de çok karşımıza çıkıyor. Sadece zarf değil ya ben ne anlatsam çocuklara başlıyorum, biliyorlarmış gibi anlatmaya. Bakıyorlar sonra fark ediyorum Türkçede bu önem verirler diye düşünüyorum. Soruyorum, öğrenmiş oluyorlar, İngiliz hep önden gidiyor. Yani çok kötü ama maalesef bu şekilde." (İngilizce öğretmeni, dMGT-2 toplantıları)

Another sub-category in the category of policies related to interdisciplinary teaching was ***policies limiting education***. Participants stated that there are some restrictive policies in education preventing interdisciplinary teaching. Selected statements of the participants on the subject are as follows:

"There are limitations due to some concerns… Current education, directing perspectives are effective, you know." (Native language teacher, idPLC-1 meetings)

"Bazı kaygılardan dolayı sınırlayıcılar var…O anki eğitim yönlendiren bakış açıları etkili biliyorsunuz;" (Türkçe öğretmeni, dMGT-1 toplantıları)

"Muscles, in the old times, there were a lot of visuals showing the muscles. But now they've removed it this year, the topic of muscles... But we explain the muscles, we have to explain [them]. Because the topic is called the support movement system. Now, we call this [as] what we call the support system under this topic, it is the bones we say, the joints, the cartilage. Since we have also stated that the muscles are in the movement system, we have to explain it unavoidably. So, it is formal, I also don't want to get into those topics now. [You can't imagine how] our books are so troublesome. I don't even [want to] make any comments because, uhm, we can't get out of it when we start talking about it, frankly." (Science teacher, idPLC-1 meetings)

"Kaslar eski yıllarda kasları gösteren bir sürü görsel vardı. Şimdi bu sene kaldırmışlar ama kaslar konusunu... Ama kasları anlatıyoruz, anlatmak zorundayız. Çünkü destek hareket sistemi diye başlık. Şimdi bunu bu başlık altında destek sistemini ne ediyoruz işte kemiklerdir diyoruz, eklemlerdir, kıkırdaktır. Hareket sisteminde kaslara kasları kapsadığını da ifade ettiğimize göre mecburen anlatmak zorundayız. Yani resmi şimdi o konulara da girmek

istemiyorum. Yani kitaplarımız o kadar sıkıntılı ki. Girdik mi çıkamayacağımız için hiç ıı yorum bile yapmayım açıkçası" (Fen bilgisi öğretmen, idMGT-1 toplantıları)

"Hocam (a way of calling out to colleagues in school in Turkish) Unfortunately, they already want us not to teach [those subjects], the subjects they want to [us to] get acquainted with the student are already provided. So, we can't get out of it" (Foreign language teacher, idPLC-1 meetings)

"...Hocam maalesef yani onlar zaten bizim öğretmememizi istedikleri, öğrenci ile karşılaştırmak istedikleri konular zaten hazır geliyor. Yani onun dışında çıkamıyoruz." (İngilizce öğretmen, dMGT-1 toplantıları)

Regarding the ***policies on interdisciplinary teaching***, participants reported that there are supportive statements regarding interdisciplinary teaching by MoNe in policy documents and national subject matter curriculum guides. They also noted that the statement of "interdisciplinary cooperation" is included in the minutes of each subject matter group (zümre) meetings at the beginning of the academic year. However, teachers underlined that how to realize interdisciplinary cooperation is unclear, and they do not do it in reality. The statements of the participants on the subject are as follows:

"Actually, our group records always write something, there is an expression of cooperation with other groups. But there will be cooperation with other groups, but what will be done, how it will be done, with which group, what theme will be done, these are never clearly stated. But it was years ago. The Ministry of National Education brought it. In order to cooperate with other groups so that it can be found in the group report. I mean, we keep it there as an inscription." (Foreign language teacher, idPLC-1 meetings)

"Aslında zümre tutanaklarımızda her şey yazar, diğer zümrelerle işbirliği ibaresi var. Ama o orada ibareden diğer zümrelerle işbirliği yapılacaktır nokta ama ne yapılacak, nasıl yapılacak, hangi zümre ile yapılacak, hangi temada yapılacak bunlar asla hani açık bir şekilde belirtilmez. Ama onun seneler önce MEB getirmiş. Zümre tutanağında bulunsun diye diğer zümrelerle iş birliği yapılsın diye. Diyorum ya biz de ibare olarak o nu orada bulunduruyoruz." (İngilizce öğretmeni, dMGT-1 toplantıları)

"Not as an experience, but we always include it in our group meetings every year, but nothing is done." (Visual art teacher, idPLC-2 meetings)

"Deneyim olarak değil ama zümre toplantılarımız da mutlaka hep dahil ederiz her sene ama hiçbir şey de yapılmaz." (Görsel sanatlar öğretmeni, dMGT-2 toplantıları)

Moreover, participants also noted the school administrators' perceived support for interdisciplinary teaching policies. The researcher's field notes also showed that

when we visited the schools, both administrators listened carefully to this study and supported us using all the school's facilities. Selected excerpts from the statements of teachers on the topic are presented below:

> *"[With respect to interdisciplinary teaching] Our manager even encourages us" (Psychological counseling subject teacher, idPLC-1 meetings)*

> *"[Disiplinlerarası öğretimle ilgili olarak] Müdürümüz bizi teşvik eder" (Psikolojik rehberlik ve danışma öğretmeni, dMGT1 toplantıları)*

> *"They might even like it." (Physical education and sport teacher, idPLC-1 meetings)*

> *"Hoşlarına gider hatta." (Beden eğitimi ve spor öğretmeni, dMGT-1 toplantıları)*

> *"Our administrator supports projects." (Foreign language teacher, idPLC-2 meetings)*

> *"Müdürümüz projeleri destekler" (İngilizce öğretmeni, dMGT-2 toplantıları),*

Category 2. Teacher Competence in Interdisciplinary Teaching Collaboration

Two different sub-categories were created in the "teacher competence in interdisciplinary teaching collaboration" category, including "interdisciplinary teaching experience" and "professional content knowledge" are examples of these.

Interdisciplinary teaching experience two different codes were created in the sub-category of interdisciplinary teaching experience. These include the existence of interdisciplinary learning and the failure to implement it.

In the category of interdisciplinary teaching experience, the participants expressed their opinions on the e*xistence of interdisciplinary learning* extensively. The participants talked about the interdisciplinary learning methods they have already done. Related participants mentioned the following:

> *"Actually, there was. Huh huh. I have mentioned before. You know, there was interdisciplinary communication with mathematics teachers, something that we have been doing for years. Actually, it's not the first time we've seen this. If you remember, I always mentioned it at every opportunity. We already have work with mathematics teachers, art teachers and music teachers from time to time. But how much is it? That's what we try to do with our own efforts. Apart from this, we were getting help from our teachers who would cover our own subjects. (Understood). As a science groups, let me tell you." (Science teacher, idPLC-1, interview)*

> *"Aslında vardı. Hı hı. Ben daha önceden de bahsetmiştim. Biliyorsunuz matematik öğretmenleriyle vardı disiplinler arası iletişim vardı zaten bizim*

yıllardır olan bir şey. Aslında biz ilk defa görmüyoruz bunu. Hep de her fırsatta da belirtmiştim hatırlarsanız. Matematik öğretmenleriyle dönem dönem resim öğretmenleriyle, müzik öğretmenleriyle bizim zaten çalışmalarımız oluyor. Ama ne kadar oluyor? İşte kendi çabalarımızla bu tür şeyleri yapmaya çalışıyoruz. Bunun dışında ııı yani kendi konularımızı kapsayacak nitelikte öğretmenlerimizden yardım alıyorduk. (Anladım). Fen zümresi olarak, öyle söyleyeyim." (Fen biligis öğretmeni, dMGT-1, bireysel görüşme)

"We cooperate with other groups, and we write visual arts and music as physical education. So, where is our communication here? It usually happens on national holidays, obviously there is a relationship there." (Physical education and sport teacher, idPLC-1 meetings)

"...Diğer zümrelerle iş birliği ve bizde de beden eğitimi olarak görsel sanatlar ve müziği yazarız. Buradaki iletişimimizde nerede oluyor? Genelde milli bayramlarda oluyor açıkçası oralarda bir ilişki..." (Beden eğitimi ve spor öğretmeni, dMGT-1 toplantıları)

"It was always in education. Uhm, it was in me, but I also have a special interest. Though, most of them, in English teaching have it. In fact, we always draw on the board or something." (Foreign language teacher, idPLC-2 meetings)

"Eğitimde de vardı hep. Iıı benim içimde de vardı ama benim özel ilgim de var. Gerçi ingilizce öğretmenliğinde çoğunda var. Aslında hep çizeriz biz tahtaya falan." (İngilizce öğretmeni, dMGT-2 toplantıları)

"I mean, maybe we were connecting with our teacher friend with a single lesson, maybe with a math teacher, but we didn't expand the event more comprehensively like this. For example, when I was going to teach a numerical subject, I was contacting our Mathematics teacher. How should we explain it, my teacher? Did you explain it before? Sometimes we saw that it did not match. They didn't come to the subject. But we were working on that subject. The child was having difficulties. So, I did it with a single math lesson." (Science teacher, idPLC-2, interview)

"Yani tek dersle belki hani bir matematikle biz öğretmen arkadaşımızla bağlantı kuruyorduk ama böyle daha kapsamlı daha büyütmemiştik olayı. Mesela ben sayısal bir konu anlatacağım zaman Matematik öğretmenimizle irtibata geçiyordum. Hocam nasıl anlatalım? Siz önce anlattınız mı? Bazen uyuşmadığını görüyorduk. Yani onlar daha o konuya gelmemiş oluyorlardı. Ama biz işliyorduk o konuyu. Çocuk zorlanıyordu. Yani tek matematik dersiyle yapmıştım." (Fen bilgisi öğretmeni, dMGT-2, bireysel görüşme)

In the interdisciplinary teaching experience sub-category, another code that the participants expressed was the ***failure to implement interdisciplinary learning***. Participants stated that subject matter cooperation and interdisciplinary learning were not implemented even though they were in the legislation. The statements of the participants on the subject are as follows:

"Actually, our group records always write something, there is an expression of cooperation with other groups. But there will be cooperation with other groups, but what will be done, how it will be done, with which group, what theme will be done, these are never clearly stated. But it was years ago. The Ministry of National Education brought it. In order to cooperate with other groups so that it can be found in the group report. I mean, we keep it there as an inscription." (Foreign language teacher, idPLC-1 meetings)

"Aslında zümre tutanaklarımızda hep şey yazar, diğer zümrelerle işbirliği ibaresi var. Ama o orada ibareden diğer zümrelerle işbirliği yapılacaktır nokta ama ne yapılacak, nasıl yapılacak, hangi zümre ile yapılacak, hangi temada yapılacak bunlar asla hani açık bir şekilde belirtilmez. Ama onun seneler önce MEB getirmiş. Zümre tutanağında bulunsun diye diğer zümrelerle iş birliği yapılsın diye. Diyorum ya biz de ibare olarak o nu orada bulunduruyoruz." (İngilizce öğretmeni, dMGT-1 toplantıları)

"We memorize it as if the child memorizes it until he takes the exam. After the exam is over, he forgets it when he no longer needs it. A year later he does not remember. What he learned a year ago." (Science teacher, idPLC-2 meetings)

"Biz ezber yaptırıyoruz sanki çocuk sınava girene kadar ezberliyor. Sınav bittikten sonra da artık ona ihtiyacı kalmayınca unutuyor. Bir sene sonra hatırlamıyor. Bir sene önceki öğrendiklerini." (Fen bilgisi öğretmeni, dMGT-2 toplantıları)

"You know, I haven't thought about this (interdisciplinary teaching method) in such detail. I also started to think in this way. You know, [as if] the students were giving you an example, and that's what we'll do in the next subject, and like that. I think of it all the time by myself. How can I connect [my lesson] with mathematics? How can I connect with other branches [and such questions]. At least I've started to inquire." (Foreign language teacher, idPLC-2, interview)

"…Hani bu bunun (disiplinler arası öğretim yöntemi) üzerine böyle etraflıca düşünmemiştim. Bu sayede düşünmeye de başladım böyle. Hani öğrenciler size örnek veriyorlarmış da bundan sonraki konuda böyle yaparız falan. Ben de onu düşünüyorum hep kendi kendimi. Matematikle nasıl bağdaşabilirim? Diğer branşlarla nasıl bağdaşabilirim diye. En azından sorgular oldum." (İngilizce öğretmeni, dMGT-2, bireysel görüşme)

In the sub-category of ***professional content knowledge***, three different codes were created. These were "shortcomings in the education of teachers," "communication problems within and between teachers' groups," and "no awareness of other branches' curriculum."

In the professional content knowledge sub-category, the participants expressed their opinions extensively about ***shortcomings in the education of teachers***. Teachers mentioned that they felt inadequate for interdisciplinary education:

"It feels it, but I also feel that I need to catch up a little bit more, and in this sense, I need to make up for my deficiencies. Because he is not well, versed in other fields, after all. I think this requires some work." (Physical education and sport teacher, idPLC-1 meetings)

"Hisseder; ama biraz daha yetişmem gerektiğini hani bu anlamda eksiklerimi tamamlamam gerektiğini de hissederim. Çünkü diğer alanlara oldukça vâkıf değil sonuçta. Bu da bir çalışmayı gerektirir diye düşünüyorum."(Beden eğitimi ve spor öğretmeni, dMGT-1 toplantıları)

"No, I don't see it enough. In the verbal field, for example, in the field of history and geography, if such a project were done, I would sit and study. I mean, right now, I don't think it's enough. Maybe we are closer to numerical fields, that is, English or grammar. I do not think that I am very competent in these subjects, "We need to do something. If we are going to undertake such a project, we need to take responsibility." (Science teacher, idPLC-2 meetings)

"Yok yeterli görmüyorum. Sözel alanda mesela tarih coğrafya alanında eğer böyle bir proje yapılmış olsa oturup ders çalışırım. Yani şu anda hani yeterli olduğunu düşünmüyorum açıkçası. Belki sayısal alanlara daha yakınız öyle yani İngilizce olsun dil bilgisi olsun. Bu konularda çok yeterli olduğumu düşünmüyorum, bir şeyler yapmamız lazım. Böyle bir projeye gireceksek ben elimizi taşın altına koymak gerekiyor." (Fen bilgisi öğretmeni, dMGT-2 toplantıları)

"As I said, I wonder if there is the right information, for that bridge between them. But is the move about it correct? For example, this skeleton, for the muscle, is also what I thought a lot about, what can I do? What can I do? What bone-related activity can I do? You know, okay, I'm doing [it]. But I reconciled with it correctly, and then, so, I copied from that video we were watching. Like, that's how I forged a link from there. After that, when we go to the muscular system, where can I match it [with something similar] like that? What can I do by changing it a little bit, uhm, so just that thing, that is, what can I make them do that is the appropriate activity? Would it be correct? Would I be on the right track? You know, would I forge the right connect. It was only one problem there." (Physical education and sport teacher, idPLC-2, interview)

"...Bu dediğim gibi bu aradaki o köprüyü acaba doğru hani bilgi var. Ama onunla ilgili hareket acaba doğru mu? Mesela bu iskelet, kas da ben çok düşündüm ne yapabilirim? Ne yapabilirim? Kemiklerle ilgili ne etkinlik yapabilirim? Hani tamam yapıyorum. Ama onunla doğru bağımı, sonra işte o izlediğimiz videodan kopya çektim. Hani oradan öyle bağ kurdum. Oradan sonra işte kas sistemine geçtiğimizde yine ona benzer nereden yakalayabilirim? Biraz değiştirerek ıı yani sadece o şeyi yani onu uygun etkinlik ne yaptırabilirim? Doğru mu olur? Doğru yolda mı ilerlerim? Hani doğru bağımı kurarım. Orada bir tek sıkıntı vardı..." (Beden eğitimi ve spor öğretmeni, dMGT-2, bireysel görüşme)

Communication problems within and between teachers' groups was another code in which the participants gave their opinions in the professional content

knowledge sub-category. Teachers stated that adequate communication was not provided with other teachers, both among and within the group. The statements of the teachers on the subject are as follows:

> "...Including me, I don't even know about science. Right now, there is nutrition, there is this, there is this, we are directly related, but we are obviously aware of what week he is working on. Yes, we have a deficiency in this, but there is a problem in the system in general. There is no sanction. You do not create any platform regarding this. Everyone is responsible for their own lesson to save themselves. In short, we can say that there is no such communication." (Physical education and sport teacher, idPLC-1 meetings)

> "...Bende dahil olmak üzere ben fen bilgisi konularını bile bilmiyorum. Şu an beslenme var, şu var bu var direk ilişkiliyiz ama hangi hafta o neyi işliyor açıkçası bir haberiz. Bu bunda bizimde evet eksikliğimiz var ama genel anlamda sistemde de sıkıntı var. Hani bir yaptırım yok bu. Bununla ilgili herhangi bir platform oluşturmuyorsun. Herkes kendisini kurtarmak için kendileri dersinden sorumlu. Özetle böyle bir iletişim yok diyebiliriz." (Beden eğitimi ve spor öğretmeni, dMGT-1 toplantıları)

> "We don't see much with my three friends from the morning staff or with the students. We go out and they come in. We talked to the friends from the morning people, but we didn't come too curious. There was no sharing. It didn't attract attention." (Physical education and sport teacher, idPLC-2, interview)

> "Sabahçılardan üç arkadaşım ya öğrencilerle çok görüşmüyoruz. Biz çıkıyoruz onlar giriyorlar. Sabahçılardan arkadaşlarla konuştuk ama çok meraklı da gelmedik. Paylaşım olmadı. İlgi çekmedi." (Beden eğitimi ve spor öğretmeni, dMGT-2, bireysel görüşme)

> "The basis of the failure is miscommunication. The fact that the groups cannot reach a consensus, not creating such an environment in schools. We go to class hurry. We complete the 40 minutes. We can't even take a breather at 10 minutes of recess... I have said it before, I think it is very troublesome for us to communicate with our own friends and branch friends, let alone different branches." (Native language teacher, idPLC-1, interview)

> "...İletişimsizlik başarısızlığının temelinde bu var. Zümrelerin fikir birliğine gidememesi böyle bir ortamın okullarda yaratılmaması. Çünkü biz haldır, aldır aldır derse gidiyoruz. 40 dakikayı dolduruyoruz. 10 dakikalık teneffüste bile bir nefes alamıyoruz... Daha önce de söyledim, sanırım farklı branşları bırakın kendi arkadaşlarımızla branş arkadaşlarımızla iletişimimiz bile çok sıkıntılı." (Tükçe öğretmeni, dMGT-1, bireysel görüşme)

> "Believe me, we don't have much dialogue with the groups...Our branch, for example, also does not sit down and talk. So, we are two teachers, either she has an errand, other things come up. Then there is adversity, no time is created to sit down. Remotely, ok, we got a printout. Immediately prepared this application. Because the ready-mades are used..." (Foreign language teacher, interview; idPLC-2 meetings)

"Zümrelerle inanın diyaloğumuz çok yok. Yani onlar ters devre olduğu için genellikle sohbet içinde değiliz; ...Bizim branşta mesela oturup konuşmuyor. Yani 2 öğretmeniz ya onun işi oluyor. Farklı bir şey oluyor. O zaman sıkıntı oluyor, oturup bir zaman yaratılmıyor. Uzaktan tamam çıktı aldık. Hemen bu uygulama hazırladı. Hazırlar kullanıldığı için..." (İngilizce öğretmen, bireysel görüşme; dMGT-2 toplantıları)

"... none of them (the group) asked anything. [as to ask] What are you doing, I've never been in a communion. We just said what we did. There were friends who were curious. Everyone from different branches is in a rush..." (Native language teacher, idPLC-1, interview)

"...hiç biride (zümresi) bir şey sormadı. Ne yapıyorsunuz siz bir paylaşım içinde bulunmadım. Sadece yaptığımızı işi söyledik. Merak eden arkadaşlar vardı. Farklı branşlardan herkes bir koşuşturma içerisinde..." (Türkçe öğretmeni, dMGT-2, bireysel görüşme)

The teachers expressed their opinions by saying they were ***unaware of other subject matters' curricula***. The teachers stated that they were unaware of the curriculum of other branches and lacked knowledge about the subjects. They said that they had never studied each other's course curriculum before. The statements of the teachers on the subject are as follows:

"I didn't know either, for example, I never knew that children practice this support and movement system in the sixth grade. I even thought that in the following years. I personally did not know it myself. I really think that we have a deficiency in this regard. What do my other branch colleagues do, where, when, I really have no idea where they are." (Foreign language teacher, idPLC-1 meetings)

"Ben de bilmiyordum mesela çocukların bu destek ve hareket sistemini altıncı sınıfta işlediklerini hiç bilmiyordum. Hatta daha ileriki senelerde diye düşünüyordum. Şahsen kendim de bilmiyordum. Gerçekten bu konuda bir eksiğimiz maalesef var diye düşünüyorum. Diğer branş arkadaşlarım ne yapıyor, nereye, ne zaman, neredeler gerçekten bir fikrim yok yani." (İngilizce öğretmeni, dMGT-1 toplantıları)

"Well, since my branch is guidance, I can't say that I actually needed the content of other courses until today, but as you said, I have information from my previous education. Especially in Turkish and mathematics, but there is no need for me to use it. When I think about their work, I don't really use the contents of other courses. So even if you try to use it, yes, I admit that I am inadequate, because I have to sit down and study again and look again." (Psychological counseling subject teacher, idPLC-2 meetings)

"Iıı şöyle branşım rehberlik olduğu için aslında diğer derslerin içeriğini bugüne kadar aslında hiç ihtiyaç duyduğumu söyleyemem yani; ama dediğiniz gibi önceki eğitimimden kalan bilgilerim var. Özellikle Türkçe ve matematikte ama hani kullanmam gerektirecek bir durum da yok. Yani benim yaptığım hani

şu an tüm çalışmalarını düşündüğüm zaman gerçekten hani diğer derslerin içeriklerini ben ııı kullanmıyorum. Yani kullanmaya kalksan da evet yetersiz olduğumu itiraf ederim yani çünkü oturup ııı tekrardan çalışmam tekrardan bakmam gerekir yani." (Rehberlik ve psikolojik danışmana öğretmeni, dMGT-2 toplantıları)

"So, we only have information. From time to time, we compare with the social [studies topics] the interdisciplinary approach a little bit, with social studies [topics] on important days but he doesn't know about me, I don't know about him. [you can say that it is] interdisciplinary from a distance away. Just only with the social [sciences] and us, so. But there was no other experience than that. We didn't also have the opportunity to do it." (Physical education and sport teacher, idPLC-2, interview)

"Yani sadece bilgimiz var. Zaman zaman sosyalle biz hani önemli günlerde, sosyal bilgilerle, disiplinler arası yaklaşımı biraz benzetiyoruz ama ne onun benden haberi var, ne benim ondan haberim var. Uzaktan uzağa disiplinler arası. Sadece işte sosyalle bizim. Ama onun dışında bir deneyim yoktu. Yapma imkanımız da olmadı." (Beden eğitimi ve spor öğretmeni, dMGT-2, bireysel görüşme)

"I honestly don't think many teachers, including me, know what other majors do. You know, there may be a small number of them in there, but…" (Physical education and sport teacher, idPLC-1 meetings)

"Ben de dahil olmak üzere birçok öğretmenin diğer branşların ne yaptığını bildiğini hiç sanmıyorum açıkçası. Hani arada sayısı az olarak bulunan olabilir ama…" (Beden eğitimi ve spor öğretmeni, dMGT-1 toplantıları)

Category 3. Suitability of Work/School Setting for Interdisciplinary Teaching

In the ***suitability of work/school setting for interdisciplinary teaching***, six different codes were created "student developmental stage," "ongoing education," "too much workload, "insufficient physical facilities," and "students' and families' attitudes."

In the sub- category of the ***student's developmental stage***, the teachers talked about the problems brought about by the developmental periods of the students. They stated that the subjects in the curriculum did not progress in accordance with the developmental stages of the children. Teachers mentioned the following:

"School is very difficult; also, they are already entering puberty. And the children have other problems." (Science teacher, idPLC-1meetings)

"Okul çok zor zaten bide ergenliğe giriyor. Bir de başka sorunları da var çocukların." (Fen bilgisi öğretmeni, dMGT-1 toplantıları)

"Is it possible to examine the curriculum in direct proportion to the development of children? You know, in the sixth grade, clocks are early for hours. It would be better to learn at 7 with the past tense. Maybe he can do this in terms of children's development." (Foreign language teacher, idPLC-2 meetings)

"Çocukların gelişimiyle doğru orantılı olarak müfredat incelenebilir mi acaba? Hani atıyorum altıncı sınıfta saatler saatler için erken bir zaman geçmiş zamanla 7 lerde öğrenmek daha iyi olur. Bunu çocukların gelişimi açısından belki o olabilir." (İngilizce öğretmeni, dMGT-2 toplantıları)

"I tried to give the same words in the skeletal system that are in the book. I also tried to choose the most important ones, the most important ones in my opinion. I didn't want to give it all, also. because it could be too heavy language, for children." (Foreign language teacher, idPLC-2, interview)

"Kitaptaki olan iskelet sistemindeki kelimelerin aynısını ben de vermeye çalıştım. Bir de en önemlilerini, bana göre en önemlilerini seçmeye çalıştım. Hepsini de vermek istemedim. Çok çünkü ağır dili olabileceği için, çocuklar için." (İngilizce öğretmeni, dMGT-2, bireysel görüşme)

Ongoing education was a sub-category the teachers used to say what they thought about whether the environment was suitable for interdisciplinary teaching. Teachers talked about the impact of the currently adopted education system on interdisciplinary learning. The expressions of the teachers on the subject are as follows:

"I observe from the outside, for example, they are asked for something from us, they want them from us, but the desired thing is not feasible at all. We're trying to make it up so we can do it now. We are trying to set the clock. Dimi teacher, they just want it, you know, can this be done? Is there time for this? Nobody thinks about it, they just say we want to do it." (Foreign language teacher, idPLC-2 meetings)

"Dışarıdan gözlemliyorum mesela bizden onlardan bir şey isteniyor onları bizden istiyorlar ama istenilen şeyin yapılabilitesi hiç yok. Biz onu artık yapalım diye işte uydurmaya çalışıyoruz. Saat ayarlamaya çalışıyoruz. Dimi hocam onlar sadece istiyorlar, hani bu yapılabilir mi? Bunun için zaman ayrılabilir mi? Bunu pek düşünen yok, bunu yapın istiyoruz diyorlar o kadar." (İngilizce öğretmeni, dMGT-2 toplantıları)

"And by the way (5,6 different subjects at the same time), can you imagine, Hocam, the situation in which the child's brain turns into? So, the kid comes out of a completely different subject here in math. Pop, 10 minutes pass, he's taking a completely different lesson at that moment. the theme is different, the subject is different, the teacher is different, oh, everything, if we think about the dramatic picture this kid went through there, they're even more harmful than we are, of course, it is very difficult for us, but when we look at it from

their point of view, it is really very difficult." (Foreign language teacher, idPLC-1 meetings)

"Ve bu arada (aynı anda 5,6 farklı konunun işlenmesi) hocam çocuğun beyninin geldiği durumu düşünebiliyor musunuz? çocuk yani burada matematikte tamamen farklı bir konudan çıkıyor. Hop aradan 0 dakika geçiyor, tamamen farklı bir derse giriyor o anda. Teması farklı, konusu farklı, hocası farklı ya her şey bu çocuğun orada yaşadığı dramatik tabloyu düşünecek olursak, bizden de zararlı aslında onlar tabi ki bizim için çok zor ama onlar açısından baktığımızda çok çok zor gerçekten." (İngilizce öğretmeni, dMGT-1 toplantıları)

In the sub-category of ***too much workload***, the teachers stated that their number of lessons per week was too many, and the course content was very dense, so they could not find time and energy for different activities. Moreover, they stated that they have much paperwork outside of class. Related teachers mentioned the following:

"... Today I had 6 hours of class. I left one class. Whenever I come to the other class or on other days, there are very busy schedules. Besides, you have a task for other activities at school. We should be given time to work, we should be supported. Okay, I'm researching, but if I can't get help from the physical education teacher on the transition between disciplines, if I can't get a positive feedback, I won't go to you again after 1,2 tries... I'm so sorry, I'm going to say drudgery, we become physically exhausted from chores, let alone in schools. When we go home, our pulp is gone " (Native language teacher, idPLC-1 meetings)

"... Bugün 6 saat dersim vardı. Bir sınıftan çıktım. Diğer sınıfa ne ara ben veya başka günlerde çok yoğun programlar oluyor. Bunun yanı sıra işte okulda başka başka aktiviteler için göreviniz oluyor. Iıı bize çalışacak zaman verilmeli, destek olunmalı. Tamam, ben araştırıyorum ama ben beden eğitimi öğretmeninden disiplinler arası geçiş konusunda yardım alamıyorsan bir olumlu yaklaşım dönüt alamıyorsam ben 1,2 denemeden sonra bir daha gitmem yanına böyle şeylerde söz konusu... Bırakın ücreti okullardaki çok özür dilerim angarya diyeceğim angarya işlerden biz fiziksel olarak bitkin hale geliyoruz. Eve gittiğimizde bizim posamız çıkmış oluyor " (Türkçe öğretmeni, dMGT-1 toplantıları)

"I can reach a limited number of students. I wish I could reach every student. This is the biggest problem I am experiencing right now. Not only now, but this is something that always is. Uhm, normally our school currently has 3 staff. I have to work alone right now. And under these circumstances, it is certainly not possible anyway. So, it is troublesome." (Psychological counseling subject teacher, idPLC-2 meetings)

"Ben sınırlı sayıda öğrenciye ulaşabiliyorum. Keşke her öğrenciye ulaşabilsem. Şu an da yaşadığım en büyük sıkıntı bu zaten. Şu an değil aslında her zaman olan bir şey. Ee normalde bizim okulumuz şuan 3 kadrolu. Tek çalışmak durumundayım şu anda. Ve bu şartlar altında zaten kesinlikle

mümkün olmuyor. O yüzden sıkıntı." (Psikolojik danışmanlık ve rehberlik öğretmeni, dMGT-2 toplantıları)

Another sub-category regarding the suitability of work/school settings for interdisciplinary teaching was ***inadequate physical facilities***. Teachers stated that the physical facilities in the school were insufficient. The researcher's field notes support the teachers' statement. One school had only one small library, which was insufficient to create an idPLC environment. While the indoor areas of the other school are suitable, the outdoor space is inadequate. The population of the school is also too crowded for the building. However, there are suitable meeting areas for an idPLC environment. The representations of the teachers on the subject are as follows:

"There is no such place in this school. We worked on the Erasmus project last year. We couldn't find a room to work like that." (Foreign language teacher, idPLC-1 meetings)

"Ben, bu okulda öyle bir yer yok. Geçen sene Erasmus projesinde çalışmıştık. Öyle çalışacak bir oda bulamadık." (İngilizce öğretmeni, dMGT-1 toplantıları)

"Our garden is not very suitable for drawing too much anyway. There are some fields that we drew ourselves, but we drew something on the back, for example, there is a square, there are circles in the square. The children run away from each other when they press the line. I watched the full logic of it again today, but I did not understand it completely. So, the children are on the line. There's a midwife in the middle trying to catch them while they're swapping places. For example, sixth graders use it because it's just ours. I don't know for younger age groups. They go there every break. They drew something like h in the middle of our building. For example, children play there. It's in our front yard. If there is an opportunity, children will definitely play. In primary school, my son's garden was newly built. It is a very small garden, but there are hopscotch or something. For example, they play in the hopscotch while I am waiting for the child. I don't think it is completely useless, but he cannot use it much. " (Physical education and sport teacher, idPLC-2 meetings)

"Bizim bahçemiz çok uygun değil zaten çok çizime. Biz kendi kendimize çizdiğimiz bazı sahalar var ama arka tarafa şey çizdik mesela bir kare var karede yuvarlaklar var. Çocuklar birbirlerinden kaç kaçıyorlar çizgiye basınca. Tam mantığını bugün tekrar izledim ama tam anlamadım. Yani çocuklar çizginin üstünde birbirleriyle yer değiştirirken ortada ebe var ebe yakalamaya çalışıyor. Mesela sadece olan bizimkisi olduğu için altıncı sınıflar orayı kullanıyor. Küçük yaş gruplarında bilmiyorum. Her teneffüs oraya gidiyorlar. Orada bizim binamız h gibi bir şey tam ortasına çizmişler. Mesela çocuklar orada oynuyor. Ön bahçemizde öyle bir imkan olsa mutlaka çocuklar oynayacaktır. İlkokulda oğlum bahçesi yeni yapıldı. Çok küçük bir bahçe ama seksekler falan var. Mesela ben orada çocuğu beklerken sekseklerde oynuyorlar. Çok tamamen faydasız değil bence ama çok da kullanamıyor ya

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böyle arada yüzde 50 yüzde 50 diyebilirim benim gözlemlediğim." (Beden eğitimi ve spor öğretmeni, dMGT-2 toplantıları)

Student and family attitude s were the last sub-category in which the teachers gave their opinions on the suitability of work or school settings for interdisciplinary teaching. Teachers talked about the attitudes of students and parents in the process. The statements of the students on the subject are as follows:

"Planning plus the child does not have a goal anyway. Why does he come to school? Why is he alive? He doesn't know anything. I'm sorry but that's the truth. In other words, the subject we are discussing here actually addresses him as well. In other words, the information that children learn is meaningless to him. That is, it does not relate to daily life. In other words, this interdisciplinary approach does not appeal to him a little, but rather to him. In other words, how can the child use the knowledge he has learned in daily life? You know, it offers him that perspective, in that sense, it's a nice approach." (Psychological counseling subject teacher, idPLC-2 meetings)

"Planlama artı çocuğun hedefi yok zaten. Ya niye okula geliyor? Niye yaşıyor? Hiçbir şeyden haberi yok. Üzgünüm ama gerçek bu. Yani aslında burada bizim tartıştığımız konu aslında ona da hitap ediyor. Yani çocukların öğrendiği o bilgiler onun için anlamsız kalıyor. Yani günlük yaşamla ilişkilendirmiyor. Yani bu aslında disiplinler arası yaklaşım da biraz ona biraz değil baya ona hitap ediyor. Yani çocuk onu öğrendiği bilgiyi günlük yaşamda nasıl kullanabilir? Hani ona o bakış açısını sunuyor o anlamda yani güzel bir yaklaşım." (Psikolojik danışmanlık ve rehberlik öğretmeni, dMGT-2 toplantıları)

"...Students who can't write properly are studying. The Turkish language is 70 80 90, that is, there is a slackness in the system, this slackness reflects on the student. The student does not take his work seriously, he does not try, he is ready, the parent comes and says to the teacher, why did you give my child 70? I don't know, my child has taken these lessons, so it is such a complex situation that there was a system that required multilateral rather than unilateral interpretation..." (Native language teacher, idPLC-1 meetings)

"...Hiç doğru dürüst yazamayan öğrenciler okuyor. Türkçesi 70 80 90 yani sistemde bir gevşeklik var bu gevşeklik öğrenciye aksediyor. Öğrenci işini ciddiye almıyor, çabalamıyor, hazıra konuyor veli gelip diyor ki, öğretmene niye benim çocuğuma 70 verdin. Benim çocuğum bilmem şu dersler şunu almış yani o kadar karmaşık bir durum ki tek taraflı değil çok taraflı yorum gereken sistem vardı..." (Türkçe öğretmeni, dMGT-1 toplantıları)

"Like I said their reluctance recently made me a bit of something. Like, am I going to waste time, I wonder? [it] pushed [me] to such negative thoughts. [As you wonder] you want all the students to participate when you do an event? This relaxation in students inevitably makes you sad and leads you to think negatively..." (Native language teacher, idPLC-1, interview)

"…Dediğim gibi son zamanlarda isteksizlikleri biraz beni şey yaptı. Hani boşa mı zaman geçireceğim acaba? Böyle bir olumsuz düşünceye itti. Hani bir etkinliği yaparken bütün öğrencilerin katılmasını istiyorsunuz? Öğrencilerde ki bu gevşeme ister istemez sizi üzüyor, sizi olumsuz düşünmeğe yöneltiyor…" (Türkçe öğretmeni, dMGT-1, bireysel görüşme)

"Oh, I had this thing group set up. You know, they had set up a video thing on a WhatsApp group to send workouts three days a week. For example, there were beautiful visuals from there… At the parents' meeting, for example, the parents were waiting for me. Normally physical education teachers do not expect many parents at the meeting. Uhm, we talked to them quite a bit… They said they were very, very pleased that the children were moving… I even told them, you know, take your child when he comes from school. You will have [to] move for an hour, too. You will walk together. Oh, they were so happy. In fact, five people who didn't give their consent at first gave their consent back. So, they realized that [the activities] are really beneficial for the children." (Physical education and sport teacher, idPLC-2, interview)

"Ya bu şey grubunu kurdurmuştum ben. Hani haftada üç gün egzersiz göndermek için video şey WhatsApp grubu kurmuşlardı. Mesela oradan güzel görüntüler oldu… Veli toplantısında veliler mesela bekliyorlardı beni. Normalde beden eğitimi öğretmeni çok veliler beklemezler toplantıda. Iıı onlarla biz bayağı konuştuk…. Çocukların hareket etmesinden çok çok memnun olduklarını söylediler… Hatta onlara dedim ki hani çocuğunuzu alın okuldan gelince. Bir saat size de hareket olur. Beraber yürürsünüz. Ya onlar çok mutlulardı. Hatta ilk başta onay vermeyen beş kişi geri onay verdi. Yani çocukların gerçekten faydalı olduğunu fark etmişler" (Beden eğitimi ve spor öğretmeni, dMGT-2, bireysel görüşme)

4.1.2. Theme 2: Acceptance

This theme specifically emerged from the second idPLC meeting, where teachers had a chance to watch exemplary interdisciplinary teaching. After the discussions of the first idPLC meeting and the concrete example of interdisciplinary teaching at the second idPLC, teachers' start to understand the educational value of the interdisciplinary teaching. For the "Acceptance" theme, two categories were created. These include the "positioning the lesson in interdisciplinary teaching" and "teacher motivation." (Figure 4.3)

Category 1. Positioning the Lesson in Interdisciplinary Teaching

Three sub-categories emerged in this category. These are "topics suitable for interdisciplinary teaching," "connecting with other branches," and "openness to development."

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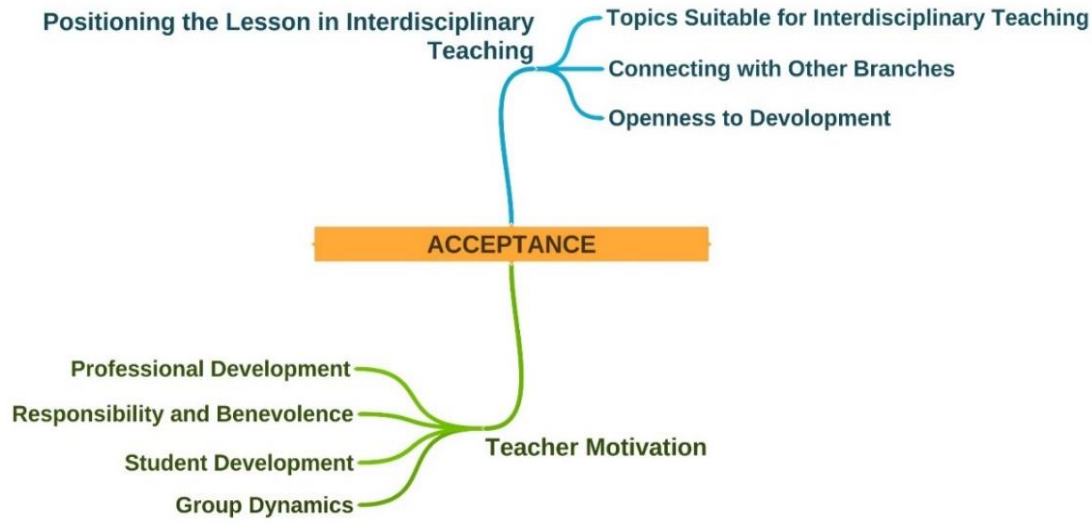
Figure 4. 3. Hierarchical categories/ sub-categories display of acceptance theme

At the end of the second week, the teachers started to position themselves in idPLC. In positioning the lesson in interdisciplinary teaching, the teachers expressed their opinions about ***topics suitable for interdisciplinary teaching***. Teachers talked about topics that may be suitable for interdisciplinary learning. Related participants mentioned the following:

> *"Yes. Now, I realized that especially science and physical education lessons are very intertwined, especially in the field of biology, they are both very intertwined. I noticed that and I think that this should definitely be done jointly, especially when the science and physical education curricula are being prepared, that is, a common curriculum should be prepared in the field of biology. For example, I worked mostly in my field and in different groups, but mostly with Turkish because we have a lot of trouble with grammar. The child does not learn Turkish, he learns English and goes ahead. You teach the child, but they can't make an example, because there is no Turkish equivalent, the mother tongue will eventually know in the mother tongue so that they can know what they have learned in a second language, unfortunately, it is very difficult without knowing it." (Foreign language teacher, idPLC-1 meetings)*

> *"Evet. Şimdi şöyle aslında özellikle fen dersi ile beden eğitimi dersinin çok iç içe olduğunu farkettim, özellikle işte biyoloji alanında çok iç içe ikisi de çok iç içe. Onu farkettim ve bence kesinlikle ve kesinlikle özellikle fen bilgisi ve beden eğitimi müfredatları yapılırken kesinlikle bunun ortak yapılması lazım yani ortak müfredat hazırlanması lazım diye düşünüyorum biyoloji alanında. Mesela benim alanımda da en çok farklı zümrelerde de çalıştım ama en çok türkçe ile çünkü gramer konusunda biz çok sıkıntı çekiyoruz. Çocuk Türkçesini öğrenmemiş oluyor ingilizcesini öğreniyor önden gidiyor. Çocuğa öğretiyorsun ama örnekleme yapamıyor çocuklar çünkü Türkçe karşılığı yok*

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ana dil sonuçta ana dilde bilecek ki ikinci bir dilde neye tekabül ettiğini öğrendiği şeyin bilsin bunu bilmeden çok zor oluyor malesef." (İngilizce öğretmeni, dMGT-1 toplantıları)

"Our topics overlap. Because basically you can take it out of science if we don't go into it. Many topics we are doing the application. We are already in the app. Hold on to it without taking a breath, but of course we weren't going inside. Why is this so? Cause and effect? We didn't do much of the interrogation. Let's be frank." (Physical education and sport teacher, idPLC-1, interview)

"Konularımız örtüşüyor çünkü. Çünkü esasen içine girmesek fen bilgisindeki çıkarabilirsin. Birçok konu biz uygulamasını yapıyoruz. Uygulamada iç içeyiz zaten. Bir nefes almadan tutun da oradan ama tabii ki içeriye girmiyorduk. Bu neden böyle? Neden sonuç? Sorgulama işini pek yapmıyorduk. Açık konuşalım." (Beden eğitimi ve spor öğretmeni, dMGT-1, bireysel görüşme)

"When we talk about science, for example, when I talk about nutrition or something about physical hope, we often overlap with science, for example. I know that the subject of nutrition is in the real science. But kids take it at different times I guess. I do not go into such details because you must have learned this, but there is no permanence in children because it is not at the same time. I had such an experience, last year, when we talked, but I did not have the opportunity to go at the same time. " (Physical education and sport teacher, idPLC-2 meetings)

"Bizim daha çok hani ıı fenle ilgili olarak bu ben mesela beslenmeyi anlatırken ya da ıı fiziksel umutla ilgili bazı şeyleri anlatırken fenle mesela çok çakıştığımız oluyor. Beslenmeyle ilgili konusunu asıl fende olduğunu biliyorum. Ama çocuklar sanırım farklı zamanlarda alıyor. Ben bunu öğrenmiş olmanız lazım diye çok böyle ayrıntıya girmiyorum ama çocuklarda kalıcılık kalmıyor aynı anda olmadığı için. Böyle bir deneyimim de yani geçen sene hani biz konuşmuştuk ama aynı anda gitme imkanım olmadı." (Beden eğitimi ve spor öğretmeni, dMGT-2 toplantıları)

In positioning the lesson in interdisciplinary teaching, another sub-category that the teachers gave their opinions on was ***connecting with other branches***. Teachers talked about the applications that can be made by establishing connections between branches. The statements of the teachers on the subject are as follows:

"Sometimes I applied Turkish subjects by combining them with knowledge in science. For example, you can write the information there and write the topics like the way of expression in Turkish or spelling punctuation, like 2 birds with one stone. I applied it this way, but of course, I think that much more successful results will be achieved when these studies are spread over all the courses." (Native language teacher, idPLC-1, interview)

"Bazen Türkçe konularını fen bilgisindeki bilgilerle birleştirerek uyguladım. Mesela oradaki bilgileri yazıp Türkçe de anlatım biçimi ya da yazım noktalama gibi konuları hani bir taşla 2 kuş misali. Bu şekilde uyguladım ama tabi ki bu

çalışmalar bütün derslerin yayıldığında çok daha başarılı sonuçlar elde edilir diye düşünüyorum." (Türkçe öğretmeni, dMGT-1, bireysel görüşme)

"I see my lesson closely with visual arts, so I think it should be a lot. I think it should be integrated because students learn better by seeing, even if I draw something on the board myself, at least the words can be explained with pictures, posters can be used, visuals can be used instead of giving them the Turkish language. In this respect, I have always seen visual arts very closely. Among those who are not here, I see them close to music. English teaching with songs that are useful to listen to." (Foreign language teacher, dMGT-2, interview)

"Görsel sanatlarla yakın görüyorum dersimi yani çok olması gerektiğini düşünüyorum. Entegre edilmesi gerektiğini düşünüyorum çünkü öğrenciler görerek daha iyi öğrendikleri için tahtaya kendim bir şeyler çizsem bile en azından kelimeleri direkt hani türkçesini vermek değil de resimle anlatılabilir, posterler kullanılabilir, görseller kullanılabilir maket olur. Hani bu açıdan görsel sanatlar çok yakın görmüşümdür her zaman. Burada olmayanlar arasında müziğe de yakın görüyorum. Dinlemekte fayda şarkılarla ingilizce öğretimi." (İngilizce öğretmeni, dMGT-2, bireysel görüşme)

"As a field knowledge, I don't have much knowledge with visual art. Oh, [and] I can't build a connection right now. There are, uhm, actually a lot in common with English, uhm, but I am [the one that is] missing from there. Science, uhm, is a little closer, so. With the topics, with our systems, they are a little more in line with this. So, not the parts about the thing, not the parts about the chemistry but the biology, the biology part in science lessons, uhm, there is that thing, like due to my branch. At least there is an underlying information but not in other parts." (Physical education and sport teacher, idPLC-2 meetings)

"Alan bilgisi olarak benim görselle hani benim çok bilgim yok. Ya bağda çok fazla hani kuramıyorum şu an. İngilizce ile aslında ıı çok ortak yönler var ama ıı oradan da ben eksiğim. Fen bilgisi ıı biraz daha böyle yakın. Bizim sistemlerle konularla onlar biraz daha böyle paralellikte için. Ya bu şey kısımları değilde işte kimya bölümleri değilde biyolojiye giren, fen bilgisinin o biyoloji kısmında ıı kendi branşımdan dolayı yani bir şey var. En azından bir altta yatan bir bilgi var ama diğer kısımlarında yok." (Beden eğitimi ve spor öğretmeni, dMGT-2 toplantıları)

"For example, I also found a support movement system in the sciences. He/she uses his body without realizing it. So, when you look at it, every lesson can actually find its own parts. Of course, using your hands, arms… So, if you look at it, it is more permanent." (Science teacher, idPLC-1 meetings)

"Mesela fen bilimlerinde destek hareket sistemi de buldum. Farkında olmadan vücudunu kullanıyor. Yani baktığınız zaman aslında her ders kendinden parçalar bulabiliyor. Tabi ki elini kullanma kolunu kullanma. Yani baktığınız zaman daha kalıcı." (Fen bilgisi öğretmeni, dMGT-1 toplantıları)

In the category of positioning the lesson for interdisciplinary teaching, another sub-category that teachers expressed was ***openness to development***. Teachers stated

that they are open to development and innovation. The expressions of the teachers on the subject are as follows:

> *"Of course, I spent more time. In other words, we've been going from a ready, made plan in recent years. I confess, but now that such a study has taken place, I sat at the table you know. I opened three or four sources at once. I found other works. He got creative. It made us act a bit, not a bit, but a lot." (Physical education and sport teacher, idPLC-1, interview)*

> *"Tabi tabi daha çok vakit harcadım. Yani aslında son yıllarda daha çok hazır plandan gidiyoruz. İtiraf ediyorum ama şimdi böyle bir çalışma olduğunda ben bildiğiniz masanın başına oturdum. Üç dört kaynağı birden açtım. Daha farklı çalışmalar buldum. Yaratıcı oldu. Biraz bizi de harekete biraz değil bayağı bir harekete geçirdi yani." (Beden eğitimi ve spor öğretmeni, dMGT-1, bireysel görüşme)*

> *"I guess I should not say that I am. It is necessary to research, how I can do better, new technologies, as you said, how they are done in different countries." (Visual art teacher, idPLC-2 meetings)*

> *"Ben oldum dememek lazım herhalde. Araştırmak, daha iyi nasıl yapabilirim, yeni teknolojiler, dediğiniz gibi farklı ülkelerde nasıl yapılıyor araştırmak lazım." (Görsel sanatlar öğretmeni, dMGT-2 toplantıları)*

Category 2. Teacher Motivation

Four different sub-categories emerged for the teacher motivation category. They are "professional development," "responsibility and benevolence," "student development," and "group dynamics."

