The Effect of a Blended Project-Based Training Program on EFL Teachers' Implementation of Differentiated Instruction in Jerusalem

أثربرنامج تدريبي مدمج قائم على المشروع على تطبيق التعليم المتمايزلدى معلمي اللغة الإنجليزية كلغة أجنبية في القدس

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Abstract:

Objectives: The current study aimed to investigate the effect of a blended project-based training program on EFL teachers' implementation of differentiated instruction in Jerusalem.

Methods: The study used a descriptive-analytical design using quantitative methods; the study used a one-group quasi-experiment that lasted for ten weeks. It involved using a questionnaire instrument adapted from Whipple's (2012) administered both before and after the training program on 35 EFL teachers from Jerusalem. The data was transformed into numerical form and analyzed using the Statistical Package for the Social Sciences (SPSS). As the data was not normally distributed, a nonparametric Wilcoxon test was employed for statistical analysis.

Results: The data revealed a positive effect of the training program.

Conclusions: There was a significant difference between participants' implementation of differentiated instruction before and after the blended project-based training program. Thus, the researchers offered crucial recommendations to the Ministry of Education, including allocating special funds for teacher training.

Keywords: *Blended learning; Project-based learning; EFL teachers; Differentiated instruction; Professional development.*

الملخص:

الأهداف: هدفت الدراسة الحالية إلى معرفة برنامج تدريبي مدمج قائم على المشاريع على تطبيق معلمي اللغة الإنجليزية كلغة أجنبية للتعليم المتمايز في القدس.

المنهجية: استخدمت الدراسة التصميم الوصفي التحليلي باستخدام الأساليب الكمية؛ استخدمت الدراسة شبه تجربة مكونة من مجموعة واحدة استمرت لمدة عشرة أسابيع. وقد تضمنت استخدام أداة استبيان مقتبسة من ويبل (2012) والتي تم تطبيقها قبل وبعد البرنامج التدريبي على 35 مدرسًا للغة الإنجليزية من القدس. وتم تحويل البيانات إلى شكل عددي وتحليلها باستخدام الحزمة الإحصائية للعلوم الاجتماعية (SPSS). وبما أن البيانات لم تكن موزعة بشكل طبيعي، فقد تم استخدام اختبار ويلكوكسون اللامعلمي للتحليل الإحصائي.

النتائج: أظهرت البيانات وجود أثر إيجابي للبرنامج التدريبي.

الخلاصة: كان هناك فرق كبير بين تنفيذ المشاركين للتعليم المتمايز قبل وبعد برنامج التدريب المدمج القائم على المشروع. وهكذا، قدم الباحثان توصيات قيمة لوزارة التربية والتعليم، بما في ذلك تخصيص أموال خاصة لتدريب المعلمين.

الكلمات المفتاحية: *التعلم المدمج؛ التعلم القائم على المشاريع؛ معلمو اللغة الإنجليزية كلغة أجنبية؛ التعليم المتمايز؛ التطوير المهني.*

Introduction:

Countries all over the world strive to provide teachers with appropriate professional development training programs to go with 21st-century education (Caena, & Redecker, 2019). Thus, teachers need training programs to raise their instruction, class management, and self-efficacy to challenge upcoming new approaches, especially after the invasion of technology (Pozo-Rico, Gilar-Corbí, Izquierdo, & Castejón, 2020). Technology is invading all aspects of life including education (Bornand & Tondeur, 2020). Therefore, it seems logical to train teachers via frontal and virtual training programs to help them master innovative educational approaches that facilitate instruction, management, interaction, and finally, assessment.

Moreover, technology has boosted various kinds of both frontal and virtual learning (Çakiroğlu, & Erdemir, 2019; Usher & Barak, 2018). However, teachers reported a low ability to implement sufficient products. Chen, & Yang (2019) accordingly, proposed the project-based approach as a systematic approach that supports the process of inquiry about students' explorations, in a trial to generate a new product that relates to the essence of the educational goals. Furthermore, in the digital age, many educators emphasize the importance of 'Continuous, Professional Development' (CPD), especially blended-based training "A combination of face-to-face and computer-mediated instruction focus on the transmission of information rather than learning" (Cronjé, 2022). Since there is a great need for transformational and unprecedented skills that tipped the scales of the quality of education. Digitalization undoubtedly imposes new pedagogical and organizational modifications including organizational, cultural, and administrative layers (Hämäläinen, et al., 2021).

