

Lesson Study, Differentiated Instruction and Professional Development of Teachers: Exploring the Relationship in Secondary Schools in Greece

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Abstract

The main purpose of this paper is to present the results of research, that aimed to investigate the effect of lesson study as a professional development activity on the effective implementation of differentiated instruction and, above all, to identify which specific characteristics of lesson study as a professional development activity influence the plan, implementation, and understanding of the differentiation by the teachers, in the teaching of the Modern Greek Language course of the 2nd class of Lyceum. The research was qualitative and grounded theory data collection and analysis techniques were used, in the context of its implementation. The research was carried out in three schools in two municipalities of Eastern Attica, with the participation of four teachers and eighty students. Data were collected before, during, and after the lesson study cycle and included classroom observations, interviews of the participating teachers, protocols for planning, observing, revising, and reflecting on the research lesson as well as transcripts of teacher meetings and the teaching of the research lesson, diaries, which were kept during the implementation of the lesson study, students' assignments as well as their interviews after the teaching. The research showed that the lesson study cycle outcomes for each participating teacher were greatly influenced by the completion of all stages of a lesson study cycle, as there were no characteristics that alone accounted for these outcomes. Teachers' thoughts and opinions about the process support this finding. All participants referred to their positive experience of the lesson study process holistically, demonstrating that all stages of the lesson study cycle are important and interdependent.

Keywords: lesson study, differentiated instruction, research lesson, professional development of teachers

1. Introduction

The inhomogeneity that prevails in modern school classrooms due to the rapid technological, economic, and cultural developments push teachers to revise their concepts and teaching methods (Sfyroera, 2004), as they know that with the traditional way of teaching, they cannot meet and cover the many and diverse needs of their students (Koutselini & Persianis, 2000).

The traditional, one-dimensional and standardized way of teaching is due to the isolation culture of teachers, who have become accustomed to the habit of closing the classroom door and feeling comfortable, autonomous and free due to isolation, avoiding criticism from their colleagues (Mon, 2009). Teachers who adopt this culture replicate their teachers' teaching, using the same traditional strategies they used, which cannot meet the diverse needs of students, resulting in some students failing to graduate from school (Coe, 2010).

In order to limit school failure and achieve students' learning goals, teachers must ensure the continuous improvement of the quality of their teaching, by enriching their knowledge and their professional development, so that by applying appropriate teaching practices their students' learning needs are met, ensuring that their potential is maximized (Tomlinson, 2003; Harsono, 2016).

The improvement of teachers' teaching and the satisfaction of students' diverse learning needs can be achieved by applying two innovative teaching practices which are lesson study (Lewis & Hurd, 2011) and differentiated instruction (Valiandes & Neophytou, 2017).

Through cooperative learning, which is promoted by the application of lesson study as well as the implementation of differentiated instruction, the successful treatment of increasing school diversity and new social data and demands can be achieved (Fykaris & Mitsi, 2012). In particular, with the interaction between teachers and students, synergies are created that make the educational process more effective (Bandura, 2006). When teachers work together in a collaborative effort, they improve teaching and learning, benefiting themselves and their students (Van Sickle, 2011), promoting their professional development, and making schools learning spaces for teachers and students (Desimone, 2009). This process is guided by the teachers themselves and not by various external experts who visit their classrooms to teach methods, which may not be able to be effectively applied to all students (Birman, Desimone, Porter & Garet, 2000). The acquisition of more knowledge and teaching skills by teachers is not achieved when they are trained piecemeal by these external experts (Hunzicker, 2011). Also, teachers do not regularly participate in training conducted by their colleagues, which can improve the quality of their teaching (Porter, Garet, Desimone & Birman, 2003), enhancing their pedagogical knowledge and professional development (Grossman & McDonald, 2008).

Therefore, in a modern education system, cooperation between teachers is a decisive factor for achieving effective professional development and a necessary condition for dealing with the many and diverse needs of the student population (Van Sickle, 2011). In order to build this cooperative framework among teachers, the use of lesson study is necessary to remove the existing dysfunctions of the system, which mainly come from their conservative perceptions (Lewis & Hurd, 2011). Also, the implementation of differentiated instruction helps teachers develop and apply appropriate skills to address the many and varied needs of students, due to the heterogeneity of classes (Tomlinson, 2003). A necessary condition for the implementation of differentiated instruction by teachers is the change of their beliefs and practices so that they have the opportunity to learn and develop professionally, utilizing new paradigms, models, thinking opportunities, and applications that take place in the classroom (Hockett, 2010).