In the teacher motivation category, the teachers expressed opinions about ***professional development***. Teachers mentioned that professional development is their most significant motivation for contributing to interdisciplinary learning. Teachers mentioned the following:

> *"Now, as teachers of different branches, we are longing to share. So, unfortunately, our shares are few. Be it in your own work, in the academic field, at school, or in the social field. now it was fun for us to commute there for once, frankly. On the last road, chat, conversation, we went and came. First, we said how can we come, but when we were leaving, we had such sharing. On the way, we had such sharing as we turned along the way. And what are we doing right from our point of view during the brainstorming meetings we held there? What are we doing wrong? What are the different opinions of my friends? Learning these motivated me, frankly. Learning and receiving their ideas also motivated me. Because I'm telling you, this is our biggest longing at school. In other words, we unfortunately cannot share with*

each other about our lessons about children. We don't have time for that."
(Foreign language teacher, idPLC-1, interview)

"Şimdi biz zaten farklı branşların öğretmenleri olarak paylaşmanın özlemi içindeyiz. Yani paylaşımlarımız maalesef az. Kendi işte okulda akademik alanda olsun, sosyal alanda olsun. Şimdi bir kere bizim için oraya gidip gelmek eğlenceli oldu açıkçası. Yolda son yolda sohbet, muhabbet, gittik geldik. Önce bir nasıl geliriz falan dedik ama işte giderken öyle paylaşımlarımız oldu. Yolda yol boyunca dönerken öyle paylaşımlarımız oldu. Bir de orada o beyin fırtınası şeklinde yaptığımız bireysel görüşmeler kendi açımızdan neleri doğru yapıyoruz? Neleri yanlış yapıyoruz? arkadaşlarımın farklı görüşleri neler? bunları öğrenmek beni motive etti açıkçası. Ya onların fikirlerini de öğrenmek, almak motive etti. Çünkü diyorum ya bizim en büyük özlemimiz okulda bu. Yani biz çocuklarla ilgili derslerimizle ilgili, birbirimizle paylaşımda maalesef bulunamıyoruz. Buna bir vaktimiz yok." (İngilizce öğretmeni, dMGT-1, bireysel görüşme)

"Well, first of all, I add something extra to myself. Because where people stand, so let me take a look at it. How will this work? Or how I can work differently. For so many everyday things. A lot of people don't mind. But when something like this happens, I also improve myself. You have great influence. And the students are really the students, you know, we randomly chose a group, but the students were the students who took us one step ahead. Because they were more willing than us. What huh. So, when there was an inner motivation in both myself and the students, he walked away." (Physical education and sport teacher, idPLC-2, interview)

"Ya hani öncelikli olarak kendime bir şeyler katıyorum ekstra. Çünkü insan durduğu yerde yani ben dur şuna bir bakayım. Bu nasıl yürüyecek? Ya da dersim nasıl değişik işlerim diye. Çok günlük şeylerden dolayı. Çok insan kafa yormuyor. Ama böyle bir şey de olunca kendimi de geliştirmiş oluyorum. Iıı sizin büyük etkiniz var. Ve öğrenciler de gerçekten hani biz rastgele bir grup seçmiştik ama öğrenciler de bizi bir adım öne götüren öğrenciler oldu. Çünkü onlar bizden daha istekliydiler. Hı hı. Yani hem kendim hem öğrencilerde bir iç motivasyon olunca yürüyüp gitti." (Beden eğitimi ve spor öğretmeni, dMGT-2, bireysel görüşme)

"I contribute to myself also as professionally... Of course, I am here because it will contribute to both me and the students..." (Physical education and sport teacher, idPLC-1 meetings)

"Hem mesleki anlamda kendim için katkı sağlıyorum...tabi ki hem kendime hem de öğrencilere katkısı olacağı için buradayım..." (Beden eğitimi ve spor öğretmeni, dMGT-1 toplantıları)

Responsibility and benevolence are another sub-category that the teachers gave their opinions on in the category of teacher motivation. Teachers expressed a strong sense of responsibility and helpfulness. Here, the characteristics of the

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researcher, such as her smile, style, and communication skills, come to the fore. The statements of the teachers on the subject are as follows:

> *"Goodwill… style is very important, he expressed himself very well and I want to help students too. There are things that we are helpless with. I thought this would be a good opportunity. That was my aim too. That's it." (Science teacher, idPLC-1 meetings)*

> *"İyi niyet ııı üslup tarzı çok önemlidir, kendini çok güzel ifade etti ııı ve ben de öğrencilere yardımcı olmak istiyorum. Çaresiz kaldığımız konular oluyor. Bu konularda hani güzel bir fırsat olur diye düşündüm. Benim de amacım buydu. O kadar." (Fen bilgisi öğretmeni, dMGT-1 toplantıları)*

> *"Really, yes, it's very difficult for me, this is the job that I've been talking about. I really pushed my conditions, but as I said, I didn't want to offend, Mrs. Nehir, because it was very sympathetic. I actually like to take part in such projects, but it's nice. There is a change, there is a motivation to your profession again. And those two." (Foreign language teacher, idPLC-1 meetings)*

> *"Gerçekten öyle ki benim evet çok zor ki ben sizden bahsedenler bu iş geldi işte. Gerçekten çok şartlarımı da zorladım ama dediğim gibi çok sempatik geldiği için Nehir Hanım, valla kırmak istemedim. Ben bu tip projelerin içinde yer almayı aslında severim de hani güzel oluyor. Bir değişiklik oluyor, bir motivasyon oluyor tekrardan mesleğinize. Bir de o ikisi." (İngilizce öğretmeni, dMGT-1 toplantıları)*

In the category of teacher motivation, teachers also stated their views on ***student development.*** Teachers stated that the remarkable impact on student development inspired them. They stated that the motivation and willingness of the students to come to the lesson is the factor that increases the motivation of their teachers. Teachers who also noted the following:

> *"…Because I see a change in children, albeit small. In short, because I believe in its effectiveness." (Physical education and sport teacher, idPLC-1, interview)*

> *"…Ufak ufak da olsa çocuklarda bir değişim olduğunu gördüğüm için. Özetle etkililiğine inandığım için." (Beden eğitimi ve spor öğretmeni, dMGT-1, bireysel görüşme)*

> *"…And the students are really the students, as we randomly selected a group, but the students were the students who took us one step further. Because they were more willing than us. So, when there was an inner motivation in both myself and the students, he walked away." (Physical education and sport teacher, idPLC-2, interview)*

> *"…Ve öğrenciler de gerçekten hani biz rastgele bir grup seçmiştik ama öğrenciler de bizi bir adım öne götüren öğrenciler oldu. Çünkü onlar bizden daha isteklilerdi. Yani hem kendim hem öğrencilerde bir iç motivasyon olunca yürüyüp gitti." (Beden eğitimi ve spor öğretmeni, dMGT-2, bireysel görüşme)*

Another sub-category that the teachers gave their opinions in the teacher motivation is ***group dynamics.*** Teachers stated that the interaction of their group motivates them. The statements of the teachers on the subject are as follows:

"No, of course, because we believe in the effectiveness of the project. Because we became integrated with the group and I was really excited about this work, because I believe in its effectiveness (Physical education and sport teacher, idPLC-1, interview)

"Yok tabii ki projenin etkililiğine inandığımız için. Grupla bütünleştiğimiz için ve hakikaten ufak ufak da olsa bunu bu çalışmanın beni de heyecanlandırdığını. Özetle etkililiğine inandığım için." (Beden eğitimi ve spor öğretmeni, dMGT-1, bireysel görüşme)

"You know, I joined because I was curious and wanted to be in a different environment, but now I say I'm glad I joined" (Science teacher, idPLC-2 meetings)

"Hani başta merak ettiğim için farklı bir ortamda bulunmak istediğim için katılmıştım ama şu anda hani iyi ki katılmışım iyi ki aranızdayım diyorum (Fen bilgisi öğretmeni, dMGT-2 toplantıları)

4.1.3. Theme 3: Practice

The practice theme mainly emerged from the third, fourth, and fifth idPLC meetings. In the 3rd, 4th, and 5th weeks, interdisciplinary pedagogical content knowledge on selected body systems (skeletal, muscular, cardiovascular & respiratory), HrF, physical activity, and wellbeing were discussed, respectively. Furthermore, the discussion on common concepts/contents to be used in the classes on these issues advanced. Teachers started to implement interdisciplinary teaching plans in their classes. The teachers showed the rest of the group how they used the curriculum and content in the subject matter. (see Appendix L)

Under the "Practice" theme, data indicated two categories. These were "teachers view on the student experiences" and "Planning and implementing interdisciplinary teaching of the subject matter" (Figure 4. 4).
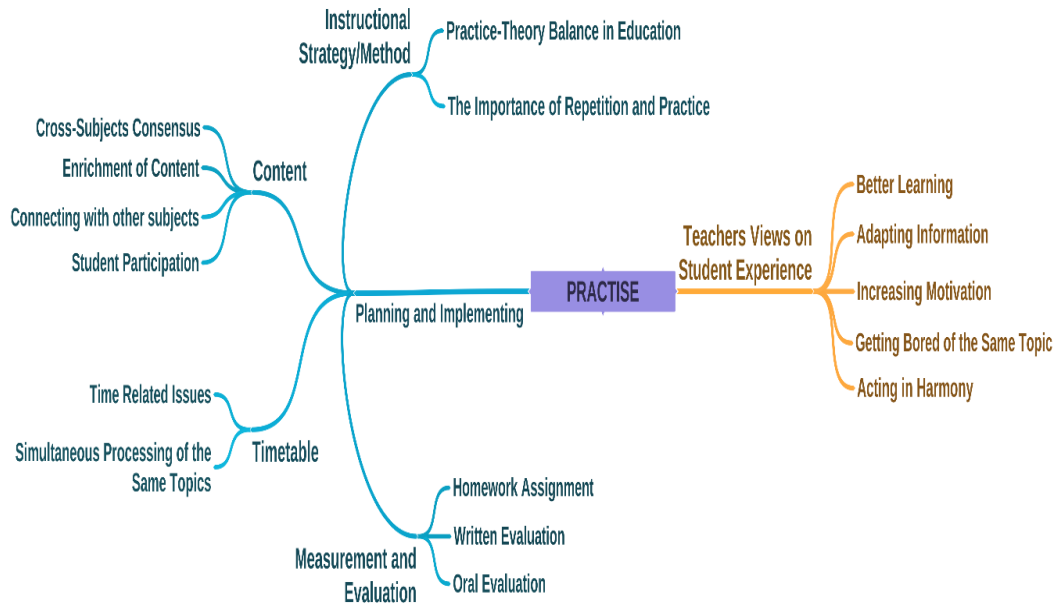
Figure 4. 4**.** Hierarchical categories/ sub-categories/ codes display of practice theme

Category 1. Teachers views on students' experience

In the "***teachers view on students' experience***," five different sub-categories are generated. These include "better learning," "adapting information," "increasing motivation," "getting bored of the same topic," and "acting in harmony."

In the teachers' views on students' experience, they expressed their opinions on ***better learning*** intensively. Teachers mentioned that students learn subjects better with interdisciplinary learning. Related teachers mentioned the following:

> *"Well, the fact that the courses were interconnected seemed even more so. I mean, at school, the children were studying separately, but I thought they were learning better in conjunction. In other words, every project of this project is absolutely good for students. But this one was better for me." (Psychological counseling subject teacher, idPLC-1, interview)*

> *"Yani derslerin birbirleriyle bağlantılı olduğu gerçeği ııı daha da böyle bir gözüktü. Yani okulda çocuklar ayrı ayrı dersler görüyorlardı ama bağlantılı olarak daha da iyi öğreniyorlar diye düşündüm. Yani bu projenin her proje mutlaka öğrenciye yönelik olan her proje çok iyidir. Ama bu daha bir iyi geldi bana." (Rehberlik ve psikolojik danışmana öğretmeni, dMGT-1, bireysel görüşme)*

> *"...I see a change in my students as well. Now our class is a class with poor academic success. But in other classes, this issue is really better understood by them. I understand from here that we can see a serious difference because you*

work together in interdisciplinary studies." (Science teacher, idPLC-1 meetings)

"...Öğrencilerimde de değişiklik görüyorum. Şimdi sınıfımız seçtiğimiz sınıf akademik başarısı zayıf bir sınıf. Fakat diğer sınıflar içerisinde bu konu hakikaten onlarda daha iyi anlaşıldı. Buradan şunu anlıyorum ki disiplinlerarası çalışmalarda ortak çalıştığınız için ciddi bir fark görebiliyoruz." (Fen bilgisi öğretmeni, dMGT-1 toplantıları)

"This study did not burden me much in terms of science, I did my job, it did not affect my curriculum. It did not affect the lecture hours. I gave my normal lesson. On the contrary, I think it is beneficial. Because that's how children reflected it on me, how do I say to repeat this in other lessons? Most of them say that reinforcement is good, so 90% of them say the same thing, except for 3,5 students, they say that we learn this lesson, we reinforce it in the other lesson, we say it in English, we say it in the body, we say it in the visual, we understand better. 3,5 students complained that only the classes were going away. Here he says you have an art visual class. I've also been among students who said that we didn't want him to go like this, his teacher or something. Again, there were those who said that we don't do such different things in physical education, we wanted to do it; but I got positive feedback in the majority of them, they said it was good. I've already seen him. Therefore, the success of the class was high, but because we did it, they learned better. They got it quicker. In other words, I think that it did not bring any burden to me, it was a plus." (Science teacher, idPLC-2 meetings)

"Fen açısından bana fazla bir yük getirmedi bu çalışma ben işimi yaptım, ders programımı etkilemedi. Ders saatlerini etkilemedi. Ben normal dersimi anlattım. Aksine faydası olduğunu düşünüyorum. Çünkü çocuklarda böyle yansıttılar bana hani nasıl diyorum diğer derslerde bunu tekrar etmek? pekiştirmenin iyi geldiğini söylüyor çoğu yani %90'nı aynı şeyi söylüyorum, 3,5 öğrenci haricinde diyorlar ki biz bu dersi öğreniyoruz, diğer derste pekiştiriyoruz işte, ingilizcede söylüyoruz, bedende söylüyoruz, görselde söylüyoruz, daha iyi anlıyoruz diyenler çok fazlaydı. 3,5 öğrenci de sadece derslerin gitmesinden yakınıyordu. İşte diyor bir sanat görsel dersiniz var. Onun da hani bu şekilde gitmesini istemiyorduk öğretmeni falan diyen öğrenciler de oldum. Yine beden eğitiminde böyle hani daha farklı şeyler yapmıyor, yapmak istiyorduk diyenler de oldu; ama büyük çoğunluğunda olumlu dönütler aldım, iyi geldiğini söylediler. Bende onu görebildim zaten. Yani sınıfın başarısı yüksekti ama bunu yaptığımız için daha iyi öğrendiler. Daha çabuk kavradılar. Yani bana herhangi bir yük getirmediği gibi artısı oldu katkısı oldu diye düşünüyorum." (Fen bilgisi öğretmeni, dMGT-2 toplantıları)

Another sub-category in which the teachers expressed their opinions in the sub-category of teachers' view on student experiences is ***adapting information***. Teachers stated that students could quickly adapt the knowledge they learned in other courses to their subject matter courses. The statements of the teachers on the subject are as follows:

"So, if you say yes, I'm sure you contributed to the science lesson. For another example, while processing a text in the Turkish lesson, they took care to express it verbally or in writing. This contribution still continues. So, was this achieved by the progress of our lessons in general or because of this project? I can't say much to him. As I said, one thing that was clear was supported in the science lesson, as information." (Native language teacher, idPLC-1 meetings)

"Yani dersen evet fen bilgisi dersine katkı sağladığından eminim. Başka bir mesela Türkçe dersinde bir metni işlerken sözlü ya da yazılı olarak ifade etmelerinde özen gösterdiler. Bu katkı var şu anda da devam ediyor. Yani bu genel anlamda bizim derslerimizin ilerlemesiyle mi sağlandı yoksa bu projeden dolayı mı? Onu pek bir şey söyleyemeyeceğim. Dediğim gibi net olan bir şey fen bilgisi dersi dersinde destekledi, bilgi olarak." (Türkçe öğretmeni, dMGT-1 toplantıları)

"Without asking me, they conveyed the matter to me as if this was here and there. For example. I told you about the event. We're going to do this. While we were saying that we will implement it like this, in the meantime, this was the task of this bone. Straight striated muscles like this bone was like this or that muscle group was like this. What was hello in the respiratory system? I didn't remember the name. alveoli. Here are their duties. By the way, I asked. What was his job? As. I also got into the science subject a bit, but while doing the activity, they interacted with themselves like aaa, this was that, that was it." (Visual art teacher, idPLC-2, interview)

"Ben sormadan aaa şurası şöyleymiş, burası böyleydi gibi konuyu aktardılar bana. Mesela. Hani etkinliği anlattım ben. Şunu şöyle yapacağız. Bunu böyle uygulayacağız derken o arada işte aaa şu kemiğin görevi buydu. Bu kemik böyleydi veya şu kas grubu böyleydi gibi düz çizgili kaslar mesela. Işte solunum sisteminde alo neydi? Adı aklıma gelmedi. Alveoller. Işte onların görevleri. Bir arada ben sordum işte. Şunun görevi neydi? Gibi. Biraz fen konusuna da kaydım ama etkinliği yaptırırken onlar kendilerinden aaa bu böyleydi, şu şöyleydi gibi etkileşimde bulundular." (Görsel sanatlar öğretmeni, dMGT-1, bireysel görüşme)

In the category of teachers' view on student experiences, the teachers also commented on ***increasing motivation***. The teachers mentioned that the student's involvement in such an application increases their motivation. They said that their active participation in the lessons and the fact that learning is not limited to only one lesson are among the factors that increase the student's motivation. The researcher's field notes also revealed the student's enthusiastic participation in the lesson, and the student was actively involved in the classroom environment. Related teachers mentioned the following:

"Oh, the students are very positively motivated. In other words, a weaker class of the school in terms of academics was chosen a little bit. I think they felt special. In other words, being involved in a project as a project motivates

children positively. This was beautiful, I think. So, they also said they learned better with it." (Psychological counseling subject teacher, idPLC-1, interview)

"Ha öğrenciler çok olumlu yönde motive oldular. Bir de yani okulun daha akademik anlamda zayıf bir sınıfı ıı biraz seçildi. Bunlar kendilerini özel hissettiler bence. Yani proje olarak bir projenin içinde bulunmak çocukların olumlu anlamda motive ediyor. Bu çok güzeldi bence. Yani bununla daha iyi öğrendiklerini de söylediler." (Rehberlik ve psikolojik danışmana öğretmeni, dMGT-1, bireysel görüşme)

"Children are very excited, my teacher. They say it anyway, we learned the meaning of this word in English, or I get very positive feedback from my teacher in visual arts because I do this. This is extra gratifying. So, it seems like they are making more effort. It's like science. " They liked it more. They think like that, they say they like it very much. I haven't experienced anything like that in the other class, but I get good reactions in this class." (Science teacher, idPLC-2 meetings)

"Çocuklar çok heyecanlı hocam. Söylüyorlar zaten biz diyor işte ingilizcede şu kelimenin anlamını öğrendik, ya da görsel sanatlarda hocam şöyle yap diye ben onlardan çok olumlu dönüşler alıyorum. Bu da ekstra memnun edici oluyor. Yani daha fazla gayret gösteriyorlar gibi geliyor. Feni de sanki daha fazla sevdiler. Böyle düşünüyorlar, çok seviyoruz diyorlar. Diğer sınıfta öyle bir şey yaşamadım şimdiye kadar ama bu sınıfta güzel tepkiler alıyorum." (Fen bilgisi öğretmeni, dMGT-2 toplantıları)

Another sub-category in the category of teachers' view on student experiences, where the teachers expressed their opinions, is ***getting bored with the same topic***. Teachers stated that students were bored with repeating the same topics in different courses. This code has been unexpected to us. Because the time allocates to these subjects in the science curriculum of the MoNE is ten weeks. Teachers said that the students got bored in the sixth week. The statements of the teachers on the subject are as follows:

"You have to leave it somewhere. Because these can bore a 12, year, old child (Science teacher, idPLC-1meetings)

"Bir yerde bırakmak gerekiyor. Çünkü bunlar 12 yaş çocuğu küçük sıkabiliyor." (Fen bilgisi öğretmeni, dMGT-1 toplantıları)

"...Apart from that, they talked a little bit more, that is, seeing the same subject over and over in other classes is getting a bit boring. They said, Sir, enough is enough, we learned it." (Psychological counseling subject teacher, idPLC-2 meetings)

"...Onun dışında ıı biraz hatta ıı yani aynı konuyu tekrar tekrar başka derslerde görmenin biraz artık sıkıcı gelmeye başladığından bahsettiler. Hocam yeter artık dediler, öğrendik dediler." (Psikolojik danışmanlık ve rehberlik öğretmeni, dMGT-2 toplantıları)

"Uhm, in the beginning they were more enthusiastic and did so willingly... Towards the end, as I said, I observed that they were a little bored, boredom. Nothing else, and that, as I just told you, was due to the fact that the duration was long." (Native language teacher, idPLC-1, interview)

"Iıı başlangıçta daha hevesliler de isteyerek yaptılar...Iıı sona doğru dediğim gibi biraz sıkılma sıkıldıkları gözlemledim. Başka da bir şey değil, o da demin size anlattığım gibi sürenin uzun olmasından kaynaklandı." (Türkçe öğretmeni, dMGT-1, bireysel görüşme)

Acting in harmony is another sub-category through which teachers share their views on the category of teachers' view on student experiences. In the sample video the groups watched in the second week, the teachers talked about how impressed they were with how well the kids worked together. They stated that their students also acted in harmony when they started using the interdisciplinary teaching method in their lessons. The researcher's field notes supported the teachers' statements. According to the field notes, the students applied what the teacher told them without disturbing the classroom order throughout the lesson. It was observed that when one of them did not want to join the lesson, other friends included him. One of them said that, especially in the physical education teacher's lesson, the class did not disperse, and they were waiting for the teacher:

"There uh I don't know English. I didn't understand the teacher's lesson, but I'm sure there was a lesson about Egypt. While he was talking there, the children were acting freely, but everyone was curious about the subject. From time to time, rhythm came into play, and they turned accordingly. So, I noticed it. Teacher, prepared children give information much more easily in a free environment." (Psychological counseling subject teacher, idPLC-1 meetings)

"Orada ııı ingilizce bilmiyorum. Anlamadım öğretmenin verdiği dersi ama eminim Mısır'la ilgili bir ders anlatıldı. Orada anlatırken çocuklar serbest davranıyorlardı ama herkes merak ediyordu konuyu. Iıı zaman zaman işin içine ritim girdi, ona göre döndüler. Yani onu fark ettim ben. Öğretmen hazırlıklı çocuklar serbest ortamda bilgiyi çok daha rahat veriyorsunuz." (Rehberlik ve psikolojik danışmana öğretmeni, dMGT-1 toplantıları)

"They all act in harmony and following the instructions of their teacher. I started to see these in my own lessons as well." (Physical education and sport teacher, idPLC-2, interview)

"Hepsi bir uyum içerisinde ve öğretmeninin yönlendirmesiyle yönergelerine uyarak hareket ediyorlar. Bunları kendi derslerimde de görmeğe başladım." (Beden eğitimi ve spor öğretmeni, dMGT-2, bireysel görüşme)

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Category 2. Planning and implementing interdisciplinary teaching of the subject matter

Four different sub-categories were created in the *planning and implementing category*. These include "content," "an instructional strategy or method," "timetable," and "measurement and evaluation."

There are four different codes inside the *content* sub-category. These include "cross-subject consensus," "enrichment of content," "connecting with other subjects," and "student participation."

The teachers voiced a strong opinion regarding the *cross-subject consensus* in the content sub-category. By utilizing similar themes in the lessons, the participants drew connections between them. Teachers who also noted the following:

> *"Yes, now it's nice to hear the same term from different teachers, isn't it actually in terms of learning, of course he creates." (Science teacher, idPLC-1 meetings)*

> *"Yaratır. Tabi ki yaratır. Evet, şimdi farklı öğretmenlerden aynı terimi duyması çok güzel bir şey değil mi aslında öğrenmesi bakımından, tabi ki yaratır." (Fen bilgisi öğretmeni, dMGT-1 toplantıları)*

> *"There was a lot of confusion. I mean, the concepts in physical education and ours—the concepts we learned and the concepts in science—were very different. It happened when I learned extra things. You already know what I don't know. Because I teach science, when was the last time I taught science? Now, for example, there are many concepts in the science lesson that children teach. Actually, we are on the same road. But we do not realize that we are on the same path because we go down different paths. I always searched for the science book before each lesson. I wonder how he came up with this concept. What's up? Sometimes there were things I didn't know. I asked the children questions. When the children answered, I learned from them in the process. I mean, the things we actually know You know, it's very extra. There was muscle. Striated muscle, non, striated muscle. For example, cardiac muscle was newly introduced as a third muscle. I don't have it. We were too. heart muscle. Here it goes for both. Its structure looks like this, and it works like this. We have two muscle types, for example, and we know a lot about three of them, but they've changed, so we've updated them." (Physical education and sport teacher, idPLC-2, interview)*

> *"Kavram karışıklığı çok fazlaydı. Yani bizimkilerle beden eğitimindeki kavram, öğrendiğimiz kavramlarla fen bilgisindeki kavramlar çok farklı. Ekstra şeyler de öğrendiğimde oldu. Hani bilmediğim. Çünkü fende yani ben en son ne zaman fen bilgisi dersi işledim? Aslında aynı yola gidiyoruz. Ama farklı yollardan gittiğimiz için aynı yolda olduğumuzun farkında olmuyoruz. Ben devamlı Fen Bilgisi kitabı araştırdım her dersten önce. Acaba bu kavramı nasıl vermiş? Acaba bilmediğim ne var? Iıı bazen bilmediğim şeyler oldu. Ben*

çocuklara soru sordum. Çocuklar cevaplayınca ben onlardan da öğrenmiş oldum aslında o süreç içerisinde. Yani aslında bildiğimiz şeyler. Hani çok ekstra hı. Bir iki tane mesela şey bizim öğrendiğimizde iki tür şey vardı. Eklem var, kas vardı. Çizgili kas, çizgisiz kas. Kas. Mesela kalp kası üçüncü bir kas olarak yeni girmiş. Bende o yok. Biz de şeydik. Kalp kası. İşte ikisine de giriyor. Yapısı buna benziyor işte çalışması buna benziyor iki kas çeşidimiz vardır mesela üç olmuş ya aslında bildiğimiz şeyler ama ıı değişmiş yani onları güncellemiş olduk." (Beden eğitimi ve spor öğretmeni, dMGT-2, bireysel görüşme)

"So, it was different, you had different terms, frankly. When I read them, there were some of them, I said, oh, has this been the equivalent here. So, I learned new things, too. I tried to explain it to the children in a more appropriate way by making a connection between the two. Of course, it [has been] gained different things from there. I learned things I didn't know from your terms." (Science teacher, idPLC-2, interview)

"Yani farklı sizde farklı terimler vardı açıkçası. Onları okuyunca aaa bu buradaki karşılığı bu muymuş dediğim şeyler oldu. Yani ben de yeni şeyler öğrendim. Çocuklara da böyle onu daha uygun bir dille hani ikisi arasında bağlantı kurarak anlatmaya çalıştım. Tabii oradan da farklı şeyler kazanmış oldu. Bilmediğim şeyleri de öğrenmiş oldum sizdeki terimlerden." (Fen bilgisi öğretmeni, dMGT-2, bireysel görüşme)

"Actually, there were concepts that I had recently learned. You know, after many years, it was like I refreshed my knowledge. So, since I'm not a master of the subject, I don't think I'm competent either, especially from science. Of course, I read those concepts." (Visual art teacher, idPLC-2 meetings)

"Yeni öğrendiğim bir kavramlar oldu aslında. Hani uzun yıllar geçtikten sonra bilgilerimi tazeledim gibi oldu. Yani tam hakim olmadığım için benimde yetkin olduğunu düşünmüyorum fen bilgisinden özellikle. Okudum tabi ki o kavramları." (Görsel sanatlar öğretmeni, dMGT-2 toplantıları)

In the content sub-category, **content enrichment** was another area in which the teachers expressed their opinions. According to the researcher's field notes, it was observed that the physical education teacher hung posters about body systems on the walls while teaching. Teachers stated that they enriched the course content by increasing examples and activities. The expressions of the teachers on the subject are as follows:

"This is the right video for the children. "The videos that are made are better. I applied to the videos. Other than that, I just read the project we did last year. I reviewed it again. I wanted to match it. Because in case I use some information from you. So. " (Foreign language teacher, idPLC-1, interview)

"Bu yani çocuklara hani doğru videoyu karşılarına çıkarmak için çok izledim. Şöyle yapayım istedim. Bir Türkçe video bulayım. Bir İngilizce video bulayım. Ama İngiliz Türkçe video çok bulamadım. Çeşitliliği çok fazla değil.

Türkçelerin sıkıcı. Anladım. Akıcı gitmiyor. İngilizce olan videolar daha güzel. Videolara başvurdum. Onun haricinde ha bu işte evvelki sene yaptığımız projemi şöyle bir okudum. Tekrar gözden geçirdim. Hani eşleştirmek istedim. Çünkü olur ya sizden biraz bilgi kullanırım. Yani." (İngilizce öğretmeni, dMGT-1, bireysel görüşme)

"First of all, painting. Painting. Visual arts are very important to me. Physical education. Yes. Because as you said, the most important lesson I will definitely connect with is physical education. After that, I have nothing to do with Turkish. Maybe we can do a drama. It can be a drama study. If you remember I mentioned, we can dramatize it in the form of a mini, theatre about systems. That way, maybe it will be in Turkish. Apart from that, if we say that children who can understand what they read should already do science, then yes, let's say Turkish. Mathematics is a must." (Science teacher, idPLC-1, interview)

"Öncelikle resim. Resim. Görsel sanatlar benim için çok önemli. Beden eğitimi. Evet. Çünkü dediğiniz gibi sistemler konusunda kesinlikle bağ kuracağım en önemli ders beden eğitimi. Ondan sonra Türkçe konusunda şeyim yok. Belki bir drama yapabiliriz. Drama çalışması olabilir. Bahsetmiştim hatırlarsanız. Sistemlerle ilgili bir minik tiyatro şeklinde dramalaştırabiliriz. O şekilde belki Türkçe olursa olur. Onun dışında hani okuduğunu anlayan çocuklar zaten fen bilgisi yapmalı diyorsak evet Türkçe diyelim o zaman. Matematik olmazsa olmazımız." (Fen bilgisi öğretmeni, dMGT-1, bireysel görüşme)

"We played games. It's about the same subject. We played different games. They liked it, of course." (Science teacher, idPLC-2, interview)

"Oyunlar oynadık. Aynı konuyla ilgili. Farklı oyunlar oynadık. Onların da hoşuna gitti tabii bu durum." (Fen bilgisi öğretmeni, dMGT-2, bireysel görüşme)

"For example, in my classes, I actually allow them to dance a little or something. Well, since I make them listen to songs, I say, so, let's dance on the subject. There are songs that are about our body parts, and others like that. Not only they do that, but they also dance. I can at least contribute a little bit to their steps." (Foreign language teacher, idPLC-2 meetings)

"Ben mesela derslerimde zaten aslında biraz dans etmeleri falan izin veriyorum. Şey şarkılar dinlettiğim için hani konuyla alakalı hadi dans edelim diyorum işte. Vücut bölümlerimizi öteki ona göre şarkılar var. Hem onu yapıyorlar hem dans ediyorlar. Birazcık en azından adımlarına belki katkıda bulunabilirim böyle." (İngilizce öğretmeni, dMGT-2 toplantıları)

Another code in which the teachers expressed their opinions is ***connecting with other subjects***. Field notes' findings also showed that, the physical education teacher established a connection with the other lessons using the question- answer method. Another teacher used the knowledge contest method in a physical education lesson.

Teachers stated that they touched on the subjects of other branches during the course. The statements of the teachers on the subject are as follows:

"Sometimes I applied Turkish subjects by combining them with knowledge in science. For example, you can write the information there and write the topics like the way of expression in Turkish or spelling punctuation, like 2 birds with one stone. I applied it this way, but of course, I think that much more successful results will be achieved when these studies are spread over all the courses." (Native language teacher, idPLC-1, interview)

"Bazen Türkçe konularını fen bilgisindeki bilgilerle birleştirerek uyguladım. Mesela oradaki bilgileri yazıp Türkçe de anlatım biçimi ya da yazım noktalama gibi konuları hani bir taşla 2 kuş misali. Bu şekilde uyguladım ama tabi ki bu çalışmalar bütün derslerin yayıldığında çok daha başarılı sonuçlar elde edilir diye düşünüyorum "(Türkçe öğretmeni, dMGT-1, bireysel görüşme)

"We started it. We made a light entry today. For example, we told the children which joints can play and which ones cannot. In other words, this is what my teacher is doing while he is doing his movements, this is it. They will use them more in physical education class. It will run it. I don't know that they need to loosen it up by doing warm- up exercises first. So, we talked about the structure of bones. It's long and short, but frankly, I didn't know where to use it. It seems to me that they can support over muscles and joints." (Science teacher, idPLC-2 meetings)

"Onu başladık. Bugün hafif bir giriş yaptık. Çocukları mesela eklemleri hangi eklemlerinizi oynayabildiğini, hangisinin oynayamadığını anlattık. Yani hocam da hareketinin yaptırırken işte bu oynayabiliyor ya da burada işte çok zorlamayın, oynayamıyor gibi ya da kasların hani nasıl çalıştığını çizgili kasların hızlı çalıştığını, çabuk yorulduğunu söyledik. Beden eğitimi dersinde daha çok onları kullanacaklar. Onu çalıştıracak. İşte ne bileyim antrenman yaparak önce ısınma hareketleri yaparak onu gevşetmeleri gerektiğini. Yani kemiklerin yapısından bahsettik. Uzun kısa ama onu çok nerede kullanacaklarını açıkçası çok bilemedim. Kaslar ve eklemler üzerinden destek olabilirler gibi geliyor bana." (Fen bilgisi öğretmeni, dMGT-2 toplantıları)

Student participation is another code of the content sub-category where teachers offer their ideas. According to the teachers, the subjects were covered by assuring student participation in the lecture. The following are the teachers' comments on the subject:

"What can our elders, mothers, grandmothers do, by reconciling it with life? From the blood pressure thing because they couldn't move. It can be mentioned that they use blood pressure medication or something. A discussion environment can be created by giving children the right to speak. It will be better understood then." (Native language teacher, idPLC-1 meetings)

"Yaşamla bağdaştırıp büyüklerimiz, annelerimiz, babaannelerimiz ne yapabiliyorlar. Hareket edemedikleri için tansiyon olayından. Onların

tansiyon ilaçları kullanmasından falan bahsedilebilir. Çocuklara söz hakkı verilerek bir tartışma ortamı yaratılabilir. Daha iyi anlaşılır o zaman." (Türkçe öğretmeni, dMGT-1 toplantıları)

"For example, brochures or posters can be made for exercises at school or in the classroom. It can be made to stand out right now. By using both verbal, written and visual, uhm, in order to create awareness… They [may] think that if they prepare these things for children themselves, they can become even more interesting and attention-grabbing." (Visual art teacher, idPLC-2 meetings)

"Okulda veya sınıfta egzersizlere yönelik mesela broşür ya da afiş çalışması yaptırılabilir. Şu an dikkat çekici hale getirebilir. Hem sözel hem yazılı hem görsel kullanarak ıı farkındalık oluşturmak amaçlı...Çocuklara bunlar kendileri hazırlarlarsa daha da ilgi çekici ve dikkat çekici hale gelebilir diye düşünür." (Görsel sanatlar öğretmeni, dMGT-2 toplantıları)

"In general, of course, we use a lot of questions and answers. There's a bit of an implication. But after that, it is mainly the question and answer. So, yes, [it is] in this way." (Physical education and sport teacher, idPLC-1, interview)

"Genelde tabii soru cevap çok kullanıyoruz. Sezdirme var biraz. Ondan sonra soru cevap ağırlıklı ama. Bu şekilde evet." (Beden eğitimi ve spor öğretmeni, dMGT-1, bireysel görüşme)

Two other codes were created in the ***instructional strategy/method*** sub-category. They are "the practice-theory balance in education" and "the importance of repetition and practice."

In the instructional strategy and method sub-category, the teachers extensively expressed their opinions on ***the practice and theory balance in education***. They emphasized the importance of repeating the topics in succession with other lectures. Related teachers mentioned the following:

"Immediately, it is necessary to start trying. For example, this was applied in the Turkish lesson. I mean, it should be put into practice in physical education class as well. So, it's a collective effort." (Science teacher, idPLC-1 meetings)

"Hemen denemeye geçmek gerekir. Mesela Türkçe dersinde bu uygulandı. Beden eğitimi dersinde de uygulamaya geçirmeli yani. Yani kolektif çalışma işte." (Fen bilgisi öğretmeni, dMGT-1 toplantıları)

"What we normally do anyway is do a warm- up at the beginning. We either do this with a guide or a student who knows. For example, now that we are doing this, what did we do? Having voluntarily moved here, a link can be established here." (Physical education and sport teacher, idPLC-1 meetings)

"Zaten normalde ne yapıyoruz, en başında bir ısınma hareketleri yapıyoruz. Bunu ya biz yaptırıyoruz rehber eşliğinde ya da bilen hani öğrenen bir öğrenci. Mesela şimdi şunu yapıyoruz, kaldır ne yaptık? Burada istemli hareket ettirdi burada bir bağ kurulabilir." (Beden eğitimi ve spor öğretmeni, dMGT-1 toplantıları)

"So, as I said, it is produced in such a way. In plain terms, children stay up in the air for such things anyway. It is more permanent for them to learn them by doing them during the lesson. When I tell you directly, let's not think of it as only six in one eighth grade. When the students in high school or university are told, something is clear in their minds. So, in college, I got to know myself. Well, we definitely processed them, but I didn't have them. So that moment is gone. Because there is no exemplification, it is aerobic or anaerobic, in plain terms. Okay, they're diametrically opposed, but what happens when we do what we do? There was no explanation. III and remained only in plain expression. "Even at that time, I don't think it will be permanent," she said with a straight face. "I don't think it will be permanent for a secondary school child (Physical education and sport teacher, idPLC-2 meetings)

"Yani dediğim gibi öyle bir şekilde üretilir. Zaten düz anlatımla çocuklar çok havada kalıyor bu tür şeyler. Ders esnasında yaparak bunları öğrenmeleri daha kalıcı oluyor. Iıı direk anlattığımda zaten ya sadece altısı bir arada sekizinci sınıf olarak düşünmeyelim. Lisedeki öğrencilerin anlatıldığında ya da üniversitedeki öğrenciye kafada net bir şey oluşturuyor. Yani ben üniversitede kendimden biliyorum. Iıı biz bunları mutlaka işledik ama bende yoktu. Yani kalmamış o an. Çünkü bir örneklendirme yok, düz anlatımla aerobik, anaerobik. Tamam birbirinin tersi ama biz ne yapıyoruz ne yaparsak ne olur. Açıklaması da yoktu. Iıı ve sadece düz anlatımda kaldı. Benim o dönemde bile kalmadı ki ortaokul seviyesindeki çocuğa düz anlatımla zaten hiç zannetmiyorum yani kalıcı olacağını." (Beden eğitimi ve spor öğretmeni, dMGT-2 toplantıları)

"So, I don't know anything else, uhm, you know, when I instruct the subject, I explain what is generally theoretical. Uhm, here, for example, when I was doing something, when I was planning, I did theory and practice at the same time. So, while the kids were doing something, I also gave theoretical information in those intervals. But until now, even if I played a game in my classes, I would explain it first. Then, we would go into practice. But here, we also gave feedback to the children while applying it. There has been such a change." (Physical education and sport teacher, idPLC-2, interview)

"Yani daha ııı bilmiyorum hani konu anlatırken ben ya teorik genelde anlatıyorum. Iıı burada mesela şey yaparken, planlarken teoriyle uygulamayı aynı anda yaptım. Yani çocuklar bir şey yaparken o aralarda teorik bilgi de verdim. Ama şimdiye kadar derslerimde oyun bile oynatsam ilk önce anlatıyordum. Sonra uygulamaya geçiyorduk. Ama burada uygularken de çocuklara geri bildirim verdik. Öyle bir değişme oldu." (Beden eğitimi ve spor öğretmeni, dMGT-2, bireysel görüşme)

The importance of repetition and practice is another code in which teachers gave their opinions in the instructional strategy and method sub-category. The teachers stated the importance of repeating the topics and doing practices related to them. The statements of the teachers on the subject are as follows:

"When it happens again after a process, you know, we repeat it over and over again, but after a month, when we go back and repeat it, it becomes more permanent, that's why I said that. You know, once again, a week break in Turkish, science and physical education in English doesn't change much. However, I was wondering if there could be such a thing for him with the simultaneous result." (Psychological counseling subject teacher, idPLC-1 meetings)

"O işte o tekrar bir süreç sonrasında olduğu zaman ııı hani üst üste tekrar ediyoruz ama 1 ay sonra tekrar geriye dönüp tekrar edince daha kalıcılığı sağlanır ya o yüzden öyle dedim. Hani üst üste tekrar her dersi Türkçe de fen de ve beden eğitimi ingilizcede 1 hafta ara çok 1 şey değiştirmez. Yine de eş zamanlı sonuçta onun için öyle bir şey olabilir mi diye düşündüm." (Rehberlik ve psikolojik danışmana öğretmeni, dMGT-1 toplantıları)

"...many say that reinforcement is good so, 90% of the time I say the same thing, except for 3- 5 (few) students, they say we're learning this lesson, we are reinforcing in the other lesson, uhm, there were a lot of [students] that said we say it in English, we say it in physical education, we say it in Art, and we understand better…"(Science teacher, idPLC-2 meetings)

"...pekiştirmenin iyi geldiğini söylüyor çoğu yani %90 nı aynı şeyi söylüyorum, 3-5 öğrenci haricinde diyorlar ki biz bu dersi öğreniyoruz, diğer derste pekiştiriyoruz işte, ıı ingilizcede söylüyoruz, bedende söylüyoruz, görselde söylüyoruz, daha iyi anlıyoruz diyenler çok fazlaydı…" (Fen bilgisi öğretmeni, dMGT-2 toplantıları)

Two different codes are created in the ***timetable*** sub-category. These are "time-related issues" and "simultaneous processing of the same topics."