Among the new approaches that benefited from the viral improvement of technology, is differentiated instruction "A philosophy of teaching purporting that students learn best when their teachers effectively address the variance in students' readiness levels, interests, and learning profile references. A key goal of differentiated instruction is maximizing the learning potential of each student" (Tomlinson. et al, 2003) which aimed to adapt teaching using student-centered approaches to achieve the potential pre-prepared educational objectives.

Many studies worldwide such as Whipple (2012) and Ismajli & Imami, 2018 indicate that teachers need appropriate professional development courses that relate to the latest approaches to applying the latest tools and facilities. Previous studies also proved low understanding and implementation of differentiated instruction in the classroom.

Moreover, the researcher consulted (The National Institute for Educational Training (NIET) in Ramallah, Palestine, and found that the institute did not conduct a specific training course about differentiation. It was the same in East Jerusalem; contacts with the supervisor and the administrator of (The Teachers' Professional Development Centre in East Jerusalem) informed of the absence of the subject training. The supervisor added that teachers need such kind of training, but unfortunately, they had never been trained in differentiated instruction since they lack experts in this domain. Thus, it is important to address this gap related to providing teachers with specific competencies in applying differentiated instruction via blended courses.

Question of the Study:

Is there a significant increase at (α= 0.05) in the teachers' implementation of differentiated instruction due to attending the blended project-based training program?

Significance of the Study:

Our era is known for accelerated innovations, approaches, tools, and technologies employed in education. Teachers are the cornerstones in this cycle of innovation. Accordingly, the Ministry of Education and the "Teachers' Professional Development Centre" tend to run various training programs for teachers aiming to provide them with the latest qualifications to assist students' learning.

This study contains both theoretical and practical significance. The theoretical significance stems from describing the teachers' implementation of differentiated instruction before and after the training program.

Furthermore, the practical significance stems from building a blended project-based training program that aims to qualify teachers with the theoretical and practical competencies in differentiated instruction, since they, hopefully, will become more aware of the praxis of differentiated instruction; what to teach, why, when, and how to provide students with the best learning opportunities.

In addition, applying a blended training program encourages teachers to keep up with and take advantage of the new tools of technology in education and adhere to the personalized learning approach.

Furthermore, project-based learning supports the teachers' implementation of differentiated instruction components especially 'product' which seemed to be the least achieved among other components as reported by previous studies.

As a result, this study hopes to provide teachers with appropriate training to allow them to implement new approaches properly. Accordingly, these teachers will assist the student's learning and produce not only knowledgeable but also productive students regardless of their differences. Moreover, it is hoped that this study will be beneficial to school principals, the Ministry of Education, and further research.

The researchers also predicted that blended learning could help as a platform for the training program to overcome the many obstacles that prevented conducting frontal meetings with teachers, especially, the barriers in Jerusalem that prevent some teachers from reaching the (Teachers' Professional Development Centre) in the old city of Jerusalem. More specifically, the researchers conducted the flex blended model that depends mainly on online lessons in which the trainer is a facilitator. Additionally, the model provides opportunities for students to collaborate with their peers and receive personalized support from the trainer via various online means of communication when needed.

Theoretical Framework:

The study is project-based and relates mainly to John Dewey who is the father of pragmatic progressive education which involves offering different things to different people. Inspired by Francis Bacon, Dewey suggested this pedagogical reform as a solution to achieve educational justice and to provide the students with real-life learning by addressing their interests as a fundamental basis for development (Vaughan, 2018).

Dewey emphasized the importance of distinguishing between interest and choice stating that interest is situational and can change by time, the sequence of experiences, and social interactions with the surrounding environment that can empower individualized student-centred learning based on student's interests.

Differentiated instruction counterparts with progressive education; Deweyan education is associated with student-centeredness, freedom, activity, and learning by doing to cultivate an adapting atmosphere to the student's interests aiming to maintain continuous necessary progress through using the student's ability sensibly (Vaughan, 2018). Differentiated instruction also stems from refusing fixed methods, unchangeable content, and conventional assessment (Whipple, 2012).

Accordingly, Tomlinson was a proponent of progressive education and saw it as a fundamental aspect of differentiated instruction. She believed in the importance of allowing students to develop naturally according to their interests and motivations, with guidance from a skilled and talented teacher. This process involves measuring the student's development and paying attention to environmental factors, with the input of all stakeholders in a cooperative context (Vaughan, 2018).