From the review of the international literature, only two studies were identified that examined the effect of lesson study in the context of the implementation of differentiated instruction in Mathematics in primary education (Harsono, 2016; Hockett, 2010). From the review of the Greek literature, no research was identified that studies the effectiveness of lesson study in the context of the implementation of differentiated instruction at any level of education. More specifically, few researches of the international and Greek literature on lesson study, dealt with the professional development of teachers and the improvement of student learning in minimal knowledge subjects (Howell, 2014; Loose, 2014; Panoutsos, 2015; Sirotic, 2015), while research on differentiated instruction focused mainly on the conditions, procedures and difficulties for its effective implementation as well as its impact on student learning (Hogan, 2014; Maddox, 2015; Stone, 2012).

From the review of the investigations, it follows: a. a relatively small number of researches on

the application of lesson study and differentiated instruction in secondary education as well as on the evaluation of their effectiveness on the learning outcomes of students in the course of Modern Greek Language in Greece b. a small number of studies focusing on the conditions, processes, and difficulties of lesson study and effective differentiation in the Modern Greek language course and c. lack of experimental research to evaluate the effectiveness of lesson study in the context of the implementation of differentiated instruction in Greece and internationally. The present research is implemented aiming to cover these gaps. More specifically, it aims to investigate the effect of lesson study on the way the teacher plans, implements, and understands the differentiated instruction in secondary education in the Modern Greek Language of the 2nd Lyceum, a cognitive field in which students often face special learning difficulties, which find it difficult to achieve their learning goals. It also explores which characteristics of lesson study as a professional development activity influence how teachers plan, implement and understand differentiation.

2. The relationship between lesson study, differentiated instruction and professional development of teachers: A theoretical approach

2.1 Lesson study

Lesson study is a student-centered teaching approach guided by teachers themselves with the aim of improving their teaching and their students' learning (Harsono, 2016; Smith, 2008). It is a teaching practice in which teachers collaboratively proceed first in planning a teaching unit, choosing the learning objectives, and then in teaching it (research lesson), collecting data on student learning. Then, through the exchange of views, they revise the research lesson and reteach it, applying the modifications they decided together based on the observations of the previous teaching (Fernandez, 2002; Van Sickle, 2011).

The lesson study is implemented by a group of teachers of the same specialty, usually 3 to 6 people, who, devoting approximately 10 to 15 hours for 3 to 4 weeks, collaboratively plan and implement the teaching of a teaching unit (Fernandez, 2002 · Hockett, 2010).

The frequency of their meetings is determined based on the degree of difficulty of the unit chosen for teaching and the cognitive object, the time required for planning the teaching, and the time available in the teachers' daily timetable (Hamzeh, 2014).

The stages of lesson study (Stepanek et al., 2007) are the following:

- I. Research theme, choose a unit and setting learning goals
- II. Planning the research lesson
- III. Teaching, observing and collecting data of the research lesson
- IV. Assessment – feedback, revising and reteaching.
- V. Reflecting - formulating and sharing final results.

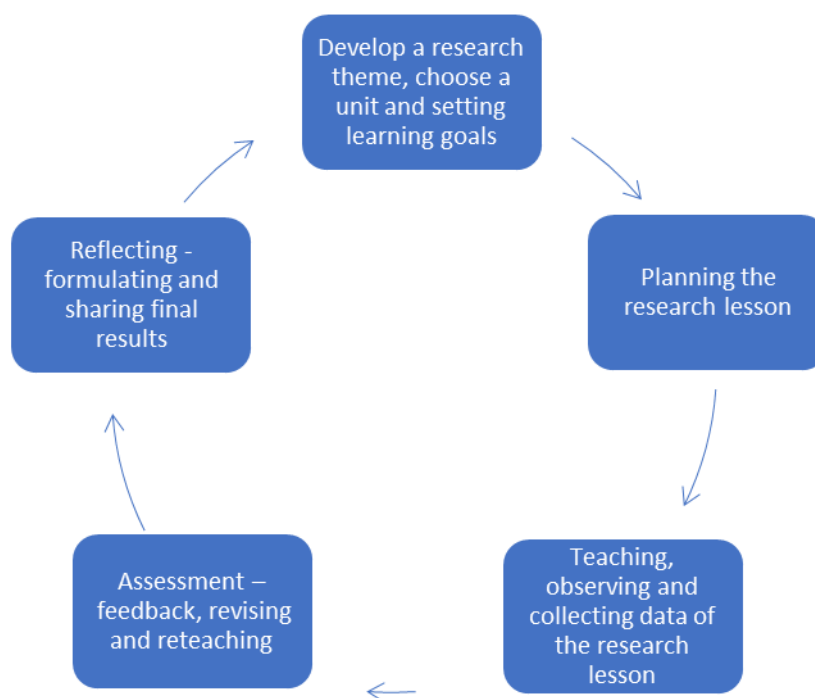


Figure 1 shows a lesson study cycle.