In the timetable sub-category, the teachers expressed their opinions on ***time-related issues*** intensively. Teachers mentioned that they had difficulty completing the subjects due to the course hours and curriculum. In the field notes, it was observed that the physical education lesson was completed without any recess. However, the children were learning by playing games, so no leaving was observed in the classroom. Related teachers mentioned the following:

"I had the hardest time. Because physical education is two hours a week. A very good planning and programming is required. Children will appreciate that they always want to play. So, they want to be on the move. No matter how much we put this into the application, he says, will we not play football? I would say class time. Briefly. Lesson time was not enough for me. Two hours of physical training." (Physical education and sport teacher, idPLC-1, interview)

"En çok sürede zorlandım. Çünkü beden eğitimi haftada iki saat. Çok iyi bir planlama programlama yapmak gerekiyor. Çocuklar takdir edersiniz ki sürekli oyun oynamak istiyorlar. Yani hareket halinde olmak istiyorlar. Biz ne kadar

bunu uygulamanın içine soksak da diyor ki futbol oynamayacak mıyız? Yani ders süresi diyeyim. Kısaca. Ders süresi çok yeterli gelmedi bana. İki saat beden eğitimi."(Beden eğitimi ve spor öğretmeni, dMGT-1, bireysel görüşme)

"If we think about it for now, for example, it might not come in the written week, if it had started earlier, this work would not have coincided with the written week. At least we wouldn't have wasted our time. As I said, my 2 weeks have been very unfortunate. You know, we can say that maybe it coincided with that class, but we could have started earlier. If I had started working early, or at least maybe we wouldn't have had a big loss. Can it work better or not as a burden I had already finished the topics early. We have already studied the units that we will ask in the written, there was no problem in that regard. It's just that my lessons are gone." (Foreign language teacher, idPLC -2 meetings)

"Şu an için düşünürsek mesela yazılı haftasında gelmeyebilirmiş, daha böyle erken başlasaydı bu çalışmaya yazılı haftasına denk gelmezdi. En azından zaman kaybımız olmazdı. Dediğim gibi benim 2 haftadır çok talihsizlik oldu. Hani o sınıfa yani belki denk geldi de diyebiliriz ama daha erken başlayabilirdik. Erken çalışmaya başlasaydım ya da en azından belki büyük kaybımız olmazdı. Daha iyi çalışabilir mi yoksa yük olarak değil ben zaten konuları erken bitirmiştim. Yazılıdaki soracağımız üniteleri çalışmıştık zaten o konuda bir sıkıntı olmadı. Sadece derslerimin gitmesi kayıp oldu." (İngilizce öğretmeni, dMGT-2 toplantıları)

In the timetable sub-category, another code in which the teachers expressed their opinions is the **simultaneous processing of the same topics**. Teachers stated that the subjects should be taught simultaneously with other lessons. The statements of the teachers on the subject are as follows:

"Here, there can be lessons related to each other, but also either following or simultaneously. I think there should always be projects like this in order to improve education." (Psychological counseling subject teacher, idPLC-1, interview)

"İşte birbirleriyle iletişimi ilişkili derslerin olabileceği, aynı zamanda ya takip eden ya da eş zamanlı olarak. Yönetilebileceği bence eğitimin iyileştirilmesi adına böyle projeler hep olmalı." (Rehberlik ve psikolojik danışman öğretmeni, dMGT-1, bireysel görüşme)

"What I observe most in English myself, for example, is the issue of clocks at six. Usually, I have to teach Turkish first. I wish the hours were taught before, but it would be easier for me to teach English later. You know, if this system develops, at least what will happen? "If a math teacher has to teach at the same time, he/she will have taught it beforehand. I'll give it in English later. It really needs to go in parallel like this. It's not a very interesting subject, it's something that should happen, but for some reason it is not practiced in our country......

"They can all correlate to each other, but my topic at the moment, for example, never correlates but there are topics where we can apply, uhm, with the current topic in the coming units. Thematically there is. But it doesn't correlate at the

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moment. For example, why not play around with it and put it there? It can be then, will correlate. It would be nice, too." (Foreign language teacher, idPLC-1 meetings)

"Ya ben en çok kendim de ingilizcede gözlemlediğim mesela şu an altılarda saatler konusu. Genellikle önceliğim türkçesini öğretmek zorunda kalıyorum. Saatlerin keşke diyorum daha önce öğretilmiş olsa da ben sonra ingilizcesini öğretmek benim için daha kolay olur. Hani bu sistem gelişirse en azından ne olur? Aynı anda veya matematik öğretmeninin öğretmesi gerekiyorsa o önceden öğretmiş olur. Ben sonra İngilizcesini veririm. Böyle paralel gitmesi gerekli gerçekten. Çok enteresan bir konu değil aslında olması gereken bir şey ama nedense bizim ülkemizde uygulanmıyor… Hepsi birbirine uydurabilir ama mesela şu an benim konum asla uymuyor ama ilerleyen zamanlarda ıı şu anki konuyla uygulayabileceğimiz yerler var. Tema olarak var. Ama şu anki uymuyor. Mesela neden olup yerine oynatıp oraya koymayalım? olabilir o zaman uyar. Çok da güzel olur" (İngilizce öğretmeni, dMGT-1 toplantıları)

The ***measurement and evaluation*** sub-category is divided into three different codes. There are also "*homework assignments*" and "*oral* and *written assessments*".

In the measurement and evaluation sub-category, the first code in which the teachers expressed their opinions was a ***homework assignment***. The teachers stated that they gave homework to the students about the subjects. The statements of the teachers on the subject are as follows:

"I did homework. I didn't consider it as a note. But I gave homework. I watched a video first. They watched that video in English. But they had not yet entered the circulatory system at that time. Then, when they switched to the circulation system, I made them watch the video they watched again, and I said, now come on, they didn't know the things in this video, I said, tell me the Turkish equivalents when they watch it for the first time. They said. I made such an assignment. I also sent a video and asked a student to translate it into Turkish from a few students. What did I ask a few students to write a summary in English, and those who were a little better at English? Oh, I wanted both Turkish and English." (Foreign language teacher, idPLC-1, interview)

"Ödevlendirme yaptım. Not olarak değerlendirmedim. Ama ödev verdim. Önce bir video izlettim. O videoyu İngilizce izlediler. Ama daha hiç o zaman dolaşım sistemine geçmemişlerdi. Sonra dolaşım sistemine geçince izledikleri videoyu tekrar izlettim ve bana dedim şimdi hadi dedim bu videodaki şeylerin bilmiyorlardı ilk izlediklerinde Türkçe karşılıklarını söyleyin dedim. Söylediler. Öyle bir görevlendirme yaptım. Bir de bir video gönderip bir öğrenciden birkaç öğrenciden Türkçe'ye çevirmesini istedim. Birkaç öğrenciden İngilizce özet çıkarmasını biraz daha İngilizcesi iyi olanların bir de ne istemiştim? Ha hem Türkçe hem İngilizce istedim bir de." (İngilizce öğretmeni, dMGT-1, bireysel görüşme)

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"Oh, I had this thing group set up. You know, they had set up a video thing on WhatsApp group to post workouts three days a week. It was like homework." (Physical education and sport teacher, idPLC-2, interview).

"Ya bu şey grubunu kurdurmuştum ben. Hani haftada üç gün egzersiz göndermek için video şey WhatsApp grubu kurmuşlardı. Ev ödevi gibi oldu" (Beden eğitimi ve spor öğretmeni, dMGT-2, bireysel görüşme)

In the measurement and evaluation sub-category, the teachers expressed their opinions extensively about ***oral evaluation***. The teachers mentioned that they evaluated the students verbally. Related teachers mentioned the following:

"I didn't do anything in terms of measurement, evaluation, cognitive sense, as a question and answer. I did, but maybe I will use them in the next measurement, evaluation, a week or two later. but in general, I did it verbally, that is, in measuring, and I did it as an observation. Measurement evaluations." (Physical education and sport teacher, idPLC-1, interview)

"Ölçme, değerlendirme, bilişsel anlamda bir şey yapmadım açıkçası, soru cevap olarak. Yaptım ama belki bunları ilerideki ölçme, değerlendirme, bir iki hafta sonrası kullanacağım. Ama genelde şeydi, sözlü yaptım yani ölçmede dedim ve gözlem olarak yaptım. Ölçme değerlendirmeleri." (Beden eğitimi ve spor öğretmeni, dMGT-1, bireysel görüşme)

"When I ask questions, I also ask retrospectively. I also asked at the beginning of the lesson. I didn't give anything away. What did you learn in the science class. I took a look at what they knew. I was asking questions again in the videos during the lesson. They were very good anyway. the readiness of the students was good." (Foreign language teacher, idPLC -2, interview)

"Sorular sorduğumda ıı geçmişe yönelik de sorduğum zaman. Hem ıı dersin girişinde sordum. Ben daha hiçbir şey vermeden. Ne öğrendiniz ı Fen bilgisi dersinde diye. Ona bir baktım neler bildiklerine. Hem de ders esnasında videolarda da gene sorular soruyordum. Zaten çok iyilerdi hani hazırbulunuşlukları iyi derecedeydi öğrencilerin." (İngilizce öğretmeni, dMGT-2, bireysel görüşme)

In the measurement and evaluation sub-category, the ***written evaluation*** was another code in which the teachers expressed their opinions. Teachers stated that they evaluated students with written exams. The statements of the teachers on the subject are as follows:

"Uh, under normal conditions, we have two classic software. I ask multiple choice, true false, fill in the blank and open- ended questions in my regular exams. I did not change the system. I did it the same way again. I, but I increased the number of exams. In particular, I had a good exam on the last three subjects that we studied with my friends with whom we worked together. And as a result of my exam, I saw that the average of success of our students, with whom we applied, increased." (Science teacher, idPLC-1, interview)

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"Hı normal şartlarda bizim klasik yani klasik iki tane yazılımız var. Iıı çoktan seçmeli, doğru yanlış, boşluk doldurma ve açık uçlu sorular sorarım ben normal sınavlarında. Sistemi değiştirmedim. Yine aynı şekilde yaptım. Iıı fakat sınav sayısını arttırdım. Özellikle son üç konumuzu birlikte çalıştığımız arkadaşlarımla çalıştığımız son üç konuda ıı bir sınav yaptım. Ve sınavımın neticesinde ıı uygulama yaptığımız öğrencilerimizin başarı ortalamasını yükseldiğini gördüm." (Fen bilgisi öğretmeni, dMGT-1, bireysel görüşme)

"I did it in writing. I wrote for a while. Think of it like this written quiz III I'm the best in the other classes and I'll say they were almost equal with my class. They scored a close match with our most successful class. We talk about it all the time, it's not such a successful class. This is an average close to a real good. I'm fine." (Science teacher, idPLC-1 meetings)

"Ben yazılı yaptım. Bir ara yazılı yaptım. Iıı bu yazılı quiz gibi düşünün ıı diğer sınıflar içinde en başarılı olan ıı benim kendi sınıfında la beraber hemen hemen eşittiler öyle söyleyeyim. En başarılı sınıfımızla yakın bir puan aldılar. Hep bahsediyoruz, o kadar başarılı bir sınıf değil. Bu da bir gerçek iyiye yakın bir ortalama. Ben çok iyiyim." (Fen bilgisi öğretmeni, dMGT-1 toplantıları)

"I made an exam today. I used the information I received from my friend as a Turkish [lesson] question. In other words, I turned my evaluation into a Turkish exam and I did not give a score." (Native language teacher, idPLC-1 meetings)

"Ben bugün yazılı yaptım. Arkadaşımdan aldığım bilgileri Türkçe sorusu olarak kullandım. Yani Türkçe sorusuna dönüştürdüm değerlendirmemi hani puan vermedim" (Türkçe öğretmeni, dMGT-1 toplantıları)

4.1.4. Theme 4: Reflection

The last session (6th meeting) of idPLC was the primary data source for the fourth theme, reflection. During the sixth idPLC meeting, teachers reflected on their experiences. Under this theme, there are three categories emerged "Interdisciplinary teaching experience," "Teacher learning," and "Teacher recommendations." (Figure 4.5)
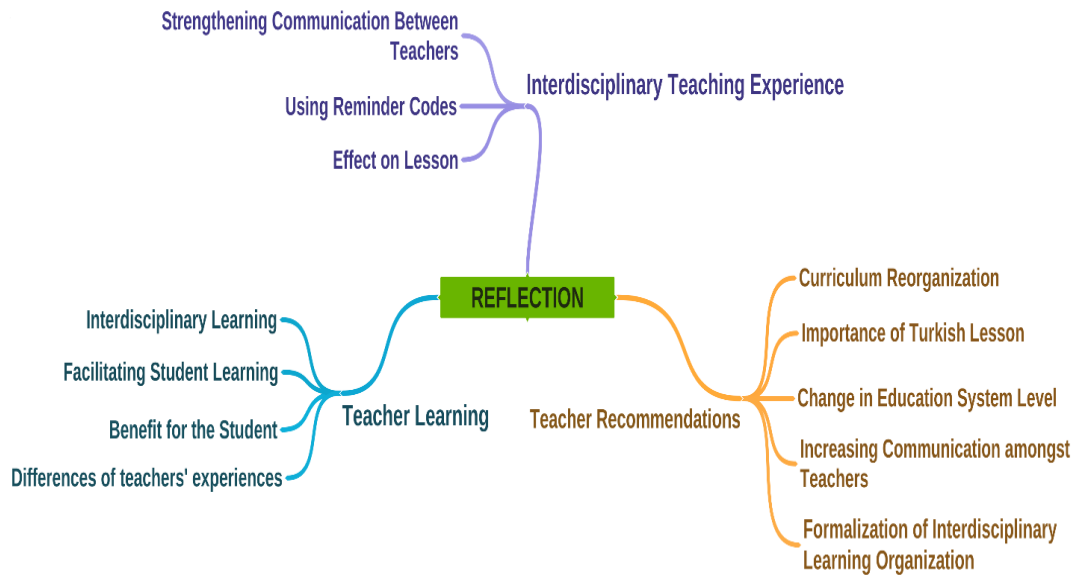
Figure 4. 5. Hierarchical categories/ sub-categories display of reflection theme

Category 1. Interdisciplinary Teaching Experience

Three different sub-categories are created in the category of **interdisciplinary teaching experience**. These sub-categories, such as "strengthening communication between teachers," "using reminder codes," and "effect on lesson."

In the category of interdisciplinary teaching experience, the teachers expressed their opinions about **strengthening communication between teachers**. Teachers mentioned that the relationship and communication between teachers became stronger thanks to interdisciplinary learning. Related teachers mentioned the following:

> *"Now, we have communication with all our educator friends at school before, of course, but of course, the pandemic or something is also effective in this, as we sit together a lot. Did not have. Actually, the biggest effect of this was that I had the opportunity to be side by side with many of my friends. With a few friends that I only saw at school from the back and how sweet and resourceful they were, it was very nice in a social sense. Developed. It also strengthened our communication and we gained knowledge, what did you process? What can we do? It was very constructive and creative. I am very satisfied with myself. Definitely a cohesive band." (Physical education and sport teacher, idPLC-1, interview)*

> *"Şimdi daha öncesinde okulda yani tabii ki bütün eğitimci arkadaşlarımızla iletişimimiz var; ama çok yan yana oturduğumuz tabii bunda pandemi falan da etkili. Yoktu. Esasen bunun en büyük etkisi ben birçok arkadaşımla yan yana olma fırsatı buldum. Okulda sadece geriden görmüş olduğum birkaç*

arkadaşımla ve ne kadar tatlı olduklarını, birikimli olduklarını bir defa bu sosyal anlamda çok güzel oldu. Geliştirdi. Bizim iletişimimizi de kuvvetlendirdi ve bilgi sahibi olduk, ne işledin? O ne yapabiliriz? Gayet yapıcı yaratıcı şekilde devam etti. Ben çok memnunum kendi adıma. Uyumlu bir grup kesinlikle." (Fen bilgisi öğretmeni, dMGT-1, bireysel görüşme)

"Let me say this. We weren't very friendly at school. We had a teacher relationship. Just like a teacher. But now we are sincerer. We got to know each other better. Our shares have increased. You know, our shares have increased both in terms of this thing and in a private sense. It is the same in terms of lessons. We used to talk about how this and this is while we were working together. We also went and came together. We ate, we worked, we toured, we had fun. In that sense, shares have increased. So, it was nice. Now he is not just an ordinary friend. We can smile more sincerely like this when we see them." (Science teacher, idPLC-2, interview)

"Şöyle söyleyeyim. Çok samimi değildik biz okulda. Öğretmen ilişkisi vardı aramızda. Sadece öğretmen gibi. Ama şimdi daha samimi olduk. Birbirimizi daha yakından tanıdık. Paylaşımlarımız arttı. Hani bu şey anlamında da özel anlamda da paylaşımlarımız arttı. Ders anlamında da öyle. Zaten beraber hani çalışmayı yaparken şu nasıl, bu nasıl diye konuşuyorduk. Ayrıyeten beraber gittik, geldik. Yedik, iştik gezdik, eğlendik. O anlamda da paylaşımlar arttı. Güzel oldu yani. Şimdi sadece sıradan bir arkadaş değil. Böyle daha samimi gülümseyebiliyoruz onları gördüğümüz de." (Fen bilgisi öğretmeni, dMGT-2, bireysel görüşme)

Another sub-category the teachers gave their opinions in the category of interdisciplinary teaching experience was **using reminder codes**. Teachers stated that they used mnemonic coding to facilitate learning. The statements of the teachers on the subject are as follows:

"...That's how I noticed that too. You can transfer information to the student with certain clues, this is the classroom method. In our youth, private tutors used to do it for us. We used to. But I liked it so much that we applied it in the other class. It's like they got it a little quicker. It's a very difficult subject. With coding, but we're trying to get out of it." (Science teacher, idPLC-1 meetings)

"...Şunu da fark ettim. Belli ip uçlarıyla öğrenciye bilgi aktarabiliyorsunuz, bu dershane yöntemidir. Bizim gençliğimizde dershaneciler bize yapardı. Uygulardık. Ama o kadar hoşuma gitti ki diğer sınıfta da onu uyguladık. Biraz daha sanki çabuk kavradılar. Çok zor bir konu. Kodlama ile ama işin içinden çıkmaya çalışıyoruz." (Fen bilgisi öğretmeni, dMGT-1 toplantıları)

"It works by connecting from here anyway. This is the characteristic of the present generation. So, it reaches somewhere by short cuts. One of the memory techniques." (Psychological counseling subject teacher, idPLC-1 meetings)

"Buradan bağ kurarak çalışıyor zaten. Şimdiki neslin özelliği o. Yani kısa yollardan bir yere ulaşıyor. Hafıza tekniklerinden biri" (Rehberlik ve psikolojik danışman öğretmeni, dMGT-1 toplantıları)

In interdisciplinary teaching experience in the sub-category of *effect on the lesson*, the teachers also gave their opinion on the plan. Teachers mentioned that they changed their lesson plans for the application. Related teachers mentioned the following:

"There was a change in students. That's more so, actually, the science teacher also said it in meetings. [She said] that her job has become easier. In fact, my job has also become easier. For example, when I was instructing the kids about this, I was starting from scratch and explaining them. But now in this process, instead of explaining them from scratch, by using questioning, [I ask] how much they remember of what they have learned. I did extra reinforcement at the point where they didn't remember. But if it was during the normal course of time, I would have to instruct it myself. Uhm, you know, there's also this in science for example, when the science teacher had covid, I started to go into the circulation system. You know, the others should be anything because I didn't explain it in as much detail, uhm, as a science [teacher but] a little bit like this, but when I started to explain, the kids were, uhm, just listeners. There was no participation, but when I did class after the other science teacher, it really made my job easier. I just made that connection with the kids. I also got good feedback from the children." (Physical education and sport teacher, idPLC-2, interview)

"Öğrencilerde değişim oldu. Daha böyle yani aslında hani Fen bilgisi hocam da toplantılarda söyledi. Benim işim kolaylaştı diye. Aslında benim işim de kolaylaştı. Mesela ben çocuklara bunu anlatırken sıfırdan başlayıp anlatıyordum. Ama şimdi bu süreçte sıfırdan anlatmak yerine çocuklara soru yoluyla öğrendiklerini ne kadarını hatırlıyorlar. Hatırlamadıkları noktada ekstra takviye yaptım. Ama normal ders süresinde olsaydı ben onu kendim işlemek zorunda kalacaktım. Iıı hani fen bilgisinde şu da var mesela Fen bilgisi hocam kovid olduğunda şeye dolaşım sistemine ben giriş yaptım. Hani diğerleri de şey olmasın çünkü ıı birazcık böyle gir çok fen bilgisi kadar ayrıntılı anlatmadım ama giriş yaptığımda çocuklar böyle ıı sadece dinleyicilerdi. Bir katılım yoktu ama diğer Fen bilgisi hocam' dan sonra yaptığımda gerçekten benim işim kolaylaşmış oldu. Ben sadece o aradaki bağı kurdum çocuklarla. Çocuklardan da güzel dönüt aldım." (Beden eğitimi ve spor öğretmeni, dMGT-2, bireysel görüşme)

"Well, I can say that my interest in different subjects increased. Therefore, I thought about how I could work on different subjects. How does the student think? How does one learn? How does he understand? You know, I also researched this myself." (Visual art teacher, idPLC-2, interview)

"Böylece farklı konulara ilgim arttı diyebilirim. Bu yüzden farklı konularda nasıl çalışma yaptırabilirim diye düşündüm. Öğrenci nasıl düşünür? Nasıl öğrenilir? Nasıl anlıyor? Biliyorsunuz bunu ben de kendim araştırdım." (Görsel sanatlar öğretmeni, dMGT-1, bireysel görüşme)

Category 2. Teacher Learning

In the *teacher learning* category, four distinct sub-categories are generated. These include "interdisciplinary learning," "facilitating student learning," "benefit for the student," and "differences of teachers' experiences."

The teachers expressed their opinions on intensive interdisciplinary learning in the teacher learning category. Teachers mentioned that they also learned much about other branches during the interdisciplinary training. Related teachers mentioned the following:

"Is it in the sense of professional English? Oh, for example now. When I was in high school, I even took science class in English when I was in secondary school. I took English, I'm a college graduate. But I forgot. I forgot. So here is the respiratory tract. I should not say, but I forgot most of it. There has been progress in my field in terms of words. Let me tell you that." (Foreign language teacher, idPLC-1, interview)

"Mesleki İngilizce anlamında mı? Ha şimdi mesela şöyle. Ben lisedeyken de fen dersini ortaokuldayken hatta İngilizce görmüştüm. İngilizce aldım. Kolej mezunuyum ben. Ama unutmuşum. Unutmuşum. Yani o işte solunum yolu işte oradaki organlarımız bazıları Türkçeye benziyor ama çoğunu unutmuşum. Hepsini de demeyeyim de çoğunu unutmuşum. Kendi alanımda kelime anlamında ben de ilerleme oldu. Öyle söyleyeyim." (İngilizce öğretmeni, dMGT-1, bireysel görüşme)

"So, there were things I learned in English, things I learned in physical education. Like I said, I learned different words. I learned that their counterparts are different. Ah, that's it. I could say that's it. Like triceps, biceps for example. So, we weren't talking about them either. That's what it means to be. It also gave me something for myself. I'm not just talking about kids. I think it helps me too. I really saw that other friends had difficulties. Sir, we used to contact a lot about how this place is, so we were going to tell it like this. Because we didn't want to be disconnected. So that it would not be different when I was describing them. We were in constant contact with them." (Science teacher, idPLC-2, interview)

"Yani İngilizce'de öğrendiğim şeyler oldu, beden eğitiminde öğrendiğim şeyler oldu. Dediğim gibi farklı kelimeler öğrendim. Karşılıklarının farklı olduğunu öğrendim. Aaa bu buymuş. Bu buymuş diyebildim. Hani triceps, biceps mesela. Yani biz de onlardan bahsetmiyorduk. Bunun karşılığı böyleye denk geliyormuş diye. Kendi adıma da bir şeyler kazandırdı. Sadece çocuklar için söylemiyorum. Bana da faydası olduğunu düşünüyorum. Gerçekten diğer arkadaşların zorlandıklarını gördüm. Hocam burası nasıl falan diye biz bayağı irtibata geçiyorduk yani hani böyle mi anlatacağız diye. Çünkü kopukluk olsun istemiyorduk. Onları anlatırken ben anlatırken farklı şekilde olmasın diye. Sürekli irtibattaydık onlarla da." (Fen bilgisi öğretmeni, dMGT-2, bireysel görüşme)

"Actually, it was a new concept that I learned. It was as if I had refreshed my knowledge after many years had passed. I mean, I don't think I'm competent, especially in science, since I don't have a full grasp of it. Of course, I read those concepts." (Visual art teacher, idPLC-2 meetings)

"Yeni öğrendiğim bir kavramlar oldu aslında. Hani uzun yıllar geçtikten sonra bilgilerimi tazeledim gibi oldu. Yani tam hakim olmadığım için benimde yetkin olduğunu düşünmüyorum fen bilgisinden özellikle. Okudum tabi ki o kavramları." (Görsel sanatlar öğretmeni, dMGT-2 toplantıları)

Facilitating student learning is another sub-category under which teachers share their views on teacher learning. According to the teachers, it facilitated student learning, saving time in lectures. The following are the teachers' comments on the subject:

"For example, I have to give things about breathing that week. That week, for example, I gave these to the children, but I could not be very detailed. But even with that part it was very good. I saw that because I took it after science, I already saw that children came full of science. A ready sample came to me. I supported them with the move." (Physical education and sport teacher, idPLC-1 meetings)

"Mesela o hafta solunumla ilgili şeyleri vermeliyim. O hafta mesela çocuklara ben de bunları verdim ama çok ayrıntılı olamadım. Ama o kısmı ile bile çok iyi oldu. Şunu gördüm ben fen bilgisinden sonra ele aldığım için çocukların fen bilgisinden dolu geldiğini gördüm zaten. Hazır bir numune geldi bana. Ben de hareketle onları destekledim." (Beden eğitimi ve spor öğretmeni, dMGT-1 toplantıları)

"And we'll make each other's job easier. The kids will do better in science class. It's kind of made my job easier, actually." (Science teacher, idPLC-2 meetings)

"Ve birbirimizin işini kolaylaştıracağız çocuklar fen dersinde daha iyi olacaklar. Benim işimi de kolaylaştırmış oluyordu bu bir nevi aslında." (Fen bilgisi öğretmeni, dMGT-2 toplantıları)

In the teacher learning category, the teachers also expressed their opinions about the benefit for the student. Teachers mentioned that interdisciplinary education is very beneficial for students. Related teachers mentioned the following:

"So, there are common purposes, we have already realized this better. All for the sake of the children. It may not be successful in a single course, and if interdisciplinary transition is provided, the student will be more successful. We can save time, as you just said. Learning gets easier, um yes, learning just got easier. For example, when the physical education teacher applied the subject in a science lesson outside, when I made an activity related to it, the learning time was shortened and learning became easier. I noticed these." (Native language teacher, idPLC-1, interview)

"Yani ortak amaçlar var zaten bunu daha iyi fark ettik. Her şeyi çocukların iyiliği için. Bir de tek derste başarı sağlamayabilir disiplinler arası geçiş sağlanırsa öğrenci daha başarılı olur. Demin sizin dediğiniz gibi zaman kazanabiliriz. Öğrenme daha kolaylaşır, ıı evet, öğrenmek kolaylaştı. Örneğin bir fen bilgisi dersindeki konuyu beden eğitimi öğretmeni dışarıda uyguladığında ben onunla ilgili bir etkinlik yaptırdığımda gerçekten öğrenmenin süresi kısaldı ve öğrenmek kolaylaştı. Bunları fark ettim." (Türkçe öğretmeni, dMGT-1, bireysel görüşme)

"We were also happy to think that practicing it benefited children. So, we found that children learn more easily and faster." (Science teacher, idPLC-2, interview)

"Onu uygulamanın çocuklara fayda sağladığını düşünmek bizi ayrıyeten mutlu etti. Yani çocukların daha kolay, daha hızlı öğrendiklerini gördük." (Fen bilgisi öğretmeni, dMGT-2, bireysel görüşme)

"While friends talking about their contribution in their lessons, you know, I've always said before that we have learning to learn. In this sense, its contribution is great. For example, the contribution to special children's learning will be even greater. So, they will see it in English, they will see it as a picture. For example, the things we wrote that day, the children had always told, the lack of visuals. In this thing, in the project, it should have been visuals [and they have been] aware of that. They even added that there should have been music. It will make it easier for them to learn. They will do a repetition by heart without working at home themselves. Since the subject of each lesson is the same, since it is similar, uhm, therefore the contribution is great. I think it's a lot. Uhm, as I said, where should it start, where should it overlap with whom (within a consortium of teachers and subjects), which courses should be attended at synchronously and which classes should be attended later? Maybe, by looking at the results, you know, in that thing, there, I don't know, we can make an organization. What would we do? Something a little different." (Psychological counseling subject teacher, idPLC-1 meetings)

"Arkadaşlar onlar derslerindeki katkısını anlatırken, hani hani bizde hep öğrenmeyi öğrenmek diye daha önce de söyledim. Bu anlamda katkısı büyük. Mesela özel çocukların öğrenmelerine katkısı daha da büyük olacaktır. Yani ingilizce olarak görecek resim olarak görecek. Mesela o gün yazdırdığımız şeyleri çocuklar hep resmin eksikliğini söylemişler. Bu şeyde projede farkındalar resimde olmalıydı. Hatta müzikte olmalıydı diye eklemişler. Öğrenmelerini kolaylaştıracak. Kendileri evde çalışmadan ezbere bir tekrar yapacaklar. Her derse konu benzer olduğu için aynı olduğu için ıı o yüzden katkısı büyük. Bence çok fazla. Iıı ben dediğim gibi hani nerede başlamalı, nerede kiminle örtüşmeli, hangi dersler aynı anda daha sonra hangi dersler katılmalı? Belki o şeyde biraz daha hani sonuçlara bakarak orada bir ne bileyim organizasyonu yaparız. Ne yaparız? Biraz daha farklı." (Rehberlik ve psikolojik danışman öğretmeni, dMGT-1 toplantıları)

Another sub-category that participants in the teacher learning category discussed was the ***differences in teachers' experiences***. Participants talked about new-

generation and old-generation teachers and their differences. The statements of the participants on the subject are as follows:

> *"I tried to understand what you said. Sometimes I thought that new teachers also adapt much more agilely. There may also be people who don't care about anything in the past. So, I thought about your new new old separation." (Native language teacher, idPLC-1 meetings)*

> *"Anlamaya çalıştım dediğinizi ama. Bazen yeni öğretmenler de çok daha kıvrak bir şekilde adapte olabiliyorlar diye düşündüm. Eskilerde hiçbir şey umursamayanlar da çıkabilir. Yani yeni yeni eski ayrımınızı düşündüm." (Türkçe öğretmeni, dMGT-1 toplantıları)*

> *"But there is a generation gap, Teacher. For example, the teacher has to know the language of that generation. For example, we say that the child is simply not listening. As a way of learning something under the desk, maybe the thing is auditory, so it doesn't have to look." (Physical education and sport teacher, idPLC-1 meetings)*

> *"Ama kuşak farkı var ya Hocam. Mesela o kuşağın dilini öğretmen bilmek zorunda. Mesela biz çocuğu diyoruz ki en basitinden bu çocuk dinlemiyor. Sıranın altında bir şey öğrenme şekli olarak o belki şey sadece işitsel işitsel ağırlıklı yani bakmak zorunda değil." (Beden eğitimi ve spor öğretmeni, dMGT-1 toplantıları)*

Category 3. Teacher Recommendations

Finally, five different sub-categories are developed for the area of **teacher recommendations**. Among these are "curriculum reorganization," "the importance of Turkish lesson," "change in education system level," "increase communication amongst teachers," and "formalization of the interdisciplinary learning organization."

> *"In the teacher recommendations category, the participants expressed their opinions on curriculum reorganization. Participants mentioned that the curriculum should be organized, and a common curriculum should be determined with other branches. Related participants mentioned the following:*

> *"There, curricula have to move things around. They can all fit together, but for example, my position at the moment never fits, but there are places that we can apply to the current topic in the future. It exists as a theme. But the current one doesn't fit. For example, why not play it and put it there? Maybe it will fit then. That would be great too." (Foreign language teacher, idPLC-1 meetings)*

> *"Orada müfredatların şeylerin konuların yerinden oynaması lazım. Hepsi birbirine uydurabilir ama mesela şu an benim konum asla uymuyor ama ilerleyen zamanlarda ııı şu anki konuyla uygulayabileceğimiz yerler var. Tema olarak var. Ama şu anki uymuyor. Mesela neden olup yerine oynatıp oraya*

koymayalım? olabilir o zaman uyar. Çok da güzel olur." (İngilizce öğretmeni, dMGT-1 toplantıları)

"What I observe most in English myself, for example, is the issue of clocks at six. Usually, I have to teach Turkish first. I wish the hours were taught before, but it would be easier for me to teach English later. You know, if this system develops, at least what will happen? "If a math teacher has to teach at the same time, he/she will have taught it beforehand. I'll give it in English later. It really needs to go in parallel like this. It's not a very interesting subject, it's something that should happen, but for some reason it is not practiced in our country." (Foreign language teacher, idPLC -2, interview)

"Ya ben en çok kendim de ingilizcede gözlemlediğim mesela şu an altılarda saatler konusu. Genellikle önceliğim türkçesini öğretmek zorunda kalıyorum. Saatlerin keşke diyorum daha önce öğretilmiş olsa da ben sonra ingilizcesini öğretmek benim için daha kolay olur. Hani bu sistem gelişirse en azından ne olur? Aynı anda veya matematik öğretmeninin öğretmesi gerekiyorsa o önceden öğretmiş olur. Ben sonra İngilizcesini veririm. Böyle paralel gitmesi gerekli gerçekten. Çok enteresan bir konu değil aslında olması gereken bir şey ama nedense bizim ülkemizde uygulanmıyor." (İngilizce öğretmeni, dMGT-2, bireysel görüşme)

"I experienced something similar to that. Let me tell you something about it. Today there was distance education. While a class of mine was teaching them in quarantine, I was talking about where sports came from and how it emerged. Because we worked theoretically. Here I am from before Christ. I went there before Christ, when I was talking about what kind of sports the Japanese, the Chinese and India were inclined to, which countries or why the Turks gave importance to sports, why the branches were, etc., my teacher, we already got into these social issues. "In India, because of its religious issue, they preferred such a serene sport. Maybe things like yoga came from there. They said that you are like a multi-purpose teacher because you actually came out of there thinking or something." (Physical education and sport teacher, idPLC-2 meetings)

"Ona benzer ben bir şey yaşadım. Bundan bir ıı hemen açayım. Bugün uzaktan eğitim vardı. Bir sınıfım karantinada onlara ders anlatırken ıı spor nereden ortaya çıktı, nasıl ortaya çıktı ondan bahsediyordum. Teorik olarak işlediğimiz için. İşte ben oradan milat öncesi milattan önceye girdim oradan işte Japonların, Çinlilerin de Hindistan'ın nasıl bir spora yatkın olduklarını, hani hangi ülkelerin ya da Türkler spora neden işte ağırlık verdiği, branşların neden olduğunu falan anlatırken, öğretmenim biz zaten sosyalde bu konulara girdik. Diye böyle tarihten oradan dine geçtim. Hindistan işte dinsel konusundan dolayı onlar daha böyle bir dingin sporları tercih etmişler işte. Yoga tipi gibi belki de şeyler oradan çıkmıştır. Oradan aslında düşünerek çıkmıştır falan diye böyle öğretmenim çok amaçlı öğretmen gibisiniz dediler." (Beden eğitimi ve spor öğretmeni, dMGT-2 toplantıları)

Another sub-category the participants gave their opinions on in the teacher recommendations category is ***the importance of Turkish lessons***. Participants

emphasized the importance of the Turkish course as the foundation for all others. The statements of the participants on the subject are as follows:

"For example, I worked mostly in my field and in different groups, but mostly with Turkish because we have a lot of trouble with grammar. The child does not learn Turkish, he learns English, he goes ahead. You teach the child, but he can't make an example, because there is no Turkish equivalent, the mother tongue will know in the mother tongue after all. Let him know what he learned in a second language, it is very difficult without knowing it, unfortunately." (Foreign language teacher, idPLC-1, interview)

"Mesela benim alanımda da en çok farklı zümrelerde de çalıştım ama en çok Türkçe ile çünkü gramer konusunda biz çok sıkıntı çekiyoruz. Çocuk Türkçesini öğrenmemiş oluyor İngilizcesini öğreniyor önden gidiyor. Çocuğa öğretiyorsun ama örnekleme yapamıyor çocuklar çünkü Türkçe karşılığı yok ana dil sonuçta ana dilde bilecek ki ikinci bir dilde neye tekabül ettiğini öğrendiği şeyin bilsin bunu bilmeden çok zor oluyor maalesef." (İngilizce öğretmeni, dMGT-1, bireysel görüşme)

"Turkish is already in my opinion, it is necessary for every course to be in Turkish first and foremost. It's the same with language, even for math. I tell my students; your Turkish must be very good." (Foreign language teacher, idPLC-2 meetings)

"Türkçe zaten bence her ders için en başta Türkçe olması gerekiyor. Matematik için bile dilde de aynı şekilde. Ben öğrencilerime söylüyorum ediyorum, Türkçeniz çok iyi olmalı." (İngilizce öğretmeni, dMGT-2 toplantıları)

In the teacher recommendations category, the participants also expressed their opinions about **the change in the educational system**. Participants mentioned that there should be changes in the education system and management channel. Related participants mentioned the following:

"MoNE should include new things. We always see that others are better, we know, but it seems to me that we are not doing anything. It seems to me that we are acting individually in terms of correct innovation, in terms of correcting where there is a problem. MoNE is as if it is individual. Do whatever you want." According to him schools are the cuisine of national education. I think they don't listen to us too much." (Psychological counseling subject teacher, idPLC-1, interview)

"Milli Eğitim Bakanlığı yeni şeyler katılmalı. Hep başkaları şunlar daha iyi diye görüyoruz, biliyoruz ama biz bir şey yapmıyoruz gibi geliyor bana. Doğru yenilik açısından, bir yerlere aksayan yerleri düzeltme açısından bireysel hareket ediliyormuş gibi geliyor. Milli Eğitim Bakanlığı sanki bireysel. Canın ne istiyorsa ona göre. Çok da milli eğitimin mutfağı okullar. Çok da bizi dinlemiyorlar diye düşünüyorum." (Rehberlik ve psikolojik danışman öğretmeni, dMGT-1, bireysel görüşme)

"Now it is done from above, then managers are informed about it, such as in-service training. I think that we can start this business by helping the teachers in their own conditions as administrators. But the beginning must come from above." (Science teacher, idPLC-1 meetings)

"Şimdi şöyle yukarıdan yapılır ondan sonra hizmet içi eğitim gibi yöneticiler bu konuda bilgilendirilir. Yöneticilerde öğretmenlerini kendi koşullarında yardımcı olarak bu işe başlarız diye düşünüyorum ben. Ama başlangıç yukarıdan gelmeli." (Fen bilgisi öğretmeni, dMGT-1 toplantıları)

The participant's responses to the category of teacher recommendations also included the phrase ***increase communication amongst teachers***. Participants stated that teachers should communicate more with one another. The following are the participants' comments on the subject:

"Here, there can be lessons related to communication with each other, either following or simultaneously, huh. I think there should always be such projects for the improvement of education." (Psychological counseling subject teacher, idPLC-1, interview)

"İşte birbirleriyle iletişimi ilişkili derslerin olabileceği, aynı zamanda ya takip eden ya da eş zamanlı olarak hı hı. Yönetilebileceği bence eğitimin iyileştirilmesi adına böyle projeler hep olmalı." (Rehberlik ve psikolojik danışman öğretmeni, dMGT-1, bireysel görüşme)

"I mean, if such a study comes to life, it will be very beneficial. I believe in this wholeheartedly, but while doing this, we need to work on common issues at the same time." (Science teacher, idPLC-1 meetings)

"Yani böyle bir çalışma hayat geçerse çok faydalı olur. Buna yürekten inanıyorum ama bunu yaparken ortak konuları aynı anda ortak çalışmamız gerekiyor." (Fen bilgisi öğretmeni, dMGT-1 toplantıları)

Another sub-category for which the participants gave their opinions in the teacher recommendations category is ***the formalization of interdisciplinary learning organization***. Participants stated that interdisciplinary training should be formalized and approved by the administrators. The statements of the participants on the subject are as follows:

"For example, when these seminar programs come out, you know that there is something every day, even there, there is an article called interdisciplinary communication, and my teachers should definitely have a picture of my dear teacher. It has to be written." (Physical education and sport teacher, idPLC-1 meetings)

"Mesela bu seminer programları çıktığında da her güne bir şey var biliyorsunuz konu başlığı orda bile hani disiplinler arası iletişim diye bir madde konularak öğretmenlerimin kesinlikle değerli hocam resmi olması

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lazım. Yazılı olması lazım."(Beden eğitimi ve spor öğretmeni, dMGT-1 toplantıları)

"Actually, there are heads of school principals. So of course, they can. Heads of departments can manage it." (Visual art teacher, idPLC-2 meetings)

"Aslında okul müdürü zümre başkanları var işte. Yani yapabilirler tabii. Zümre başkanları bunu yönetebilir." (Görsel sanatlar öğretmeni, dMGT-2 toplantıları)

4.2. The Result of the Second Research Question

Research Question 2. How does the teachers' participation in the idPLCs influence their students' HrF knowledge and physical activity participation level?