Literature Review:

The project-based learning (PBL) is "a collaborative inquiry-based teaching method where students are integrating, applying and constructing their knowledge as they work together to create solutions to complex problems" The concept is not new (Guo, Saab, Post, & Admiraal, 2020). It extends back to the 19th century. It was first addressed by John Dewey in 1897 stemming from constructive theory. He proposed the idea of learning by doing as a pedagogy instead of focusing on memorization (Markula & Aksela, 2022) he also believed that (PBL) has the power to leverage the student's brilliance and creativity and discover their roles in society since they are members of the community (Pyle & Hung, 2019).

The project-based learning (PBL) became a national scope and powerful challenging and innovative pedagogy in the 21st century that aims to reframe learning. Although projects are the final step of the learning process, project-based learning is a systematic approach that emphasizes the process as much as the product if not more (Li & Schoenfeld, 2019).

PBL represents a transformation in educational ideology from traditional instruction grounded on memorizing facts and understanding isolated concepts to application, presentation, creation, and knowledge communication (Mulcahy, & Wertz, 2021). Thus, Kingston (2018) suggested this approach supports students who have learning disabilities, emotional and behavioural disorders, and health problems, including attention shortage hyperactivity disorder. Galvan & Coronado (2014) found a solid relationship between differentiation and project-based learning since they are both progressive and constructivist-based approaches that seek to convert students from passive to active and productive students.

To dig deeper, project-based learning parallels with differentiated instruction in four main ideas: the first is active construction by which teachers assist their students depending on various previous knowledge and skills (readiness). Second, situated learning by working with real-world problems in different environments. Third, social interaction by cooperating with different preferences (interests) of grouping. Fourth, cognitive tools are used in the (process) of learning during the session to build the final (product). However, it is important to begin the project session by introducing the topic, asking questions, asking the students to gather data and evidence, and then launching their projects (Sormunen, Juuti, & Lavonen, 2020).

Teachers can enrich their student's learning experience profoundly. They can achieve this by offering unconventional learning pathways and choices that foster conscious and authentic learning experiences. Such an approach aims to encourage students to evolve from mere consumers of knowledge to proactive creators. By empowering students to create new products that address real-world issues, teachers provide them with potential opportunities for their future development (Wilson, 2021).

According to Picon (2022), teachers have a critical role in facilitating effective learning in their students. This involves scaffolding their students with supporting cognitive tools and developing rubrics that ensure learning. Furthermore, teachers should inform their students about the rubrics and make sure that they understand them. If needed, teachers should divide the students into groups and provide appropriate space for them to choose how they will meet the rubrics.

Teachers should also follow up with their students' progress and provide honest, on-time, precise, and mutual feedback. When students face obstacles, teachers should help them overcome these challenges and afford direct instruction when needed. Additionally, teachers should focus on asking brainstorming guiding questions to enhance their students' leadership skills, self-confidence, and natural curiosity. To promote reflection and learning, teachers should encourage their students to ask questions and figure things out. Finally, teachers should provide students with an appropriate environment to apply their projects and offer a variation of digital or real publication platforms to showcase their work.

In summary, Picon (2022) emphasizes that effective teaching involves a range of strategies and techniques. Teachers should not only provide support and guidance but also foster independence and self-reflection in their students. By following these principles, teachers can create a positive and engaging learning environment that promotes student success and achievement.

Although it is a dominant approach, teachers found it difficult to understand, design, and develop appropriate projects (Al-Busaidi & Al-Seyabi, 2021). The lack of qualified teachers accordingly hinders achieving significant change, especially the lack of product ideas. Thus, scientists recommended a professional development training program within a culture that empowers adults in coaching (Cherif, 2020).

Teachers are newcomers to project-based learning; accordingly, schools should hold the responsibility to develop their skills beginning with knowing the students' age, and profile, affording training, field guide, and written directions, then ending with assessment either individually or within groups of teachers. Teachers should understand that students nowadays are up to the challenge, projects need effort, and that new contexts encourage project learning (Boss & Krauss, 2022).

Project-based learning constitutes one approach to differentiated instruction (DI) (Liwanag, Salic-Hairulla, Malicoban, Alcuizar, & Villaruz, 2022). It shares with differentiated instruction the focus on contextualization. Moreover, Sormunen, Juuti & Lavonen (2020) argued that when teachers master (PBL), they will find their way to apply differentiated instruction; they will be proficient enough to design appropriate projects that assist in acquiring the curriculum and enhancing life skills.

There is a set of advantageous strategies for differentiated instruction within the framework of project-based learning like differentiating grouping according to particular objectives. Moreover, product voice and choice are essential in both (PBL) and (DI) since students can express their passion in the final products such as posters, and artistic or theatrical work in addition to the way they build these products. Differentiating individual work and teamwork also enhances collaboration in (PBL) (Juuti and Lavonen, 2020).