Figure 1: Presentation of a lesson study cycle (Adapted from Stepanek et al., 2007).

Its successful implementation requires various skills (Stepanek et al., 2007) as well as the change in teachers' perceptions, which is more likely to take place in a school environment in which teachers participate in lesson study (Hamzeh, 2014). By interacting, planning lessons together, and exchanging views in the context of a fruitful and constructive dialogue about teaching, they develop professionally while simultaneously improving the performance of their students. Teachers feel part of a community, which provides them with support and guides them to bring about changes in their perceptions, but also helps them to effectively implement new strategies in their teaching (Ellwood, 2013).

2.2 Differentiated instruction

Differentiated instruction is a teaching practice that aims to alleviate inequalities between students and improve their learning outcomes, satisfying their varied needs (Kossyvaki, 2006). Differentiated instruction offers the possibility for the teacher to intervene in important axes of the learning process, facilitating the participation of all students in learning (Argyropoulos, 2013). Differentiated instruction is based on two important axes, the student and the curriculum (Padeliadu, 2008). The first axis, focusing on the special needs of students, is distinguished in learning readiness, interests, and learning profile (Tomlinson, 2001). Knowing these parameters in depth, the teacher can obtain important information to plan and organize his teaching effectively (Valiandes & Neophytou, 2017). The second axis, with a focus on teaching, is distinguished into content, process, and final product (Levy, 2008; Tomlinson & Imbeau, 2010).

Figure 2 shows the axes of differentiated instruction.