This research question (sub-questions a and b) sought to determine whether there is a statistically significant difference between the HrF knowledge test and physical activity level of the experimental and control group students.

Research Question 2.a. Do the teachers' participation in the idPLC increase their students' HrF knowledge?

This question aimed to investigate if there were significant differences between the HrF knowledge tests of pretest and post test for experimental and control groups. Firstly, descriptive statistics results are given in terms of each variable's mean and standard deviation. Then, the results of the necessary paired sample t-test hypotheses, including sample size criteria, missing values, outliers, independence of observation, and normality were presented. Finally, the paired sample t-test results were presented.

4.2.1. Descriptive Statistics of the HrF Knowledge

The means and standard deviations are summarized in Table 4.1 after descriptive statistics were used. Before and after the dMGT intervention, the "HrF Knowledge Examination for Middle School Students" was administered to 80 secondary school students (35 in the experimental group and 45 in the control group). According to the descriptive results, the experimental groups' pretest HrF knowledge test scores ($M = 23.34$, $SD = 3.52$) were lower than the experimental groups' posttest HrF knowledge test scores ($M = 26.83$, $SD = 3.62$). It seems that HrF knowledge test scores increased for the experimental groups' students between pretest and posttest.

For control groups' pretest HrF knowledge test scores ($M = 23.00$, $SD = 3.80$) were higher than the control groups' posttest HrF knowledge test scores ($M = 21.84$, SD = 4.13). It seems that HrF knowledge test scores decreased for the control groups' students between pretest and posttest.

Table 4. 1

Descriptive statistics of HrF Knowledge Test for Groups

Groups	Time	*N*	*M*	*SD*
Experimental Groups	Pretest (HrF)	35	23.34	3.52
	Posttest (HrF)	35	26.83	3.62
Control Groups	Pretest (HrF)	45	23.00	3.80
	Posttest (HrF)	45	21.84	4.13

4.2.2. Paired Sample T-Test for HrF Knowledge Test

a.1. Assumptions of Paired Sample T-Test

For the paired sample t-test, outliers (Tabachnick & Fidell, 2013), independence of observations, sample size criteria, normality assumptions were checked before progressing on to primary analysis (Field, 2018).

Sample size. The sample size was determined by the estimated effect size of 0.30. An estimated sample size of at least 24 participants was recommended to observe statistical significance at the 0.05 alpha level with an estimated power level of 0.80, according to G*Power software's (G*Power 3.1) calculations. In this study, there were 35 students in experimental groups and 45 students in control groups. In total, 80 students participated in the study.

Outliers. Standard z-scores, box plots, and histograms were used to look for univariate outliers. Tabachnick and Fidell (2013) defined potential outlier cases as z-scores greater than 3.2 lower than -3.29 ($p<.001$, two-tailed test). According to z-score results, no cases exceeded the scores for both groups. However, two cases in control groups and four cases in experimental groups were univariate outliers. When these cases did not change the main analysis results, they were included in the study.

Normal distribution of the differences. Skewness and Kurtosis values, histograms, Q-Q plots, Kolmogorov-Smirnov and Shapiro-Wilk tests (Pallant, 2016), were used to validate the normality assumption (Field, 2018).

Histograms are utilized to represent the spread of a single continuous variable. The histogram's shape can be examined to learn more about how the continuous variable's scores are distributed. The HrF knowledge scores for both groups were obviously not normal (see Appendix K). *The skewness and kurtosis* values for both the experimental and control groups were between -1 and +1 for HrF Knowledge Tests results, as shown in Table 4.2. The greater the distance from zero, the more likely the data is not normally distributed. If the distribution is normal, the observed values (the dots on the chart) should follow the straight line accurately. *Q-Q plots* demonstrated the normality of distributions because the plots were centered on the line and not too far away from it (see Appendix K). *Kolmogorov-Smirnov & Shapiro-Wilk* test determines the normality of the score distribution. A non-significant finding ($p > 0.05$) indicates that the data is normal. The results of the Kolmogorov-Smirnov tests are clearly normal ($p > 0.05$) (Table 4.3). As a result, the data on HrF knowledge tests showed a normal distribution for both groups.

Table 4. 2

Descriptive Statistics of the HrF Test Scores for Students

Groups	Time	*M*	*SD*	*Skew.*	*SE*	*Kurtosis*	*SE*
Experimental Groups	Pretest (HrF)-Posttest (HrF)	3.49	.55	-.04	.40	-.75	.78
Control Groups	Pretest (HrF)-Posttest (HrF)	-1.16	.73	-.35	.35	.22	.70

Table 4. 3

Kolmogorov-Smirnov & Shapiro-Wilks Tests Results of HrF Knowledge

Groups	Time	Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	*df*	*p*	Statistic	*df*	*P*
Experimental Groups	Pretest (HrF)-Posttest (HrF)	.12	35	.19	.97	35	.47
Control Groups	Pretest (HrF)-Posttest (HrF)	.11	45	.20	.98	45	.59

In order to examine the effect of idPLCs on students' HrF Knowledge test scores, a paired sample t-test was conducted. Results indicated that there was a significant difference between students' HrF knowledge pretest scores ($M = 23.34$, $SD = 3.52$) and students' HrF knowledge posttest scores ($M = 26.83$, $SD = 3.61$) in the experimental groups; $t(34) = -6.38$, $p = 0.001$, Cohen's d $= 1.08$, large effect (Gravetter & Wallnau, 2013, p. 264).

Additionally, there was not a significant difference between students' HrF knowledge pretest scores ($M = 23.00$, $SD = 3.80$) and students' HrF knowledge posttest scores ($M = 21.84$, $SD = 4.13$) in the control groups; $t(44) = 1.59$, $p = .119$.

Table 4. 4

The Result of Paired sample T-Test for HrF Knowledge for Both Groups

Groups	Time	M	SD	Std. Error Mean	t	df
Experimental Groups	Pretest (HrF)- Posttest (HrF)	-3.49	3.23	.55	-6.38[*]	34
Control Groups	Pretest (HrF)- Posttest (HrF)	1.16	4.88	.73	1.59	44

Note. p < .05

Research Question 2.b. Do the teachers' participation in the idPLC increase their students' physical activity participation level?

The goal of this question was to see if there were any significant differences in the physical activity levels of pretest and posttest for experimental and control groups. Firstly, descriptive statistics results are given in terms of each variable's mean and standard deviation. Secondly, the results of the necessary paired sample t-test hypotheses, which are including sample size criteria, missing values, outliers, independence of observation, and normality were presented. Finally, the paired sample t-test results were presented.

4.2.3. Descriptive Statistics of the Physical Activity Level

The means and standard deviations are summarized in Table 4.5 after descriptive statistics were used. Before and after the idPLC intervention, the " Physical

Activity Questionnaire for Older Children" was administered to 75 secondary school students (32 in the experimental group and 43 in the control group). According to the descriptive results, the experimental groups' pretest physical activity level (M =3.02, SD = .77) was lower than the experimental groups' posttest physical activity level (M = 3.47, SD = .71). It seems that physical activity level increased for the experimental groups' students between pretest and posttest.

The control groups' pretest physical activity level (M = 3.07, SD =.67) was lower than the control groups' posttest physical activity level (M = 3.11, SD =.81). Physical activity levels appear to have increased for students in the control groups between pretest and posttest.

Table 4. 5

Descriptive statistics of Physical Activity Level for Groups

Groups	Time	N	M	SD
Experimental Groups	Pretest (PA)	32	3.02	.77
	Posttest (PA)	32	3.47	.71
Control Groups	Pretest (PA)	43	3.07	.67
	Posttest (PA)	43	3.11	.81

4.2.4. Paired Sample T-Test for Physical Activity Level

b.1. Assumption of Paired Sample T-Test

Before moving on to the primary analysis, the sample size criterion, assumptions of outliers (Tabachnick & Fidell, 2013), independence of observations, normality were checked (Field, 2018).

Sample size. The sample size was determined by the estimated effect size of 0.30. An estimated sample size of at least 24 participants was recommended to observe statistical significance at the 0.05 alpha level with an estimated power level of 0.80, according to G*Power software's (G*Power 3.1) calculations. In total, 75 students participated in the study. 43 of them were from control groups, and 32 were from two experimental groups.

Outliers. Standard z-scores, box plots, and histograms were used to look for univariate outliers. Tabachnick and Fidell (2013) defined potential outlier cases as z-scores greater than 3.2 lower than -3.29 (*p*.001, two-tailed test). According to z-score results, no cases exceeded the score. However, three cases (Case 37 and Case 17) in the experimental groups were univariate outliers due to their distribution in the histogram and q-q plot. The Case-37 had surgery after the pre-test, so it could not attend activities. Cases 17 stated that they were sick. According to the findings, without these cases univariate outliers produced better results. So, they were deleted.

Normal distribution of the differences. Histograms, Skewness and Kurtosis, Q-Q plots, Kolmogorov-Smirnov and Shapiro-Wilk tests (Pallant, 2016) were used to validate the normality assumption (Field, 2018). *Histograms* are used to display the distribution of a single continuous variable. Examining the histogram's shape can reveal more information about the distribution of scores for a continuous variable. The physical activity level scores for both groups were obviously not normal (see Appendix K). The *skewness and kurtosis values* for both the experimental and control groups were between -1 and +1 for physical activity level results, as shown in Table 4.6. The more the number is away from zero; the more likely it is that the data is not normal. *Q-Q plots* demonstrated the normality of distributions because the plots were centered on the line and not too far away from it. If the distribution is normal, the observed values (the dots on the chart) should follow the straight line accurately (see Appendix K). *Kolmogorov-Smirnov & Shapiro-Wilk test* determines the normality of the score distribution. A non-significant finding ($p > .05$) indicates that the data is normal. Table 4.7 clearly shows that the results of the Kolmogorov-Smirnov tests do not deviate from normality ($p > 05$). As a result, the data on two physical activity level tests showed a normal distribution for both groups.

Table 4. 6

Descriptive Statistics for Physical Activity Level of Students

Groups	Time	*M*	*SD*	*Skew.*	*SE*	*Kurtosis*	*SE*
Experimental Groups	Posttest (PA) - Pretest (PA)	3.02	.77	.22	.41	-1.03	.81
Control Groups	Posttest (PA) - Pretest (PA)	3.07	.67	.13	.36	-.13	.71

In order to examine the effect of idPLCs on students' physical activity level, a paired sample t-test was conducted. Results indicated that there was a significant difference between students' physical activity pretest level ($M = 3.02$, $SD = .77$) and students' physical activity posttest level ($M = 3.47$, $SD = .71$) in the experimental groups; $t(31) = -3.23$, $p = .003$, Cohen's d = .57, large effect (Gravetter & Wallnau, 2013, *p*. 264).

Table 4. 7

Kolmogorov-Smirnov & Shapiro-Wilks Tests Results of Physical Activity Level

Groups	Time	Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	*df*	*p*	Statistic	*df*	*P*
Experimental Groups	Posttest (PA) - Pretest (PA)	.13	32	.20*	.94	32	.07
Control Groups	Posttest (PA) - Pretest (PA)	.10	43	.20*	.98	43	.73

Moreover, there was not a significant difference between students' physical activity pretest level ($M = 3.07$, $SD = .67$) and students' physical activity posttest level ($M = 3.11$, $SD = .81$) in control groups; $t(42) = -.337$, $p = .74$.

Table 4. 8

The Result of Paired Sample T-Test for Physical Activity Level for Both Groups

Groups	Time	*M*	*SD*	Std. Error Mean	*t*	*df*
Experimental Groups	Posttest (PA) - Pretest (PA)	-.45	.79	.14	-3.23 *	31
Control Groups	Posttest (PA) - Pretest (PA)	-.04	.78	.12	-.337	42

Note. p < .05

4.3. The Result of the Third Research Question

Research Question 3. What are the idPLC teachers' students' views on their teachers' teaching approaches to selected body systems (skeletal, muscular, cardiovascular & respiratory), HrF, and physical activity participation?

The data for this research question was acquired from focus groups' interviews and students' journals. Journal writing was done by all of the students in the experimental group. There was a total of twelve students involved in the focus group meetings, six representing each of the two groups. Findings showed that the idPLC teachers' students' views on their teachers' teaching approaches to selected body systems (skeletal, muscular, cardiovascular & respiratory), HrF, and physical activity participation through four themes. These are implementation and efficiency of interdisciplinary courses, creative or original thinking, making real-life connection, and increased awareness (Figure 4.6).
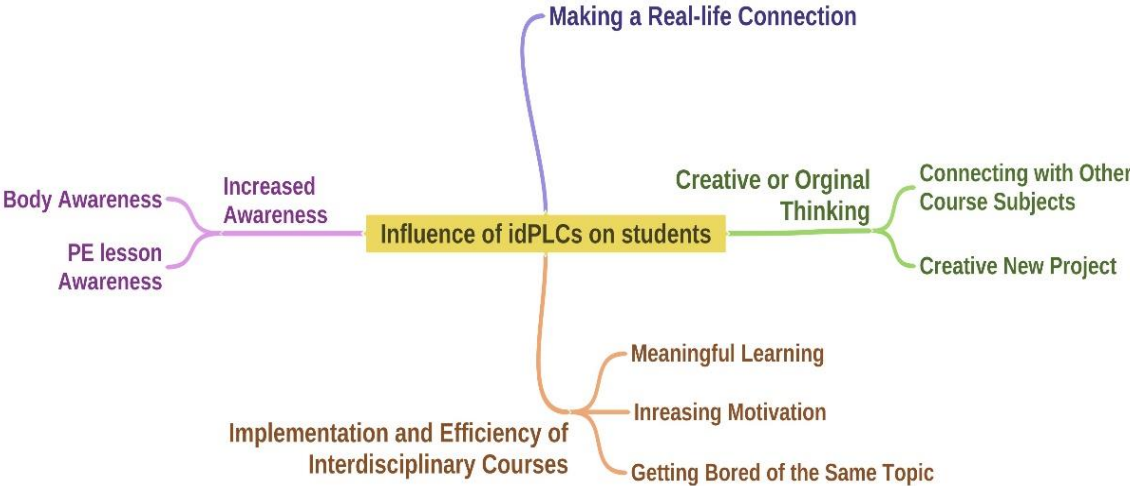
Figure 4. 6. Hierarchical themes\ categories display of the third research question

Theme 1: Implementation and Efficiency of Interdisciplinary Courses

Three categories were created for the theme of implementation and efficiency of interdisciplinary courses. They are meaningful learning, increasing motivation, and getting bored of the same topic.

In the theme of implementation and efficiency of interdisciplinary courses, students expressed their views on *meaningful learning*. They said that what they learned was more permanent. They also stated that it helped them to learn the same subjects in other lessons and reinforce the subject. They said that those who did not understand the subject in science class could understand it in other classes. Even if they missed the lesson, they said they learned the subject by following other lessons.

Thus, the subject was learned in more meaningful. Relevant participants stated the following:

> "...I think we've learned better. Because it was a very difficult subject, we reinforced it in every lesson and learned new things in IIII, that is, in English, and we examined the subject from different angles." (Student T)

> "... Bence daha iyi şekilde öğrendik. Çünkü çok zor bir konuydu böyle her derste pekiştirerek Iıı yani İngilizcede falan yeni şeyler öğrendik ve konuyu farklı açılardan inceledik" (Öğrenci T)

> "...we consolidated better; it became permanent in our minds. So, it was very nice." (Student M)

> "...daha iyi pekiştirdik; aklımızda kalıcı oldu. Yani çok güzeldi." (Öğrenci M)

> "I got confused between circulation and respiration a little bit, but reinforcing it in each lesson made me understand better, I understood much more." (Student T)

> "...dolaşım ile solunumu biraz karıştırdım ama her derste pekiştirmek daha iyi anlamamı sağladı daha anladım." (Öğrenci T)

> "...I didn't really understand much when our science teacher instructed [us], but then when [we] did it again in other lessons, I understood better." (Student R)

> "...fen bilgisi hocamız anlattığında aslında çok fazla anlamamıştım ama sonra öbür derslerde de tekrar yapınca daha iyi anladım." (Öğrenci R)

> "...As our friend said, at first, I couldn't also understand respiratory [system]. We had competitions in the respiratory [topic] in PE class. We've done a lot of things. That's when I figured it out in PE class. In the visual art lesson, we did projects such as trees related to respiration, trees are our breath. We have done a lot of projects with such methods. In English class, they taught us new words in different languages, that is, in our English language [class]. That [lesson] contributed more to us with those new words. [In] English, both my English has developed and also [I] learned new information." (Student Ö)

> "...Arkadaşımızın dediği gibi ilk başta ben de solunumu anlayamamıştım. Solunumda beden dersinde yarışmalar yaptık. Bir sürü şey yaptık. O zaman beden dersinde anladım. Görsel dersinde solunumla ilgili ağaç, ağaçlar bizim nefesimizdir gibi projeler yaptık. Öyle yöntemlerle bir sürü proje yaptık. İngilizce dersinde bize farklı diller farklı dillerde yani İngilizce dilimizde ıı yeni kelimeler öğrettiler. O yeni kelimelerle de bize daha çok katkı sağladı. İngilizce hem İngilizcemi gelişti hem de belirli bilgiler öğrendi" (Öğrenci Ö)

Another code in the theme of implementation and efficiency of interdisciplinary courses about which the students expressed their opinions was *increasing motivation*. The motivation of students increases as learning becomes fun

and meaningful. They said that they learn better by having fun and playing games. The statements of the students on the subject are as follows:

> "…We learned in a fun way by also having fun, by playing games, by doing competitions." (Student H)

> "…Bir de eğlenerek, oyun oynayarak, yarışmalar yaparak yaptığımız için eğlenceli bir şekilde öğrendik." (Öğrenci H)

Students in the theme of implementation and efficiency of interdisciplinary courses also expressed their views on **getting bored of the same topic.** The students said they started to get bored when they saw the same subject in different classes for a few weeks. The statements of the students on the subject are as follows:

> "I think it was a useful project, but it could be that when, uhm, in doing lessons, uhm, lessons [should] not [be] a little more crudely but [they] should have a certain time. A specific lesson should be taught 1 or 2 weeks. When [we] covered constantly in the same week, uhm, the same thing for 5 weeks, the subject got a little longer. It bored us a little; but we also reinforced it very well." (Student Ö)

> "…Bence yararlı projeydi ama ııı şöyle olabilir, ıı dersler yaparken ıı dersleri biraz daha ıı kabacasına değilde belirli bir zamanı olmalı. 1 ya da 2 hafta belirli bir ders işlenmeli. Hep aynı hafta ıı 5 hafta boyunca aynı şeyi işleyince konu biraz uzadı. Biraz bizi sıktı; ama çok iyi de tekrarlamış olduk." (Öğrenci Ö)

> "But when it was always the same topic, uhm, as our friend said, it bored us a little bit." (Student R)

> "Ama üst üste olunca ıı arkadaşımız dediği gibi biraz sıktı." (Öğrenci R)

Theme 2: Creative or Original Thinking

Creative or original thinking is the second theme to emerge from this study. For the theme, two categories were made. These include connecting with other course subjects and creating a new project.

In the theme of creative or original thinking, the students expressed their opinions about **connecting with other course subjects.** Students also connected with other lessons outside the project with different pairings (2 pairs; 3 pairs). The statements of the students on the subject are as follows:

> "In social [studies class], for example, we covered maps. We could have made those maps in physical education as well. With things like that, interesting like this, each of us could have been a country. We could have played a role that way. "(Student K)

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"Sosyalde mesela biz haritaları işliyoruz mesela. Beden eğitiminde de o haritaları yapabilirdik. Böyle şeylerle, böyle ilginç, her birimiz ülkeler olurdu. O şekilde canlandırma yapabilirdik." (Öğrenci K)

"It could have been associated with mathematics. We learned in physical education class that also somersaults are in the Olympics. In mathematics, there is also a minus, plus, cross. So, four operations. For example, we could show the minus sign by doing somersaults. After that, we could put two cushions for the addition sign and one of us could have laid down as a line in the middle. One of us could have stood on top of it in the form of a 4. We would have learned the subject better and we would have had fun at the same time." (Student H)

"Matematikle ilişkilendirilebilirdi. Hem takla atmalar olimpiyatlarda olduğunu biz beden eğitimi dersinde öğrendik. Matematikte de eksi artı çarpı var. Yani dört işlem. Mesela eksi işaretini parende atarak gösterebilirdik. Ondan sonra toplama işaretini iki tane minder koyup ortaya bir çizgi olarak birimiz yatabilirdik. Üstünde birimizde 4 şeklinde durabilirdik. Hem konuyu daha iyi öğrenmiş olurduk yine hem de eğlenmiş olurduk" (Öğrenci H)

"For example, science, math, and social [studies] classes can all be all-in-one. In science class, we can draw the map of Turkey on our lungs and combine scaling, and so on, on the map of Turkey with mathematics lessons." (Student H)

"Mesela fen, matematik ve sosyal dersi, hepsi, üçü bir arada olabilir. Fen dersinde akciğerlerimizin üzerine Türkiye haritasını çizip, Türkiye haritasında ölçeklendirme falan da matematik dersi ile birleştirebiliriz." (Öğrenci H)

In the theme of Creative or original thinking, another category is ***creating new projects.*** The students said that they could do projects by connecting with different subjects.

"Teacher, as our friend said, if we learn about the systems in English, there are professions that we can acquire in the future, teacher, [and] in these professions, we can cover those words in English. Teacher, so, I think it makes more sense to learn earlier." (Student F)

"Öğretmenim arkadaşımızın dediği gibi İngilizcede eğer sistemlerle ilgili şeyler öğrenirsek bu zamanlarda öğretmenim ilerde edinebileceğimiz meslekler var öğretmenim bu mesleklerde de İngilizce olarak o kelimeleri işleyebiliriz. Öğretmenim bu yüzden daha erkenden öğrenmek bence daha mantıklı." (Öğrenci F)

"We can do studies called people and environment." (Student Ö)

"İnsan ve çevre adlı çalışmalar yapabiliriz." (Öğrenci Ö)

"Hocam, in fact, we could have used all 3 or three lessons at once. Social [studies], science, math, and that is for example, there will be a problem and a map of Turkey, for example, Ankara Istanbul, hocam, Two-tenths of so many

million people in Ankara give blood, like that, hocam, we would convert it to a problem.” (Student H)

“Hocam aslında 3 üç dersi de bir anda kullanabilirdik. Sosyal, fen, matematik onu da şey mesela hem problem olacak hem Türkiye haritası ile ilgili mesela Ankara İstanbul hocam Ankara’da şu kadar milyon insanın onda ikisi kan veriyor falan diye hocam onu probleme dönüştürürdük.” (Öğrenci H)

“I have the idea of planting saplings.” (Student Ö)

“Benim fidan dikme fikrim var.” (Öğrenci Ö)

Theme 3: Making Real-Life Connection

The third theme emerged as ***making a real-life connection***. The students expressed that they could apply what they learned to life. The statements of the students on the subject are as follows:

“When our teacher explains them in this way in the classroom or in the garden, both because the physical education lesson is a fun lesson, it was both fun and as if we were in science class. For example, when I was revising the subjects, it came to my mind that they were involved in physical education classes or something, so I easily thought of them when solving tests.” (Student Ö)

“Öğretmenimiz sınıfta ya da bahçede bunları bu şekilde anlatınca hem beden eğitimi dersi eğlenceli geçen bir ders olduğu için hem eğlenceli geçti hem de sanki fen dersindeymişiz gibi geçti. Mesela hani konuları tekrar ederken derslerde, beden eğitimi dersine falan işlediklerini aklıma geldiği için, test çözerken mesela kolaylıkla aklıma geldi.” (Öğrenci Ö)

“Hocam, the same thing happened with us in the school bus. My friend was asleep, and we thought he was dead. We immediately measured the pulse; it wasn't measuring. Here he came to himself, woke up and looked at [us].” (Student H)

“Hocam bizde serviste aynı şey oldu. Arkadaşım uyuyor biz de öldü zannettik. Hemen nabzı ölçtük; ölçmüyordu. İşte sonra kendine geldi, uyandı bakıyor.” (Öğrenci H)

“For example, we play the darbuka. For example, since we play without a lot of breaks, we change the one in front of us every once in a while, or something. We are out of breath when it ends because we play non-stop. Every once in a while, I think about it and look at my pulse. Yes, for example, when I looked at my pulse from the watch after I played the darbuka, [it] was 145 or 147. After that, I did something 10 minutes later, I measured it again. [It] resulted 100. I didn't understand why this was like that at first. Wondered if it wasI never stopped? But after that, I saw that I was already tired. My hands have been, like, blushed.” (Student B)

“Mesela darbuka çalıyoruz. Mesela biz bayağı ara vermeden çaldığımız için arada bir darbuka falan değiştiriyoruz önümüzde olanı. Hiç durmadan çaldığımız için bittiği zaman nefes nefese kalıyoruz. Arada bir aklıma geliyor

ve nabzıma bakıyorum. Evet, mesela ben ıı şey darbuka çaldıktan sonra nabzıma baktığımda saatten 145 veya 147 çıkmıştı. Ondan sonra bir 10 dk sonra şey yaptım ölçtüm gene. 100 çıktı. Neden böyle olduğunu anlamadım önce. Acaba hiç durmadığımdan mı? Ama ondan sonra bir baktım zaten yorulmuşum. Ellerim falan kızarmış. (Öğrenci B)

Theme 4: Increased Awareness

The final theme discussed within the scope of the research is increased awareness. Two codes were created for the theme. These consist of body awareness and PE lesson awareness.

In the theme of increased awareness, the students conveyed their opinions about **body awareness.** They stated that they could understand their bodies better thanks to physical education and visual arts lessons. Related students mentioned the following:

"Measuring your pulse, you know. When we ran, when we warmed up, we saw how much of it, how much of our pulse was." (Student F)

"Nabzını ölçmek yani. Koştuğumuzda, ısındığımızda ne kadarını ne kadar nabzımız bunu gördük." (Öğrenci F)

"Uhm, a man who was in the news, because he was breathing the same air in the mask, because he was constantly breathing while running with a mask in America, had his lungs exploded. The knowledge we learned in this PE class, in science class, in painting class also, that in real life I wear masks a lot on the street and since sometimes I also run with a mask, I can better understand [the reason for] the beat of my heart and the fast beating of my pulse." (Student H)

"Iıı haberlere çıkmıştı bir adam Amerika'da maske ile koşarken sürekli nefes alıp verdiği için maskenin içinde aynı havayı soluduğu için ciğerleri patlamıştı. Bu beden dersinde fen dersinde, resim dersinde öğrendiğimiz bilgiler de benim gerçek hayatta sokakta çok maske taktığımı ve bende maskeli bazen koştuğum için kalbimin atışına ve nabzımın hızlı atışını daha iyi anlayabiliyorum." (Öğrenci H)

"As our friends say, our teacher would send us a few videos several times a week. We were doing warm-up movements, cooling-down movements. When we asked our teacher about this, he said that usually when our elders went to the doctor, they told them to do sports for heart compression. But our teacher told us that if you start doing sports at this age, you won't have any diseases in the future and you will do regular sports at that time, he had said. Uhm, And the videos he sent us has been beneficial to us a lot." (Student H)

"Arkadaşlarımızın dediği gibi öğretmenimiz bize haftada birkaç kez video atıyordu. Isınma hareketleri, soğuma hareketleri yapıyorduk. Bunların öğretmenimize sorduğumuzda demişti ki, genellikle büyüklerimiz doktora

gidince kalp sıkışmaları falan spor yapmalarını gerektiğini söylüyorlardı. Ama öğretmenimiz bize dedi ki, eğer bu yaştan başlarsanız spor yapmaya gelecekte hastalıklarınız olmaz ve o zamanda düzenli spor yaparsınız demişti. Iııı ve bu gönderdiği videoların bize çok faydası oldu." (Öğrenci H)

Another category that the students gave their opinions in the increased awareness was ***physical education lesson awareness***. They said that they noticed the similarity of physical education with other course subjects. The following are the students' comments on the subject:

"Uhm, teacher, I think issues like the respiratory systems that we deal with, in my opinion, should move to physical education. Because uhm, there we can learn how to keep our breathing regular and so on. We can learn how it works. Therefore, teacher, some subjects may be more suitable for science and in some subjects that may be suitable for physical education." (Student F)

"Iııı öğretmenim bence işlediğimiz solunum sistemleri gibi konular bence beden eğitimine geçmeli. Çünkü eee orada nefesimizi nasıl düzenli tutabileceğimizi falan öğrenebiliyoruz. Nasıl işlediğini öğrenebiliyoruz. Ondan dolayı öğretmenim bazı konularda fen bilimlerinin olabilir bazı konularda beden eğitimi için daha uygun olabilir." (Öğrenci F)

"Not all subjects in science, but the circulatory system and such, I think, uhm, can also be transferred also to physical education…" (Student H)

"Fen bilimlerindeki bütün konular değil ama dolaşım sistemi falan sistemler bence ııı beden eğitimine de geçebilir…" (Öğrenci H)

"In physical education class, most of the time since elementary school, we run a lot in physical education class, but we breathe in and out while running. We breathe in and out quickly. We don't understand anything from our breathing in and out. With this subject, we learned how our breathing is, how we can breathe regularly and consistently. Uhm, while doing this breathing activity, the project, we also learned aerobic and anaerobic activities in the PE class. In which aerobic and anaerobic studies, we learned how we breathe, how much we breathe. How our pulse is measured and what, we learned about how much it should be in normal time. i think it, in my opinion it was very helpful, it was fun." (Student Ö).

"Beden eğitimi dersinde çoğu zaman ilkokuldan beri beden eğitimi dersinde bol bol koşarız ama koşarken nefes alıp veririz. Hızlıca nefes alıp veririz. Hiçbir şey anlamayız nefes alıp vermemizden. Biz de bu konuyla birlikte nefes alıp vermemizin nasıl olduğunu, nasıl düzenli ve güzel nefes alabileceğimizi öğrendik. Iııı hem Projeyi bu nefes alma etkinliğini yaparken de beden dersinde aerobik ve anaerobik çalışmaları da öğrendik aynı zamanda. Hangi aerobik ve anaerobik çalışmalarda nasıl nefes aldığımızı, nasıl ne kadar fazla nefes aldığımızı öğrendik. Nabzımızın nasıl ölçüldüğünü ve ne normal zamanda ne kadar olduğunu öğrendik. Bence çok bence çok yararlı oldu, eğlenceli oldu." (Öğrenci Ö)

"... it has to be something connected with physical education. Already systems, uhm, most of them [or] a few of them also have cover body [parts]. Most of them already have body [parts] and oxygen exchange, like, such that the respiratory system, heartbeat, pulse. We use them in physical education. Because it is necessary. So for this reason, science [topics] should be transferred to physical education because it is used. So there's no problem for that. Uhm, [no] harm [done]. But the benefit is quite great because we learn while having fun and it contributes to these things." (Student B)

"...beden eğitimi ile bağlantılı şey olmalı. Zaten sistemlerin ııı birçoğu birkaç tanesinin de vücut var. Zaten çoğunda da vücut var ve oksijen alıp verme böyle solunum sistemi, kalp atımı, nabız. Onları beden eğitiminde kullanıyoruz. Çünkü gerekiyor. Yani bu nedenle fen beden eğitimine aktarılmalı çünkü kullanılıyor. Bir şey yok yani. Iı zararı. Ama faydası baya büyük çünkü hem eğlenirken öğreniyoruz bunları da katkısı oluyor." (Öğrenci B)

4.4. Summary of Findings

The ultimate aim of this study was to develop a model that reveals how the interdisciplinary teaching method should be applied in schools and which courses should be included with the idPLCs intervention program. To reach this aim, this study was to analyze the impacts of an idPLC consisting of a group of different subject matter teachers on: 1) teachers' content knowledge and pedagogical content knowledge development processes on selected body systems (skeletal, muscular, cardiovascular, and respiratory) and HrF knowledge, 2) their students' HrF knowledge and physical activity levels, and 3) the idPLC teachers' students' views on interdisciplinary teaching approaches.

First of all, it was aimed to develop teachers' content and pedagogical content knowledge on the selected body systems (skeletal, muscular, cardiovascular, and respiratory) and HrF knowledge. Four themes emerged by analyzing the six-week video- records of idPLCs meetings, field notes and semi-structured interviews with teachers, these were 1) Questioning, 2) Acceptance, 3) Practice and 4) Reflection. It has been shown that teachers' content knowledge and pedagogical content knowledge on the selected body systems (skeletal, muscular, cardiovascular and respiratory) and HrF knowledge develop through successive processes.

Seeing the effect of the idPLCs intervention program on students was done through physical education and sports lessons. In order to see this effect, students' HrF knowledge test and physical activity participation levels were measured with

pretest/posttest applications. Findings revealed a significant increase in the experimental group students' HrF knowledge and physical activity levels as compared to the control group ($p < 0.05$). Based on these results, it was clear that the teachers who took part in idPLCs were able to bring the content knowledge and pedagogical content knowledge they gained at the meetings into the classroom.

The findings revealed how the teachers' content and pedagogical content knowledge developed on the selected subjects and whether they could transfer them to the classroom environment. Finally, focus group interviews with students and student journals were used to better understand how these idPLCs were perceived by students. Findings showed that the idPLC teachers' students' views on their teachers' teaching approaches to selected body systems (skeletal, muscular, cardiovascular & respiratory), HrF, and physical activity participation through four themes. These are 1) implementation and efficiency of interdisciplinary courses, 2) creative or original thinking, 3) making real-life connection, and 4) increased awareness.

CHAPTER V

DISCUSSION

This study aimed to examine the influence of the idPLC on teachers' content and pedagogical content knowledge on selected body systems (skeletal, muscular, cardiovascular & respiratory) and HrF knowledge; the effect of students' HrF knowledge and physical activity participation level; and views of students on their teachers' teaching approaches to selected body systems (skeletal, muscular, cardiovascular & respiratory), HrF, and physical activity participation. For this purpose, the findings of the 3 research questions in the study in accordance with the qualitative and quantitative data obtained, are discussed below.

5.1. Research Question 1

How does the idPLC influence the teachers' content and pedagogical content knowledge on selected body systems (skeletal, muscular, cardiovascular & respiratory) and HrF?

Six-week idPLC meetings, field notes, and semi-structured interviews were analyzed for the first question. Four themes emerged from teachers' content and pedagogical content knowledge development processes on selected body systems and HrF knowledge, including 1) questioning, 2) acceptance, 3) practice, and 4) reflection. Teachers' content and pedagogical content knowledge developments occurred as a successive process. Qualitative results showed that teachers' participation in idPLCs positively affected their content and pedagogical content knowledge on selected body systems and HrF knowledge.

In the emerging questioning theme, it seems essential for teachers to focus on the interdisciplinary teaching method to understand the model. The results showed that when teachers discussed how to include selected body systems and HrF knowledge in

their lessons, they discussed policies related to interdisciplinary teaching, teacher competencies in interdisciplinary teaching collaboration, and the suitability of work/school setting for interdisciplinary teaching.

The most crucial point is that when each subject matter teacher examined the curricula of other branches, it effectively developed an understanding of the curricula and content of other subject matter courses. Moreover, as the teachers discussed expected learning outcomes about selected body systems and HrF knowledge, it was revealed that the physical education lessons were not at the desired level during the teachers' education life and that some of them did not attend the physical education lesson by developing a fear of it. This situation was reflected in the fact that teachers' knowledge of HrF, physical activity, and well-being was weaker than their knowledge of selected body systems. At this point, it can be said that it was a critical decision for the facilitator to move forward by placing body systems knowledge at the center of the program and supporting it with HrF knowledge to prevent the breakup of the groups.

Firstly, it was determined that the policies were insufficient when applying the interdisciplinary teaching method. It has been revealed that the teachers cannot get away from the existing curricula and that some policies do not permit them to change their programs except for physical education and visual arts curriculum lessons. The importance of idPLCs should be increased, as the curriculums are limited to interdisciplinary teaching methods. Moreover, the support of school administrators turned out to be important in creating idPLCs. Getting the administrator's support for interdisciplinarity in the classroom is a crucial success factor (Robbins & Searby, 2012). The support of school administrators to idPLCs is also reflected in the researcher's field notes. Both school principals supported this study and helped to use the school facilities.

Secondly, it has been revealed that teachers feel insufficient to create collaboration in order to apply the interdisciplinary teaching method. It has been observed that teachers can connect with a particular lesson, but they do not consider themselves sufficient in terms of how to connect several lessons simultaneously. Today's teacher is a learning guide with an interdisciplinary viewpoint, contributing to developing basic abilities, also known as 21st-century skills, in students of all disciplines (MoNE, 2017). The programs that primarily focus on teacher development

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should include idPLCs in professional development opportunities to be offered to teachers.

Improving the foundation of a shared vision that underpins the interdisciplinary teaching approach may become necessary. Schools that promote idPLCs, encourage shared purpose and ensure a social environment for teachers and flexible structures required for collaboration are more likely to generate interdisciplinary collaborative curricula. In addition, these idPLCs can contribute to developing teachers' proficiency in interdisciplinary teaching methods.

These findings were consistent with the relevant literature on schools providing the structures, resources, and support necessary for effective teacher collaboration (Hernández & Brendefur, 2003). Sel (2022) defined problems in teaching financial literacy as "deficiencies in the curriculum, failure to establish interdisciplinary relationships, problems in terms of teaching time, insufficient student readiness." These outcomes are similar to the results of our study.

In the studies carried out by Dervişoğlu (2013), Akyol (2015), and Gürkan (2019), teachers' lack of knowledge about the interdisciplinary teaching method, insufficient cooperation between groups, and lack of equipment in schools were stated as limitations. These results are also in line with the findings of the current study.

After questioning the barriers to interdisciplinary collaboration, the theme of acceptance emerged. It has been seen that finding a place in their own lesson positioning in interdisciplinary teaching and motivation of idPLCs' members have an important place in the process of carrying out idPLCs and applying the interdisciplinary teaching method. Teachers had difficulty positioning their courses in the interdisciplinary teaching method approach, except for physical education and science teachers. In the interdisciplinary teaching method, presenting concrete lessons prepared with this method around the world for teachers to find a place in their lessons has made the method easier to understand. Giving teachers examples of how the program works helps them understand it and makes it easier for them to connect it to other lessons. Moreover, providing concrete evidence of the interdisciplinary teaching method allowed teachers to look at it from a different perspective. This evidence may have helped how their own lesson would connect with different subject matter lesson.

Findings showed that teachers believed the program would contribute to their professional development, and their students' achievements increased their motivation. Teachers may be more likely to use interdisciplinary teaching methods in their lessons if they are more motivated to believe that combining related subjects can help students do better in school or their professional development. In addition, teachers' high sense of responsibility in idPLCs and their openness to benevolence/helpfulness emerged as essential points for the continuity of idPLCs. At this point, teachers, in particular, highlighted the researcher's and facilitator's communication styles. It was seen that the supportiveness of the researcher in the context and the facilitator's creation of a positive environment for collaboration and making the participants feel valued increased the teachers' motivation.

While integrating body systems and HrF knowledge according to the interdisciplinary teaching methods may be important to encourage good group dynamics for effective collaborative curriculum creation. Hernández and Brendefur (2003) found similar findings to create a successful interdisciplinary collaborative process; effective group dynamics, open communication, and democratic input are critical issues.

According to the findings, it was seen that the teachers internalized the process after questioning the obstacles in front of the interdisciplinary teaching model. In the practice theme where teachers experienced the model, their' awareness was on planning/implementing and student experiences. In the 3rd, 4th and 5th weeks, the teachers discussed the selected body systems and HrF knowledge suitable for the interdisciplinary teaching method they would use in their courses. Teachers used resources shared with them to refresh their knowledge of selected body systems and HrF knowledge. After the science teacher taught the selected topic, she shared the unclear points of the topics with the other subject matter teachers. According to the information given by the science teacher, the teachers deepened their discussion on the selected subjects, including what was important to students, where the problems came from, and how they were handled. These interactions and resources were effective in designing the course contents for the teacher.

According to the findings, providing a good balance of theory and practice of the selected topics is necessary. It has been found to be effective when the topics are

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explained within 2 weeks by establishing a link between the courses. Moreover, it can be effective to start with a topic from a science lesson to understand the basic knowledge. Concretization and repetition of the selected topic with other subject matter courses facilitate understanding the subject matter with the other teachers.

In order to use the interdisciplinary teaching method more effectively and clearly, determining a common terminology can be a critical step. During the teachers' conversations, it came out that the terminology the student learned in science was called something different in physical education, which confused. To avoid this conceptual confusion, the appropriate terminology has been determined. Teachers shared their pedagogical content knowledge by talking with each other about how to help students with difficulties with selected subjects. Experts on an interdisciplinary team need to find a common language or terminology to work on a problem effectively and make the best use of their time (Haythornthwaite et al., 2006). According to Daniel et al. (2022) workshops can provide a platform for communication through initiatives such as the development of interdisciplinary research blogs or research publications that solicit contributions from members of both the disciplines. Creating common terminology can be critical when teachers teach complicated subjects using the interdisciplinary method.

Integration of knowledge from different fields requires experts to spend time communicating and building common meanings (Klein, 1990). Through collaboration, teachers can benefit from one another's knowledge of their instructional goals, curriculum, pedagogical competence, student motivation, and learning styles (Jacobs, 1989). The use of idPLCs in the current study has effectively created an active discussion environment and achieved common goals with the facilitator. In this context, the study contributes empirical evidence to the literature.

The findings revealed that the timetable was the most challenging point in planning and implementing the interdisciplinary teaching model. With intensive course contents, teachers' concern about completing the subject may have limited in using time effectively. In the literature, Akyol (2015) and Gürkan (2019) found similar findings that teachers have limited time and worry about being unable to complete the program due to intense content. Chen et al. (2007) found the same results about the timeline: teachers realized it was essential to modify it for interdisciplinary lessons.

This study evaluated student learning through physical education and sports lessons. However, other subject matter teachers used the methods of written exams, oral exams, and homework to see the effectiveness of the lessons they structured. It has been determined that students have the opportunity to reinforce what they have learned in the lesson outside of school with homework. Teachers wanted to see the immediate effect of the program. It was understood that to see this immediate effect, it was necessary to use an effective measurement tool for all subject matter teachers.

Teachers' views on student experience showed that teachers' interdisciplinary pedagogical content knowledge improved. When the teachers saw that the students learned the subjects that they had difficulty in conceptualizing better through their interdisciplinary curriculum. Students learn best when they are given several opportunities to draw connections between different areas of knowledge (Piaget, 1952). It has been observed that students learn better, act in harmony, and increase their motivation with the interdisciplinary teaching method. This may indicate an expected change in the student when idPLCs are created effectively. Interdisciplinary learning provides access to children with diverse learning styles (Cone et al., 1998). It is seen that the interdisciplinary teaching method is effective for both successful students and students in the disadvantaged group, increasing the effectiveness of idPLCs. Surprisingly, the findings revealed that students got bored repeating the same subjects repeatedly after a particular week. IdPLCs may need to move on to a different topic before the specified week, providing that observing the student deeply. In this way, the student can be prevented from being disconnected from the context of the school.

If interdisciplinary teams work together in an encouraging environment, they can create curricular modules that are highly authentic, integrated, and based on standards (Chen et al., 2007). IdPLCs engage in meaningful collaborative curriculum development when they have reflective conversations based on their own experiences, requirements, and available resources. The resources presented to the teachers at the meetings are all approved by government institutions and are easily accessible to teachers. Providing teachers with reliable and easily accessible resources to improve their CK on selected topics can help increase confidence in the study done. It can be said that the idPLC environment effectively contributes to developing interdisciplinary

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content and pedagogical content knowledge on selected subjects in teachers. Instead of trying to direct team cooperation using predetermined models for technical support, encouraging reflective conversation can lead to better outcomes. Terry et al. (2018) stated that through interdisciplinary group work, disciplinary dialogues, and cooperation, faculty instructors who participated in PLC also contributed to developing pedagogical content knowledge while learning from each other. In the study conducted by An (2016), it was observed that the interdisciplinary professional content knowledge of pre-service teachers has improved. This result is similar to the result of our study.

Teachers' reflection on their practices became prominent in understanding the functionality of the idPLCs' process. Reflections are essential to ensure the sustainability of idPLCs in the school environment. These reflections have led to interdisciplinary teaching experience, teacher learning, and teacher recommendations that may be important to the long-term success of idPLCs. The results showed that the professional development of teachers improved with idPLCs at the desired level. It can be said that this result is realized by teachers becoming more aware of their knowledge, skills, and values, using the interdisciplinary teaching method in their lessons and following the needs of the students. Teaching and learning results benefit from teachers working in teams to coordinate better and integrate the curriculum (Mertens & Flowers, 2003).