Moreover, both DI and project-based learning stimulate both teachers and students to think out of the box and serve efficient mechanisms of appropriate instruction and adapted assessment practice. Thus, choosing active pedagogies that meet the student's needs and interests is necessary on the way to elevate the student's engagement and motivation to learn (Short, 2011). Kurt & Beck (2023) added that project-based learning led to meaningful work, an authentic setting, factual assistance, and high motivation on one hand and unreliable technology implementation, unsatisfactory exam-based teaching, and poor student-teacher communication on the other hand.

Anggraini (2023) argued that project learning is a useful way to enhance students' autonomous learning and provide opportunities for students to improve their English language proficiency, and help them create a dynamic and engaging learning environment. Dincă, Luştrea, Craşovan, Oniţiu & Berge (2023) also proved more collaboration, communication, confidence, awareness, and skills improvement about team building, work, and performance through conducting project-based learning.

Hujjatusnaini, Corebima, Prawiro, & Gofur (2022) related integrating blended project-based teachers' training to enhancing the 21st skills on higher-order thinking and creative skills (HOTS). On the other hand, Lim, Jawawi, Jaidin & Roslan (2023) claimed that project learning hinders understanding among students. Sormunen, Juuti & Lavonen (2020) also found that project-based learning in a differentiated classroom had a beneficial impact on students' engagement in collaborative teamwork, which was facilitated by teacher-led reflective discussions.

When it comes to teachers, Liu, Wang, Su & Zhou (2019) emphasized project-based training as a means for teachers to integrate technological tools in planning, gathering information, designing, and evaluating students. Aksela & Haatainen (2019) stated that teachers have positive attitudes toward applying the project-based approach due to several reasons such as organization, collaboration, the versatility of production, and most importantly, students' motivation. However, teachers reported several challenging issues that inhibit their progress like time management, technical proficiency, pedagogical awareness, funding, and technical proficiency to apply either online or blended learning.

However, blended learning is no longer an option, today many education professionals such as (Kumar, A., Krishnamurthi, Bhatia, Kaushik, Ahuja, Nayyar, & Masud, 2021; Rianto, 2020; Farooq, Hamid, Alvi, Omer, 2022;

Hamilton, 2019) presented six approaches to blended learning; the Face-to-face driver model, the rotational model, the flex model, online lab school model, the self-blended model, and the online driver model.

Blended learning is an accessible and convenient system of learning that depends on integrating online virtual with face-to-face frontal contexts. Thus, it combines student self-control with instructor-led elements. In this case, students independently choose the time, place, speed, and way of learning interacting with the directions and rubrics pre-specified by the teacher (Srinivasan, Ramos & Muhammad, 2021). It was first conducted in the 1960s in higher education. However, the term was first used after the creation of the "Learning Management System" that put blended learning into the modern era in 1999 in America after utilizing software programs to teach via the internet as complementary to in-person learning. This combination gradually allowed the utmost benefit of computers' capabilities and human experience to develop new and exciting ways of active and engaging learning (Fedorova, 2020).

Blended learning accordingly can provide students with an autonomous learning environment. They can decide their learning pace, revisit important material any time, receive the content wherever they are, and then, launch to a higher level. Blended learning also empowers the students' educational journey and raises communication between teachers and students by allowing updated announcements, publishing information, discussing, asking and answering questions, and giving instructions for both students and parents (Hamilton, 2019). Fedorova (2020) added that blended learning costs less than frontal training. It also provides a more flexible environment since it enables the trainees to regulate training and assignment times which helps them control their professional development. Moreover, using varied online tools and methods improves engagement and competitiveness in training among the trainees. In addition, trainees in blended learning receive constant support and feedback anywhere and anytime within a culture of collaboration resulting in better qualifications and keeping space for a self-based system (Wang, 2019).

Blended learning training is crucial for teachers for many reasons. Teachers become more familiar with the components of blended learning; they become more flexible, up-to-date, and cooperative with colleagues to build a higher class of expert teachers' community. This technology integration with the theories of education encourages openness to colleagues' feedback, group projects, and online discussion (Momchilova, 2021). They also become more qualified to overcome technical obstacles. In addition to improving access to a wide range of online resources and platforms, coach their students, facilitates learning, and act more proficiently to take advantage of the global invasion of online resources properly in formal education. Overall, teachers' improvement is supposed to benefit the students' engagement and lead to greater outcomes among them (Bruggeman, Tondeur, Struyven, Pynoo, Garone & Vanslambrouck, 2021).