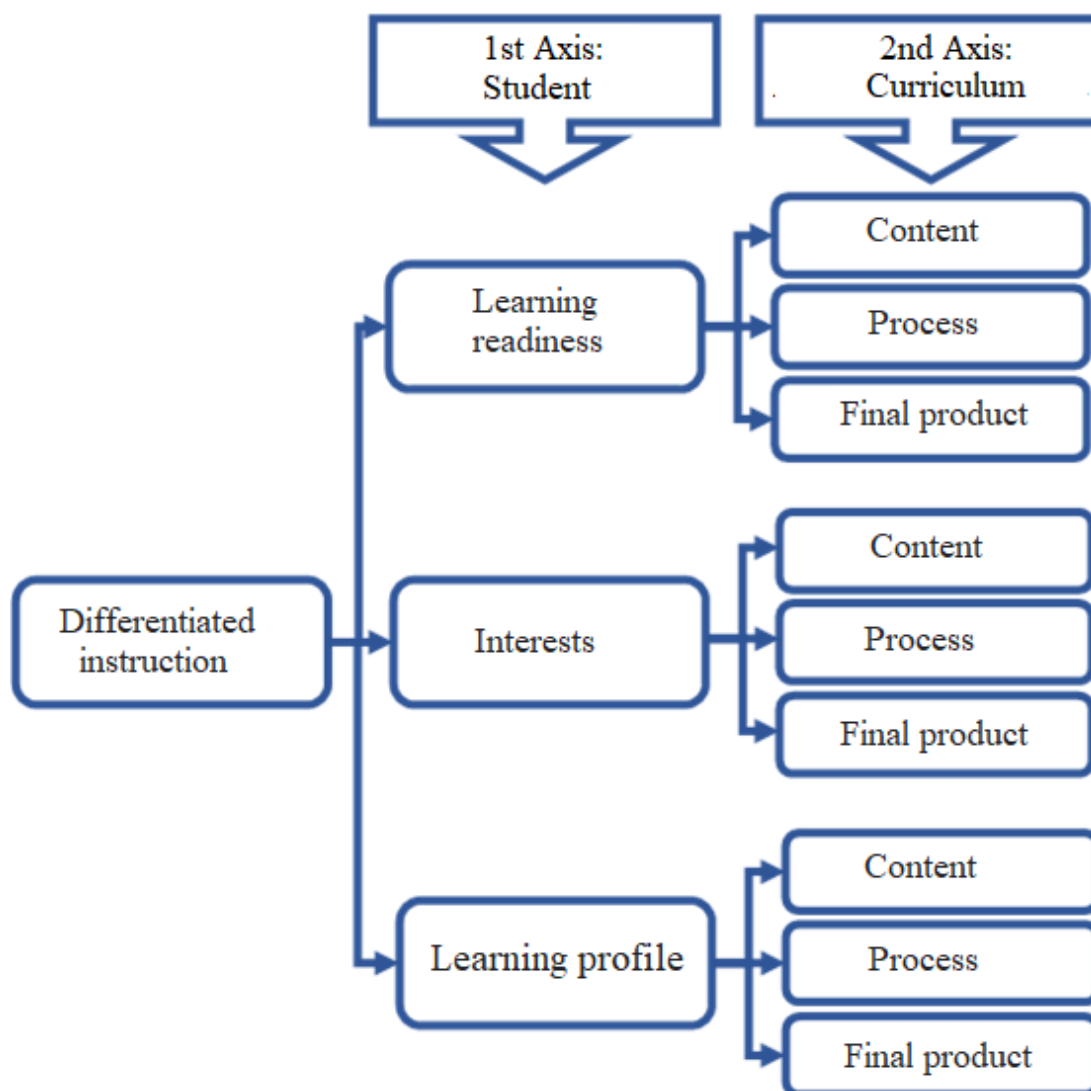


Figure 2: Axes of differentiated instruction (Padeliadu, 2008).

Differentiated instruction requires detailed planning as well as the use of many means and strategies (Valiandes & Neophytou, 2017). Strategies, which are grounded in the theoretical background of differentiation, are necessary to achieve the effective planning and successful implementation of differentiated instruction in the classroom.

Through differentiated instruction, the transformation of knowledge is promoted, providing students with a variety of learning experiences that allow the implementation of theoretical knowledge in practical situations, focusing on preparing them to transition smoothly from the field of learning to the field of work, through a new learning model, which can respond to the diversity of students and meet the increased demands of society (Ariss, 2017; Hogan, 2014).

2.3 Professional development of teachers

The professional development of teachers can be implemented with many different approaches. It is most effective when it is sustained, relies on collaboration and focuses on student learning, relates to school reality, is implemented in the classroom and during the school schedule (Smith, 2008), and effectively addresses everyday challenges (Darling-Hammond & Richardson, 2009). In particular, researchers have found that there is a direct correlation of teachers' professional development with their classroom teaching, and in combination with assessment, teachers become motivated to take an interest in their own learning as well (Mon, 2009). Additionally, it has been pointed out by some researchers that professional development that takes place in school helps teachers to change their practice and improve their students' learning (Hockett, 2010).

Professional development directs teachers to better understand the learning needs of all their students, to teach the subject more effectively, and to assess student learning, with the goal of all students succeeding (Howell, 2014).

Most opportunities for teacher professional development come from approaches that allow teachers to learn through their own teaching. Analytical reflection on teaching enables teachers, by adopting new teaching methods and strategies, to make important changes that lead to the improvement of their teaching (Nauerth, 2015).

Teachers must develop professionally throughout their educational career, enrich and constantly increase the level of their knowledge and skills in order to be able to more effectively fulfill their teaching obligations and contribute to the improvement of the learning of all students (Photopoulou, 2013).

2.4 The relationship between lesson study, differentiated instruction, and professional development of teachers

Lesson study is a didactic approach that is based on the cooperation of teachers and aims at their professional development, but it is also based on cooperation with students, ensuring at the same time the acquisition of knowledge by them (De Jesus, 2012). Lesson study enhances teachers' knowledge and skills, helps them develop professionally, and facilitates student learning (Harsono, 2016; Lewis & Hurd, 2011).

By jointly shaping the teaching of a lesson, setting lesson objectives, deciding in what ways to assess their students, and trying to anticipate what their students might not understand in order to help them overcome their difficulties, teachers benefit themselves by externalizing their ideas, documenting their opinions and using persuasive arguments (Mon, 2009).

The environment of dialogue and collaboration formed in the context of lesson study promotes and strengthens the teachers in the exchange of ideas and opinions, who as a group of colleagues, through creative dialogue and with respect to the different point of view, adopt innovative approaches (Lewis & Hurd, 2011). Through continuous, honest, two-way, and effective communication they collectively support student learning by improving their teaching.