For the sustainability of idPLCs, it may be beneficial to adapt the curricula according to the interdisciplinary teaching method. Instead of teaching each subject using an interdisciplinary method, it might be better to figure out which subjects are hard to understand and teach those using this method.

Moreover, all subject matter teachers emphasized the importance of Turkish lessons. The Turkish curriculum has "to understand what students read" and "to express themselves in writing and orally" among the particular objectives (MoNE, 2018d). The findings showed that the students were not at the wished level of these abilities. Since the interdisciplinary teaching method is student-centered, it can give students more ways to express themselves.

In the idPLCs, the teachers collaborated on their learning, prepared an effective program, and progressed by motivating each other in this study. Effective professional

development programs improve teachers' and pedagogical content knowledge (Armour & Yelling, 2007). The findings show that teachers' professional content and pedagogical content knowledge on the selected body system and HrF knowledge improved during the idPLCs process in this study. This result can show that the applied idPLC program is effective.

Different learning communities should be implemented as tools for teachers' ongoing professional development (Parker et al., 2021; Hunuk & Ince, 2013; Ince et al., 2020; Lieberman & Miller, 2008). Effective idPLCs with dynamic groups and the accurate selection of facilitators could use teachers' professional development (Hernández & Brendefur, 2003; Chen et al., 2007; An, 2016)

Hernández and Brendefur (2003) found similar findings: "Interdisciplinary teacher-teams should share similar conceptions of authenticity and integration, have prior experience collaborating in teams, work in a school committed to collaboration, and focus on teaching for increased understanding of concept connections and applications in occupational contexts." Chen et al. (2007) findings corroborate the interdisciplinary teaching literature's recommendation that successful and real interdisciplinary collaboration is founded on instructors' interaction, shared leadership positions, and teaching duties. Hernández and Brendefur (2003) found similar findings.

Overall, the findings of this research question have extended the literature by empirically revealing the contribution of idPLCs to the teacher's content and pedagogical content knowledge on the selected body and Hrf knowledge by using the sharing model (Cone et al., 1998). Moreover, the study has contributed to the literature on how idPLCs should be applied in the school environment, the points to be considered while applying, and sustainability.

5.2. Research Question 2.

How does the teachers' participation in the idPLCs influence their students' HrF knowledge and physical activity participation level?

The study evaluated students through the physical education course to see the effects of idPLCs. The increase in HrF knowledge and physical activity level in the

students of teachers in the idPLCs can be considered as the transfer of teacher learning in idPLCs to the lesson and student learning.

The results show an increase in the HrF knowledge level of the students in the experimental group, the teachers in the idPLCs transferred their interdisciplinary content knowledge and pedagogical content knowledge to their classes to improve their HrF knowledge, and student learning improved in this regard. Previous studies have shown that students' HrF knowledge levels are not at the desired level (Hunuk et al., 2007; Ince et al., 2020), and students have misconceptions about body systems (Ekiz, 2015; Keçeci et al., 2019). Considering that one of the primary outcomes of physical education courses is improving physical activity knowledge (MoNE, 2018b), the increase in student learning with interdisciplinary teaching methods is vital in this study.

This increase in the level of knowledge includes "making the organs speak", "writing poems on their bodies" in Turkish lessons, "material development showing joints and muscles" in art class, "painting and dough activities in connection with real life"; "Short videos on selected topics," "work papers," "examples brought from life" exercise in English class; The "activities, games, parkour" activities in the physical education class may have been effective. In addition, supporting the classes with visual materials about the selected subjects might have helped.

Many studies have shown that when different subject teachers use an interdisciplinary teaching method approach, students' math (Cecchini & Carriedo, 2020; Mahanin et al., 2017; Kaprinis et al., 2009; Özçelik & Semerci, 2016) and science (Boyraz &Serin, 2017; Spintzyk et al., 2016; Korkmaz &Konukaldı, 2015) learning improves.

The findings showed that the physical activity levels of the students in the experimental group increased significantly compared to the students in the control group from the pretest to the posttest. Developing the habit of participating in regular physical activity is one of the most important goals of the physical education curriculum (NASPE, 2004; MoNE, 2018b). A few studies showed that teachers used the interdisciplinary teaching method, and students' physical activity levels increased (Cecchini & Carriedo, 2020; Spintzyk et al., 2016). Integrating knowledge and concepts of the core disciplines into the physical education curriculum could award

physical education a more central and essential position in the educational setting (Marttinen et al., 2017).

Homework given by the physical education teacher to gain the habit of out-of-school physical activity during the practice may have increased physical activity levels. Moreover, WhatsApp groups established by a physical education teacher with families may have increased students' motivation. The teacher has sent videos via WhatsApp. The videos with short and entertaining content sent as homework may have increased the tendency of children to participate in physical activity.

An evaluation of the data collected during the study presented a positive picture of idPLC's effectiveness regarding the students' physical activity level and HrF knowledge increase. The students demonstrated that they could make incomprehensible abstract concepts concrete in different lessons through the focus group interviews. However, qualitative findings about teacher learning concretely reveal that teachers carry their learning from idPLC to school and lessons. Repeating the selected topics in different lessons simultaneously shows that the information can learn more deeply.

5.3. Research Question 3.

What are the idPLC teachers' students' views on their teachers' teaching approaches to selected body systems (skeletal, muscular, cardiovascular & respiratory), HrF, and physical activity participation?

Focus group interviews and student journals were analyzed in order to understand the views of students on interdisciplinary teaching approaches towards selected body systems, HrF knowledge, and their participation in physical activity. According to the findings, four themes emerged: implementation and efficiency of interdisciplinary courses; creative or original thinking; making a real-life connection, and increased awareness.

It has been observed that meaningful learning occurs as the students repeat the same topics in different lessons. The fact that the student is active in the lesson and that the lessons are adapted to students with different learning styles can increase their motivation. Similar findings regarding interdisciplinary teaching methods were found by Gero (2016). Both the teachers and students stated this situation. Interdisciplinary

learning provides access to children with diverse learning styles and frequently combines the modalities of seeing (visual), hearing (auditory), and doing (kinesthetic), allowing children to use their strengths to learn what they are taught (Cone et al. l,1998).

There is a great emphasis on connecting students' experiences to what they will learn, which makes the interdisciplinary teaching style more engaging for students and increases their motivation to study (Lattuca et al.,2004). The implementations that emerged in lessons using interdisciplinary teaching methods may be more exciting and motivate students learning. These studies support the current study's findings (Cuervo, 2018; Kaprinis et al., 2009; Papaioannou et al., 2020; Papaioannidou et al., 2015).

The findings revealed that the students got bored with the lessons after a particular week, and students learned faster because they learned the same subject in different lessons. Therefore, using idPLCs implementations in schools can effectively teach difficult and complex subjects in a shorter time. In this way, the intensity of the curriculums can be reduced.

It has been revealed that the students learn better about body systems, HrF knowledge, which they have difficulty understanding, by playing games and having fun. The rich content of the courses, the use of common concepts, and the explanation of them in connection with other courses may affect the easier learning of the students. Students will become aware of the benefits and limitations of a single subject and discover how different disciplines can be combined to produce a more profound understanding (Ivanitskaya et al., 2002). The studies carried out are similar to the results of our study (Portnoy et al., 2020)

Students started to produce new projects with what they learned from the interdisciplinary teaching methods. They presented original and creative ideas on subjects they did not understand in other lessons that were not included in the study. Students who attend lessons with an interdisciplinary teaching method improve authentic achievement (Newmann &Associates, 1996). The courses taught with the interdisciplinary method may have brought different perspectives to the students. Interdisciplinary learning could improve students' cognitive abilities, such as flexible thinking (Ackerman, 1989), higher-order thinking (Ackerman & Perkins, 1989), and critical thinking (Field et al., 1994). This situation caused the students to make sense

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of the information according to themselves, expand by synthesizing, and produce new ideas. As a result, teachers involved in idPLCs can develop students' higher-order thinking. The studies enforced are similar to the results of our study (Cuervo, 2018; Hernández & Brendefur, 2003).

Students began to transfer the knowledge they learned to life. In particular, students shared information with their family members and friends. It shows that teachers participating in idPLCs transfer knowledge by connecting with life to make knowledge meaningful. Knowledge gained in the classroom can be applied to real-world situations, strengthening students' interest in learning (Chen et al., 2007; Newell, 1994). Studies in the literature support the results of our study (Pietsch et al., 2014; Hernández & Brendefur, 2003)

The findings revealed that students developed an awareness of their bodies. Awareness may have arisen in children since the selected body systems, and HrF knowledge can be embodied in physical education and visual arts lessons. Along with these lessons, their also awareness of physical education lessons increased. Moreover, Students began to connect with other subjects, primarily physical education and visual arts. Physical education lessons are a powerful tool to use interdisciplinary learning because it contributes thematic connections and real-world practices (Mohnsen, 2011; Patterson, 2004), learning through movement and fun (Cone & Cone, 1998), being able to connect with a wide range of biological, psychological, social, physiological and other aspects (Rodić, 2014).

CHAPTER VI

CONCLUSION & RECOMMENDATIONS

The study's conclusions are offered for the three research questions stated below.

Data analysis revealed four themes in teachers' content and pedagogical content knowledge development processes on selected body systems and HrF knowledge. These are 1) questioning, 2) acceptance, 3) practice, and 4) reflection. The study's findings determined that idPLCs' intervention was effective on different subject matter teachers' content and pedagogical content knowledge development processes on selected body systems and HrF knowledge.

The findings showed that the awareness of teachers involved in idPLCs towards other selected lessons has improved. The idPLCs environment has contributed to their pedagogical content knowledge on connecting with these lessons and integrating the interdisciplinary teaching method into their lessons.

Additionally, the contribution of the idPLCs to their professional development, group dynamics, and the characteristics of the facilitator and their effectiveness in student development increased the teachers' motivation. The study's findings revealed that highly motivated teachers are more likely to create and maintain idPLCs in the school environment with the cooperation of school administration and other subject matter teachers. However, for idPLCs to be effective, educational institutions must provide the physical environment, resources, and support teachers need.

As the curriculum was too intensive and teachers were worried about managing their subjects, they could avoid trying new teaching methods in the classroom. However, idPLCs enabled teachers to share this responsibility with other subject-matter teachers. Thus, it has been revealed that the interdisciplinary teaching method provides excellent support to both the teacher and the student in teaching a complex

subject. With this method, the teacher used the time effectively, and the workload decreased.

The findings indicated that the HrF knowledge and physical activity levels of the students of idPLC's teachers increased. Based on these findings, the teachers participating in idPLCs are successful in their professional development, and what they have learned in idPLCs can transfer to their students. If the activities in idPLCs are designed according to the student's needs, their HrF knowledge levels will increase. This situation showed that idPLCs improve different subject-matter teachers communication and student learning.

The fact that the learned knowledge was applicable in the physical education lesson enabled the students to incorporate it into their own lives by making a real-life connection. The physical education teachers plan the class in accordance with the needs of the students, and the homework is given to support physical activity in daily life. The inclusion of technology increased the physical activity level of the students.

It is widely acknowledged that the success of teachers in creating and teaching lessons is critical to realizing educational equality (An, 2016). Since the interdisciplinary teaching model can reach students with different learning styles simultaneously, it helps disadvantaged students not stay away from education.

The findings of the focus group interviews and journal analysis indicated that four themes emerged to understand students' views on interdisciplinary teaching approaches towards selected body systems, HrF knowledge, and their participation in physical activity. These are the implementation and efficiency of interdisciplinary courses; creative or original thinking; making real-life connections, and increased awareness. It showed that an interdisciplinary perspective would increase student involvement in learning, create a real-life link, and improve their integrative and critical thinking skills. In addition, the study results reveal that the idPLC structure improves students' communication and group work skills as it is necessary to develop and expand students' critical thinking and integrative abilities.

The study concluded that the interdisciplinary connections established in the physical education and visual arts course, where students can embody abstract concepts, are more instructive in increasing selected body systems, HrF knowledge,

and physical activity level. Since students learn by doing, living, and playing games, it has been revealed that the existence of these two courses is vital in idPLCs.

The study findings indicated that even if students missed a lesson that week, the same subject was taught in other classes, ensuring that the student did not fall behind. Additionally, repetition of the topic in different lessons provided deep learning. Where learning took place, students' motivation increased. However, the student got bored after a certain period when the same topics were always taught in different classes.

The findings showed that the students shared what they learned from the lessons with their families and friends outside of school. In addition, they stated that they acted according to the information they learned from the activities they did outside of school. This shows that the student transfers the knowledge learned at school to real life.

This study modeled that the interdisciplinary teaching approach is effectively implemented by creating idPLCs. In the school environment, it has been revealed that it will be effective to deal with difficult and complex issues with this approach, rather than transferring every subject with idPLCs.

6.1. Recommendations

This study has successfully modeled how to make and maintain the interdisciplinary teaching included in the curriculum using idPLCs as a tool. The quality, efficiency, and sustainability of professional development opportunities offered to teachers gain importance. Thus, the use of PLC is recommended to support teacher professional development (Tannehill et al., 2021; Patton, Parker & Tannehill, 2015; Goodyear & Casey, 2015). The application of idPLC is recommended as a tool for teachers' professional development in interdisciplinary topics and practices, especially complex subjects for students to understand.

Curriculum makers should bring together teachers from the different subject matter and adapt their curriculum to the developmental stages of children. Explaining learning outcomes that complement each other at various times between courses may cause students to struggle with learning. It is recommended to reorganize the programs by establishing interdisciplinary connections.

It has been revealed that the curricula have intense content. It was stated that it is crucial to support the incomprehensible subjects in the program with visual content. Visual content can be developed with short videos of 3-5 minutes, depending on the student's developmental stage, for complicated subjects. Teachers participating in idPLCs can be supported by experts to develop visual content development skills.

The support of school principals increases the motivation of teachers to participate in idPLCs. Getting the administrator's help for interdisciplinarity in the classroom is a crucial success factor (Robbins & Searby, 2012). In the study, the school administrators allowed us to use all the facilities in the school. They followed the developments of our work closely and shared on the school websites. It is recommended to work in cooperation with school principals in the organization of idPLCs, in time planning, creating resources for materials, and allocating space.

In this study, the student's learning took place before the period specified in the programs. idPLCs can be realized by the circulation of teachers in teaching obscure subjects according to student needs at every grade level. Thus, students can learn in a shorter time by repeating the information they have learned and connecting it with life, and the time they spend at school can be shortened. The time that teachers will separate for their professional development may increase.

In this study, student output was followed only through physical education and sports lesson. In future studies, with more comprehensive measurement and evaluation tools, student outputs can be looked at over all the classes participating in idPLCs.

For idPLCs to be actively implemented and maintained in schools, cooperation on policies is required with the MoNE. For teachers to join idPLCs suitable time-space can be set in the school. Moreover, in-service training can include idPLCs suitable for teacher needs.

In teacher training institutions or in-service training, teachers should be provided with cross-curricular literacy skills.

Researchers can benefit from idPLCs on subjects' students in different branches have difficulty understanding. Physical education and visual arts classes are essential at idPLCs because they help make knowledge more concrete and easier to learn.

It is recommended that people who will facilitate the idPLCs are selected from among those with high intellectual knowledge. The examples they will bring to the meetings should be based on scientific sources and examples from life. In order for the teachers in the community to gain a sense of trust, the facilitator must have a good command of own content knowledge. In order to ensure the progression of the group and keep their motivation high, they should be able to talk with each subject matter teacher at a certain level about their branches.

REFERENCES

ACSM (2010). *ACMS's Health-Related Physical Fitness Assessment Manual*.Philadephia: Walters Kluwer Health/ Lippincott Williams & Wilkins Health.

Akerson, V. L., & Flanigan, J. (2000). Preparing Preservice Teachers to Use an Interdisciplinary Approach to Science and Language Arts Instruction. *Journal of Science Teacher Education*, *11*(4), 345–362. https://doi.org/10.1023/a:1009433221495

Akins, A., & Akerson, V. L. (2002). Connecting science, social studies, and language arts: an interdisciplinary approach. *Educational Action Research*, *10*(3), 479–498. https://doi.org/10.1080/09650790200200196

Akyol, U. (2015). Matematik Öğretmenlerinin Ara Disiplinlere İlişkin Görüşleri. *Mediterranean Journal of Humanities*, *5*(1), 61–61. https://doi.org/10.13114/mjh.2015111368

Alvargonzález, D. (2011). Multidisciplinarity, Interdisciplinarity, Transdisciplinarity, and the Sciences. *International Studies in the Philosophy of Science*, *25*(4), 387–403. https://doi.org/10.1080/02698595.2011.623366

An, S. A. (2016). Preservice teachers' knowledge of interdisciplinary pedagogy: the case of elementary mathematics–science integrated lessons. *ZDM*, *49*(2), 237–248. https://doi.org/10.1007/s11858-016-0821-9

Applebee, A. N., Adler, M., & Flihan, S. (2007). Interdisciplinary Curricula in Middle and High School Classrooms: Case Studies of Approaches to Curriculum and Instruction. *American Educational Research Journal*, *44*(4), 1002–1039. https://doi.org/10.3102/0002831207308219

Armour, K., Quennerstedt, M., Chambers, F., & Makopoulou, K. (2015). What is 'effective' CPD for contemporary physical education teachers? A Deweyan framework. *Sport, Education and Society*, *22*(7), 799–811. https://doi.org/10.1080/13573322.2015.1083000

Armstrong, C. M. (2010). *Teacher collaboration in music education: The impact of the DuFour model on music teachers' attitudes and their students' achievement* [PhD dissertation]. Oakland university.

Barab, S. A., Barnett, M., & Squire, K. (2002). Developing an Empirical Account of a Community of Practice: Characterizing the Essential Tensions. *Journal of the Learning Sciences*, *11*(4), 489–542. https://doi.org/10.1207/s15327809jls1104_3

Barth, R. S. (2006). Improving relationships within the schoolhouse. *Educational Leadership*, *63*(6), 8–13. https://eric.ed.gov/?id=EJ745553

Battersby, S. L., & Verdi, B. (2014). The Culture of Professional Learning Communities and Connections to Improve Teacher Efficacy and Support Student Learning. *Arts Education Policy Review*, *116*(1), 22–29. https://doi.org/10.1080/10632913.2015.970096

Baumert, J., Kunter, M., Blum, W., Brunner, M., Voss, T., Jordan, A., Klusmann, U., Krauss, S., Neubrand, M., & Tsai, Y. M. (2010). Teachers' Mathematical Knowledge, Cognitive Activation in the Classroom, and Student Progress. *American Educational Research Journal*, *47*(1), 133–180. https://doi.org/10.3102/0002831209345157

Bolam, R., McMahon A., Stoll L., Thomas S. M., & Wallace M. (2005). Creating and sustaining effective professional learning communities. *Department for Education and Skills: London.*

Boyer, S. J., & Bishop, P. A. (2004). Young Adolescent Voices: Students' Perceptions of Interdisciplinary Teaming. *RMLE Online*, *28*(1), 1–19. https://doi.org/10.1080/19404476.2004.11658176

Boyraz, C., & Serin, G. (2017). Science Instruction through the Game and Physical Activities Course: An Interdisciplinary Teaching Practice. *Universal Journal of Educational Research*, *5*(11), 2026–2036. https://doi.org/10.13189/ujer.2017.051119

Brown B.D., Horn R.S., & King G. (2018). The effective implementation of professional learning communities. *Alabama Journal of Educational Leadership*, *5*, 53–59.

Brown J. S. & Adler R.P. (2008). Minds on fire: Open education, the long tail, and learning 2.0. *Educational Review*, *43*(1), 16–32.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated Cognition and the Culture of Learning. *Educational Researcher*, *18*(1), 32–42. https://doi.org/10.3102/0013189x018001032

Burns, M. K., Naughton, M. R., Preast, J. L., Wang, Z., Gordon, R. L., Robb, V., & Smith, M. L. (2017). Factors of Professional Learning Community Implementation and Effect on Student Achievement. *Journal of Educational and Psychological Consultation*, *28*(4), 394–412.

https://doi.org/10.1080/10474412.2017.1385396

Busuttil, K. (2007). Atoms pair-up before a break-up. *Nano Today*, *2*(2), 11. https://doi.org/10.1016/s1748-0132(07)70046-4

Caine, R. N., & Caine, G. (1994). *Making Connections: Teaching and the Human Brain* (Revised). Addison-Wesley.

Carriedo, A., & Cecchini, J. A. (2019). How to increase the daily physical activity during the school day? example of an interdisciplinary project between physical education and mathematics. *Journal of Sport and Health Research*, *11*(1), 187–196.

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Reports*, *100*(2), 126–131.

Cassidy, M., & Puttick, G. (2022). "Because Subjects Don't Exist in a Bubble": Middle School Teachers Enacting an Interdisciplinary Curriculum. *Journal of Science Education and Technology*, *31*(2), 233–245. https://doi.org/10.1007/s10956-021-09951-y

Catherine M W., Anja M., Stephen J. Juris, Eron Drake, Samik Upadhaya, & Pratik Chhetri. (2013). Water as Life, Death, and Power: Building an Integrated Interdisciplinary Course Combining Perspectives from Anthropology, Biology, and Chemistry. *Journal of the Scholarship of Teaching & Learning*, *13*(5), 106–124. http://files.eric.ed.gov/fulltext/EJ1017114.pdf

Cecchini, J. A., & Carriedo, A. (2020). Effects of an Interdisciplinary Approach Integrating Mathematics and Physical Education on Mathematical Learning and Physical Activity Levels. *Journal of Teaching in Physical Education*, *39*(1), 121–125. https://doi.org/10.1123/jtpe.2018-0274

Çeken, R. (2020). Öğrencilerin fen projelerinin insanVücudundaki sistemler yönünden içerikAnalizi. *OMÜ Eğitim Fakültesi Dergisi*, *29*(3), 249–259. https://doi.org/10.7822/omuefd.678222

Çepni, S., & Çil, E. (2009). A case study for reliability on portfolio evaluation. *Procedia - Social and Behavioral Sciences*, *1*(1), 963–968. https://doi.org/10.1016/j.sbspro.2009.01.171

Çetinkaya, M., & Taş, E. (2018). The effect of activity-based web material on eliminating the misconceptions in 6th grade "Systems in our body" unit. *International E-Journal of Educational Studies*, 92–113. https://doi.org/10.31458/iejes.428319

Chen, W., Cone, T. P., & Cone, S. L. (2007). A Collaborative Approach to Developing an Interdisciplinary Unit. *Journal of Teaching in Physical Education*, *26*(2), 103–124. https://doi.org/10.1123/jtpe.26.2.103

Chettiparamb, A. (2007). *Interdisciplinarity: A literature review*. The Interdisciplinary Teaching and Learning Group, Subject Centre for Languages, Linguistics and Area Studies, School of Humanities, University of Southampton, SO17 1BJ.

Choi, B. C. K., & Pak, A. W. P. (2007). Multidisciplinarity, interdisciplinarity, and transdisciplinarity in health research, services, education and policy: 2. Promotors, barriers, and strategies of enhancement. *Clinical &Amp; Investigative Medicine*, *30*(6), 224. https://doi.org/10.25011/cim.v30i6.2950

Chou C. (2011). Teachers' professional development: Investigating teachers' learning to do action research in a professional learning community. *Asia-Pacific Education Researcher*, *20*(3), 1.

Christie, B. (2000). Topic Teamwork: A Collaborative Integrative Model for Increasing Student-Centered Learning in Grades K-12. *Journal of Physical Education, Recreation &Amp; Dance*, *71*(8), 28–32. https://doi.org/10.1080/07303084.2000.10605188

Chrysostomou, S. (2004). Interdisciplinary approaches in the new curriculum in Greece: A focus on music education. *Arts Education Policy Review*, *105*(5), 23–30. https://doi.org/10.3200/aepr.105.5.23-30

Clark, S. N., & Clark, D. C. (1992). The Pontoon Transitional Design: A Missing Link in the Research on Interdisciplinary Teaming. *Research in Middle Level Education*, *15*(2), 57–81. https://doi.org/10.1080/10825541.1992.11669995

Clark, S. N., & Clark, D. C. (1997). Exploring the Possibilities of Interdisciplinary Teaming. *Childhood Education*, *73*(5), 267–271. https://doi.org/10.1080/00094056.1997.10521112

Cobb, P., & Bowers, J. (1999). Cognitive and Situated Learning Perspectives in Theory and Practice. *Educational Researcher*, *28*(2), 4–15. https://doi.org/10.3102/0013189x028002004

CohenMiller, A. S., & Pate, E. (2019). A Model for Developing Interdisciplinary Research Theoretical Frameworks. *The Qualitative Report*. https://doi.org/10.46743/2160-3715/2019.3558

Collinson, V., & Fedoruk Cook, T. (2001). "I don't have enough time" - Teachers' interpretations of time as a key to learning and school change. *Journal of Educational Administration*, *39*(3), 266–281. https://doi.org/10.1108/09578230110392884

Conley, S., Fauske, J., & Pounder, D. G. (2004). Teacher Work Group Effectiveness. *Educational Administration Quarterly*, *40*(5), 663–703. https://doi.org/10.1177/0013161x04268841

Corbin, C. B. (2002). Physical Activity for Everyone: What Every Physical Educator Should Know about Promoting Lifelong Physical Activity. *Journal of Teaching in Physical Education*, *21*(2), 128–144. https://doi.org/10.1123/jtpe.21.2.128

Cox, M. D. (2001). 5: Faculty Learning Communities: Change Agents for Transforming Institutions into Learning Organizations. *To Improve the Academy*, *19*(1), 69–93. https://doi.org/10.1002/j.2334-4822.2001.tb00525.x

Creamer, E. G., & Lattuca, L. R. (2005). Advancing faculty learning through interdisciplinary collaboration. *Jossey-Bass EBooks*.

Crow, G. M., & Pounder, D. G. (2000). Interdisciplinary teacher teams: Context, design, and process. *Educational Administration Quarterly*, *36*(2), 216–254. https://doi.org/10.1177/00131610021968967

Cuervo, L. (2018). Study of an interdisciplinary didactic model in a secondary education music class. *Music Education Research*, *20*(4), 463–479. https://doi.org/10.1080/14613808.2018.1433148

Daniel, K. L., McConnell, M., Schuchardt, A., & Peffer, M. E. (2022). Challenges facing interdisciplinary researchers: Findings from a professional development workshop. *PLOS ONE*, *17*(4), e0267234. https://doi.org/10.1371/journal.pone.0267234

Demir, K. (2015). The effect of organizational trust on the culture of teacher leadership in primary schools. *Educational Sciences: Theory &Amp; Practice*, *15*(3). https://doi.org/10.12738/estp.2015.3.2337

Derri, V., Aggeloussis, N., & Petraki, C. (2004). Health-Related fitness and nutritional practices: Can they be enhanced in upper elementary school students? *The Physical Educator*, *61*(1), 35–44.

Desimone, L. M. (2009). Improving Impact Studies of Teachers' Professional Development: Toward Better Conceptualizations and Measures. *Educational Researcher*, *38*(3), 181–199. https://doi.org/10.3102/0013189x08331140

Dewey, J. (1917). Duality and Dualism. *The Journal of Philosophy, Psychology and Scientific Methods*, *14*(18), 491. https://doi.org/10.2307/2940462

DeZure, D. (2010). Interdisciplinary pedagogies in higher education. In *The Oxford Handbook of Interdisciplinarity* (1st ed., pp. 372–386). Oxford: Oxford University Press.

Dimmock, C. (2014). Conceptualising the research–practice–professional development nexus: mobilising schools as 'research-engaged' professional learning communities. *Professional Development in Education*, *42*(1), 36–53. https://doi.org/10.1080/19415257.2014.963884

Dix S. & Cawkwell G. (2011). The influence of peer group response: Building a teacher and student expertise in the writing classroom. *English Teaching-Practice and Critique*, *10*(4), 41–57.

Doğan, S., & Adams, A. (2018). Effect of professional learning communities on teachers and students: reporting updated results and raising questions about research design. *School Effectiveness and School Improvement*, *29*(4), 634–659. https://doi.org/10.1080/09243453.2018.1500921

Dogan, S., Pringle, R., & Mesa, J. (2015). The impacts of professional learning communities on science teachers' knowledge, practice and student learning: a review. *Professional Development in Education*, *42*(4), 569–588. https://doi.org/10.1080/19415257.2015.1065899

Dolenec, Z., & Dolenec, P. (2013). Correlation in teaching biology and geography. *Croatian Journal of Education-Hrvatski Casopis Za Odgoj I Obrazovanje*, *15*, 267–274. https://hrcak.srce.hr/106731

Driver, R., Asoko, H., Leach, J., Mortimer, E., & Scott, P. (1994). Constructing scientific knowledge in the classroom. *Educational Researcher*, *23*(7), 5. https://doi.org/10.2307/1176933

DuFour, R. (2004a). What is a "professional learning community"? *Educational Leadership*, *61*(8), 6–11.

DuFour, R. (2004b). Schools as learning communities. *Educational Leadership*, *61*(8), 6–11.

DuFour, R. B., DuFour, R. B., & Eaker, R. E. (2008). *Revisiting Professional Learning Communities at Work: New Insights for Improving Schools*. Solution Tree.

Durmuş, E., & Alpkaya, U. (2019). Disiplinlerarası yaklaşımla işlenen derslerin, öğrencilerin beden eğitimi ve matematik derslerine yönelik tutumlarına etkisi. *Eurasian Research in Sport Science*, *4*(2), 112–120. https://doi.org/10.35333/ERISS.2019.94

Easton, L. B. (2015). The 5 habits of effective PLCs. *Journal of Staff Development*, *36*(6), 24.

Ellis, A. K., & Fouts, J. T. (2001). Interdisciplinary Curriculum: The Research Base. *Music Educators Journal*, *87*(5), 22–68. https://doi.org/10.2307/3399704

Epstein, J. L. (1993). Middle Grades Research: Not Yet Mature, but No Longer a Child. *The Elementary School Journal*, *93*(5), 519–533. https://doi.org/10.1086/461738

Epstein, M. J. (2004). Teaching a "humanistic" science: Reflections on interdisciplinary course design at the post-secondary level. *Current Issues in Education*, *7*(3).

Fairman, J. C., & Mackenzie, S. V. (2014). How teacher leaders influence others and understand their leadership. *International Journal of Leadership in Education*, *18*(1), 61–87. https://doi.org/10.1080/13603124.2014.904002

Field, M., Lee, R., & Field, M. L. (1994). Assessing interdisciplinary learning. *New Directions for Teaching and Learning*, *1994*(58), 69–84. https://doi.org/10.1002/tl.37219945806

Flowers, N., Mertens, S. B., & Mulhall, P. F. (1999). The Impact of Teaming: Five Research-Based Outcomes. *Middle School Journal*, *31*(2), 57–60. https://doi.org/10.1080/00940771.1999.11494619

Fogarty, R. J., & Pete, B. M. (2009). *How to Integrate the Curricula* (Third). Corwin.

Fullan, M. (2007). *The New Meaning of Educational Change, Fourth Edition* (4th ed.). Teachers College Press.

Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What Makes Professional Development Effective? Results From a National Sample of Teachers. *American Educational Research Journal*, *38*(4), 915–945. https://doi.org/10.3102/00028312038004915

Gaskins, I. W., Guthrie, J. T., Satlow, E., Ostertag, J., Six, L., Byrne, J., & Connor, B. (1994). Integrating instruction of science, reading, and writing: Goals, teacher development, and assessment. *Journal of Research in Science Teaching*, *31*(9), 1039–1056. https://doi.org/10.1002/tea.3660310914

Gatewood, T. E., Cline, G., Green, G., & Harris, S. E. (1992). Middle School Interdisciplinary Team Organization and Its Relationship to Teacher Stress. *Research in Middle Level Education*, *15*(2), 27–40. https://doi.org/10.1080/10825541.1992.11669993

Gee, J. P. (2008). A Sociocultural Perspective on Opportunity to Learn. *Assessment, Equity, and Opportunity to Learn*, 76–108. https://doi.org/10.1017/cbo9780511802157.006

George, P. S., & Alexander, W. (2002). *The Exemplary Middle School* (3rd ed.). Wadsworth Publishing.

Gero, A. (2016). Students' attitudes towards interdisciplinary education: a course on interdisciplinary aspects of science and engineering education. *European Journal of Engineering Education*, *42*(3), 260–270. https://doi.org/10.1080/03043797.2016.1158789

Giles, C., & Hargreaves, A. (2006). The Sustainability of Innovative Schools as Learning Organizations and Professional Learning Communities During Standardized Reform. *Educational Administration Quarterly*, *42*(1), 124–156. https://doi.org/10.1177/0013161x05278189

Gravetter, F. J., & Wallnau, L. B. (2013). Statistics for the behavioral sciences (9. baskı). *Belmont, CA: Wadsworth*.

Gürkan, B. (2018). Examination of secondary school teachers' opinions regarding interdisciplinary teaching. *Pegem Eğitim Ve Öğretim Dergisi*, *9*(1), 91–124. https://doi.org/10.14527/pegegog.2019.004

Guskey, T. R. (2002). Professional Development and Teacher Change. *Teachers and Teaching*, *8*(3), 381–391. https://doi.org/10.1080/135406002100000512

Hackmann, D. G., Petzko, V. N., Valentine, J. W., Clark, D. C., Nori, J. R., & Lucas, S. E. (2002). Beyond Interdisciplinary Teaming: Findings and Implications of the NASSP National Middle Level Study. *NASSP Bulletin*, *86*(632), 33–47. https://doi.org/10.1177/019263650208663204

Haiyan, Q., & Allan, W. (2020). Creating conditions for professional learning communities (PLCs) in schools in China: the role of school principals. *Professional Development in Education*, *47*(4), 586–598. https://doi.org/10.1080/19415257.2020.1770839

Hall, P., & Weaver, L. (2001). Interdisciplinary education and teamwork: a long and winding road. *Medical Education*, *35*(9), 867–875. https://doi.org/10.1046/j.1365-2923.2001.00919.x

Hamm, J. V., Lambert, K., Little, T. D., Farmer, T. W., & Harris, M. V. (2021). A Longitudinal Study of Interdisciplinary Team Relational Supports of Sixth-Grade Teachers' Sense of Efficacy and Perceived Collective Efficacy of Team Members. *The Elementary School Journal*, *122*(2), 141–164. https://doi.org/10.1086/716898

Hammons, A. J., Fiese, B., Koester, B., Garcia, G. L., Parker, L., & Teegarden, D. (2019). Increasing undergraduate interdisciplinary exposure through an interdisciplinary web-based video series. *Innovations in Education & Teaching International*, *57*(3), 317–327. https://doi.org/10.1080/14703297.2019.1635902

Hansen, S. D. (2009). The academic evolution of teaming. *Principal Leadership*, *9*(7), 32–36.

Hargreaves, A., & Moore, S. (2000). Curriculum integration and classroom relevance: A study of teachers' practice. *Journal of Curriculum and Supervision*, *15*(2), 89–112.

Harrison, L. M., & Bishop, P. A. (2021). The evolving middle school concept: This we (still) believe. *Current Issues in Middle Level Education*, *25*(2), 2–5.

Hatch, G. M., & Smith, D. R. (2004). Integrating Physical Education, Math, and Physics. *Journal of Physical Education, Recreation &Amp; Dance*, *75*(1), 42–50. https://doi.org/10.1080/07303084.2004.10608541

Havnes, A. (2009). Talk, planning and decision-making in interdisciplinary teacher teams: a case study. *Teachers and Teaching*, *15*(1), 155–176. https://doi.org/10.1080/13540600802661360

Haythornthwaite, C., Lunsford, K. J., Bowker, G. C., & Bruce, B. C. (2006). Challenges for Research and Practice in Distributed, Interdisciplinary Collaboration. *New Infrastructures for Knowledge Production*, 143–166. https://doi.org/10.4018/978-1-59140-717-1.ch007

Heck, S. F. (1980). Planning: The Key to Successful Interdisciplinary Teaching. *Middle School Journal*, *11*(4), 10–12. https://doi.org/10.1080/00940771.1980.11495560

Hernández, V., & Brendefur, J. (2003). Developing Authentic, Integrated, Standards-Based Mathematics Curriculum: [More Than Just] An Interdisciplinary Collaborative Approach. *Journal of Vocational Education Research*, *28*(3), 259–283. https://doi.org/10.5328/jver28.3.259

Hodgson, T., Keck, R., Patterson, R., & Maki, D. (2005). Mathematics in the biology classroom: A model of interdisciplinary education. *The Journal of College Science Teaching*, *34*(5), 46–50. https://eric.ed.gov/?id=EJ752552

Holbrook, J. (2000). Interdisciplinary Education in Science. In *Interdisciplinary education – challenge of 21st century Guidebook*. Tempus Jep 14461-99.

Hoover-Dempsey, K. (2005). Final performance report for OERI grant # R305T010673: The social context of parental involvement: A path to enhanced achievement. *Report to the Institute of Educational Sciences, U.S. Department of Education*.

Hord, S. M., Roussin, J., & Sommers, W. A. (2009). *Guiding Professional Learning Communities: Inspiration, Challenge, Surprise, & Meaning* (1st ed.). Corwin.

Howard-Shaughnessy, C., & Sluder, J. B. (2015). Roller skating and interdisciplinary physical education. *Strategies*, *28*(4), 26–32. https://doi.org/10.1080/08924562.2015.1044146

Huggins, K. S., Scheurich, J. J., & Morgan, J. R. (2011). Professional Learning Communities as a Leadership Strategy to Drive Math Success in an Urban High School Serving Diverse, Low-Income Students: A Case Study. *Journal of Education for Students Placed at Risk (JESPAR)*, *16*(2), 67–88. https://doi.org/10.1080/10824669.2011.560525

Hünük, D. (2013). *Using communities of practice in developing health-related fitness knowledge of physical education teachers: Impact on student learning* [PhD dissertation]. Middle East Technical University.

Hünük, D., Tannehill, D., & Levent Ince, M. (2019). Interaction patterns of physical education teachers in a professional learning community. *Physical Education & Sport Pedagogy*, *24*(3), 301–317. https://doi.org/10.1080/17408989.2019.1576862

Hursh, B., Haas, P., & Moore, M. (1983). An Interdisciplinary Model to Implement General Education. *The Journal of Higher Education*, *54*(1), 42–59. https://doi.org/10.1080/00221546.1983.11778151

Jackson, A. W., & Andrews, G. A. (2000). *Turning Points 2000: Educating Adolescents in the 21st Century* (2000th ed.). Teachers College Press.

Jacobs, H. H. (1989). *Interdisciplinary Curriculum: Design and Implementation* (Copyright 1989). Assn for Supervision & Curriculum.

Johnson, C. W., & Voelkel, R. H. (2019). Developing increased leader capacity to support effective professional learning community teams. *International Journal of Leadership in Education*, *24*(3), 313–332. https://doi.org/10.1080/13603124.2019.1600039

Jones, C. (2010). Interdisciplinary Approach - Advantages, Disadvantages, and the Future Benefits of Interdisciplinary Studies. *ESSAI*, *7*(1), 26.

Jorn, L., Whiteside, A., & Duin, A. H. (2009). PAIR-Up. *EDUCAUSE Review*, *44*(2).

Kaittani, D., Derri, V., & Kioumourtzoglou, E. (2016). Interdisciplinary learning in education: A focus on physics & physical education. *Sport Science*, *9*, 22–28.

Kalkan, F. (2016). Relationship between professional learning community, bureaucratic structure and organisational trust in primary education schools. *Educational Sciences: Theory &Amp; Practice*, *16*(5). https://doi.org/10.12738/estp.2016.5.0022

Kaprinis, S., Digelidis, N., & Papaioannou, A. (2009). Physical education and math: An interdisciplinary teaching approach. *Inquiries in Sport and Physical Education*, *7*(2), 90–102.

Kılıç, K. (2019). *Role of a needs assessment – based learning community experience on artistic gymnastics coaches' professional knowledge and practices* [PhD dissertation]. Middle East Technical University.

Klein, J. T. (1996a). Interdisciplinary Needs: The Current Context. *Library Trends*, *45*(2), 134–154.

Klein, J. T. (1996b). *Crossing Boundaries: Knowledge, Disciplinarities, and Interdisciplinarities (Knowledge, Disciplinarity & Beyond)*. University of Virginia Press.

Klein, J. T. (2005). Integrative learning and interdisciplinary studies. *Peer Review*, *7*(4), 8–10.

Konukman, F., & Marx, A. C. (2009). An Interdisciplinary Approach to Physical Education and Sport. *Journal of Physical Education, Recreation &Amp; Dance*, *80*(4), 12–13. https://doi.org/10.1080/07303084.2009.10598304

Korkmaz, H., & Konukaldı, I. (2015). İlköğretim fen ve teknoloji eğitiminde disiplinlerarasi tematik öğretim yaklaşiminin öğrencilerin öğrenme ürünleri üzerine etkisi. *Buca Eğitim Fakültesi Dergisi*, *39*.

Lambert, J. (2006). High School Marine Science and Scientific Literacy: The promise of an integrated science course. *International Journal of Science Education*, *28*(6), 633–654. https://doi.org/10.1080/09500690500339795

Laster, N. M., & Russ, T. L. (2010). Looking Across the Divide: Analyzing Cross-Disciplinary Approaches for Teaching Business Communication. *Business Communication Quarterly*, *73*(3), 248–264. https://doi.org/10.1177/1080569910376474

Lattuca, L. R., Voigt, L. J., & Fath, K. Q. (2004). Does Interdisciplinarity Promote Learning? Theoretical Support and Researchable Questions. *The Review of Higher Education*, *28*(1), 23–48. https://doi.org/10.1353/rhe.2004.0028

Lave, J., & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation (Learning in Doing: Social, Cognitive and Computational Perspectives)* (1st ed.). Cambridge University Press.

Lee, I. M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., & Katzmarzyk, P. T. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *The Lancet*, *380*(9838), 219–229. https://doi.org/10.1016/s0140-6736(12)61031-9

Lindvig, K., & Ulriksen, L. (2019). Different, Difficult, and Local: A Review of Interdisciplinary Teaching Activities. *The Review of Higher Education*, *43*(2), 697–725. https://doi.org/10.1353/rhe.2019.0115

Little, J. W. (1982). Norms of Collegiality and Experimentation: Workplace Conditions of School Success. *American Educational Research Journal*, *19*(3), 325–340. https://doi.org/10.3102/00028312019003325

Liu, H. Y. (2021). Effect of interdisciplinary teaching on collaborative interactions among nursing student teams in Taiwan: A quasi-experimental study. *Nurse Education Today*, *106*, 105083. https://doi.org/10.1016/j.nedt.2021.105083

Lomos, C., Hofman, R. H., & Bosker, R. J. (2011). Professional communities & student achievement – a meta-analysis. *School Effectiveness & School Improvement*, *22*(2), 121–148. https://doi.org/10.1080/09243453.2010.550467

Louis, K. S., Marks, H. M., & Kruse, S. (1996). Teachers' Professional Community in Restructuring Schools. *American Educational Research Journal*, *33*(4), 757–798. https://doi.org/10.3102/00028312033004757

MacPhail, A., & Lawson, H. (2021). *School Physical Education and Teacher Education: Collaborative Redesign for the Twenty-first Century (Routledge Studies in Physical Education and Youth Sport)* (1st ed.). Routledge.

Mahanin, H. U. H., Shahrill, M., Tan, A., & Mahadi, M. A. (2017). Integrating the use of interdisciplinary learning activity task in creating students' mathematical knowledge. *International Journal of Research in Education and Science*, *3*(1), 280–298.

Malik, A. S., & Malik, R. H. (2010). Twelve tips for developing an integrated curriculum. *Medical Teacher*, *33*(2), 99–104. https://doi.org/10.3109/0142159x.2010.507711

Manning, M. L., & Saddlemire, R. (2000). Ten Guidelines for Effective Interdisciplinary Teams. *NASSP Bulletin*, *84*(620), 83–88. https://doi.org/10.1177/019263650008462010

Mansilla, V. B. (2005). Assessing student work at disciplinary crossroads. *Change: The Magazine of Higher Learning*, *37*(1), 14–21. https://https://doi.org/10.3200/ CHNG.37.1.14–21

Marlett, P. B., & Gordon, C. J. (2005). The use of alternative texts in physical education. *Journal of Adolescent and Adult Literacy*, *48*(3), 226–237.

Mavropoulos, A., Roulia, M., & Petrou, A. L. (2004). An Interdisciplinary Model for Teaching the Topic "Foods": A Contribution to Modern Chemical Education. *Chem. Educ. Res. Pract.*, *5*(2), 143–155. https://doi.org/10.1039/b4rp90017k

McBee, R. H. (2000). Why Teachers Integrate. *The Educational Forum*, *64*(3), 254–260. https://doi.org/10.1080/00131720008984762

McLaughlin, M. W., & Talbert, J. E. (2001). *Professional Communities and the Work of High School Teaching* (1st ed.). University of Chicago Press.