Teachers, accordingly, should realize that high-quality blended learning demands a higher understanding of the target goals, how to plan, implement, and what tools can serve to achieve these predetermined goals. The whole process cannot succeed with combining haphazard components altogether without giving rationale to adapting them to the blended context. Personalizing blended learning, hence, must relate to the existing content, resources, technical facilities, funding, and available tools (Bailey, Martin, Schneider, Vander Ark, Duty, Ellis & Terman, 2013).

Bailey, Martin, Schneider, Vander Ark, Duty, Ellis & Terman (2013) believed in blended learning as assisting factor for educators to achieve once-in-a-generation continual, effective, and meaningful opportunities for project-blended learning implementation, teachers have to design their process beginning with setting timelines, budget, learning goals, infrastructure support, curriculum reformation, impact measurement and mainly, the human capital. Moreover, this process needs the support of all stakeholders in the educational field; supervisors, the school community, part-time working professionals, families, the teachers' union, and headmasters are also responsible for making this dream true. blended learning is crucial to enhance DI. Accordingly, governments are advised to develop teachers' awareness of the issue of responding to the student's needs by running suitable training courses (Boelens, Voet & De Wever, 2018; Osifo, 2019).

Blended learning and DI also stem from personalized learning theory that emphasizes a student-centered environment (Alamri, Watson, & Watson, 2021). Unfortunately, teachers lack the appropriate competencies to prepare, instruct, manage, and conduct assessments via blended context. Thus, it is the responsibility of experts to train teachers and convince them of the importance of applying suitable blended instruction and create a community group to share experiences and ideas to critically affect the employment of blended learning (Bruggeman et al.; 2021) and prevent wasting time using the traditional approaches (Surahman, Ulfa, Husna, Slamet, Qolbi, Setiawan, & Diana, 2019).

Blended instruction served in differentiated and personalized student-centered approaches which led to higher students' perception and practice in addition to allowing for various opportunities to access digital tools based on the student's needs and the available resources (Attard & Holmes (2022). Moreover, blended learning is a way to create the 12th-century learning experience inside and outside school (Hover & Wise, 2022). Blended learning also supports differentiated contexts (Hu, Peng, Chen, & Yu, 2021).

Research Methodology:

Research Design:

The researchers followed the descriptive analytical design. The researchers conducted a one-group quasi-experimental research through which the sample attended a pre-test. Then joined a ten-week training program. Finally, attended a post-test using a 4-point Likert scale with responses that included Hardly ever/Never do this1, Sometimes/Have used on a few occasions 2, Frequently use this 3, and 'Use intentionally and often 4. The scale was adapted from an electronic questionnaire by Whipple (2012). The 4-point scale is used to produce a forced choice measure where no neutral point is available (Croasmun & Ostrom, 2011). The study consisted of the blended project-based training course as the independent variable and the teachers' implementation of differentiated instruction in the classroom as the dependent variable.

Limitations of the Study:

The limitations of a study involve identifying and describing any factors that may have impacted the study's findings or conclusions. Common delimitations might include issues related to the study's design, data collection, sample size, or generalizability of the results (Ross & Bibler Zaidi, 2019).

The study was conducted in Jerusalem directorate, Palestine during the scholastic year 2022-2023. Moreover, the population of the study consisted of (35) English teachers for grades from 1st grade to 12th grade who are working in Jerusalem schools. It is the same sample members who registered for the training program to investigate the effect of a training program on teachers' implementation of differentiated instruction in Jerusalem.

The recent study was carried out in Jerusalem, which posed challenges for the researcher in obtaining the necessary permissions due to political issues. The Ministry of Education in Ramallah has limited control over schools and teachers in Jerusalem, including those in the eastern region populated by Arab citizens. As a result, it took approximately three months to obtain official permission to conduct the study. Moreover, the study, which was originally scheduled to begin in September 2023, was delayed until October due to a teachers' strike in Palestine. The researcher required approximately four months to recruit volunteer teachers who were willing to participate in the study. As a result, the researchers sought permission from the Dean of the Education Faculty at An-Najah National University to issue completion certificates to trainees, which served as an incentive for teachers to take part in the training course. As a consequence of the strike that preceded the beginning of the training program, there were no male volunteers. This was due to their work in alternate jobs after school, especially on Saturdays, which are school holidays. Since many male teachers have familial financial obligations, they often choose to work in the Israeli part of Jerusalem to augment their earnings. Finally, trainers who were older had a harder time with the implementation phase because they lacked the necessary technological skills to support the training product. Thus, the trainer had individual interaction with each trainee in this group in a trial to overcome this obstacle.