The lesson study which is based on the cooperation between the teachers and directed by them, takes place inside the classroom of a school unit, focusing simultaneously on the improvement of their teaching and the learning of their students (Hamzeh, 2014). It can be implemented more effectively with the participation and guidance of teachers who have the relevant experience, providing clear instructions and protocols (Perry & Lewis, 2008). By collaborating in the implementation of lesson study, teachers achieve the combination of practices, knowledge, and teaching techniques and improve their practice (Lewis & Hurd, 2011).

Teachers within this collaborative and supportive lesson study environment (Shouffler, 2018), are encouraged to focus on their classroom teaching, while at the same time being able to share lessons they have collaboratively designed together in its implementation. Lesson study is a process that helps novice and experienced teachers become empowered by positively impacting their teaching practice (Smith, 2008). The development of relationships between participating teachers, which are based on mutual trust and mutual support, help teachers especially newly appointed teachers to face their weaknesses and, with the skill of examining an expanded set of ideas, methods, and materials, to increase their self-esteem for teaching (Carroll, 2013; Coenders & Verhoef, 2018; Howell, 2014; Lee, 2008; Nauerth, 2015). Collaborative plan is an important feature of it based on goals and observations of teachers of a professional educational community. By observing and analyzing students' work, teachers focus on students' thinking and learning, sharing opinions and observations about the teaching they have observed in the classroom (Hockett, 2010). Cooperation and working within the group contribute to the more effective management of the pressure of everyday life by teachers, as all together having the possibility to modify lesson plans and apply various techniques and methods, improve their teaching (Hix, 2008). Through collaborative teaching practices, teachers show greater interest in improving their teaching (Lee, 2008).

Teachers through professional development try to meet the needs of the diverse student population, since, during their studies or as practicing teachers, they had not acquired the appropriate knowledge to recognize and cover these needs (Bangel, Enersen, Capobianco & Moon, 2006). The correct implementation of differentiated instruction can meet these needs (Harsono, 2016).

Teachers with the implementation of lesson study can contribute to the better study of differentiated instruction by observing how the planning of the research lesson and certain elements of teaching affect the motivation of students and the acquisition of knowledge by them. Through fruitful and constructive dialogue between teachers, understanding of differentiation is facilitated and teaching is improved, actively involving teachers in investigating, observing, and revising their teaching, promoting their professional development, which takes place in their own classroom through their teaching. Consequently, the implementation of the teachers' professional development is done by them, as they learn through their daily teaching (Nauerth, 2015).

Teachers implementing differentiated instruction in their classroom, focus on their specific needs with a view to enhancing and promoting their learning (Tomlinson & Allan, 2000), providing many opportunities to process information and understand concepts. By focusing on

the uniqueness of their students, they focus not only on meeting their needs but also on their potential to contribute to the learning process (Stone, 2012). By implementing differentiated instruction in the classroom, teachers know that their students are not able to master the same knowledge, within the same amount of time and in the same way. For this reason, they teach in a flexible way, by adapting the curriculum and presenting the educational material through many and varied ways, based on their needs, without expecting to adapt to it themselves (Tomlinson, 2001).

When teachers interact, collaborate, and jointly share resources, experiences, and practices according to multiple research findings, the successful implementation of differentiation of teaching is promoted (Puzio, 2012).

In conclusion, teachers through lesson study, which is a form of professional development, can improve their knowledge (Murata, Bofferding, Pothen, Taylor & Wischnia, 2012), strengthen their pedagogical knowledge (Cerbin & Kopp, 2006) as well as the knowledge of their students (Wright, 2009), implementing differentiated instruction more effectively. Therefore, lesson study can be a strategy for the professional development of teachers, which is supported and carried out in the school unit and can be applied to any subject at all levels of education (Harsono, 2016).

3. Purpose and research question

This paper is part of a wider research that aims to explore the impact of lesson study on the way teachers plan, implement, and understand differentiation. In particular, the main purpose of this paper is to investigate the way in which the combined use of lesson study and differentiation in the context of the teaching of the Modern Greek language course of the 2nd class of Lyceum, affects the professional development of teachers.

From the review of the Greek and international literature emerged the need to investigate a basic research question which is the following: "Which characteristics of the lesson study affect the professional development of teachers and specifically the way in which teachers plan, implement and understand differentiation?"