McLaughlin, M. W., & Talbert, J. E. (2002). Professional communities and the work of high school teaching. *Choice Reviews Online*, *40*(01), 40–0442. https://doi.org/10.5860/choice.40-0442

Medina-Jerez, W., Dambekalns, L., & Middleton, K. V. (2012). Art and science education collaboration in a secondary teacher preparation programme. *Research in Science &Amp; Technological Education*, *30*(2), 209–224. https://doi.org/10.1080/02635143.2012.698603

Mehrtash, S. (2021). *Designing, Implementing, and Evaluating a Professional Learning Community for Group Exercise Instructors* [PhD dissertation]. Middle East Technical University.

Mertens, S. B., & Flowers, N. (2003). Middle School Practices Improve Student Achievement in High Poverty Schools. *Middle School Journal*, *35*(1), 33–43. https://doi.org/10.1080/00940771.2003.11494524

Mills, R. A., Powell, R. R., & Pollak, J. P. (1992). The Influence of Middle Level Interdisciplinary Teaming on Teacher Isolation: A Case Study. *Research in Middle Level Education*, *15*(2), 9–25. https://doi.org/10.1080/10825541.1992.11669992

Mills, R. F., & Pollak, J. P. (1993). Collaboration and Teacher Change in the Middle School. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, *66*(5), 302–304. https://doi.org/10.1080/00098655.1993.9955999

Mohnsen, B. (2011). Authentic Interdisciplinary Instruction: Raising the Bar. *Strategies*, *24*(3), 18–20. https://doi.org/10.1080/08924562.2011.10590928

MoNE. (2018a). *English course curriculum (2-8. Grades)*. Ankara: Ministry of National Education Publication.

MoNE. (2018b). *Physical education and sport course curriculum (5-8. Grades)*. Ankara: Ministry of National Education Publication.

MoNE. (2018c). *Science course curriculum (3-8. Grades)*. Ankara: Ministry of National Education Publication.

MoNE. (2018d). *Turkısh course curriculum (1-8. Grades)*. Ankara: Ministry of National Education Publication.

MoNE. (2018e). *Visual arts course curriculum (1-8. Grades)*. Ankara: Ministry of National Education Publication.

Morris, R. J. (2007). Improving curriculum theory and design for teaching law to non-lawyers in built environment education. *Structural Survey*, *25*(3/4), 279–292. https://doi.org/10.1108/02630800710772854

Moser, K. M., Ivy, J., & Hopper, P. F. (2019). Rethinking content teaching at the middle level: An interdisciplinary approach. *Middle School Journal*, *50*(2), 17–27. https://doi.org/10.1080/00940771.2019.1576579

Mu, G. M., Liang, W., Lu, L., & Huang, D. (2018). Building Pedagogical Content Knowledge within Professional Learning Communities: An approach to counteracting regional education inequality. *Teaching and Teacher Education*, *73*, 24–34. https://doi.org/10.1016/j.tate.2018.03.006

Mullen, C. A., & Hutinger, J. L. (2008). The Principal's Role in Fostering Collaborative Learning Communities Through Faculty Study Group Development. *Theory Into Practice*, *47*(4), 276–285. https://doi.org/10.1080/00405840802329136

Multidisciplinarity, interdisciplinarity, and transdisciplinarity in health research, services, education and policy: 2. Promotors, barriers, and strategies of enhancement. (2007). *Clinical &Amp; Investigative Medicine*, *30*(6), 224. https://doi.org/10.25011/cim.v30i6.2950

Murata, R. (2002). What Does Team Teaching Mean? A Case Study of Interdisciplinary Teaming. *The Journal of Educational Research*, *96*(2), 67–77. https://doi.org/10.1080/00220670209598794

Murphy, S. L. (2015). How Do We Teach Them to Read If They Can't Pay Attention? Change in Literacy Teaching Practice through Collaborative Learning. *Language and Literacy*, *17*(1), 83. https://doi.org/10.20360/g2xk5m

Newell, W. H. (1990). Interdisciplinary curriculum development. *Issues in Integrative Studies*, *8*, 69–86. http://www.oakland.edu/upload/docs/AIS/Issues%20in%20Interdisciplinary%20Studies/1990%20Volume%2008/05_Vol_8_pp_69_86_Interdisciplinary_Curriculum_Development_(William_H._Newell).pdf

Newell, W. H. (1994). Designing interdisciplinary courses. *New Directions for Teaching and Learning*, *1994*(58), 35–51. https://doi.org/10.1002/tl.37219945804

Newell, W. H., & Green, W. J. (1982). Defining and Teaching Interdisciplinary Studies. *Improving College and University Teaching*, *30*(1), 23–30. https://doi.org/10.1080/00193089.1982.10533747

Newmann, F. M. (1996). Authentic Assessment in Social Studies. *Handbook of Classroom Assessment*, 359–380. https://doi.org/10.1016/b978-012554155-8/50014-4

Orillion, M. F. (2009). Interdisciplinary Curriculum and Student Outcomes: The Case of a General Education Course at a Research University. *The Journal of General Education*, *58*(1), 1–18. https://doi.org/10.2307/27798118

Ostovar-Nameghi, S. A., & Sheikhahmadi, M. (2016). From Teacher Isolation to Teacher Collaboration: Theoretical Perspectives and Empirical Findings. *English Language Teaching*, *9*(5), 197. https://doi.org/10.5539/elt.v9n5p197

Owen, S. M. (2014). Teacher professional learning communities in innovative contexts: 'ah hah moments', 'passion' and 'making a difference' for student learning. *Professional Development in Education*, *41*(1), 57–74. https://doi.org/10.1080/19415257.2013.869504

Özaydınlı, B., & Kılıç, C. (2019). Disiplinlerarası Yaklaşıma İlişkin Ortaöğretim Öğretmenlerinin Görüşleri ve Ders Uygulamaları. *Ankara Universitesi Egitim Bilimleri Fakultesi Dergisi*, 301–330. https://doi.org/10.30964/auebfd.446969

Özçelik, C., & Semerci, N. (2016). Disiplinler Arası Öğretim Yaklaşimina Dayali Hazirlanan Öğretim Etkinliklerinin, Öğrencilerin Geometrik Cisimlerin Hacimleri Konusundaki Akademik Başarilarina Etkisi. *Fırat Üniversitesi Sosyal Bilimler Dergisi*. https://doi.org/10.18069/firatsbed.346912

Papaioannidou, M., Derri, V., & Filippou, F. (2015). The effect of an interdisciplinary Greek traditional dance, history, and geography program on elementary students' satisfaction and motivation. *Sport Science*, *8*(2), 83–90. https://www.cabdirect.org/cabdirect/abstract/20163109685

Papaioannou, A., Milosis, D., & Gotzaridis, C. (2020). Interdisciplinary Teaching of Physics in Physical Education: Effects on Students' Autonomous Motivation and Satisfaction. *Journal of Teaching in Physical Education*, *39*(2), 156–164. https://doi.org/10.1123/jtpe.2018-0315

Park, J. H., Lee, I. H., & Cooc, N. (2018). The Role of School-Level Mechanisms: How Principal Support, Professional Learning Communities, Collective Responsibility, and Group-Level Teacher Expectations Affect Student Achievement. *Educational Administration Quarterly*, *55*(5), 742–780. https://doi.org/10.1177/0013161x18821355

Parker, M., Patton, K., Gonçalves, L., Luguetti, C., & Lee, O. (2021). Learning communities and physical education professional development: A scoping review. *European Physical Education Review*, *28*(2), 500–518. https://doi.org/10.1177/1356336x211055584

Patterson, J. (2004). Why Teach Physical Education History? *Journal of Physical Education, Recreation &Amp; Dance*, *75*(7), 29–32. https://doi.org/10.1080/07303084.2004.10607271

Patton, K., Griffin, L. L., Sheehy, D., Arnold, R., Gallo, A. M., Pagnano, K., Dodds, P., Henninger, M. L., & James, A. (2005). Navigating the mentoring process in a Research-Based teacher development project: A situated learning perspective. *Journal of Teaching in Physical Education*, *24*(4), 302–325. http://hdl.handle.net/20.500.12648/2498

Patton, K., & Parker, M. (2017). Teacher education communities of practice: More than a culture of collaboration. *Teaching and Teacher Education*, *67*, 351–360. https://doi.org/10.1016/j.tate.2017.06.013

Petroelje Stolle, E., & Frambaugh-Kritzer, C. (2014). Putting Professionalism Back into Teaching: Secondary Preservice and In-Service Teachers Engaging in Interdisciplinary Unit Planning. *Action in Teacher Education*, *36*(1), 61–75. https://doi.org/10.1080/01626620.2013.850123

Pharo, E., D., A., McGregor, H., Warr, K., & Brown, P. (2013). Using communities of practice to enhance interdisciplinary teaching: lessons from four Australian institutions. *Higher Education Research &Amp; Development*, *33*(2), 341–354. https://doi.org/10.1080/07294360.2013.832168

Physical Activity Guidelines Advisory Committee. (2018). Physical activity guidelines advisory committee scientific report. In *Centers for Disease Control and Prevention*.

Pietsch, R. B., Bohland, C. L., & Schmale, D. G. (2014). To Fly or Not to Fly: Teaching advanced secondary school students about principles of flight in biological systems. *Journal of Biological Education*, *49*(1), 53–63. https://doi.org/10.1080/00219266.2014.882381

Placek, J. H., & Patton, K. G. (2002). Integrated physical education curriculum: Students' conceptions of newton's laws. *Research Quarterly for Exercise and Sport*, *73*(sup1), A-1. https://doi.org/10.1080/02701367.2002.10609056

Portnoy, A., Collins, D. L., & Jiménez, H. (n.d.). *Music: Art, physics and mathematics a practical example of interdisciplinary teaching and learning* [Paper presentation].

Pounder, D. (1999). Teacher Teams: Exploring Job Characteristics and Work-Related Outcomes of Work Group Enhancement. *Educational Administration Quarterly*, *35*(3), 317–348. https://doi.org/10.1177/00131619921968581

Pounder, D. G. (1999). Teacher Teams: Exploring Job Characteristics and Work-Related Outcomes of Work Group Enhancement. *Educational Administration Quarterly*, *35*(3), 317–348. https://doi.org/10.1177/0013161x99353002

Powell, K. E., King, A. C., Buchner, D. M., Campbell, W. W., DiPietro, L., Erickson, K. I., Hillman, C. H., Jakicic, J. M., Janz, K. F., Katzmarzyk, P. T., Kraus, W. E., Macko, R. F., Marquez, D. X., McTiernan, A., Pate, R. R., Pescatello, L. S., & Whitt-Glover, M. C. (2018). The scientific foundation for the *physical activity guidelines for Americans*, 2nd Ed. *Journal of Physical Activity and Health*, *16*(1), 1–11. https://doi.org/10.1123/jpah.2018-0618

Reese, W. J. (2005). *America's Public Schools: From the Common School to "No Child Left Behind."* Johns Hopkins University Press.

Reeves D. B. (2004). Accountability for learning: How teachers and school leaders can take charge. *Association for Supervision and Curriculum Development*.

Repko, A. F., & Szostak, R. (2016). *Interdisciplinary Research: Process and Theory* (3rd ed.). SAGE Publications, Inc.

Reynolds, K. (2016). Creating effective professional learning communities (PLCs). *BU Journal of Graduate Studies in Education*, *8*(2).

Rikard, L. G. (2008). Quality Programs, Collaboration, and Advocacy. *Journal of Physical Education, Recreation & Amp; Dance*, *79*(1), 5–8. https://doi.org/10.1080/07303084.2008.10598106

Robbins, C., & Searby, L. (2012). Exploring parental involvement strategies utilized by middle school interdisciplinary teams. *School Community Journal*, *23*(2), 113–136.

Robbins, C., & Searby, L. (2013). Exploring parental involvement strategies utilized by middle school interdisciplinary teams. *School Community Journal*, *23*(2), 113–136.

Rodić, N. (2014). Connection between physical education and other school subjects in primary school. *Croatian Journal of Education-Hrvatski Casopis Za Odgoj I Obrazovanje*, *16*, 265–292. https://hrcak.srce.hr/file/191408

Ronfeldt, M., Farmer, S. O., McQueen, K., & Grissom, J. A. (2015). Teacher Collaboration in Instructional Teams and Student Achievement. *American Educational Research Journal*, *52*(3), 475–514. https://doi.org/10.3102/0002831215585562

Rottier, J. (2000). Teaming in the Middle School: Improve It or Lose It. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, *73*(4), 214–216. https://doi.org/10.1080/00098650009600954

Ruona, W. E. A., & Blankenship, S. S. (2007). Professional learning communities and communities of practice: A comparison of models, literature review. *Online Submission*.

Saunders, W. M., Goldenberg, C. N., & Gallimore, R. (2009). Increasing Achievement by Focusing Grade-Level Teams on Improving Classroom Learning: A Prospective, Quasi-Experimental Study of Title I Schools. *American Educational Research Journal*, *46*(4), 1006–1033. https://doi.org/10.3102/0002831209333185

Schaap, H., & De Bruijn, E. (2017). Elements affecting the development of professional learning communities in schools. *Learning Environments Research*, *21*(1), 109–134. https://doi.org/10.1007/s10984-017-9244-y

Schneider, A., & Kipp, K. H. (2015). Professional growth through collaboration between kindergarten and elementary school teachers. *Teaching and Teacher Education*, *52*, 37–46. https://doi.org/10.1016/j.tate.2015.08.006

Schwager, S., & Labate, C. (1993). Teaching for Critical Thinking in Physical Education. *Journal of Physical Education, Recreation &Amp; Dance*, *64*(5), 24–26. https://doi.org/10.1080/07303084.1993.10609970

Scribner, J. P., Sawyer, R. K., Watson, S. T., & Myers, V. L. (2007). Teacher Teams and Distributed Leadership: A Study of Group Discourse and Collaboration. *Educational Administration Quarterly*, *43*(1), 67–100. https://doi.org/10.1177/0013161x06293631

Seashore, K. R., Anderson, A. R., & Riedel, E. (n.d.). *Implementing arts for academic achievement: The impact of mental models, professional community and interdisciplinary teaming.* [Paper presentation]. At The Seventeenth Conference of the International Congress for School Effectiveness and Improvement, Rotterdam, Netherlands.

Sel, B. (2022). İlkokullarda disiplinlerarası finansal okuryazarlık öğretimi üzerine bir eylem araştırması. *Turkish Journal of Education*, 222–241. https://doi.org/10.19128/turje.1057732

Senn, G., McMurtrie, D., & Coleman, B. (2018). Collaboration in the middle: Teachers in interdisciplinary planning. *Current Issues in Middle Level Education*, *24*(1), 2. https://https://digitalcommons.georgiasouthern.edu/cimle/vol24/iss1/6

Shah, M. (2012). The Importance and Benefits of Teacher Collegiality in Schools – A Literature Review. *Procedia - Social and Behavioral Sciences*, *46*, 1242–1246. https://doi.org/10.1016/j.sbspro.2012.05.282

Shulman, L. (1987). Knowledge and Teaching: Foundations of the New Reform. *Harvard Educational Review*, *57*(1), 1–23.

https://doi.org/10.17763/haer.57.1.j463w79r56455411

Shulman, L. S. (1986). Those Who Understand: Knowledge Growth in Teaching. *Educational Researcher*, *15*(2), 4–14. https://doi.org/10.3102/0013189x015002004

Sigurðardóttir, A. K. (2010). Professional Learning Community in Relation to School Effectiveness. *Scandinavian Journal of Educational Research*, *54*(5), 395–412. https://doi.org/10.1080/00313831.2010.508904

Smith, M. A., & Claxton, D. B. (2003). Using Active Homework in Physical Education. *Journal of Physical Education, Recreation &Amp; Dance*, *74*(5), 28–32. https://doi.org/10.1080/07303084.2003.10608482

Solomon, J., & Murata, N. M. (2008). Physical Education and Language Arts: An Interdisciplinary Teaching Approach. *Strategies*, *21*(6), 19–23. https://doi.org/10.1080/08924562.2008.10590796

Song, Y. (2011). Lessons that connect. *Educational Leadership*, *68*(6), 74–76.

Spelt, E. J. H., Biemans, H. J. A., Tobi, H., Luning, P. A., & Mulder, M. (2009). Teaching and Learning in Interdisciplinary Higher Education: A Systematic Review. *Educational Psychology Review*, *21*(4), 365–378. https://doi.org/10.1007/s10648-009-9113-z

Spintzyk, K., Strehlke, F., Ohlberger, S., Gröben, B., & Wegner, C. (2016). An empirical study investigating interdisciplinary teaching of biology and physical education. *Science Educator*, *25*(1), 35–42. http://files.eric.ed.gov/fulltext/EJ1110252.pdf

Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional Learning Communities: A Review of the Literature. *Journal of Educational Change*, *7*(4), 221–258. https://doi.org/10.1007/s10833-006-0001-8

Stübig, F., Bosse, D., & Ludwig, P. (2001). Zur wirksamkeit von fächerübergreifendem unterricht. Eine empirische untersuchung der sicht von schülerinnen und schülern. *Kassel University Press*.

Supovitz, J. A. (2002). Developing Communities of Instructional Practice. *Teachers College Record: The Voice of Scholarship in Education*, *104*(8), 1591–1626. https://doi.org/10.1177/016146810210400805

Tam, A. C. F. (2014). The role of a professional learning community in teacher change: a perspective from beliefs and practices. *Teachers and Teaching*, *21*(1), 22–43. https://doi.org/10.1080/13540602.2014.928122

Tam, A. C. F. (2015). The role of a professional learning community in teacher change: A perspective from beliefs and practices. *Teachers and Teaching: Theory and Practice*, *21*(1), 22–43. http://dx.doi.org/10.1080/13540602.2014.928122

Tannehill, D., Demirhan, G., Čaplová, P., & Avsar, Z. (2020). Continuing professional development for physical education teachers in Europe. *European Physical Education Review*, *27*(1), 150–167. https://doi.org/10.1177/1356336x20931531

Terry, L., Zafonte, M., & Elliott, S. (2018). Interdisciplinary professional learning communities: Support for faculty teaching blended learning. *International Journal of Teaching and Learning in Higher Education*, *30*(3), 402–411.

Thomas D. & Brown J. S. (2011). A new culture of learning: Cultivating the imagination for a world of constant change. *Forum for the Future of Higher Education*.

Thompson, S. C., Gregg, L., & Niska, J. M. (2004). Professional Learning Communities, Leadership, and Student Learning. *RMLE Online*, *28*(1), 1–15. https://doi.org/10.1080/19404476.2004.11658173

Tripp, B., & Shortlidge, E. E. (2019). A Framework to Guide Undergraduate Education in Interdisciplinary Science. *CBE—Life Sciences Education*, *18*(2), es3. https://doi.org/10.1187/cbe.18-11-0226

Vangrieken, K., Meredith, C., Packer, T., & Kyndt, E. (2017). Teacher communities as a context for professional development: A systematic review. *Teaching and Teacher Education*, *61*, 47–59. https://doi.org/10.1016/j.tate.2016.10.001

Vars, G. F. (2001). Can curriculum integration survive in an era of High-Stakes testing? *Middle School Journal*, *33*(2), 7–17. https://doi.org/10.1080/00940771.2001.11494658

Vars, G. F., & Rakow, S. R. (1993). Making connections: *Integrative curriculum and the gifted student*. *Roeper Review*, *16*(1), 48–53. https://doi.org/10.1080/02783199309553535

Vescio, V., Ross, D., & Adams, A. (2008). A review of research on the impact of professional learning communities on teaching practice & student learning. *Teaching & Teacher Educ. 24*(1), 80–91. http://eric.ed.gov/?id=EJ782410

Vygotsky, L. S., Cole, M., John-Steiner, V., Scribner, S., & Souberman, E. (1978). *Mind in Society: The Development of Higher Psychological Processes* (Revised ed.). Harvard University Press.

Wallace, J. J. (2007). Effects of Interdisciplinary Teaching Team Configuration upon the Social Bonding of Middle School Students. *RMLE Online*, *30*(5), 1–18. https://doi.org/10.1080/19404476.2007.11462038

Watson, C. (2012). Effective professional learning communities? The possibilities for teachers as agents of change in schools. *British Educational Research Journal*, *40*(1), 18–29. https://doi.org/10.1002/berj.3025

Willermet, C., Mueller, A., Juris, S. J., Drake, E., Upadhaya, S., & Chhetri, P. (2013a). Water as life, death, and power: Building an integrated interdisciplinary course combining perspectives from anthropology, biology, and chemistry. *Journal of the Scholarship of Teaching and Learning*, *13*(5), 106–124. http://files.eric.ed.gov/fulltext/EJ1017114.pdf

Willermet, C., Mueller, A., Juris, S. J., Drake, E., Upadhaya, S., & Chhetri, P. (2013b). Water as life, death, & power: Building an integrated interdisciplinary course combining perspectives from anthropology, biology, & chemistry. *J. of the Scholarship of Teaching & Learning*, *13*(5), 106–124.

Williams D. J. (2013). Urban education and professional learning communities. *The Delta Kappa Gamma Bulletin*, *79*(2), 31.

Wilson A. (2016). From professional practice to practical leader: Teacher leadership in professional learning communities. *International Journal of Teacher Leadership*, *7*(2), 45–62.

Winkelhake, K. M. (2015). *Case study exploring the use of an interdisciplinary approach to teach a high school mathematics and science topic* [PhD dissertation]. University Boston.

Wood, D. R. (2007). Professional Learning Communities: Teachers, Knowledge, and Knowing. *Theory Into Practice*, *46*(4), 281–290. https://doi.org/10.1080/00405840701593865

Yang, M. (2009). Making interdisciplinary subjects relevant to students: an interdisciplinary approach. *Teaching in Higher Education*, *14*(6), 597–606. https://doi.org/10.1080/13562510903315019

Zahedi, S., Bryant, C. L., Iyer, A., & Jaffer, R. (2021). Professional learning communities at a primary and secondary school network in India. *Asia Pacific Education Review*, *22*(2), 291–303. https://doi.org/10.1007/s12564-020-09665-7

Zhang, J., & Pang, N. S. K. (2015). Exploring the Characteristics of Professional Learning Communities in China: A Mixed-Method Study. *The Asia-Pacific Education Researcher*, *25*(1), 11–21. https://doi.org/10.1007/s40299-015-0228-3

Zhang, J., & Sun, Y. (2019). Investigating the effects of professional learning communities on teacher commitment in China. *Educational Studies*, *46*(6), 773–777. https://doi.org/10.1080/03055698.2019.1651695

APPENDICES

A. METU HUMAN SUBJECTS ETHICS COMMITTEE APPROVAL

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

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Sayı: 28620816   / 390

29 EYLÜL 2021

Konu   : Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi   : İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof.Dr.Mustafa Levent İNCE

Danışmanlığını yürüttüğünüz Nehir Kavi ŞİMŞEK''in "Disiplinlerarası Mesleki Öğrenme Gruplarının Öğretmenlerin Vücut Sistemleri ve Sağlıkla İlgili Fiziksel Uygunluk Konularının Öğretimine Etkisi" başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülmüş ve **390-ODTU-2021** protokol numarası ile onaylanmıştır.

Saygılarımızla bilgilerinize sunarız.

Dr.Öğretim Üyesi Şerife SEVİNÇ
İAEK Başkan Vekili

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B. OFFICIAL PERMISSIONS TAKEN FROM THE MINISTRY OF NATIONAL EDUCATION

T.C.
ANKARA VALİLİĞİ
Milli Eğitim Müdürlüğü

Sayı : E-14588481-605.99-37716253   26.11.2021
Konu : Araştırma izni

ORTA DOĞU TEKNİK ÜNİVERSİTESİ REKTÖRLÜĞÜNE

İlgi: a) Bila tarihli ve 6421 sayılı yazınız.
       b) MEB Yenilik ve Eğitim Teknolojileri Genel Müdürlüğünün 2020/2 nolu Genelgesi.

Üniversiteniz Sosyal Bilimler Enstitüsü Doktora Öğrencisi Nehir KAVİ ŞİMŞEK'in **"Disiplinlerarası Mesleki Öğrenme Gruplarının Öğretmenlerin Vücut Sistemleri ve Sağlıkla İlgili Fiziksel Uygunluk Konularının Öğretimine etkisi"** konulu araştırması kapsamında merkez ilçelere bağlı okullarda uygulanacak olan veri toplama araçları ilgi (b) Genelge çerçevesinde incelenmiştir.

Yapılan inceleme sonucunda, söz konusu araştırmanın Müdürlüğümüzde muhafaza edilen ölçme araçlarının; Türkiye Cumhuriyeti Anayasası, Milli Eğitim Temel Kanunu ile Türk Milli Eğitiminin genel amaçlarına uygun olarak, ilgili yasal düzenlemelerde belirtilen ilke, esas ve amaçlara aykırılık teşkil etmeyecek, eğitim-öğretim faaliyetlerini aksatmayacak şekilde okul ve kurum yöneticilerinin sorumluluğunda gönüllülük esasına göre uygulanması Müdürlüğümüzce uygun görülmüştür.

Bilgilerinizi ve gereğini rica ederim.

Harun FATSA
Vali a.
Milli Eğitim Müdürü

Ek:
Uygulama araçları (15 sayfa)
Dağıtım:
Gereği:
ODTÜ
Bilgi:
9 Merkez İlçe MEM

Bu belge güvenli elektronik imza ile imzalanmıştır.
Adres : Emniyet Mah. Alparslan Türkeş Cad. 4/A Yenimahalle   Belge Doğrulama Adresi : https://www.turkiye.gov.tr/meb-ebys
                                                                    Bilgi için: Emine Konuk
Telefon No : 0 (312) 306 89 30   Unvan : Şef
E-Posta: istatistik06@meb.gov.tr   İnternet Adresi: ankara.meb.gov.tr   Faks:_____
Kep Adresi : meb@hs01.kep.tr

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C. INFORMED CONSENT FORM FOR TEACHERS

Gönüllü Katılım Formu

Orta Doğu Teknik Üniversitesi (ODTÜ), Eğitim Fakültesi Beden Eğitimi ve Spor Bölümünde araştırma görevlisi Nehir Kavi Şimşek tarafından yürütülmektedir. Bu form sizi araştırma koşulları hakkında bilgilendirmek için hazırlanmıştır. Doktora bitirme projesi kapsamında bu çalışmanın amacı disiplinlerarası mesleki öğrenme grubuna katılan farklı branş öğretmenlerinin 1) disiplinlerarası öğretim yaklaşımına uygun program oluştururken birbirleriyle olan etkileşim yollarının 2) ortak ders konuları ile ilgili planlama yaparken alan bilgileri ile pedagojik alan bilgilerinin gelişiminin ve 3) öğrencilerinin alan bilgilerine etkisinin incelenmesidir. Katılımcılardan 10 hafta süresince haftada 1 kez ortalama 1-2 saatlik sürelerle bir kolaylaştırıcı eşliğinde toplantılara katılacaktır. Her bir toplantı araştırmacı tarafından video-ses kaydı ile kayıt altına alınacaktır. Toplantılar okul saatleri dışında Orta Doğu Teknik Üniversitesi, Eğitim Fakültesi, Beden Eğitimi ve Spor Bölümünde veya kendi okullarında gerçekleştirilecektir. Öğretmenlerle "sağlıkla ilgili fiziksel uygunluk bilgisi öz değerlendirme ölçeğinin", yarı yapılandırılmış görüşmeler, mesleki öğrenme grubu toplantıları video-ses kayıtları, saha notları; öğrencilerle ise "Sağlıkla İlgili Fiziksel Uygunluk Testleri", "Çocuklar için Fiziksel Aktivite Anketi" ve "İlköğretim İkinci Kademe Öğrencileri için Sağlıkla İlgili Fiziksel Uygunluk Bilgi Testi" odak grup görüşmeleri ve haftalık günlükler yoluyla veri toplanacaktır. Böylelikle, daha bilinçli ve sağlıklı nesillerin yetiştirilebilmesi için, okul derslerinin bir bütün olduğu ve hayatın içinde bütünleşebilmesini, öğretmenlerin de bu noktada gelişme göstermesi; öğrencilerde bilginin kalıcılığının sağlanması ve hayata aktarılması adına katkı sağlaması beklenmektedir beklenmektedir.

Çalışmaya katılım tamamen gönüllülük esasına dayanmaktadır. Arzu edildiği takdirde, herhangi bir yaptırıma maruz kalmadan katılımdan vazgeçme hakkına sahipsiniz. Sizlerden kimlik belirleyici hiçbir bilgi istenmemektedir. Elde edilen veriler tamamen gizli tutulacak ve sadece araştırmacı tarafından değerlendirilip bilimsel yayınlarda kullanılacaktır. Araştırmaya yönelik daha fazla bilgi için başvurulacak kişinin adresi, telefon numarası ve e-posta adresi aşağıdadır.

Araştırmacı: Nehir Kavi Şimşek
(
Tel: (
E-posta:

....

Bu çalışmanın amacı hakkında bilgilendirildim ve tamamen gönüllü olarak katılmak istiyorum. Sağladığım bilgilerin bilimsel amaçlı yayınlarda kullanılmasını kabul ediyorum.

İsim Soyadı   Tarih   İmza

-----/-----/--------

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D. PARENT CONSENT FORM

Veli Onay Mektubu

Sayın Veli

Orta Doğu Teknik Üniversitesi (ODTÜ), Eğitim Fakültesi Beden Eğitimi ve Spor Bölümünde araştırma görevlisi Nehir Kavi Şimşek tarafından yürütülmektedir. Bu mektubun gönderilmesi sizleri çalışma hakkında bilgilendirmek ve tarafınızdan izin verilmesi amacını içermektedir. Doktora bitirme projesi kapsamında bu çalışmanın amacı disiplinlerarası mesleki öğrenme grubuna katılan farklı branş öğretmenlerinin 1) disiplinlerarası öğretim yaklaşımına uygun program oluştururken birbirleriyle olan etkileşim yollarının 2) ortak ders konuları ile ilgili planlama yaparken alan bilgileri ile pedagojik alan bilgilerinin gelişiminin ve 3) öğrencilerinin alan bilgilerine etkisinin incelenmesidir.

Çalışma kapsamında, 6 farklı branş öğretmenlerimiz disiplinlerarası bir mesleki gelişim programına katılacaktır. Mesleki gelişme programına katılan öğretmenlerin öğrencilerinde olan etkiyi değerlendirmesi söz konusudur. Öğrenci öğrenmesi sağlıkla ilgili fiziksel uygunluk katılım düzeyi ve bilgi testi ve vücut sistemleri hakkında önerilen bilgi testleri ile gözden geçirilecektir ve öğretmenlere bu konuda geri bildirim verilecektir. Çalışmanın sonunda da öğrencilerle odak grup görüşmesi yapılacaktır. Bu da çocuğunuzun bilgi-beceri edinim düzeylerinin değerlendirilmesinde katkı sağlayacaktır.

Katılım sonunda herhangi bir maddi kazanç sağlanmayacaktır. Velisi bulunduğunuz öğrencilerden kimlik belirleyici hiçbir bilgi istenmemektedir. Elde edilen veriler tamamen gizli tutulacak ve sadece araştırmacı tarafından değerlendirilip bilimsel yayınlarda kullanılacaktır.

Yapılacak olan çalışmaya öğrencilerin katılımı tamamen gönüllülük esasına dayanmaktadır. Arzu edildiği takdirde, herhangi bir yaptırıma maruz kalmadan katılımdan vazgeçme hakkına sahiptirler. Sizin onayınızın yanı sıra çocuğunuzun kendi gönüllülüğü de bir ön koşuldur.

Çalışmaya ya da çocuğunuzun katılımına yönelik daha fazla bilgi için başvurulacak kişinin adresi, telefon numarası ve e-posta adresi aşağıdadır.

Saygılarımla

Teşekkürler.

Araştırmacı: Nehir Kavi Şimşek

Tel: (

E-posta: ;

....

Yukarıdaki bilgileri okudum ve çocuğumun bu çalışmada yer almasını onaylıyorum

(Lütfen alttaki iki seçenekten birini işaretleyiniz.

Evet onaylıyorum___   *Hayır, onaylamıyorum___*

Annenin adı-soyadı: _____   Bugünün Tarihi: _____

Çocuğun adı soyadı ve doğum tarihi: _____

İmzalanan bu formu lütfen öğrenciniz aracılığı ile beden eğitimi ve spor öğretmeninize ulaştırın.

Çocuğunuzun katılımı ya da haklarının korunmasına yönelik sorularınız varsa ya da çocuğunuz herhangi bir şekilde risk altında olabileceğine, strese maruz kalacağına inanıyorsanız Orta Doğu Teknik Üniversitesi Etik Kuruluna (312) 210-37 29 telefon numarasından ulaşabilirsiniz.

E. ÇOCUKLAR İÇİN FİZİKSEL UYGUNLUK BİLGİ TESTİ

Sevgili öğrenci,

Bu çalışmanın amacı, sizin sağlıkla ilgili fiziksel aktivite bilgi düzeyinizi gözden geçirmenize yardımcı olmaktır. Testi doldurmanız yaklaşık 25-30 dakikanızı alacaktır. Vereceğiniz bilgiler bu çalışma dışında hiçbir yerde kullanılmayacaktır. Bilgi düzeyinizin doğru ve güvenilir bir şekilde değerlendirilebilmesi için tüm soruların eksiksiz cevaplandırılması gerekmektedir. Göstereceğiniz özenden dolayı şimdiden teşekkür ederiz.

Yönerge: Her bir ifadeyi dikkatlice okuyunuz. Şıklardan en uygun olduğunu düşündüğünüz ifadeyi işaretleyiniz.

1. Kalp bir ....
   a) kemiktir.
   b) kastır.
   c) ciğerdir.
2. Isınma (esnetme, açma-germe) .... olmana yardımcı olur.
   a) daha esnek
   b) daha az esnek
   c) kaslı
3. Kalp atımı ....
   a) Kalbin büyüklüğüdür.
   b) Kalbinin ne kadar sağlıklı olduğudur.
   c) Kalbinin bir dakikada ne kadar attığıdır.
4. Mekik, barfiks ve şınav çekmek .... geliştirir.
   a) Kas dayanıklılığını
   b) Kalp-dolaşım sistemi dayanıklılığını
   c) Esnekliğini
5. Aşağıdakilerden hangisi aerobik (kalp-dolaşım sistemi dayanıklılığını destekleyen) bir aktivitedir?
   a) Bowling
   b) İp atlamak
   c) Golf
6. Yürüyüş sırasında ayağının hangi kısmı ilk olarak yerle temas etmelidir?
   a) Ayak ucu
   b) Yan tarafı
   c) Topuk
7. Aerobik çalışmada amaç .... ulaşmaktır.
   a) En düşük ağırlığa
   b) Parmak uçlarına
   c) Hedeflenen kalp-atım hızına
8. Kendi kendinize yapabileceğiniz en iyi fiziksel uygunluk etkinliği aşağıdakilerden hangisidir?
   a) Evinizin çevresinde bir tur bisiklete binmek
   b) 1.6 km yürüyüş yapmak
   c) Bilgisayar oyunları oynamak
9. Bir egzersiz programını devam ettirebilmek için ihtiyacım olan şey ....
   a) Özel bir plana sahip olmamaktır.
   b) Yapmaktan zevk aldığım aktiviteleri seçmektir.
   c) Arkadaşlarımdan kaçmaktır.
10. Aerobik bir aktivitenin sonunda önemli olan ....
    a) Soğuma yapmaktır.
    b) Oturmaktır.

c) Isınma yapmaktır.

11. Mekik hareketi .... güçlendirmek için iyidir.
   a) Karın kaslarımı
   b) Bacak kaslarımı
   c) Kol kaslarımı

12. Fiziksel olarak fit (formda) olmak istiyorsanız .... egzersiz yapmalısınız.
   a) Haftada bir defa
   b) Düzenli olarak
   c) Sadece bir arkadaşınızla

13. Kalp-dolaşım sistemi .... için önemlidir.
   a) Sadece çocuklar için
   b) Sadece büyükler için
   c) Herkes için

14. Yürüyüş sırasında nefes alışverişi ....
   a) Rahat olmalıdır.
   b) Hızlı olmalıdır.
   c) Durmalıdır.

15. Aerobik .... demektir.
   a) Oksijensiz
   b) Oksijenli
   c) Güçlendirme

16. Aşağıdakilerden hangisi egzersizin faydalarından biri **<u>değildir?</u>**
   a) Stresi azaltır.
   b) Kan basıncını azaltır.
   c) Kan yağı değerini yükseltir.

17. 100m sürat koşusu ne tür bir etkinliktir?
   a) Aerobik
   b) Anaerobik
   c) Kas dayanıklılığı

18. Gerdirme yaparken ....
   a) Yavaş hareketler kullanmalısın.
   b) Sıçramalısın.
   c) Daima ayakta olmalısın.

19. Fiziksel uygunluğun en önemli parçası ....
   a) Kassal kuvvettir.
   b) Kalp-dolaşım sistemi dayanıklılığıdır.
   c) Esnekliktir.

20. Soğuma egzersizleri önemlidir çünkü kalbin ....
   a) Daha hızlı atmasını sağlar.
   b) Daha güçlü olmasını sağlar.
   c) Yavaşça toparlanmasını sağlar.

21. Kalp-dolaşım sistemi dayanıklılığının gelişmesini sağlayan en iyi aktivite ....
   a) Yürüyüştür.
   b) Futboldur.
   c) Ağırlık kaldırmaktır.

22. Aerobik dansın en **öncelikli** amacı ....
   a) İyi bir dansçı olmaktır.
   b) Kalp-dolaşım sistemi dayanıklılığını arttırmaktır.
   c) Dans rutinlerini öğrenmektir.

23. Doğru jogging (hafif tempo koşu) formunda, vücut ....
   a) Kusursuz derecede düz olmalıdır.
   b) Yavaşça öne doğru eğilmelidir.
   c) Geriye, bele doğru yaslanır.

24. Aerobik dayanıklılığı geliştirebilmek için, ... egzersiz yapılmalıdır.
   a) Haftada üç kez veya daha fazla
   b) Haftada iki kez
   c) Haftada bir kez

25. Bireysel fiziksel uygunluk programında ....
    a) İhtiyaçlarına uygun olan egzersizleri kullanmalısın.
    b) Sadece kolay olan egzersizleri yapmalısın.
    c) Daima aynı egzersizleri kullanmalısın.

26. Uzmanların önerilerine göre fiziksel olarak sağlıklı kalabilmek için günde kaç adım atmalıyız?
    a) 1000
    b) 5000
    c) 10000

27. Barış okulun atletizm takımındadır. Her antrenman öncesinde ısınma egzersizleri yapmaktadır. Aşağıdakilerden hangisi Barış'ın her antrenman öncesinde ısınma egzersizleri yapmasının **nedeni/nedenlerindendir?**
    a) Ortaya çıkabilecek sakatlıkları önlemek
    b) Vücudu fiziksel olarak yapılacak egzersize hazırlamak
    c) Hepsi

28. Düzenli ağırlık antrenmanı yapan bir kişide belirli bir süre sonrasında kişinin kas yapısında .... meydana gelir.
    a) Kasın sayısında artış
    b) Kasın büyüklüğünde artış
    c) Kasın boyunda uzama

29. Fiziksel etkinlik sonrası soğuma için .... **en uygundur.**
    a) Basketbol oynamak
    b) Yüksek tempoda bisiklet sürmek
    c) Yürüme, yavaş tempoda koşu ve esnetme

30. ve 31. soruları aşağıdaki paragrafa göre cevaplayınız.

Nurdan'ın annesi sırt ağrısı problemi çekmektedir. Doktorları yaptığı testler sonucunda annesinin bel ve sırt esnekliklerinin düşük olduğunu ve bunu geliştirmesi gerektiğini söylemiştir. Nurdan annesi için egzersiz planı hazırlamak istemektedir.

30. Nurdan'a aşağıdaki esneklik hareketlerinden hangilerini mutlaka seçmesini önerirsiniz?

A)   B)   C)   D)
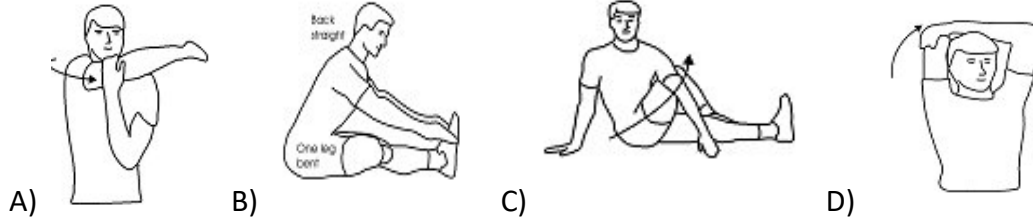
    a) A ve B
    b) B ve C
    c) C ve D

31. Nurdan'ın annesi haftada en az .... gün esneklik çalışması yapmalıdır.
    a) 1 gün
    b) 3 gün
    c) 5 gün

32 . ... sporcularının kaslarının daha esnek olması beklenir?
    a) Cimnastik
    b) Futbol
    c) Voleybol

33. .... kas dayanıklılığının geliştirilmesinde **daha etkili** olacaktır.
    a) Yavaş tempoda koşu
    b) Ağırlık kaldırma: 1-5 tekrarlı ağır yüklerle yapılan etkinlikler
    c) Ağırlık kaldırma: 20-30 tekrarlı düşük yüklerle yapılan etkinlikler

34., 35. ve 36. soruları aşağıdaki paragrafa göre cevaplayınız.

Selçuk 13 yaşındadır ve kilo vermesi gerekmektedir. Bunun için fiziksel aktivite düzeyini artırmak istemektedir.

34. Selçuk .... türde fiziksel etkinlikler seçmelidir.
       a) Takım oyunları (futbol, basketbol vb)
       b) Hızlı yürüyüş, yavaş koşu, bisiklet sürme, yüzme vb
       c) Ağırlık kaldırma
35. Egzersiz yaparken dakikadaki kalp atım hızı hedefi nasıl olmalıdır?
       a) 100 atım/ dk dan düşük olmalıdır
       b) En az 20 dk egzersiz sürdürebilecek kadar olmalıdır
       c) 180 atım/ dk dan daha yüksek olmalıdır
36. Selçuk, ... sıklıkta egzersiz yapmalıdır.
       a) Tercihen her gün
       b) Haftada 2 gün
       c) Haftada 3 gün

F. ÇOCUKLAR İÇİN FİZİKSEL AKTİVİTE ANKETİ

Yönerge

Son 7 gün içindeki (son 1 haftadaki) fiziksel aktivite düzeyinizi öğrenmeye çalışıyoruz. Bu etkinlikler terlemenize ya da bacaklarınızı yorgun hissetmenize neden olacak düzeyde spor yapmak ya da dans etmek ya da sizi nefes nefese bırakan koşma, tırmanma ve kayma gibi oyunlardır.

Unutmayın:
1. Bu ankette doğru ya da yanlış cevap yoktur- Bu bir test değildir.
2. Lütfen bütün soruları, doğru ve dürüstçe yanıtlayınız- bu çok önemlidir.

1) Boş vakitlerinizdeki fiziksel aktivite: Geçtiğimiz 7 gün içinde(son haftada) aşağıdaki aktivitelerden herhangi birini yaptınız mı? Cevabınız evet ise kaç kez? (Her soru için tek bir seçeneği işaretleyiniz).

	Hiç yapmadım	1-2 kez	3-4 kez	5-6 kez	7 kez veya daha fazla
1. Egzersiz amaçlı yürüyüş	☐	☐	☐	☐	☐
2. Kovalamaca	☐	☐	☐	☐	☐
3. Bisiklete binme	☐	☐	☐	☐	☐
4. Koşma	☐	☐	☐	☐	☐
5. Futbol	☐	☐	☐	☐	☐
6. Voleybol	☐	☐	☐	☐	☐
7. Basketbol	☐	☐	☐	☐	☐
8. Yüzme	☐	☐	☐	☐	☐
9. Dans	☐	☐	☐	☐	☐
10. Buz pateni	☐	☐	☐	☐	☐
11. Kay kay	☐	☐	☐	☐	☐
12. Zıplama	☐	☐	☐	☐	☐
13. Kürek çekme	☐	☐	☐	☐	☐
14. Paten kaymak	☐	☐	☐	☐	☐
15. Diğer	☐	☐	☐	☐	☐
16. Diğer	☐	☐	☐	☐	☐

2) Son 7 günde beden eğitimi (BE) derslerinde ne sıklıkla hareketliydiniz (çok oynamak, koşmak, zıplamak, atlamak gibi.)? (Sadece birini işaretleyin).
    1. Hiç hareketli değildim. Beden eğitimi derslerine katılmıyorum.
    2. Hemen hemen hiç hareketli değildim.
    3. Bazen hareketliydim.
    4. Oldukça sık hareketliydim.
    5. Her zaman hareketliydim.