Statistical analysis instruments:

The data collected from pre- and post-training program questionnaires was transformed into numerical data and analyzed using "Statistical Package for the Social Sciences" SPSS.

Validity of the instrument:

Validity shows how well the collected data covers the actual area of investigation or the instrument can measure what is intended to be measured (Taherdoost, 2016).
- Content validity: the questionnaire used by the researcher has been used before by (Capers, 2019 and Whipple, 2012) and showed excellent results for measuring what it has been designed to use for. However, the questionnaire was reviewed by 5 academic specialized juries in English language and English teaching methods from different universities in Jerusalem who have provided valuable modifications that suit the Palestinian context.
- Internal validity: It is the correlation coefficient between each item in one domain and the whole section (Hajjar, 2018). The researchers conducted the Pearson correlation coefficient test for each domain to test the internal validity. All of the items in all domains have p-values (Sig.) lower than 0.05, indicating that the correlation coefficients for all items are significant at $\alpha = 0.05$. Therefore, it can be concluded that these items are reliable and appropriate for measuring what they were intended to measure.
- Structure validity: relates to the alignment with the study's purpose and research objective. This involves testing the validity of each domain as well as the validity of the entire questionnaire by measuring the correlation coefficient between one domain and all other domains that share the same measurements (Hajjar, 2018). The correlation coefficients between each domain and the entire questionnaire have values ranging from 0.400 to 0.785, which are considered high enough to establish validity. These coefficients demonstrate a significant correlation at a level of $\alpha = 0.05$, as indicated by all p-values being less than 0.05. This suggests that

the domains of the questionnaire are reliable and valid for measuring their intended purposes and achieving the study objective.

Reliability of the instrument:

Testing the reliability is crucial as it pertains to the consistency of a measuring instrument across its various components. If the items within a scale measure the same construct, then the scale is considered to possess high reliability. The most used reliability measure is the Cronbach Alpha coefficient. Although there are no fixed guidelines for assessing reliability, it is generally accepted that a minimum reliability coefficient of 0.70 is desirable. For exploratory or pilot studies, it is recommended that the reliability coefficient be 0.60 or higher (Taherdoost, 2016). The Cronbach's Alpha coefficients for the current questionnaire ranged from 0.730 to 0.782, indicating a sufficiently high level of reliability.

The Results and Discussion:

Is there a significant increase at (α= 0.05) in the teachers' implementation of differentiated instruction due to attending the blended project-based training program?

In the context of statistical analysis and data examination, it is mandatory to ascertain if a particular data sample is derived from a normally distributed population. This determination is frequently made through the application of established techniques such as the Kolmogorov-Smirnov and Shapiro-Wilk tests. Notably, the Shapiro-Wilk test exhibits a higher level of statistical power in detecting deviations from normality for sample sizes ranging from 3 to 50 (Hernandez, 2021). As the sample size (n=35) is less than 50, then the researchers used Shapiro–Wilk to test the normality.

Testing Normality of Implementation of Differentiated Instruction:

When the p-value for each variable is less than the significance level of 0.05, it suggests that these variables do not follow a normal distribution. As a result, nonparametric tests should be employed for statistical data analysis non-parametric tests serve two purposes: as straightforward techniques for analyzing ordinal data and as substitutes for parametric tests, especially when there are indications of non-normality (Fagerland, 2012).

Table (1): Testing normality for implementation of differentiated instruction

No.	Implementation	Shapiro–Wilk	Sig
1	I am familiar with each individual student interests and can relate them to instruction.	0.819	0.001
2	I am familiar with each individual student background and expectations and can relate them to instruction.	0.781	0.001
3	I am familiar with each student's life circumstances and how they may affect learning.	0.845	0.001
4	I am aware of each student's learning disabilities and know how to address them in the classroom so as not to impair their learning.	0.789	0.001
5	I use pre-assessment to diagnose the student's readiness and adjust instruction.	0.835	0.001
6	I use formative assessment during the unit to measure the student's understanding.	0.844	0.001
7	I use summative assessment at the end of the lesson to determine knowledge acquisition.	0.693	0.001
8	I identify each student's learning styles.	0.862	0.001
9	I teach up keeping in mind that each student is working to achieve their highest potential.	0.696	0.001
10	Teaching materials are varied to adapt to student's interests and readiness.	0.751	0.001
11	Students participate in designing/selecting learning activities.	0.840	0.001
12	I try to meet the diverse needs of students with scaffolding, tiering instruction & allow the student to choose the learning activities.	0.845	0.001
13	I provide tasks that require students to apply and extend understanding.	0.764	0.001
14	The curriculum emphasizes general concepts.	0.793	0.001
15	I clearly explain what students should know, understand, and be able to do.	0.810	0.001
16	I use a variety of teaching materials other than the textbook.	0.837	0.001
17	I provide a variety of support strategies (organizers, study guides, audio, video…)	0.729	0.001
18	The speed of instruction varies according to the needs of individual students.	0.700	0.001
19	I use the student's preference groups and/or learning preference centers	0.814	0.001
20	I use group work with my students in the learning activities based on readiness, interests, and/or learning p.	0.805	0.001