4. Method

To answer the research question, qualitative research was chosen, which was carried out in three Lyceums in two municipalities of Eastern Attica from 09/22/2022 to 11/28/2022 with the participation of four teachers and eighty students. In the context of this qualitative research, grounded theory data collection and analysis techniques were used. For the analysis of the qualitative data in this particular research, the procedure described in the constructivist strand of Charmaz's grounded theory (2006) was used, which proposes the following three stages of coding: a) initial, b) focused coding, and finally, c) the theoretical coding.

Data collection tools of the specific research were classroom observations, interviews of the

participating teachers, protocols for planning, observing, revising, and reflecting on the research lesson, transcripts of teacher meetings and the teaching of the research lesson, diaries kept during the implementation of the lesson study, student papers as well as interviews of students who participated in the research. Data were collected before, during, and after the lesson study cycle. All participating teachers, after being informed about the purpose of the research, were trained in the teaching approaches of lesson study and differentiated instruction by the researcher, who was the head of the group.

The research was carried out in three phases. In the first phase of the research implementation (from 10-13-2023 to 10-21-2022) the researcher first observed the teaching of each teacher separately in his class, before the implementation of the lesson study cycle. In this phase, the researcher had the opportunity to observe each member of the lesson study group teaching a didactic unit of the Modern Greek Language course of the 2nd grade of the Lyceum implementing the differentiated instruction. This observation provided the researcher with basic data on the way in which each teacher conceives, plans and implements differentiation, as well as if this way changes during and after the implementation process of the lesson study. The observation of the teachers during the lesson study contributed to the understanding of the context in which the teachers carry out their daily teaching. Each participating teacher in the lesson study group chose an observation date within a specific time frame and produced a brief lesson plan, along with any explanatory notes, comments or questions. After the implementation of the specific teaching by the teachers participating in the research, the researcher conducted interviews with them.

Using the teacher's lesson plan, observation notes, the tape recording of the lesson and the recording of the post-lesson interview, the researcher assessed the degree of differentiation of the lesson in its basic elements based on a qualitative rubric.

In this phase the researcher was able to gather useful information about the experience, beliefs, goals and practices of the teachers, helping to build a framework necessary for collaboration between them during the lesson study cycle, as some did not know each other and had not worked together before.

In the second phase of the research (from 10-25-2022 to 11-08-2022) all the stages of the lesson study cycle were carried out which included the online meetings of the teachers to discuss the research theme, the choice of unit and its goals of the research lesson. This was followed by discussion on the development of the detailed teaching plan and student assessment. Subsequently, the teaching of the research lesson was carried out and immediately after that the discussion on the revision of the teaching of the research lesson and its re-teaching by another teacher of the group took place. The final stage of the lesson study cycle involved the teachers' discussion after reteaching of the research lesson.

In the third phase of the research implementation (11-16-2023 to 11-28-2023) the researcher observed the teaching of each teacher separately in his class. The teachers who had not taught the research lesson were asked to implement it in their classrooms and the teachers who had taught the research lesson and its re-teaching were asked to implement the differentiation in their classroom in another unit of the Modern Greek language course of 2nd Lyceum class, after

the completion of the lesson study cycle.

5. Results of the research

5.1 Main findings

The main findings of the present research, which aimed to investigate which characteristics of lesson study as a professional development activity influence the way in which teachers plan, implement and understand differentiation in the context of teaching the Modern Greek language course of the 2nd Lyceum class resulted from the implementation of all three phases of the research.

From the findings of the research, it emerged that all the stages of the lesson study cycle contributed to the professional development of the teachers, due to their special characteristics, which emerged in each stage and cannot be studied individually but must be examined holistically because they are all equally important and interdependent.

The key features of lesson study that facilitate teachers' development in differentiated instruction are the prolonged, in-depth planning of a single lesson, the setting of long-term goals to improve student learning, the joint selection of a teaching unit to implement the teaching of the research lesson and the determination of the short-term teaching goals by the teachers. By implementing the lesson study cycle, the teaching team tries to anticipate the possible answers, questions and reactions of their students by looking in depth at the content objectives for the particular lesson. Using formative assessment and immediately after the completion of teaching the research lesson, the team revises the lesson, taking into account the students' answers to the oral questions and the written assignments as well as the observations of the observers. The specific lesson study cycle of the present research showed these characteristics, without any of them being evaluated as more important compared to the others for achieving the differentiation of teachers.