3) Son 7 günde, *teneffüslerde* en çok ne yaptınız? (Sadece birini işaretleyin).
    1. Oturdum (konuştum, okudum, ödev yaptım).
    2. Etrafta gezindim veya dolaştım.
    3. Çok az koştum veya oynadım.
    4. Biraz koştum veya oynadım.
    5. Zamanın çoğunu koşarak, oynayarak geçirdim.

4) Son 7 günde, *öğlen arasında ne yaptınız?* (Öğle yemeği yemek dışında)?(Sadece birini işaretleyin).
    1. Oturdum (konuştum, okudum, ödev yaptım).
    2. Etrafta gezindim veya dolaştım.
    3. Çok az koştum veya oynadım.
    4. Biraz koştum veya oynadım.
    5. Zamanın çoğunu koşarak oynayarak geçirdim.

5) Son 7 gün içinde, _okuldan hemen sonra,_ kaç gün çok aktif olarak spor yaptınız, dans ettiniz ya da oyun oynadınız?(Sadece birini işaretleyin).

      1. Hiç
      2. Geçen hafta 1 kez
      3. Geçen hafta 2 ya da 3 kez
      4. Geçen hafta 4 kez
      5. Geçen hafta 5 kez

6) Son 7 günde, kaç _akşam_ çok aktif olarak spor yaptınız, dans ettiniz yada oyun oynadınız? (Sadece birini işaretleyin).

      1. Hiç
      2. Geçen hafta 1 kez
      3. Geçen hafta 2 ya da 3 kez
      4. Geçen hafta 4 ya da 5 kez
      5. Geçen hafta 6 ya da 7 kez

7) _Geçtiğimiz hafta sonu_, kaç kez çok aktif olarak spor yaptınız, dans ettiniz ya da oyun oynadınız? (Sadece birini işaretleyin).

      1. Hiç
      2. 1 kez
      3. 2 -3 kez
      4. 4 -5 kez
      5. 6 ya da daha fazla kez

8) Aşağıdakilerden _hangisi_ son 7 gün içinde boş zamanlarda yaptığınız fiziksel aktivite sıklığını en iyi şekilde tanımlamaktadır? Sizi tanımlayan cevaba karar vermeden önce lütfen beş (5) durumu da okuyunuz.

      1. Boş zamanımın hepsini ya da çoğunu **çok az** fiziksel güç isteyen aktiviteler yaparak geçirdim.
      2. Boş zamanlarımda **bazen** (geçen hafta **1-2 kez**) fiziksel aktiviteler (örneğin; koşu, yüzme, bisiklete binme, top oynamagibi) yaptım.

      3. Boş zamanlarımda **sıklıkla** (geçen hafta **3-4 kez**) fiziksel aktiviteler yaptım.

      4. Boş zamanlarımda **sık sık** (geçen hafta **5-6 kez**) fiziksel aktiviteler yaptım.

      5. Boş zamanlarımda **çok sık** olarak (geçen hafta **7 ya da daha fazla kez**) fiziksel aktiviteler yaptım.

9) Geçen haftanın her günü için ne sıklıkla fiziksel aktivitede (spor yapmak, dans etmek ya da diğer fiziksel aktiviteler) bulunduğunuzu işaretleyiniz.

	Hiç	Biraz	Orta	Sık	Çok sık
1. Pazartesi	☐	☐	☐	☐	☐
2. Salı	☐	☐	☐	☐	☐
3. Çarşamba	☐	☐	☐	☐	☐
4. Perşembe	☐	☐	☐	☐	☐
5. Cuma	☐	☐	☐	☐	☐
6. Cumartesi	☐	☐	☐	☐	☐
7. Pazar	☐	☐	☐	☐	☐

10) Geçtiğimiz hafta hasta oldunuz mu veya normal fiziksel aktivitenize engel olacak herhangi bir şey oldu mu? (Birini işaretleyiniz)

      1. Evet
      2. Hayır

Cevabınız evet ise, engel neydi?_____

G. INTERVIEW QUESTIONS (For Teachers)

Öncelikle bu görüşmeyi kabul ettiğiniz için teşekkür ederim. Bu görüşmenin amacı katılmış olduğunuz disiplinlerarası mesleki öğrenme grubu ve uygulamaları ile ilgili görüşlerinizi öğrenmek. Başlamadan önce izninizle bu görüşmenin kaydedileceğini, verdiğiniz bilgilerin sadece bu çalışma kapsamında kullanılacağını ve üçüncü kişilerle paylaşılmayacağını hatırlatmak isterim. Görüşmeye istediğiniz an ara verebilir ya da bitirebilirsiniz. Şimdi izninizle ses kayıt cihazını açarak sorularıma başlamak istiyorum.

1. Sizlerle beraber on haftalık disiplinlerarası mesleki öğrenme sürecini tamamladık. Bu süreç boyunca, disiplinlerarası mesleki öğrenme grubuna devamlılığınızı motive eden unsurlar neler oldu? Biraz bahseder misiniz?
   Sonda: Mesleki gelişim, akran desteği, pedagojik alan bilgisi

Disiplinlerarası mesleki gelişim topluluğu/ MGT (Disiplinler arası uygulamalar)

2. Şimdi bu programa katılımınız sonucu kendinizde gördüğünüz değişimlerle ilgili düşüncelerinizi sorarak devam etmek istiyorum. Bu eğitimden önce disiplinlerarası öğretime ilişkin bir deneyiminiz var mıydı? Bu sürecin sonunda disiplinlerarası öğretime yönelik deneyimlerinizde bir değişiklik oldu mu? Ne tür deneyimler elde ettiniz bahsedebilir misiniz?
   Sonda: ders planları, ders uygulaması, ölçme değerlendirme, hayata aktarım

3. Bu on haftada sağlıkla ilgili fiziksel uygunluk bilgi düzeyinizde nasıl bir değişim oldu? Bu değişimde en etkili kaynak hangisiydi?
   Sonda: Kolaylaştırıcının etkisi? Diğer branş öğretmenlerinin etkisi? Kaynaklar (kitap, makale, web sitesi)

4. Disiplinlerarası MÖG' deki paylaşımlar mesleki alan bilginizi nasıl etkiledi?
   Sonda: Ders planı/yıllık plan hazırlama, Planı uygulama

5. Disiplinlerarası ders planı oluştururken hangi disiplinlerin sizin alanınızla daha çok bütünleştiğini düşünüyorsunuz? Neden?
   Sonda: Fen bilgisi, beden eğitimi, Türkçe, İngilizce, Görsel sanatlar, rehberlik

6. Öğrenme grubunuzda size sağladığımız kaynaklar dışında, bilgilerinizi güncellemek için başka kaynaklar kullandınız mı? Evetse bunlar hangi kaynaklar?

    Sonda: Çevrim içi kaynaklar, diğer meslektaşlarınız…

7. Disiplinlerarası ders planlarınızı işlerken en çok neye dikkat ediyordunuz?

    Sonda: Kullandığınız öğretim yöntemi? Etkinlikler?...

8. Disiplinlerarası ders planlarınızı işlerken sınıf yönetimini nasıl sağladınız?

    Sonda: sınıf düzeni? Kullanılan materyaller? Zamanın kullanılması?

9. Disiplinlerarası ders planlarınızı işlerken dersinizin ölçme ve değerlendirme kısmı hakkında neler düşünüyorsunuz?

10. Disiplinlerarası ders planlarınızı işlerken öğrencilerinizde bir değişim oldu mu? Dersin içeriğini aktarmadan önce öğrencilerinizi bilgilendirdiniz mi? Öğrencileriniz dersinizdeki diğer disiplinlerle olan bütünleşmeyi fark etti mi? Evetse bir örnekle açıklar mısınız? Hayırsa sizce sebepler neler olabilir?

11. Disiplinlerarası ders planınızı işlerken zorluk yaşadınız mı? Evetse nasıl zorluklar yaşadınız bahseder misiniz?

    Sonda: Alan bilgisi, bağ kurma, kaynak bulamama, öğrenci motivasyonu

12. Çalışma boyunca öğrencilerinizin velilerinden herhangi bir geri bildirim aldınız mı? Evetse ne tür geribildirimler bahseder misiniz? Hayırsa, sizce sebepleri neden olabilir?

13. Bu çalışmaya katıldığınızdan kendi zümrelerinizin haberi var mı? Bu süreçte onlarla nasıl paylaşımlarınız oldu?

Disiplinlerarası mesleki gelişim topluluğu/ MGT

14. Birazda mesleki öğrenme grubu hakkında konuşmak istiyorum. Grup üyeleriyle iletişiminiz nasıldı? Süreçte nasıl değişti/şekillendi?

15. Katıldığınız toplantılar dışında grup üyeleri ile kendi okulunuzda paylaşımlar devam ediyor mu? Nasıl? Biraz bahseder misiniz?

16. Son olarak şu konuda da görüşünüzü almak istiyorum. Sizin bireysel olarak bu öğrenme grubuna katkınızı ne oldu? Bahsedebilir misiniz?

    Sonda: geçmiş deneyimleriniz, dersinizin pedagojik alan bilgisi, kendi alan bilginizin aktarım

17. Benim sorularım burada sona erdi. Sizin eklemek istediğiniz bir şey var mı?

H. FOCUS GROUP INTERVIEW QUESTIONS (For Students)

Bu dönem bir grup öğretmeniniz disiplinlerarası öğretim yaklaşımı ile derslerinizi işledi. Aynı konuları beş farklı derste işleyerek bütünlüğünü sağladınız. Sorularım bu derslerdeki deneyimleriniz ile ilgili olacak.

1) Disiplinlerarası yaklaşımda sağlıkla ilgili fiziksel uygunluk (SiFU) konusu işlendi? Bu konu ile ilgili ne düşünüyorsunuz?

   Sonda: konunun içeriği, uygulaması vb.

2) Disiplinlerarası yaklaşımla işlenen dersler hakkında ne düşünüyorsunuz? Sizce bu şekliyle öğretilmesi dersin verimini etkiledi mi? Evetse nasıl bahseder misiniz? Hayırsa sizce neden?

   Sonda: öğrenme düzeyleri, yaşama aktarma

3) Sizce beden eğitimi ile fen bilgisi dersi konularının ortak noktaları var mı? Evetse nedir bahseder misiniz?

   Sonda: Hangi konular/uygulamalar daha çok aklınızda kaldı?

4) Sizce beden eğitimi ile İngilizce dersi konularının ortak noktaları var mı? Evetse nedir bahseder misiniz?

   Sonda: Hangi konular/uygulamalar daha çok aklınızda kaldı?

5) Sizce beden eğitimi ile görsel sanatlar dersi konularının ortak noktaları var mı? Evetse nedir bahseder misiniz?

   Sonda: Hangi konular/uygulamalar daha çok aklınızda kaldı?

6) Sizce beden eğitimi ile Türkçe dersinin konularının ortak noktaları var mı? Evetse nedir bahseder misiniz?

   Sonda: Hangi konular/uygulamalar daha çok aklınızda kaldı?

7) Sizce SiFU boyutlarının bu şekilde farklı derslerle bağ kurulması sizin bu konuları gerçek hayata aktarmanızda etkili oldu mu? Evetse örnek verir misiniz?

   Sonda: Aileye aktarımı, akran aktarımı, bilgi paylaşımı vb.

Left page:

-*Programlar hakkında konuşma
Rehberlik → Düzen
*Davranış ortaklıları
İngilizce → Deneme yapmış → yaptığını anlattı, Fen bilgisi öğretmeni çok heyecanlandı

Türkçe → Ders hazırlığı için birlere vakit ayrılmalı.
Fen B. → Programları alıp inceliyor.

1. Kavramlar tutarlı olmalı
2. Bağları kurmalı   } Kolaylaştırıcı
   Avustralya Eğitim Sis

Fen Bil → 6. sınıf için uygun program
Reh → Ölçme ve değişmesi çocukları etkiledi
1 → Ritim ve dans tekniğiyle öğrenmek kolaydır. Programlar
                                    Video ile
                                    Üzerine konuş
(video)   İngilizce keyfi
                                    Türkçe keyfi
                                    N
                            → Kavramlar ←
                    Birbirleriniz... bağlatı...

Right page:

07.12.2021

Çözümlemelerden notlar: (3. Hafta)
1. Derslerdeki konuların uyumlandırılması, organize edilmesi
2. Öğretim programlarına ve yıllık planın baştan organize edilmesi gerekir (disiplinlerarası konulara göre)
3. Branş derslerindeki konuların 6, 7, 8. sınıfa göre içerisinde tutarlılığının olmaması
4. Ders kaynakları bu benzer konulara uygun düzenlenmeli

Kritik

*Politika yapıcıları bir nedenden dolayı veriye dayalı karar veriyor ama onun uygulayıcısı olan kişi onun neden o şekilde yapıldığını anlamıyor. (Teneffüsleri 15 dk düşü)
Çünkü ilk önce öğretmenlerin kabul etmesi gerekir, onu ikna etmek için yollardan biri budur. Öyle doğrudan... veremezsin.

Öğrencinin Adı Soya 1289   Tarih: 2{ aralık 2021

Sevgili Öğrenciler,

Geçtiğimiz haftalarda Fen Bilimleri, Beden Eğitimi ve Spor, İngilizce ve Görsel Sanatlar derslerinizde "Destek ve Hareket Sistemi", "Solunum" ve "Dolaşım" konularını işlediniz. Branş öğretmenleriniz tarafından konular, diğer derslerle ilişki kurularak sizlere aktarıldı. Şimdi sizlerden geçtiğimiz haftalardaki öğrenme sürecinizi düşünmenizi ve aşağıdaki soruları yanıtlamanızı istiyorum.

2. sorunun cevabı arkada

1. Derslerde ne tür yaşantılar deneyimlediniz?

1.soru

Aslında iyiydi ama her derstem aynı konuyu işlemek biraz sıktı ama beden dersi okadar iyi okadar güzel ve eğlenceliydi öğrenmek güzeldi. aslında oyunlar videolar yaptığımız etkinlikler güzeldi ve yaptığımız çalışmada

1.soru →

2. Derslerde edindiğiniz deneyimler sizi nasıl etkiledi?

biraz sıkma etkisini attı ve gerçekten bizim o derslerde görsel dersinde vaktimizin azalması bile bizi oradan oraya koşturdu ve bu benim o kadar hoşuma gitti ki kendimin o çabayla öğrendiğimi gösterdi bunun benim geleceğimin üstünde katkısı olacağından kesinlikle eminim Lisede işleyeceğimize konuyu şimdi rahat bi şekilde öğrenmek güzeldi. Burada bizimde ecbemiz var ve adımız geçerse memnun oluruz. ♡

3. Derslerde aynı konuların farklı şekillerde işlenmesinin size ne gibi faydaları oldu?

3.soru: Aynı dersin konusunu işlesek bile baya keyfvurici buarada benim üstümde faydası çok çünkü zevk verici. öğretici ve kendimi daha zeki hissettim aynı profösör diğer sınıfları yapmayıp bizim yapmamız beni mutlu etti. 9.4

4. Aynı konularla başka hangi dersler arasında bağ kurulabilir?

Evet kurulur çünkü fende kuvet ünitesinde Matematik yani toplama yapıyorum mesela 8/F₁ + F₂ = 3N Kurulabilir yani çünkü bir dersin bittiği yerde biri başlar Fen'den sonra Matematik sonra Sosyal'le görsel Resin çünkü kroki felen çiziyoruz

5. Farklı derslerde aynı konuların işlenişinden sınıf ortamı dışında kimlerle paylaşım yaptınız? (Ailenizle, arkadaşlarınızla vs.)

duygularım mutlu ve mükemmel ama buraya ensitmam biraz zor. Herkeze dedim Halama dayıma teyzeme kuzenime fla. herkeze çünkü bir daha asla böyle bir deneyim yaşıya bileceğimi bilmiyorum. ♡

198
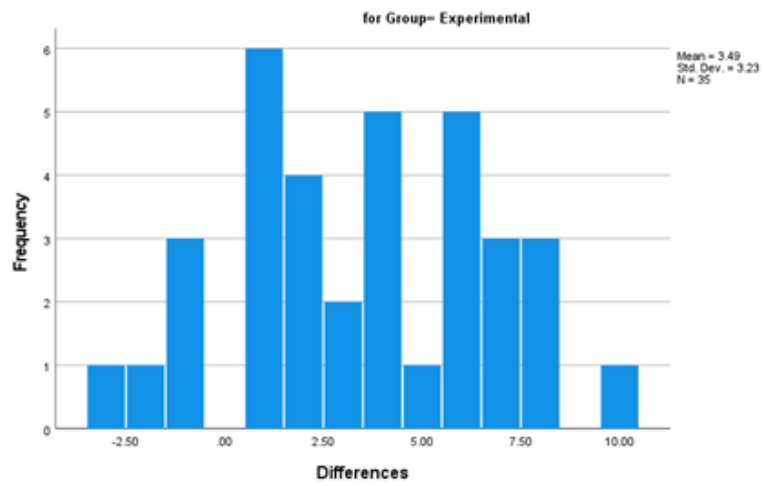
K. FIGURES

Figure 8. 1. Distribution graph of HrF knowledge for experimental group
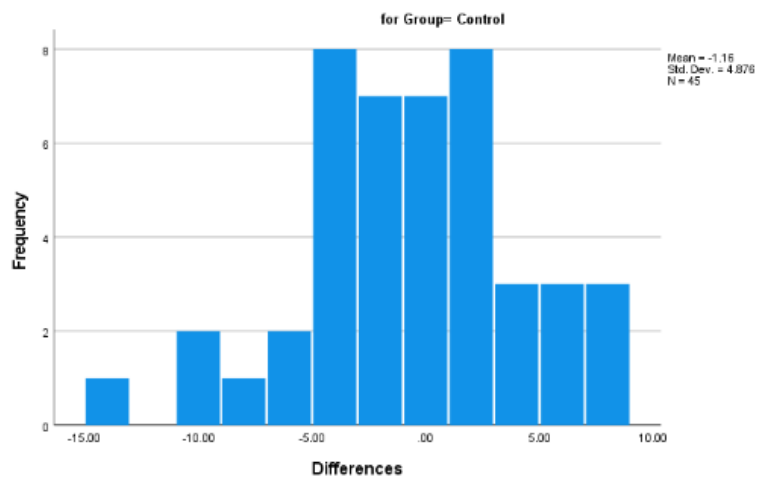
Figure 8. 2. Distribution graph of HrF knowledge for control group
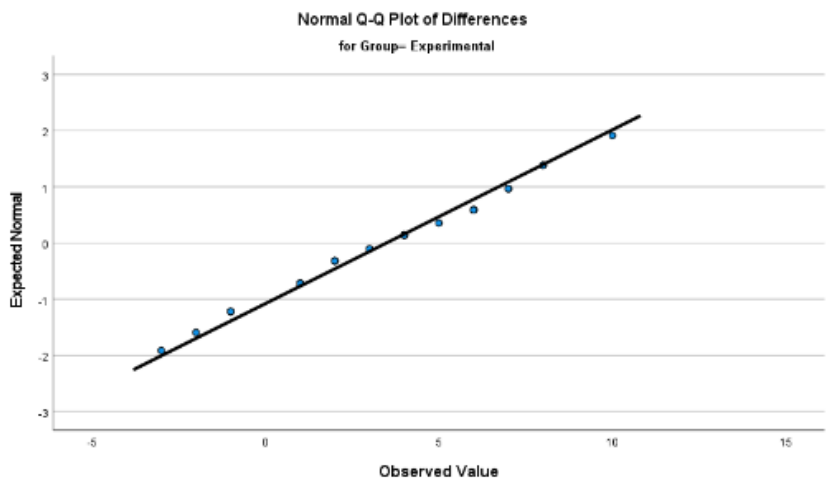
Figure 8. 3. Q-Q plot of HrF knowledge for experimental group
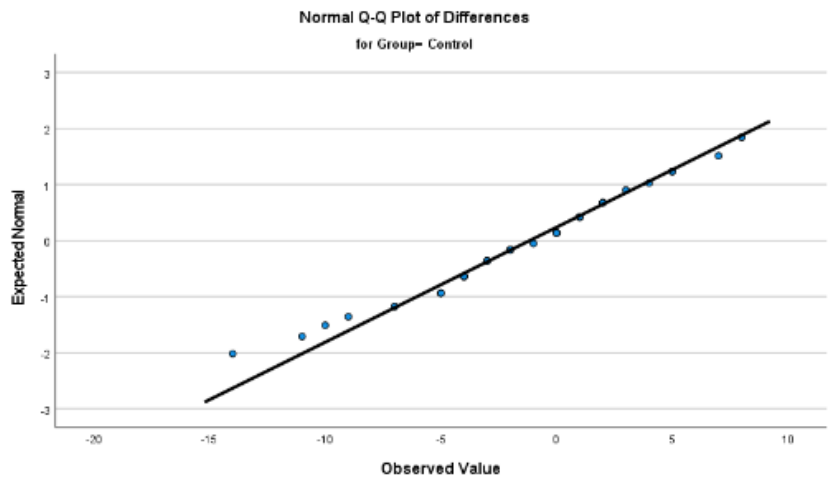
Figure 8. 4. Q-Q plot of HrF knowledge for control group
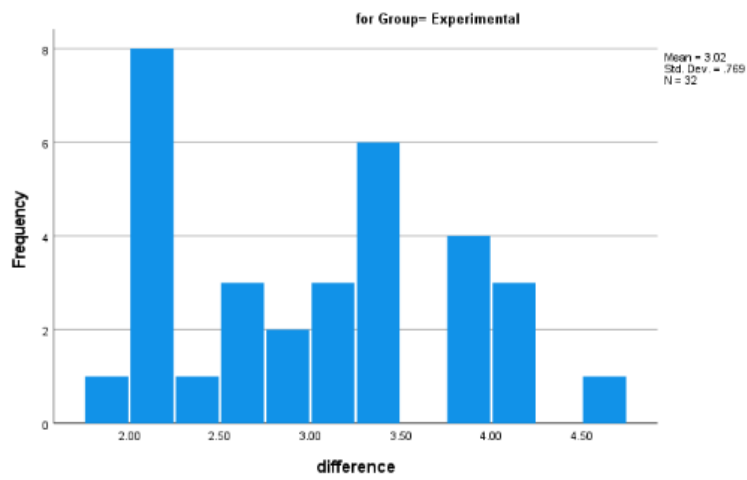
Figure 8. 5. Distribution graph of physical activity for experimental group
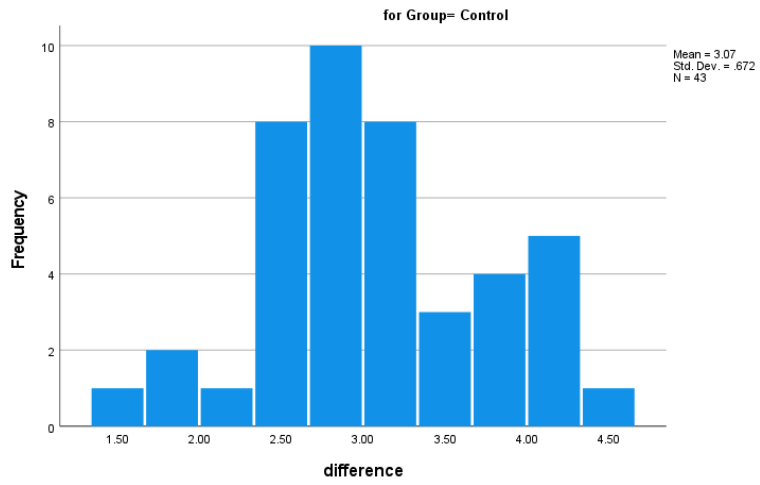
Figure 8. 6. Distribution graph of physical activity for control group
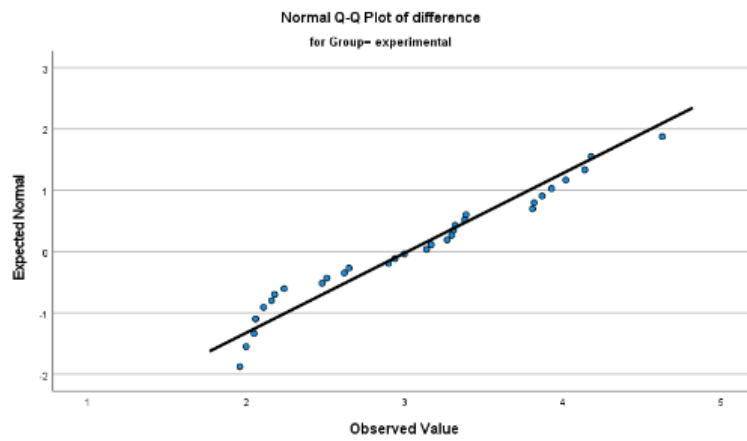
Figure 8. 7. Q-Q plot of physical activity for experimental group
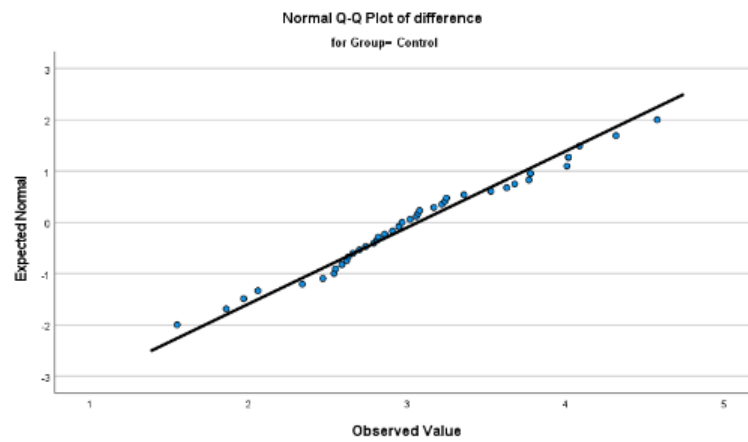
Figure 8. 8. Q-Q plot of physical activity for control group

L. PRACTICE EXAMPLES OF THE INTERDISCIPLINARY TEACHING METHOD IN SUBJECT-MATTER LESSONS

Skeletal / Muscular Systems & HrF Knowledge
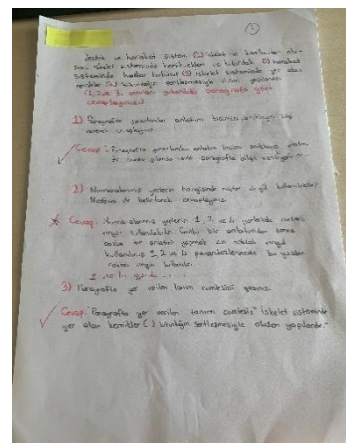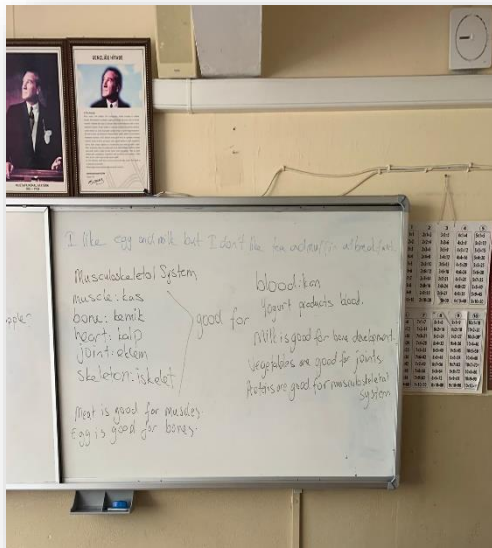
Cardiovascular System & HrF Knowledge

Circulation

Drag and drop the correct word at the correct place

| Left ventricle | Right atrium | Aorta | Left atrium |

| Capillaries | Lung | Right ventricle |

Respiratory System & HrF Knowledge

DOLAŞIM SİSTEMİ

DERS	BEDEN EĞİTİMİ
SINIF	6
SÜRE	40+40 Dakika
ÖĞRENME ALANI	6.2. AKTİF VE SAĞLIKLI HAYAT
ALT ÖĞRENME ALANI	6.2.2. Fiziksel Etkinlik kavramları, İlkeleri ve İlgili Hayat becerileri
TEMEL BECERILER	Problem çözme becerisi, iletişim becerisi, karar verme becerisi, girişimcilik becerisi, gözlem becerisi, mekânı algılama becerisi
KAZANIMLAR	BE.6.2.2.1 Fiziksel uygunluğunu geliştirecek hedefler içeren fiziksel etkinlik programı hazırlar. BE.6.2.2.2. Fiziksel etkinlik düzeyini etkileyen nedenleri açıklar.
ÖĞRETİM YÖNTEMLERİ	Anlatım, soru yanıt, gösteri, komut, alıştırma.
KULLANILAN EĞİTİM TEKNOLOJILERI ARAÇ VE GEREÇLER	Spor giysileri, minder, Dolaşım Sistemini Gösteren Afiş
DERS ALANI:	Spor Salonu
GÜVENLİK ÖNLEMLERİ	Öğrenciler ders işlemede açıklanan kurallara uyarlar. Birbirlerine çarpmamaya dikkat eder.

ÖĞRENME-ÖĞRETME SÜRECİ

-Selamlaşma ile derse giriş yapıldı.

-Bir haftalık dinlenme sürecimiz bitti. Sizlerle tatilden önceki dersimizin bitiminde bir soru sormuştum. Hatırlayan var mı? Evet "Kalbimizden çıkan kirli kan ilk olarak hangi organımıza gider?" sorusunu sormuştum. Peki cevabı hakkında bilgisi olan var mı? "Kalpten çıkan kirli kan ilk olarak akciğerlere ulaşır." cevabını aldım. "Kirli kan neden ilk olarak akciğerlere gider?" sorusuna "Çünkü kanın oksijene ihtiyacı var ve o oksijen de akciğerlerimizde mevcut." Olduğunu belirtti. Peki kan organlarımıza sadece oksijen mi taşır? sorusuna "Öğretmenim bazı besinleri de taşır." Vücudumuzun bazı besinlere ihtiyacı vardır ve kan damarlar yoluyla ihtiyaç duyulan besinleri, ihtiyaç duyan organlarımıza taşır. Bu bilgilerden sonra çocukları mekik koşusuna benzer bir şekilde alanda koşturdum ve artık bittikleri noktada "şimdi neden hareket etmekte zorlanıyorsunuz?" sorusunu yönelttim. Çocuklar vücutlarının yorulduğunu belirttiler. Burada bizi yorgun hissettiren şeyin laktik asit olduğunu söyledim. Laktik asitin vücudumuzda salgılanmasıyla beraber artık yorgunluk gibi belirtiler başlamaktadır. Buradan yola çıkarak aerobik ve anerobik dayanıklılık kavramlarından bahsettim. Afiş üzerinden damarlarımıza bakmalarını söyledim. Bazı damarlarımızın ince, bazılarının kalın olduğunu belirterek çeşitleri hakkında bilgi paylaşımı yaptık. Oturur ve dinlenmiş pozisyonda 1 dakikalık nabız ölçümü yapmalarını istedim (nabızlarını bulmakta çok zorlandılar ve neredeyse hepsinin nabızlarını tek tek bularak onların bulmalarını sağladım). Daha sonra hafif tempoda koşup, tekrar saymalarını sağladım. Ölçüm sonunda artış olduğunu fark ettiler. Bu ölçüm sonunda onları daha da zorlayacak hızlı hareketler yaptık ve tekrar ölçüm yapmalarını sağladım. Daha da arttığını farkettiler. Çocuklarda 1 dakikalık nabız ölçümündeki değerlerden bahsettim. Dinlenik ölçümün 60-80 arası, hafif tempoda 80-100 arası, hızlı tempo sonrası ise 100-120 arasında bir ölçüm yapılacağını belirttim. Kalbimizin neden daha fazla atıp vücudumuza daha fazla kan pompalama ihtiyacı hissettiğini sorduğumda o süre cevap alamadım. Vücudumuzun bir şeye çok ihtiyacı olduğunu ve onun için kalbimizin fazla attığını söyleyerek neye ihtiyacı olabilir diye bir soru daha yönelttim. Bu sefer vücudumuzun oksijene çok ihtiyacı olduğu için kalbimizin fazla atabileceğini söyledim. "Peki bu son yaptığımız egzersizde neden nefes nefese kaldınız?" diye sorduğumda oksijenin büyük çoğunluğunu egzersiz sırasında kullanıldığını, o yüzden vücudun fazla oksijene ihtiyaç duyup derin derin nefes aldıklarını belirttiler. Isınma ve soğuma hareketlerinin neden yapıldığına dair bir soru yönelttiğimde ısınma hareketlerinin vücudumuzu harekete hazırlamak için yapıldığını söylediler. Fakat soğuma hareketleri hakkında hiç fikirleri yoktu. Kalbimizin dinlenik vaziyetteyken birden çalışmasını istemenin ona zarar vereceğini ve aynı şekilde hızla çalışıp da kalbin birden yavaş çalışmasını istemenin de yine aynı şekilde zarar vereceğini belirttim. Hızla giden otomobili birden durdurduğumuzda normal bir duruş yapılamayacağını, mutlaka içerisindekileri etkileyeceğini belirterek vücudumuzda da böyle bir etki bırakacağını belirttim. Isınma hareketlerinin hem kalbimizi hem de kaslarımızı egzersize hazırladığını ve soğuma hareketlerinin ise kalbimizi ve kaslarımızı normal düzene geçmeye hazırladığını belirttim ve soğuma hareketleriyle dersimizi sonlandırdık.

• Değerlendirme	Ders sonunda çocuklara tansiyon hakkında araştırma yapmalarını istedim.

Açıklama: Aşağıdaki ders planı disiplinlerarası öğretim yaklaşımına göre hazırlanmış örnek bir plandır.

İskeletimiz kemiklerden oluşur ve eklemlerle birbirine bağlıdır.

Kemiklerin birleştiği yere eklem denir. Eklemler hareketi kolaylaştırır.

Sınıf Düzeyi: 6 (Ortaokul 2)

Disiplinlerarası Öğretim Modeli:

Bu dersin amacı fen bilgisinde öğrendiği kas iskelet sistemleri hakkında bilgi edinirken, vücutlarına ilişkin artan farkındalıklarını, vücut bölümlerinin hareket ortamında nasıl işlev gördüğüyle bütünleştirmektir.

Fen Bilgisi

İskelet, eklem, kas, kemikleri tanımlama.

Beden Eğitimi ve Spor

Kazanımlar:

Bireysel sporlara hazırlayıcı oyun ve etkinliklerde hareket becerilerini sergiler.

Temel jimnastik duruşlarını yapar.

Bu öğrenme deneyimine katılımın sonucunda, öğrencilerin aşağıdaki becerilerinde artış beklenmektedir.

- Vücudunun bölümlerini kullanarak, ayakta iyi bir denge pozisyonu sağlayabilme
- Vücudun bölümlerini kullanarak, zeminde ters bank, köprü, mum duruşu hareketlerini yapabilme
- Duruşu destekleyen vücut bölümlerine ait kas grupları, kemikler ve eklemlerin adlarını öğrenebilme

Kullanılan Araç Gereçler\ Malzemeler\ Teknolojik araçlar:

Cimnastik minderi, akıllı tahta.

Organizasyon:

Okul bahçesi veya salonda; çocuklar bireysel olarak belirlenmiş aralıklarda çalışır.

Etkinlikler (İşleniş)

"İyi dersler. Çocuklar, bugünkü dersimizde temel jimnastik duruşlarını öğreneceğiz. Geçen sene uzaktan eğitimde aldığımız için bu sene baştan tekrar edeceğiz.

Öncelikle ısınma hareketleri. U şeklinde sıra oluyoruz. Ayaklarımızı omuz genişliğinde açık. Hiç düşündünüz mü çocuklar şu an nasıl ayakta durabiliyoruz? Öğrenci A (iskeletimiz sayesinde) Öğrenci B (İskelet sistemimiz) Öğrenci C (Kemiklerimiz) Doğru. Gördüğüm kadarıyla bu konuda bilgi sahibiyiz. Peki, iskelet sistemimiz neler var? Öğrenci C (Kemikler) Öğrenci B (Kemikler, eklemler, kaslar…) Güzel.

Fen Bilgisi öğretmenizle iskelet sistemini öğrendiğinizi konuştuk. Bugünkü dersimizde, fen bilgisinde öğrendiğiniz bilgileri kullanarak jimnastik duruşlarını yaparken, vücut bölümlerinizin neler olduğunu söylemenizi isteyeceğim.

İlk duruşumuz esas duruş. Bacaklar bitişik, kollar yanlarda gövdeye paralel, baş ve gövde dik olarak yapılan duruştur. (Şekil1) Akıllı tahtadan yansıtılır.

(Şekil1)

İkinci duruşumuz ise açık bacak duruş. Ayaklar omuz genişliğinde açık olarak yapılan duruştur. Vücut ağırlığı iki bacakta eşittir. (Şekil2)

(Şekil2)

Bacaklarımı rahat bir şekilde açabildim değil mi? Öğrenciler (Evet) Peki vücudumuz tamamen kemikten oluşmuş ise bacaklarımı nasıl oluyor da rahat bir şekilde hareket ettirebiliyorum? Öğrenci C (Eklemlerimiz sayesinde) Öğrenci A (Eklemlerimiz hareketi kolaylaştırıyor çünkü) Çok iyi. Peki eklem nedir? Öğrenci D (Kemiklerin birleştiği yerde bulunur) Öğrenci B (Kemikler eklemlerle birbirine bağlıdır öğretmenim) Doğru. O zaman eklemler hareketlerimizi kolaylaştırır diyebilir miyiz? (Evet). Çok iyi.

M. CURRICULUM VITAE

Nehir KAVİ ŞİMŞEK

Education

PhD, Department of Physical Education and Sport, Faculty of Education, Middle East Technical University, Ankara, Turkiye. Ph.D thesis: Effectiveness of interdisciplinary professional learning communities on teaching selected body systems and health-related fitness, 2015-2023.

MS, Department of Physical Education and Sport, Faculty of Fatih Education, Karadeniz Technical University, Trabzon, Turkiye, Master's thesis: 8-14 yaş arası erkek ve kız yüzücülerin antropometrik ve somatotip yapılarının incelenmesi / Boys and girls between the ages of 8-14 swimmers anthropometric and somatotype analysis of structures, 2010-2013.

BS, Department of Physical Education and Sport, Faculty of Kazım Karabekir Education, Atatürk Unıversity, Erzurum, Turkiye, 2006-2010.

Work Experience

Research Assistant. September 2015- Ongoing. Middle East Technical University, Ankara, Türkiye, Department of Physical Education and Sport, Faculty of Education

Research Assistant. 2013- 2015, Ardahan University, Department of Physical Education and Sport

Publications

Journal Papers in International and National Indexed Journals

Ayan, V., & Kavi, N. (2016). 8–14 yaş arası kız yüzücülerin somatotip yapılarının ve yatay sıçrama özelliğinin incelenmesi. International Journal of Science Culture and Sport, 4(1), 23–30.

Kavi, N., Beyazoğlu, G., & Ayan, V. (2015). Analyzing the 8–14 aged male swimmers' somatotype structures and horizontal skipping features. Prime Journal of Social Science, 4(3), 993–996.

International Conference Papers & Presentations

Kavi Simsek, N., & İnce, M. L. (2022, June 15–18). How do the teachers' interdisciplinary professional learning community on body systems and physical activity affect their sixth-grade students learning? [Paper presentation]. AIESEP World Congress 2022, Gold Coast, Australia.

Sarıkaya, S., Kavi Şimşek, N., Hunuk, D., İnce, M. L. (2022, June 15–18). Technology Use Experiences of Physical Education Teachers Participating in a Technology-Supported Professional Learning Community During the Pandemic Period. [Paper presentation]. AIESEP World Congress 2022, Gold Coast, Australia.

İnce, M. L., Hunuk, D., Öztürk, M. A., Tannehill, D., Yanık, M., Savucu, Y., Kavi Şimşek, N., Sarıkaya, S., Yılmaz, M., & Taş, H. (2021, June 7–10). Technology integrated large scale professional learning community for physical education teachers: Design and implementation [Symposium]. The AIESEP 2021 Virtual Scientific Conference, Banff, Canada.

Hunuk, D., İnce, M. L., Tannehill, D., Öztürk, M. A., Yanık, M., Savucu, Y., & Kavi Şimşek, N., (2021, June 7–10). Effects of a large-scale learning community on the physical education teachers' and the learning of their students [Symposium]. The AIESEP 2021 Virtual Scientific Conference, Banff, Canada.

Kavi Şimşek, N., Sarıkaya, S., Yılmaz, M., & İnce, M. L. (2021, June 7–10). Determining Turkish secondary school students' in and out of school time physical activity level on the basis of gender and provinces [Poster session]. The AIESEP 2021 Virtual Scientific Conference, Banff, Canada.

Sarıkaya, S., Kavi Şimşek, N., Taş, H., Yılmaz, M., Balcı, T., & Hunuk, D. (2021, June 7–10). Examination of Turkish secondary school students' health-related fitness knowledge on the basis of gender and provinces [Poster session]. The AIESEP 2021 Virtual Scientific Conference, Banff, Canada.

Ayan, V., & Kavi, N. (2016b, Nisan 13–15). 8-14 Yaş arası kiz yüzücülerin somatotip yapilarinin ve yatay siçrama özelliğinin incelenmesi [Paper presentation]. 5. Uluslararası Bilim Kültür ve Spor Kongresi, Türkistan, Kazakistan.

National Conference Papers & Presentations

Kavi Şimşek, N., Sarıkaya, S., Hunuk, D., & İnce, M. L. (2021, Kasım 11–14). Teknoloji destekli bir mesleki öğrenme grubuna katılan beden eğitimi öğretmenlerinin pandemi döneminde teknoloji kullanım deneyimler [Sözel sunum]. 19. Uluslararası Spor Bilimleri Kongresi, Antalya, Türkiye.

Sarıkaya, S., Kavi Şimşek, N., & İnce, M. L. (2017, November 15–18). Sağlıkla ilgili fiziksel aktivite eğitimi sonunda öğrenmeyi yaşama aktarmayı içeren aktif hafta uygulamasında üniversite öğrencilerinin deneyimleri [Poster sunum]. 15. Uluslararası Spor Bilimleri Kongresi, Antalya, Türkiye.

Kavi Şimşek N., Devrilmez, E., & Kirazcı, S. (2016, Kasım 1–4). Genç badminton sporcularının sezinleme zamanı performansları sabit azalan hız ve farklı, badminton katılım seviyesi [Poster sunum]. 14. Uluslararası Spor Bilimleri Kongresi, Antalya, Türkiye.

Kavi Şimşek, N., & Ince, M. L. (2016, November 1–4). Differentiated instruction practices and impacts in a health-related physical activity course a case study [Poster sunum]. 14th International Sport Science Congress, Antalya, Türkiye.

Kavi, N., Beyazoğlu, G., & Ayan, V. (2014, November 7–9). Analyzing the 8–14 aged male swimmers' somatotype structures and horizontal skipping features [Poster sunum]. 13th International Sport Sciences Congress, Konya, Türkiye.

Ayan, V., Bektaş, F., Beyazoğlu, G., Soyyiğit, S., Kavi, N., & Kaya, M. (2012, Aralık 12–14). Trabzon spor lisesinde okuyan kız öğrenci sporcuların somatotip özelliklerinin incelenmesi [Sözel sunum]. 12. Uluslararası Spor Bilimleri Kongresi, Denizli, Türkiye.

Ayan, V., Bektaş, F., Beyazoğlu, G., Soyyiğit, S., Kavi, N., & Erol, A.E. (2012, Aralık 12–14). Trabzon spor lisesinde okuyan erkek öğrenci sporcuların somatotip özelliklerinin incelenmesi [Sözel sunum]. 12. Uluslararası Spor Bilimleri Kongresi, Denizli, Türkiye.

Projects

TÜBİTAK Projects

TÜBİTAK Project PhD Scholar

Ince, M. L., Hunuk, D., Öztürk, M. A., Savucu, Y., Yanık, M., Yıldırım, İ. S., Çapa Aydın, Y., Tannehill, D., & Ward, P. (2020). Beden eğitimi öğretmenleri için kanıta ve Üniversite-MEB iş birliğine dayalı bir hizmet içi eğitim uygulamasının yaygınlaştırılması (Tübitak Proje No:215K460).