21	The classroom environment is structured to allow a variety of activities including group and/or individual work.	0.861	0.001
22	I offer multiple forms of expression for the final product (exams, projects, alternative assessment…).	0.643	0.001
23	I offer students the opportunity to work individually, in pairs, or in small groups.	0.781	0.001
24	The product relates to the student's interests.	0.643	0.001
25	I offer a variety of assessment tasks.	0.686	0.001

Table (1) showed that the p-value for each variable is less than 0.05 level of significance, then the distributions for these variables are not normal. Consequently, nonparametric tests were used to perform the statistical data analysis.

Since the sample was not normally distributed, the researchers first conducted the non-parametrical Wilcoxon test to find out if there are any significant differences between participants' Implementation of differentiated instruction before and after the blended project-based training program as shown in Table (2).

***Table (2):** Wilcoxon Test*

Test statistic	Sig
2.82	0.005

*Statistical Significance at level $\alpha = 0.05$

Table (2) shows that the value of test statistic is 2.82 and the p-value <0.05, which means that there is a significant difference between participants implementation of differentiated instruction before and after the blended project-based training program. The researchers attributed the results to the project-oriented structure of the training program, suggesting that practical improvement is expected. Moreover, the researchers went through many related research and tried to build the training course to fill the notable gaps in previous attempts to enhance differentiated instruction with the help of education specialists in the (Teachers' Professional Development Centre) in Jerusalem. The results highlight the crucial role of continual professional development programs in enhancing teachers' skills across different domains emphasizing the corresponding to Jabbarov (2020) and Martinez (2022) who also shed light on the importance of the collaborative efforts by the educational committees to assist teachers' competencies.

To measure the differences in the Implementation domains of differentiated instruction before and after the blended project-based training program, the researchers also used the Wilcoxon Test:

***Table (3):** Wilcoxon Test for the implementation domains*

Domain	Test statistic	Sig
Students Interests (1-4)	0.20	0.836
Assessment (5-8)	0.72	0.474
Lesson Planning (9-13)	2.02	0.044
Content (14-17)	1.36	0.173
Process (18-21)	2.90	0.004
Product (22-25)	4.25	0.001

*Statistical Significance at level $\alpha = 0.05$

Table (3) shows that the results of implementation domains; lesson planning, process, and product had p-value w<0.05, which means that there are significant differences between participants' implementation of lesson planning, process, product of differentiated instruction before and after the training program. The researchers found this result rationale since the training began with practicing to create an appropriate lesson plan which lasted for the first three meetings of the training course; Teachers had to Present their lesson plans to the group and discuss deeply their vision of differentiated instruction planning within the community group in the training course. In accordance with process, teachers took into account the interests of their students and modified the environment which plays a crucial role in the process phase of differentiation to facilitate the desired activities such as using playgrounds, school kitchens and virtual environments. Teachers had to build their own projects according to the plans agreed on after a comprehensive discussion and experience exchange between the group participant to achieve the desired 'product' that integrate between well-oriented project and differentiated instruction at the end of the training program. Finally, the 'product' relied primarily on generating diverse projects based on the student's interests, level of readiness, and profiles, rather than traditional examinations. The results contrasted Putra (2023) whose findings revealed a misconception between adapting differentiated instruction and individualized learning. Adare, Li & Gebresilase (2023) also announced unsatisfactory teachers' competency to adapt to the environment which is considered a major component of adapting process. The researchers accordingly supposed they could fill the gap, especially in the process and product domains.