Teachers' perceptions regarding lesson study also confirm this finding. All of the participating teachers focused on their positive experience from studying a lesson holistically, highlighting the importance of all its stages and the interaction between them. Teacher A noted "fruitful collaboration and subsequent exchange of views with the group of colleagues" (Teacher A's lesson study reflection survey, p. 1) and teacher B noted "willingness to exchange views with colleagues in the same specialty regarding teaching methods, and the proposals for differentiation in teaching" (Teacher B's lesson study reflection survey, p. 1). In addition, teacher C mentioned the "excellent experience, because the exchange of views with the members of the research team was very effective" (Teacher C's lesson study reflection survey, p. 2) and teacher D pointed out: "From this experience I gained quite a few things, as I saw some new methods that so far I had not been able to implement in the context of the teaching lesson, so this lesson helped me develop professionally" (Teacher D's lesson study reflection survey, p. 1). These teachers could not have formed this particular view of lesson study if they had not completed all its stages. In addition, teachers B and C who taught the research lesson and its reteaching, in the third phase of the research, which provided them with the possibility

of preparing one more teaching of another unit, implemented forms of differentiation that required more preparation and developed professionally to a greater extent through lesson study. Through their teaching, the positive effect of lesson study on the understanding, planning, and implementation of differentiation was highlighted, as these teachers felt more confident and responded more effectively to their teaching. Indicatively, teacher B pointed out: "I think that all the stages of the process were separate, as we went step by step and therefore we got something positive from everything, to continue until the end of the process which I consider to be crowned with success" (Teacher B's lesson study reflection survey, p. 2).

In addition, the research found that the lesson study cycle, with its fruitful exchange of views and constructive dialogue, influenced how teachers understood, planned and implemented differentiation.

All the participating teachers in the lesson study with their frequent and active involvement in dialogic discussions about the planning of the research lesson, which sometimes lasted for a long time, were possessed of mutual respect as professionals and colleagues, even in cases of disagreement. These teachers were not reticent and reluctant to share their views and adopt each other's ideas or prompt each other to reconsider or justify their thoughts. Dialogue was the core of the lesson study process for this group. All the teachers focused on the existence of many and varied interactions and knowledge gained from their colleagues characterizing them as their most important experiences from lesson study.

The dialogue that developed during the realization of the lesson study cycle reflected the perceptions of teachers who as professionals collaborated during its conduct and characterized in their last meeting their experiences as very positive despite the fact that their collaboration did not take place every day. The group of teachers expressed the belief that through the collaboration between colleagues of the same specialty, the positive characteristics of the lesson study are highlighted. In the context of the dialogic discussion there were no incidents of confrontations or conflicts. The team working collectively during the implementation of all the stages of the lesson study cycle created the conditions for the formation of suitable conditions for their professional development.

The researcher did not want the selection of the teachers who would carry out the teaching of the research lesson and its re-teaching to be made in the first meeting of the group, but to be implemented in their next meeting. Each member of the group freely expressed their perceptions and experiences of the research lesson and chose to elaborate the research lesson with the other members collectively, with each presenting their best ideas to the group. Through this process, the teachers were empowered, as in the context of the teaching of the research lesson and its re-teaching, each of them contributed as a member of the group to its formation and they themselves developed professionally.

Table 1 below briefly presents the most important findings previously reported as well as the research question that guided this study.

Table 1: Research question and related findings

<p>Research question:</p> <p>What characteristics of lesson study as a professional development activity influence how teachers plan, implement, and understand differentiation?</p>
<p>Related findings:</p> <ul style="list-style-type: none">- The benefits of lesson study come from participating in all stages of a lesson study cycle, as these features were presented at each stage of it and cannot be studied individually, but must be considered holistically, because they are all equally important and interdependent.-The lesson study environment that initiates, explores and manages confrontations/discussions seems to challenge teachers to change the way they plan, understand and implement differentiation.

5.2 Limitations

The existence of certain limitations in this particular study makes it necessary to consider them when interpreting the findings. Initially, among the members of the lesson study group there were also teachers working in the same school unit in which the researcher has been working for the last sixteen years, who participated in the research as a mediator and her participation may have influenced her interactions with the participants, in the way she analyzed the data and in the way she interpreted the findings.

Also, the findings of this particular research may have been hindered by its multidimensional role in lesson study and research processes. Although she attempted to analyze and be reflective about her influence on the whole process, she is unable to interpret how the participating teachers may have assessed her or her role as a positive or negative influence on the lesson study process and what they learned from her.