Social Responsibility Project

•Allianz Motto Hareket, Online Movement Programs Developed
(Smart-i Awards 2022, Allianz Türkiye Allianz Motto Hareket Dijital Sosyal Sorumluluk Gümüş Smart-i ödülünü almıştır.)

Awards

• Best poster award 1st place, At AIESEP 2021 International Conference.

Sarıkaya, S., Kavi Şimşek, N., Taş, H., Yılmaz, M., Balcı, T., & Hunuk, D. (2021, June 7–10). Examination of Turkish secondary school students' health-related fitness knowledge on the basis of gender and provinces [Poster session]. The AIESEP 2021 Virtual Scientific Conference, Banff, Canada.

Coaching Certificates

• Alpine Skiing First Level Coaching Certificate

Memberships

• KASFAD (Kadınlar için Spor ve Fiziksel Aktivite Derneği) 2016-devam ediyor

• AIESEP (Association Internationale des Ecoles Supérieures d'Education Physique – International Association for Physical Education in Higher Education (AIESEP) 2021-ongoing

• AIS (The Association for Interdisciplinary Studies) 2021- ongoing

Giriş

20. yüzyıldaki küresel değişimler yalnızca uluslararası ekonomiyi, siyaseti, teknolojiyi, bilişsel bilgileri ve kültürü değil, aynı zamanda içinde yaşadığımız toplumu da etkiledi (EARGED, 2011). Dünyadaki bu değişikliklerin bir sonucu olarak, Türkiye Milli Eğitim Bakanlığı (MEB), genel eğitim müfredatını ve bileşenlerini, öğrencinin öğrenme sürecine aktif katılımını vurgulayan yapılandırmacı eğitim felsefesine uygun olarak yeniden düzenlemiştir (TTKB, 2005).

Bu bağlamda, öğrenci merkezli yaklaşımların uygulanması eğitimde baskın strateji haline gelmiştir. Günümüz öğretmenleri, disiplinler arası bakış açısıyla hareket ederek, tüm disiplinlerde öğrencilerin 21. yüzyıl becerileri olarak da bilinen temel becerilerin geliştirilmesine katkı sağlaması beklenmektedir (MEB, 2017). Bu nedenle, hem deneyimli hem de yeni öğretmenler, günümüz öğrencilerinin ihtiyaçlarını karşılamak için çeşitli öğrenci merkezli öğretim yöntemlerini uygulamaya hazır olmalıdır (Kapusnick & Hauslein, 2001).

Öğrenci merkezli öğretim yöntemleri, eğitimde bütünleştirici bir müfredat yaklaşımı ile, öğrencilerin sınıf ve gerçek dünya deneyimleri arasında daha derin bağlantılar kurmasını sağlar (Beane, 1997, akt Senn ve diğ, 2019). Dersler arasında bütünleştirme, dersleri öğrencilerin yaşamlarıyla daha ilgili hale getirerek daha etkili sınıf ortamı sağlar (Hargreaves & Moore, 2000). Bütünleşmeyi sağlamak adına, disiplinler arası eğitim yöntemi çeşitli konular arasındaki bağlantıları ve konu bütünlüğünü vurguladığı için tercih edilen bir yöntemdir (Senn ve diğerleri, 2019).

Klein ve Newell (1996) göre disiplinler arası bakış açısı, "*bir soruyu yanıtlama, bir sorunu çözme veya tek bir disiplin veya meslek tarafından yeterince ele alınamayacak kadar geniş veya karmaşık bir konuyu daha kapsamlı ele alma süreci*" olarak tanımlanmaktadır. Öğrencilerin önceki bilgileri üzerine inşa etmeye devam etmelerini sağlayacak sarmal bir müfredat tasarımı savunulur (Lambert, 2006). Öğrenciler, özellikle ortaokul yıllarında, genişleyen müfredat yelpazesi ile

karşılaşırlar. Aynı zamanda öğrenciler hayatlarının bu döneminde kendilerini ve dünyadaki yerlerini öğrenme, keşfetme sürecinden geçmektedir (Duerr, 2008). Bu süreçte, gençler için eğitim teşvik edici, ilginç, faydalı ve heyecan verici olmalıdır (Moser ve diğ., 2019). Bütünleştirici öğretim yöntemleri (disiplinlerüstü, çok disiplinli, disiplinler arası vb.) öğrencilerin yaptıkları işe karşı daha ilgili, daha motive ve daha iyi olmalarını sağlayabildikleri için ortaokul öğrencilerine yardımcı olabilir (Applebee ve diğ., 2007).

Disiplinler arası öğretim yaklaşımının bugün tüm eğitim düzeylerinde müfredatı geliştirmek için çok önemli olduğu konusunda yaygın bir fikir birliği vardır (Jones, 2010). Aynı zamanda, disiplinler arası yöntem günümüz müfredatının kritik bir bileşeni ve öğrenciler için önemli bir zorluk olarak ortaya çıkmıştır (Jones, 2009). Disiplinlerarası yöntem, birçok disiplini sentezler ve bir bütün olarak eğitim deneyimini geliştiren öğretmen-öğrenci ortaklıkları üretir (Jones, 2009).

Wallace'ın (2007) işaret ettiği gibi, "*günümüzde başarılı ortaokul programlarının çoğunun temeli, orta okullarda disiplinler arası ekip çalışmasıdır.*" "Disiplinler arası ekip oluşturma" terimi, farklı disiplinlerden eğitimcilerin, bir grup öğrenci için ortak bir müfredat ve ortak ders seti planlamak ve uygulamak için işbirliği yaptıkları bir öğretim stratejisini ifade eder (Mertens ve Flowers, 2003).

Farklı türde öğrenme toplulukları veya ekipler oluşturma, öğretmenlerin devam eden mesleki gelişimi için yararlı araçlar olarak teşvik edilir (Parker ve diğ., 2021). Hem teorik hem de uygulamalı profesyonel mesleki gelişimin amacı (Garet ve diğ., 2001), öğretmenlerin öğrencilerine daha etkili bir şekilde yardımcı olabilmeleri için kendi bilgi ve becerilerini geliştirmelerine yardımcı olmaktır. Sonuç olarak, mesleki gelişim toplulukları (MGT), mesleki gelişimlerinin bir parçası olarak hepsinin karşılaştığı sorunlar üzerinde çalışmak, en iyi uygulamalarla ilgili deneyimlerini paylaşmak ve çalışmak için sıklıkla işbirliği yapan öğretmen gruplarıdır (Dimino ve diğ., 2015). MGT, çeşitli araştırmacılar tarafından farklı şekillerde tanımlanmıştır, ancak hepsinin, işbirliğine odaklanma, ortak bir vizyon ve amaç, öğrencinin öğrenmesine odaklanma, öğretmenlerin daha fazla öğrenmesine yardımcı olmak için yansıtıcı tartışmanın kullanılması gibi bir dizi ortak özelliği vardır (Doan ve Adams, 2018; DuFour, 2004).

Farklı branşlardan öğretmenlerin bir müfredat tasarlamak, dersleri öğretmek ve belirli bir süre boyunca öğrenci ilerlemesini değerlendirmek için birlikte çalıştıkları disiplinler arası takım öğretimi, sıklıkla disiplinler arası öğrenme yöntemi olarak belirtilir (Jones, 2010). Herhangi bir alanın sağlayabileceğinden daha derine inmek istediğinde veya karmaşık konuların daha iyi anlaşılmasına verimli bir çözüm bulmak istediğimizde disiplinler arası yöntem kullanır (Klein, 1996; Lattuca, 2001; Pharo ve diğ., 2013). Böyle bir durumda disiplinler arası takım çalışması Seashore ve diğ., (2003), insanların yeni müfredat ve pedagojiye odaklanan daha küçük gruplarda çalıştıklarında, yansıtıcı uygulama yoluyla kariyerlerini geliştirme olasılıklarının daha yüksek olduğunu ortaya koymuştur.

Disiplinler arası oluşturulan programlar, öğrencilere çeşitli kaynaklar sunma ve farklı bakış açıları kullanarak sorunları ele alma olanağı sunduğu için gerçek dünyayla ilişkilendirilir. Disiplinlerarası öğretim yaklaşımı, öğrencilere sorunları çözmek için bilgiyi nasıl verimli bir şekilde tanımlayacaklarını ve uygulayacaklarını öğretmek için son derece işlevseldir. Çünkü sıklıkla farklı bakış açılarının entegrasyonunu, ekip çalışmasını ve eleştirel düşünme becerilerinin öğretimini vurgular (Davis, 1995; akt Hammons ve diğ., 2019).

Ortaokullarda öğrenciler, gerçek dünyadaki etkinliklerden soyut etkinliklere geçiş yaptıkları dönemdedirler (Charles, 2003). Bu nedenle, bu yaştaki çocukların kendileri için uygun olmayan konulara aktif olarak katılmalarını beklemek doğru bir yaklaşım değildir. Bu süre zarfında çocukların yaşına, yeteneğine, algı düzeyine ve zeka alanlarına uygun eğitim etkinliklerine yer verilmesi, öğrenmede kişisel ilgi ilkesi ile örtüşmektedir (Çepni ve Çil, 2009).

Mevcut birçok farklı brans öğretim programları, etkili bir öğretim yaklaşımı olarak yaygın kabul görmesi nedeniyle disiplinler arası öğretimi içerir (MEB, 2018a; 2018b; 2018c; 2018d; 2018e); ancak müfredatta vurgulandığı gibi öğretmenlerin "konu ile diğer disiplinler arasında bağlantı kurma" konusunda sınırlı kaldıkları da düşünülmektedir (İnce ve diğ., 2020). Ayrıca, Türkiye'de yakın zamanda yapılan bir MGT müdahale çalışması (İnce ve diğ., 2020), öğretmenlerin özellikle "vücut nasıl çalışır" ve "sağlıkla ilgili uygunluk" konularında alan ve pedagojik alan bilgilerini geliştirmeleri gerektiğini göstermiştir. Ayrıca İnce ve diğ. (2020), beden eğitimi öğretmenlerinin disiplinler arası öğretim yeterliliklerinin geliştirilmesine ihtiyaç

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olduğunu belirtmişlerdir. Disiplinlerarası öğretim yaklaşımı MEB (2018b; 2018c;) tarafından ilgili tüm alan dersleri için önerilmiş olsa da, diğer branş öğretmenlerinin disiplinler arası öğretim yeterliklerine ilişkin Türkiye bağlamında da daha fazla araştırmaya ihtiyaç vardır. "Vücut sistemleri", "sağlıkla ilgili fiziksel uygunluk" (SiFU) ve fiziksel aktivite konuları sadece ortaokul beden eğitimi ve spor dersi öğretim programında değil, aynı zamanda fen bilimleri müfredatında da yer almaktadır. Diğer alan derslerinin (Türkçe, görsel sanatlar ve İngilizce) öğretim programlarında seçilen bu konuları destekleyen ortak kazanımlar yer almaktadır (MEB, 2018a; 2018d; 2018e). Bu nedenle, farklı alan öğretmenlerinin disiplinler arası öğretim yeterliliğini geliştirmek, öğrencinin vücut sistemleri ve SiFU hakkında öğrenmesini desteklemek için çok önemlidir.

Çocukların bu dönemde vücutlarında meydana gelen hızlı değişimleri fark etmeleri ve bunlara uyum sağlamalarında karşılaşacakları yeni durumlara alışmaları gelişim sürecinin bir özelliğidir (Çeken, 2020). Soyut ve anlaşılması zor fen kavramlarını sınıf ortamında öğretmek ve öğrencilerin kavram yanılgılarını etkili bir şekilde azaltmak veya ortadan kaldırmak (Çetinkaya ve Taş, 2018) için, üç boyutlu materyaller veya modeller, oyunlar, gösteriler ve analojiler kurarak öğrenmeye yönelik uygulamalar tercih edilebilir. Literatür incelendiğinde, öğrencilerin sağlıkla ilgili fiziksel uygunluk bilgilerini inceleyen çalışmalarda, öğrencilerin bu konudaki bilgi düzeylerinin istenilen düzeyde olmadığı (Hunuk ve ark., 2007) ve konu ile ilgili bilgiye sahip olanlarında yetersiz olduğu tespit edilmiştir. (Placek ve diğerleri, 2001; İnce ve diğerleri, 2020).

Bu çalışmada, farklı branş öğretmenlerinin işbirliğini geliştirmek için bir "disiplinler arası mesleki gelişim topluluğu" (dMGT) yaklaşımı benimsenmiştir. Böyle bir yaklaşım, disiplinler arası öğretimin önündeki birincil engel olarak ortaya çıkan disipliner parçalanma, izolasyon ve rekabetçilikle uğraşan öğretmenler için de verimli olmaktadır (Pharo ve diğ., 2013). Ayrıca, disiplinler arası öğretim yöntemleri ve uygulamalı çalışmalara ilişkin yayınlanmış sınırlı sayıda model bulunmaktadır. (Boyer ve Bishop, 2004; Pharo ve diğ., 2013; Wallace, 2007).

Bu çalışmada, dMGT ortamının farklı branş öğretmenleri arasında "disiplinler arası işbirliği", "disiplinler arası bakış açısı" ve "disiplinler arası etkileşim" geliştirmesi ve öğretmenlerin dMGT'lerde seçilen konuda öğrendiklerini daha etkili

yöntemle sınıflara aktarması ve öğrencilerinin faydalanması beklenmektedir. Dolayısıyla kanıta ve mesleki ihtiyaçlara dayalı, öğrencinin ihtiyacına yönelik bir disiplinler arası mesleki gelişim programının süreçlerinin tanımlanması ve gelecekteki okul ortamına aktarılabilmesi üzerindeki etkisinin anlaşılması gereklidir. Ek olarak, literatürde disiplinler arası mesleki gelişim programının öğretmen uygulamalarında etkisi yeterince incelenmemiştir.

Yukarıda bahsi geçen konulara cevap bulabilmek için üç araştırma sorusu sorulmuştur:

1. Disiplinler arası mesleki gelişim toplulukları, öğretmenlerin seçilen vücut sistemleri (iskelet, kas, kardiyovasküler ve solunum) ve SiFU hakkındaki alan ve pedagojik alan bilgilerini nasıl etkiler?

2. Öğretmenlerin dMGT'lere katılımı öğrencilerin SiFU bilgilerini ve fiziksel aktivite katılım düzeylerini nasıl etkiler?

   a. Öğretmenlerin dMGT'lere katılımı öğrencilerin SiFU bilgilerini arttırıyor mu?

   b. Öğretmenlerin dMGT'lere katılımı öğrencilerin fiziksel aktivite katılım düzeylerini arttırıyor mu?

3. Disiplinler arası mesleki gelişim topluluklarına katılan öğretmenlerin öğrencilerinin, öğretmenlerinin seçilen vücut sistemlerine (iskelet, kas, kardiyovasküler ve solunum), SiFU ve fiziksel aktivite katılımına yönelik öğretim yaklaşımları hakkındaki görüşleri nelerdir?

Yöntem

Bu çalışmada, araştırma sorularına cevap bulmak için birleşik desen karma yöntem deseni (convergent mixed method design) tercih edilmiştir (Creswell ve Plano Clark, 2007). Birleşik desen karma yöntem deseni, bir araştırmacı, araştırma sürecinin aynı aşamasında nitel ve nicel verileri toplayıp analiz ettiğinde gerçekleşir. Sonuçlar genel bir anlayışta birleştirilir (Creswell ve Plano Clark, 2007; s. 77).

Çalışmada yarı deneysel (öntest/ sontest) gruplar arası bir tasarım oluşturulmuştur (Creswell, 2012). Çalışmanın birinci aşamasında, iki deney ve iki kontrol okulundan birer 6. sınıf seçildi ve deney grubundan beş farklı brans öğretmeni (beden eğitimi, fen bilgisi, İngilizce, Türkçe, rehberlik ve psikolojik danışmanlık,

görsel sanatlar) öğretmenleri belirlendi. Öğrencilerin öntest SiFU alan bilgi düzeylerini ölçmek için hem deney hem de kontrol grubundaki öğrencilere "İlköğretim ikinci Kademe Öğrencileri için Sağlıkla İlgili Fiziksel Uygunluk Bilgi Testi (Ince & Hunuk, 2014)" ve "Çocuklar için Fiziksel Aktivite Anketi (Kowalski vd. 2004, Erdim vd. 2019)" uygulandı.

Çalışmanın ikinci aşamasında (müdahale), deney grubunda belirlenen branş öğretmenleri altı hafta boyunca haftada bir gün ortalama 2 saatlik sürelerle bir kolaylaştırıcı ile birlikte dMGT'ye katılmışlardır. Çalışmada iki ayrı dMGT oluşturulmuştur. Toplantılar üniversite içinde görsel-işitsel eğitim teknolojileri ile kurulmuş bir laboratuar ortamında gerçekleştirilmiştir. Tüm dMGT toplantıları video kayıt cihazı ile kaydedilmiştir; araştırmacı toplantı sırasında alan notları tutmuştur. Ayrıca deney grubu öğretmenlerinin öğrencilerinin etkinlikleri/çalışma örnekleri/günlükleri de toplanmıştır. Tüm dMGT toplantıları öğretmenlerin okul dışındaki boş zamanlarına göre düzenlenmiştir. Altı haftalık dMGT toplantılarının genel program içeriği Tablo 1' de sunulmuştur.

Çalışmanın üçüncü aşamasında, dMGT toplantıları ardından deney ve kontrol grubu 6. sınıf öğrencileri SiFU bilgi testi ve fiziksel aktivite katılım düzeyi anketini son test olarak tekrar uygulanmıştır. Programda yer alan deney grubu öğretmenleri ile yarı yapılandırılmış görüşmeler, öğretmenlerin sınıflarından rastgele seçilen öğrencilerle odak grup görüşmeleri yapılmıştır. Ayrıca araştırmacı her iki deney okulunda beden eğitimi ve spor derslerini gözlemleyerek alan notları tutmuştur.

Araştırmaya, Ankara'nın Etimesgut ve Çankaya ilçelerinden benzer sosyoekonomik ortama sahip dört ortaokul seçilmiştir. Her bir deney ve kontrol okulundan birer 6. sınıf çalışma için belirlenmiştir. Deney okullarının birinde beden eğitimi, fen bilgisi, İngilizce, Türkçe, rehberlik ve psikolojik danışma öğretmenleri; diğer deney okulunda beden eğitimi, fen bilgisi, İngilizce, görsel sanatlar, rehberlik ve psikolojik danışma öğretmenleri dMGT programına katılmıştır. Bu öğretmenler için dahil edilme kriteri, aynı 6. sınıf şubesinde ders veriyor olma olarak belirlenmiştir. Kontrol okullarında ise sadece seçilen 6. sınıfın beden eğitimi spor dersi öğretmeni çalışmada yer almıştır. Deney okullarında, birinci deney okulundan 17, ikinci deney okulundan 18 olmak üzere toplam 35 öğrenci; kontrol okullarından, birinci kontrol

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okulundan 17, ikinci kontrol okulundan 28 olmak üzere toplam 45 öğrenci çalışmada yer almıştır.

Tablo 1

Haftalara Göre Disiplinlerarası Mesleki Gelişim Topluluğu Toplantı Kapsamı

Haftalar	dMGT Toplantı Kapsamı
1	✓ Açılış ve tanışma ✓ Çalışmanın amacının ve içeriğinin sunumu ✓ Disiplinlerarası mesleki gelişim topluluğu üzerine tartışma ✓ Farklı branş derslerinin öğretim programlarının incelenmesi ve tartışılması ✓ Farklı branş derslerinde ortaya çıkan benzer öğrenme çıktılarının/ kazanımların incelenmesi ve tartışılması
2	✓ Bir önceki haftanın değerlendirilmesi ✓ "iskelet, kas, kardiyovasküler ve solunum sistemleri, SiFU, fiziksel aktivite ve iyi oluş" konularında disiplinlerarası alan bilgisi üzerine tartışma ✓ Disiplinlerarası öğretim yönteminin, öğretmenler üzerinde oluşturacağı yük/ sorumluluk üzerine tartışma
3	✓ Önceki iki haftanın değerlendirilmesi ✓ "Seçilen vücut sistemleri, SiFU, fiziksel aktivite ve iyi oluş" konularında disiplinlerarası pedagojik alan bilgisi üzerine tartışma ✓ "Seçilen vücut sistemleri, SiFU, fiziksel aktivite ve iyi oluş "konuları üzerine disiplinlerarası derslerde kullanılacak ortak terminolojinin tartışılması ✓ "Seçilen vücut sistemleri, SiFU, fiziksel aktivite ve iyi oluş" konularında disiplinlerarası pedagojik alan bilgisi üzerine tartışması (Öğretme Stilleri, Teknoloji Kullanımı, Ölçme ve Değerlendirme)
4	✓ İlk disiplinlerarası öğretim yönteminin kullanıldığı dersler üzerinden değerlendirme ✓ "Seçilen vücut sistemleri, SiFU, fiziksel aktivite ve iyi oluş" konularında disiplinlerarası pedagojik alan bilgisi üzerine tartışması (Öğretme Stilleri, Teknoloji Kullanımı, Ölçme ve Değerlendirme)
5	✓ İkinci disiplinlerarası öğretim yönteminin kullanıldığı dersleri değerlendirme ✓ "Seçilen vücut sistemleri, SiFU, fiziksel aktivite ve iyi oluş" konularında disiplinlerarası pedagojik alan bilgisi üzerine tartışması (Öğretme Stilleri, Teknoloji Kullanımı, Ölçme ve Değerlendirme)
6	✓ Mesleki gelişim ve kariyer yönetimi ✓ Genel yansıma ve kapanış

Araştırma için öğrencilerin SiFU bilgilerinin ve fiziksel aktivite katılım düzeylerinin belirlenmesi için toplanan nicel verilerin analizinde ilişkili (bağımlı) örneklemler için t-test kullanılmıştır. Video kaydı altına alınmış ve tamamen yazıya dökülmüş 6 haftalık dMGT toplantıları, öğretmenlerle yapılan yarı yapılandırılmış görüşmeler ve araştırmacının alan notlarını analiz etmek için sürekli karşılaştırılmalı

analiz yöntemi (constant comparative technique, Strauss & Corbin, 1998) kullanılmıştır. Ek olarak, üçüncü araştırma sorusu için öğrencilerle yapılan odak grup görüşmeleri ve öğrencilerin günlükleri de sürekli karşılaştırmalı veri analizi tekniği kullanılarak analiz edilmiştir.

Çalışmanın geçerlik ve güvenirliğinin sağlanabilmesi için veri üçlemesi, katılımcı teyidi ve uzman görüşü yöntemleri kullanılmıştır (Creswell, 2009; Patton, 2002).

Bulgular

Birinci Araştırma Sorusunun Bulguları
Disiplinler arası mesleki gelişim toplulukları, öğretmenlerin seçilen vücut sistemleri (iskelet, kas, kardiyovasküler ve solunum) ve SiFU hakkındaki alan ve pedagojik alan bilgilerini nasıl etkiler?

Bu araştırma sorusunun verileri video kaydı altına alınmış ve tamamen yazıya dökülmüş 6 haftalık dMGT toplantıları, öğretmenlerle yapılan yarı yapılandırılmış bireysel görüşmeler ve araştırmacının alan notları oluşturmaktadır. Bulgular, öğretmenlerin seçilen vücut sistemleri ve SiFU konularına dair dMGT süresince alan ve pedagojik alan bilgilerinin 1) Sorgulama, 2) Kabul, 3) Uygulama ve 4) Yansıma süreçlerinden geçerek geliştiğini göstermiştir.

Öğretmenlerin disiplinler arası öğretimi "*Sorgulama*" teması ilk hafta ve ikinci hafta yapılan dMGT toplantılarında mevcuttu. Disiplinlerarası MGT toplantıların ilkinde grup birbiriyle ve yürütücülerle tanıştı ve kolaylaştırıcı amaç, içerik ve geçici program akışını katılımcılarla paylaştı. Aynı zamanda halihazırda benimsenen branş derslerinin öğretim programları incelenmiş, farklı branş dersleriyle benzer öğrenme çıktıları tartışılmıştır. İkinci idPLC toplantısında, seçilen vücut sistemleri (iskelet, kas, kardiyovasküler ve solunum), SiFU, fiziksel aktivite ve zindelik hakkında disiplinler arası içerik bilgisi üzerine tartışmalar yapıldı. Ayrıca disiplinler arası öğretim yönteminin öğretmenlere getireceği yük ve sorumluluklar ele alınmıştır. Ek olarak toplantıda kolaylaştırıcı, fiziksel aktivite, bilim, tarih ve sanatı birleştiren örnek bir disiplinler arası öğretim videosu paylaştı

(https://www.youtube.com/watch?v=hzkL_LSro0s).

Araştırma kapsamında ele alınan ilk tema olan sorgulama üç kategoriden oluşturulmuştur. Bunlar: A) Disiplinler arası öğretimle ilgili politikalar, B) Disiplinler arası öğretim iş birliğinde öğretmen yeterliliği ve C) Disiplinler arası öğretim için iş/okul ortamının uygunluğu.

"*Kabul*" teması özellikle, ilk dMGT toplantısı ve ikinci dMGT'deki disiplinler arası öğretimin somut örneğinin tartışılmasından sonra, öğretmenler disiplinler arası öğretimin eğitimsel değerini anlamaya başlaması ile ortaya çıkmıştır. Kabul teması için iki kategori oluşturulmuştur. Bunlar: A) Disiplinler arası öğretimde dersi konumlandırma ve B) Öğretmen motivasyonu.

"*Uygulama*" teması, esas olarak üçüncü, dördüncü ve beşinci dMGT toplantılarından ortaya çıktı. 3., 4. ve 5. haftalarda, sırasıyla seçilen vücut sistemleri (iskelet, kas, kardiyovasküler ve solunum), SiFU, fiziksel aktivite ve zindelik üzerine disiplinler arası pedagojik alan bilgisi tartışıldı. Ayrıca bu konularda derslerde kullanılacak ortak kavramlar/içerikler üzerine tartışmalar ilerlemiştir. Öğretmenler sınıflarında disiplinler arası öğretim planlarını uygulamaya başladılar. Öğretmenler, grubun geri kalanına konuyla ilgili müfredatı ve içeriği nasıl kullandıklarını gösterdi (Appendix L).

Uygulama temasına ait iki kategori oluşturulmuştur: A) Öğrenci deneyimleri üzerinde öğretmen görüşleri B) Farklı branşların disiplinler arası öğretimini planlama ve uygulama

Disiplinler arası MGT'nin son oturumu (6. Toplantı) dördüncü tema olan "*Yansıma*" için birincil veri kaynağıydı. Altıncı dMGT toplantısında öğretmenler deneyimlerini yansıttı. Bu tema altında A) Disiplinlerarası öğretim deneyimi, B) Öğretmen öğrenmesi ve C) Öğretmen önerileri olmak üzere üç kategori ortaya çıkmıştır.

Öğretmenlerin alan ve pedagojik alan bilgilerinin gelişmesinde dMGT'lerin etkililiği görülmüştür. Sonuçlar bireysel görüşmeler ve alan notları ile desteklenmiştir. Ayrıca dMGT progrmının etkisi öğrenci verileri ve söylemleri ile de ortaya konmuştur. Yapılan dMGT progamında, okulda yapılacak çalışmalarda müdürlerin desteğinin önemi ortaya çıkmıştır.

İkinci Araştırma Sorusunun Bulguları

Öğretmenlerin dMGT'lere katılımı öğrencilerin SiFU bilgilerini ve fiziksel aktivite katılım düzeylerini nasıl etkiler?

   a. Öğretmenlerin dMGT'lere katılımı öğrencilerin SiFU bilgilerini arttırıyor mu?

   b. Öğretmenlerin dMGT'lere katılımı öğrencilerin fiziksel aktivite katılım düzeylerini arttırıyor mu?

İkinci araştırma sorusu SifU bilgi testi (N= 80) ve fiziksel aktivite katılım ölçeğinden (N= 77) oluşan verilerin analizi ile cevaplandırılmıştır. Deney ve kontrol gruplarının ön test ve son test SiFU bilgi puanları ve fiziksel aktivite katılım düzeyleri arasındaki gelişmeleri anlamak için ilişkili (bağımlı) örneklemler için t-test uygulanmıştır. Ayrıca betimleyici istatistik sonuçları her bir değişkenin ortalama ve standart sapması cinsinden verilmiştir.

Deney grubunda yer alan öğrencilerin SiFU ön test bilgi testi puanları (M = 23.24, SD = 3.52) ile son test SiFU bilgi puanları (M = 26.83, SD = 3.61) arasında anlamlı bir fark olduğu görülmüştür; t (34) = -6.38, p= 0.001, Cohen's d = 1.08. Ayrıca dMGT'lerin öğrencilerin fiziksel aktiviteye katılım düzeyi üzerindeki etkisini incelediğimizde deney grubunda yer alan öğrencilerin ön test fiziksel aktivite düzeyi (M = 3.02, SD = .77) ile son test fiziksel aktivite düzeyi (M = 3.47, SD = .71) arasında anlamlı bir fark olduğunu göstermiştir; t (31) =-3.23, p = 003, Cohen's d = .57

Kontrol grubu öğrencilerinin ön test (M = 23.00, SD = 3.80) SiFU bilgi puanları ile son test (M = 21.84, SD = 4.13) SiFU bilgi puanları arasında anlamlı bir fark bulunmamıştır; t (44) = 1.59, p=.119. Ek olarak, kontrol grupları için öğrencilerin ön test (M = 3.07, SD = .67) fiziksel aktivite düzeyi ile son test (M = 3.11, SD = .81) fiziksel aktivite düzeyi arasında anlamlı fark bulunmamış; t (42) =-.337, p=.74.

Yapılan dMGT programının etkisini görebilmek için beden eğitimi ve spor dersi üzerinden değerlendirme yapılmıştır. Deney grubundaki öğrencilerin hem SiFU bilgilerinde hem de fiziksel aktiviteye katılım düzeylerinde gelişim olduğu görülmüştür. Bu durum dMGT' ye katılan öğretmenlerin seçilen konular üzerindeki gelişen alan bilgilerini sınıf ortamına aktarabildiklerini ortaya koymuştur.

Üçüncü Araştırma Sorusunun Bulguları

Disiplinler arası mesleki gelişim topluluklarına katılan öğretmenlerin öğrencilerinin, öğretmenlerinin seçilen vücut sistemlerine (iskelet, kas, kardiyovasküler ve solunum), SiFU ve fiziksel aktivite katılımına yönelik öğretim yaklaşımları hakkındaki görüşleri nelerdir?

Bu araştırma sorusu için veriler, odak grup görüşmelerinden ve öğrenci günlüklerinden elde edilmiştir. Deney grubunda yer alan tüm öğrenciler her her haftanın sonunda işledikleri dersler hakkında günlük tuttular. Odak grup görüşmelerine ise, iki grubun her birini temsil eden, rasgele seçme yöntemi ile belirlenen altışar öğrenci olmak üzere toplam on iki öğrenci katılmıştır.

Bulgular, dMGT öğretmenlerinin öğrencilerinin, öğretmenlerinin seçilen vücut sistemlerine (iskelet, kas, kardiyovasküler ve solunum), SiFU ve fiziksel aktivite katılımına yönelik öğretim yaklaşımlarına ilişkin görüşlerinin dört tema üzerinden olduğunu göstermiştir. Bunlar, A) Disiplinler arası derslerin uygulanması ve verimliliği, B) Yaratıcı veya özgün düşünme, C) Gerçek hayatla bağlantı kurma ve D) Farkındalık artışıdır.

Yapılan dMGT'lere katılan öğretmenlerin derslerinde disiplinler arası öğretimöğretim yaklaşımını kullandıklarını algılamışlardır. Öğrencilerin söylemleri, araştırmacının saha notları ile doğrulanmıştır. Disiplinler arası öğretim yaklaşımı, öğrencilerde dersin etkinliliğinin arttığı, yaratcı düşüncelerinin geliştiği ve orjinal fikirler ortaya koymalarını sağlamıştır. Ayrıca derslerde öğrendikleri bilgileri hayata aktarabildikleri ve okul dışında bu bilgileri kullandıklarını söylemişlerdir. Bulundukları gelişim döneminden dolayı dersler arası bağ kurarak konuların işlenmesi beden farkındalıklarının gelişmesine katkı sağlamıştır.

Tartışma ve Sonuç

Araştırma sonuçları, öğretmenlerin dMGT'lere katılımının, seçilen vücut sistemleri ve SiFU bilgisi hakkındaki alan ve pedagojik alan bilgilerini olumlu yönde etkilediğini göstermiştir. Ortaya çıkan sorgulama temasında, öğretmenlerin modeli anlamak için disiplinler arası öğretim yöntemine odaklanması önemli görünmektedir. Sonuçlar, öğretmenlerin seçilen vücut sistemlerini ve SiFU bilgilerini derslerine nasıl dahil edeceklerini tartıştıklarında, disiplinler arası öğretimle ilgili politikaları,

disiplinler arası öğretim işbirliğinde öğretmen yeterliliklerini ve disiplinler arası öğretim için iş/okul ortamının uygunluğunu tartıştıklarını gösterdi.

En önemli nokta, öğretmenlerin birbirinin ders programlarını incelediğinde, diğer brans derslerinin programlarına içeriklerine ilşkin etkili bir anlayış geliştirmişlerdir. Seçilen vücut sistemleri ve SiFU bilgisi ile ilgili beklenen kazanımları tartıştıkça, öğretmenlerin eğitim hayatları boyunca beden eğitimi derslerinin istenilen düzeyde olmadığı ve bir kısmının beden eğitimi dersine katılmadığı ortaya çıkmıştır. Bu durum, öğretmenlerin SiFU, fiziksel aktivite ve zindelik bilgilerinin seçilmiş vücut sistemleri bilgilerinden daha zayıf olması gerçeğine yansımıştır. Bu noktada kolaylaştırıcının vücut sistemleri bilgisini programın merkezine alarak ilerlemesi ve grupların dağılmaması için SiFU bilgisi ile desteklemesinin kritik bir karar olduğu söylenebilir.

Literatür incelendiğinde, yapılan çalışmaların genellikle iki ders arasında disiplinler arası öğretim yaklaşımını kullandıklarını göstermiştir. Okul ortamında disiplinlerarası MGT oluşturmak için müdür desteğinin olması başarıyı arttıran bir faktördür (Robbins ve Searby, 2012). Okul yöneticilerinin dMGT'lere verdiği destek araştırmacının alan notlarına da yansımaktadır. Çalışmamızda ortaya çıkan etkili öğretmen işbirliği için gerekli yapıları, kaynakları ve desteği sağlayan okullara ilişkin ilgili literatürle tutarlıydı (Hernández ve Brendefur, 2003; Sel, 2022).

Kabul temasında, dMGT'ye katılan öğretmenlarin disiplinler arası öğretimde kendi derslerini konumlandırmalarının ve motivasyonlarının dMGT'leri gerçekleştirme ve disiplinler arası öğretim yöntemini uygulama sürecinde önemli bir yere sahip olduğu görülmüştür. Disiplinler arası öğretim yönteminde, öğretmenlerin derslerinde yer bulması için dünya çapında bu yöntemle hazırlanan somut derslerin sunulması yöntemin anlaşılmasını kolaylaştırmıştır. Ayrıca, disiplinler arası öğretim yönteminin somut kanıtlarının sağlanması, öğretmenlerin konuya farklı bir bakış açısıyla bakmasına olanak sağlamıştır.

Bulgular, öğretmenler, ilgili konularla bağ kurulduklarında öğrencilerin okulda veya kendi mesleki gelişimlerinde daha başarılı olmalarına yardımcı olabileceğine inandıklarında, derslerinde disiplinler arası öğretim yöntemlerini kullanma olasılıkları daha yüksek olmaktadır. Ayrıca öğretmenlerin dMGT'lerde sorumluluk duygusunun yüksek olması ve yardımseverliğe/yardımseverliğe açıklıkları dMGT'lerin devamlılığı

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için önemli noktalar olarak ortaya çıkmıştır. Bu noktada özellikle öğretmenler, araştırmacının ve kolaylaştırıcının iletişim tarzlarını ön plana çıkarmışlardır. Araştırmacının bağlamda destekleyici olması ve kolaylaştırıcının işbirliği içinde olumlu bir ortam yaratması ve katılımcılara değerli olduklarını hissettirmesinin öğretmenlerin motivasyonunu artırdığı görülmüştür. Hernández ve Brendefur (2003), başarılı bir disiplinler arası işbirliği süreci oluşturmak için benzer bulgular bulmuşlardır; etkili grup dinamikleri, açık iletişim ve demokratik girdi kritik konulardır.

Elde edilen bulgulara göre öğretmenlerin disiplinler arası öğretim modelinin önündeki engelleri sorguladıktan sonra süreci içselleştirdikleri görülmüştür. Böylece pedogojik alan bilgileri ön plana gelerek uygulama temasının ortaya çıktığı görüldü. Elde edilen bulgulara göre, seçilen konuların teori ve pratiği arasında iyi bir denge sağlanması gerekmektedir. Dersler arasında bağ kurularak konuların 2 hafta içerisinde anlatılmasının etkili olduğu görülmüştür. Ayrıca, temel bilgileri anlamak için fen bilgisi dersinden konu anlatımına başlamak etkili görülmektedir. Seçilen konunun diğer alan dersleriyle somutlaştırılması ve tekrar edilmesi konunun diğer öğretmenlerle birlikte anlaşılmasını kolaylaştırmıştır.

Disiplinler arası öğretim yöntemini daha etkin ve anlaşılır bir şekilde kullanmak için ortak bir terminoloji belirlemek kritik bir adım olabilir. Disiplinlerarası bir ekipteki uzmanların, bir problem üzerinde etkili bir şekilde çalışmak ve zamanlarını en iyi şekilde kullanmak için ortak bir dil veya terminoloji bulmaları gerekir (Haythornthwaite ve diğ., 2006; Daniel ve diğ., 2022).

Öğretmenlerin uygulamalar üzerindeki yansımaları, dMGT'lerin sürecinin işlevselliğini anlamada ön plana çıkmıştır. Bu yansımalar, dMGT'lerin okul ortamında sürdürülebilirliğini sağlamak ve uzun vadeli başarısı için önemli olabilecek disiplinler arası öğretim deneyimine, öğretmen öğrenimine ve öğretmen önerilerine yol açmıştır. dMGT'lerin sürdürülebilirliği için müfredatın disiplinler arası öğretim yöntemine göre uyarlanması faydalı olabilir. Her konuyu disiplinlerarası bir yöntemle öğretmek yerine, anlaşılması zor konuların belirleyerek bu yöntemi kullanmak daha verimli olabilir.

Yapılan programın etkisini nicel verilerle görebilmek adına öğrenci çıktılarına bakılmıştır. Öğrencideki değişim beden eğitimi ve sapor dersi üzerinden, öğrencilerin SiFU bilgileri ve fiziksel aktiviteye katılım düzeyleri ile ölçülmüştür.

Sonuçlar, deney grubundaki öğrencilerin SiFU bilgi düzeyinde ve fiziksel aktiviteye katılım düzeylerinde bir artış olduğunu, dMGT'lerdeki öğretmenlerin SiFU bilgilerini geliştirmek için disiplinler arası alan bilgilerini ve pedagojik alan bilgilerini sınıflarına aktardıklarını ve bu konuda öğrenci öğreniminin geliştiğini göstermektedir. Beden eğitimi derslerinin öncelikli çıktılarından birinin fiziksel aktivite bilgisini geliştirmek olduğu düşünüldüğünde (MEB, 2018b), disiplinler arası öğretim yöntemleri ile öğrenci öğrenmesinin artması bu çalışmada önemli bir yer tutmaktadır.

Bilgi düzeyindeki bu artış Türkçe derslerinde "organları konuşturma", "vücutlarına şiirler yazma", resim dersinde "eklem ve kasları gösteren materyal geliştirme", "gerçek hayatla bağlantılı resim ve hamur çalışmaları"; İngilizce dersinde "Seçilmiş konularda kısa videolar", "çalışma kağıtları", "hayattan örnekler" alıştırması; Beden eğitimi dersindeki "etkinlikler, oyunlar, parkur" etkinlikleri etkili olmuş olabilir. Ayrıca sınıf ortamının seçilen konularla ilgili görsel materyallerle desteklenmesi yardımcı olmuş olabilir.

Birçok çalışma, farklı branş öğretmenlerinin disiplinler arası bir öğretim yöntemi yaklaşımı seçilşen konularda kullandıklarında öğrencilerin matematik (Cecchini ve Carriedo, 2020; Mahanin ve diğ., 2017; Kaprinis ve diğ., 2009; Özçelik ve Semerci, 2016) ve fen bilgisi (Boyra &Serin, 2017; Spintzyk ve diğ., 2016; Korkmaz ve Konukaldı, 2015) bilgi düzeylerinin geliştirdiği görülmüştür. Birkaç çalışma, öğretmenlerin disiplinler arası öğretim yöntemini kullandığını ve öğrencilerin fiziksel aktivite düzeylerinin arttığını göstermiştir (Cecchini ve Carriedo, 2020; Spintzyk ve diğ., 2016).

Yapılan dMGT' lerin derse yansımacı nicel veriler üzerinden değerelndirildikten sonra, öğrencilerin bu yöntemi derslerde nasıl algıladıklarını anlamak için odak grup görüşmeleri ve öğrenci günlükleri ile veriler toplanmıştır. Öğrenciler disiplinler arası öğretim yöntemlerinden öğrendikleri ile yeni projeler üretmeye başladılar. Çalışmada yer almayan diğer derslerde anlamadıkları konularda özgün ve yaratıcı fikirler sundular. Bu durum öğrencilerin bilgileri kendilerine göre anlamlandırmalarına, sentez yaparak geliştirmelerine ve yeni fikirler üretmelerine

neden olmuştur. Sonuç olarak, dMGT'lere dahil olan öğretmenler, öğrencilerin üst düzey düşünmesini geliştirebilir. Yapılan çalışmalar, çalışmamızın sonuçlarıyla benzerdir (Cuervo, 2018; Hernández & Brendefur, 2003).

Öğrenciler aile üyeleri ve arkadaşları ile bilgi paylaşımında bulunarak öğrendikleri bilgileri hayata aktarmaya başlamışlardır. Bu durum dMGT'lere katılan öğretmenlerin, farklı branşlar üzerinden yaptıklaı tartışmalar, bilgiyi anlamlı kılmak için hayatla bağlantı kurarak bilgi aktardıklarını göstermektedir. Sınıfta kazanılan bilgi, gerçek dünyadaki durumlara uygulanabilir ve öğrencilerin öğrenmeye olan ilgisini güçlendirir (Chen ve diğ., 2007; Newell, 1994). Literatürdeki çalışmalar çalışmamızın sonuçlarını desteklemektedir (Pietsch ve diğ., 2014; Hernández ve Brendefur, 2003).

Bulgular, öğrencilerin bedenleri hakkında bir farkındalık geliştirdiğini ortaya koymuştur. Seçilen vücut sistemleri ve SiFU bilgisi beden eğitimi ve görsel sanatlar derslerinde somutlaştırıldığı için çocuklarda farkındalık oluşmuş olabilir. Bu yaklaşımla birlikte beden eğitimi derslerine yönelik hem öğretmenlerin hem öğrencilerin farkındalıkları artmıştır. Beden eğitimi dersleri, disiplinlerarası öğrenmeyi kullanmak için güçlü bir araçtır çünkü tematik bağlantılar ve gerçek dünya uygulamalarına (Mohnsen, 2011; Patterson, 2004), hareket ve eğlence yoluyla öğrenmeye (Cone & Cone, 1998), çok çeşitli biyolojik, psikolojik, sosyal, fizyolojik ve diğer yönlerle bağlantı kurabilmeye katkıda bulunur. (Rodić, 2014). Ek olarak, öğrenciler konuların somutlaştırılmasında özellikle görsel sanatlar dersinin önemini vurgulamışlardır.

Bu çalışma, disiplinler arası öğretim yaklaşımının, dMGT'ler oluşturularak etkili bir şekilde uygulandığını modellemiştir. Okul ortamında, her konunun dMGT'ler ile aktarılmasından ziyade, anlaşılması güç, karmaşık konuların bu yaklaşımla ele alınması etkili olacağı ortaya çıkmıştır.

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<u>**TEZİN ADI /**</u> <u>TITLE OF THE THESIS</u> (**İngilizce** / English): EFFECTIVENESS OF INTERDISCIPLINARY PROFESSIONAL LEARNING COMMUNITIES ON TEACHING SELECTED BODY SYSTEMS AND HEALTH-RELATED FITNESS

<u>**TEZİN TÜRÜ /**</u> <u>DEGREE</u>:   **Yüksek Lisans** / Master   ☐   **Doktora** / PhD   ☒

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