On the contrary, the other three implementation domains; students' interests, assessment, and content had p-value > 0.05, which means that there are no significant differences between participants' implementation of students' interests, assessment, content in differentiated instruction before and after the training program. The findings imply that the teachers rated their implementation of these techniques the same before and after the blended project-based training program. The researchers manifested two explanations for these findings. The first is inadequate proficiency in manipulating the 'content' for many reasons; teachers have to cover the whole curriculum in a very specified time, so they don't dare to waste time trying to find substitute content, especially when they complain about the short time to fulfil the curriculum. Moreover, teachers, especially elderly ones, lack the proficiency to create online content or computerized assessment that relates to the student's interests as explained by Aslan, Turgut, & Aslan (2021) and Yohannes, Juandi, Diana, & Sukma (2021).

Since there are significant differences between participants' implementation of differentiated instruction before and after the blended project-based training program, the researchers measured if the implementation of differentiated instruction had increased after receiving the blended project-based training program.

The researchers extracted and compared the means and standard deviation for each section before and after attending the training program:

Table (4): *Standard deviation*

Comparing means and standard deviation for all domains of the questionnaire.

	Before training program		After training program	
	Mean	Standard deviation	Mean	Standard deviation
Implementation of differentiated instruction	2.65	0.326	2.84	0.180
a) Students Interests	2.66	0.478	2.68	0.396
b) Assessment	2.77	0.569	2.84	0.278
c) Lesson Planning	2.66	0.462	2.85	0.212
d) Content	2.77	0.569	2.91	0.181
e) Process	2.58	0.445	2.84	0.257
f) Product	2.44	0.343	2.91	0.219

The results of differentiated instruction implementation and all its domains showed some but not significant increase at the level of $\alpha =0.05$ which means that the teachers' implementation of differentiated instruction and its domains didn't increase significantly after attending a blended project-based training program. This finding is consistent with the results of previous studies by Jabbarov (2020); Caena, & Redecker (2019); and Martinez (2022). The results highlighted the crucial role of continual professional development programs in enhancing teachers' skills.

The researchers related the findings to teachers' unwillingness to declare their practice in the classroom, especially with people they met recently which resulted in relatively higher findings in the pre-test.

Whipple (2012) explained also that teachers may be hesitant to report their implementation level for any approach. The researchers agreed also with Geletu and Mihiretie (2023), Smets, De Neve; Struyven (2022); Olney, Rienties, Chang, & Banks (2023) who attributed their insufficient findings to limited technological competencies and educational visions among teachers that prohibit them from manipulating content and type of assessment to suite the students' interests. Thus, they highlighted the need for comprehensive training programs to support teachers in building proper pedagogical competence especially technology-based projects.

Conclusion:

- There was a slight improvement, in the teachers' implementation of differentiated instruction.
- The lack of male volunteers was a limiting factor that could affect the results of the study.
- Lesson planning is significant to achieve the educational goals.
- Adapting plans, process, contents, assessment, and product to the students' interests, profile, and needs of their students is the key core to achieve differentiation.
- Elderly teachers lack the technological competency which prohibited sufficient progress in applying differentiated instruction.
- Professional development is a continuous process to assist teachers' competencies in applying new methods.
- Professional development depends on the quality not the quantity of the courses.
- Blended learning can be efficacious in the learning process if teachers had the appropriate skills to benefit from it.
- Project-based learning is a key factor to enhance specified educational products.

Recommendations:

1. The Ministry of Education is advised to:
- set appropriate salaries for teachers that allow them to maintain a decent standard of living.
- Allocate a special budget for teachers' virtual and frontal training.
- Provide schools with new technological instruments that assist achieve 21st-century educational goals.
- Seek assistance from highly-qualified trainers who have extensive experience in the field of education, to ensure that teachers receive high-quality training.
- Pursue the global need and available resources to improve the quality of education in the country.
- Provide follow-up after each training program to ensure that teachers have successfully implemented what they learned.

2. School principals are advised to:
- Provide teachers with the necessary equipment to practice the new approaches.
- Assign free lessons for teachers to attend the training courses to learn about new approaches and methods.
- Enhance the sense of community within teachers to be able to exchange experiences and best practices.

3. Teachers are advised to:
- Chase the newly life-related emerging approaches, mainly project-based learning because learning never ends.
- Diagnose the needs, interests, and profiles of their students.
- Build teachers' community groups and cooperate with each other.

4. Researchers are advised to:
- Study the effect of the blended project-based training program on teachers' implementation of differentiated instruction on larger samples of teachers and for longer periods.
- Investigate the impact of teachers differentiated blended project-based training programs on students learning, motivation, achievement and other vital aspects.
- Use further qualitative methods to investigate how teachers implement differentiated instruction.

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