In addition, the findings regarding how the lesson study affects teachers' understanding, planning and implementation of differentiation are related to a small number of classroom observations and interviews of the participating teachers before and after the implementation of the lesson study cycle.

Yet another limitation concerns the challenge of analyzing group conversations, which are complex, evolving, and the result of many internal and external factors, some of which are difficult to identify or quantify. The researcher's active participation in these conversations may have enhanced or hindered the recording of lesson study group members' beliefs and intentions in these conversations and the identification and framing of those interactions that most fully represent the important findings. She stands behind her interpretations of these conversations in relation to her research question, but realizes that complexity may suggest

other interpretations of what happened and why, relative to the context through which these conversations are interpreted.

6. Discussion – interpretation of the research findings

The research findings showed that lesson study as an activity that enhances the professional development of the participating teachers had a significant impact on how differentiation was planned, implemented and understood. This result is also recorded by other researchers (Hockett, 2010; McLean, 2010).

The outcomes of the lesson study cycle for the participating teachers were largely determined by the completion of all stages of a lesson study cycle, as these particular features were presented in each of its stages and cannot be studied in isolation, but must be considered holistically, because they are all equally important and interdependent. This finding is in agreement with other research where it is demonstrated that the completion of all stages of the lesson study cycle is important as well as their interdependence (Hockett, 2010).

The key features of lesson study that facilitate teachers' development in differentiated instruction are the prolonged, in-depth planning of a single lesson, the setting of long-term goals to improve student learning, the joint selection of a teaching unit to implement the teaching of the research lesson and the determination of the short-term teaching goals by the teachers. By implementing the lesson study cycle, the teaching team tries to anticipate the possible answers, questions and reactions of their students by looking in depth at the content objectives for the particular lesson. Using formative assessment and immediately after the completion of teaching the research lesson, the team revises the lesson, taking into account the students' answers to the oral questions and the written assignments as well as the observations of the observers (Lewis & Hurd, 2011; Stepanek et al. 2007). The specific lesson study cycle of the present research showed these characteristics, without any of them being evaluated as more important compared to the others for achieving the differentiation of teachers. This finding is recorded by other researchers (Hockett, 2010).

Teachers' perceptions regarding lesson study also confirm this finding. All of the participating teachers focused on their positive experience from lesson study holistically, highlighting the importance of all its stages and the interaction between them. It was not possible for these teachers to have formed the specific view of lesson study and to develop professionally if they had not completed all its stages. This result is also found in other researches (Collins, 2017).

In addition, the research found that the lesson study cycle, with its fruitful exchange of views and constructive dialogue, influenced how teachers understood, planned and implemented differentiation. All the participating teachers in the lesson study with their frequent and active involvement in dialogic discussions about the plan of the research lesson, were possessed by mutual respect. All the teachers focused on the existence of many and varied interactions and knowledge gained from their colleagues characterizing them as their most important experiences from lesson study. This finding is also found in other researches which demonstrate with its many and varied interactions that lesson study helps teachers in their

professional development (Lewis & Hurd, 2011).

The group of teachers expressed the belief that through the collaboration between colleagues of the same specialty, the positive characteristics of the lesson study are highlighted. In the context of the dialogic discussion there were no incidents of confrontations or conflicts. The team working collectively during the implementation of all stages of the lesson study cycle created the conditions for the formation of appropriate conditions for their professional development, successfully implementing differentiation, a result recorded by other researchers (Puzio, 2012).

7. Conclusions

The analysis of the qualitative data and the results of the study led to the extraction of valuable conclusions about the positive effects of the implementation of lesson study as a professional development activity of teachers in the context of the implementation of differentiated instruction.

From the findings of the research, it emerged that all the stages of the lesson study cycle contributed to the professional development of the teachers, due to their special characteristics, which emerged in each stage and cannot be studied individually, but must be examined holistically, because they are all equally important and interdependent. All participating teachers focused on their positive experience of lesson study holistically, highlighting the importance of all its stages and the interaction between them to achieve their professional development.

In addition, the research found that the lesson study cycle, with its fruitful exchange of views and constructive dialogue, influenced how teachers understood, planned and implemented differentiation. All the participating teachers in the lesson study with their frequent and active involvement in dialogic discussions about the design of the research lesson, were possessed by mutual respect. All the teachers focused on the existence of many and varied interactions and knowledge gained from their colleagues, characterizing them as their most important experiences from the lesson study. The team working collectively during the implementation of all the stages of the lesson study cycle created the conditions for the formation of suitable conditions for their professional development.

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