Vol. 15, No. 04, pp. 2328-2347, 2025 DOI: 10.23960/jpp.v15i4.pp2328-2347

Jurnal Pendidikan Progresif

e-ISSN: 2550-1313 | p-ISSN: 2087-9849

http://jpp.fkip.unila.ac.id/index.php/jpp/

Evaluating the Impact of Differentiated Instruction on English Language Proficiency in EFL Classrooms: A Meta-Analytic Perspective

Mujiono[1,*], & Siti Fatimah[2]

[1]Department of English Education, Universitas PGRI Kanjuruhan Malang, Indonesia

[2]Department of Psychology, Universitas Muhammadiyah Malang, Indonesia

*Corresponding email: moejie_nova@unikama.ac.id

Received: 06 September 2025 *Accepted: 07 November 2025* *Published: 26 November 2025*

Abstract: Evaluating the Impact of Differentiated Instruction on English Language Proficiency in EFL Classrooms: A Meta-Analytic Perspective. Objectives: The study analyzes the impact of Differentiated Instruction (DI) practice on enhancing English proficiency among EFL learners on various levels, concerning particular skills, objectives, and educational settings$ **Methods:** The meta-analysis followed the PRISMA guidelines and synthesized seven quantitative studies from 2020 to 2024, which applied DI in the EFL classroom and examined writing, speaking, reading, or general proficiency results. Random-effects models were calculated based on the pooled effect size, and moderator analyses were run by looking at skill type and learner educational level as moderators for the effect size$ **Findings:** The practice of DI has been reported to have a favorable and context-dependent impact on English proficiency, with a Standardized Mean Difference (SMD) of 1.41 [95% CI: 0.48, 2.34]; however, the presence of considerable variability ($I^2 = 95\%$) in the results calls for careful interpretation. According to the subgroup analysis, the DI effects are more pronounced on productive skills, specifically speaking (SMD = 2.50) and writing (SMD = 1.68), than on general English proficiency (SMD = –0.05). In total, DI is a powerful method to facilitate EFL learning, provided that it is implemented with recognition of the context and appropriate pedagogical strategies. **Conclusion:** DI presents a sturdy, learner-centred approach to EFL teaching$ Therefore, programs developed for DI implementation should give teachers enough liberty of contextualization; teachers should undergo adequate training, and programs should be guaranteed institutional commitment$ DI can be strategically implemented by means of scaffolded tasks, flexible grouping, multimodal resources, and digital platforms to enhance the levels of engagement and achievement$ Future research should consider the long-term effects, expand evidence in different contexts, and adapt DI for the needs of higher education learners with modern technology in mind and a more collaborative approach.

Keywords: differentiated instruction, EFL, English proficiency, learner-centered pedagogy.

To cite this article:

Mujiono, & Fatimah, S. (2025). Evaluating the Impact of Differentiated Instruction on English Language Proficiency in EFL Classrooms: A Meta-Analytic Perspective. *Jurnal Pendidikan Progresif*, *15*(4), 2328-2347. doi: 10.23960/jpp.v15i4.pp2328-2347.

INTRODUCTION

The increasing heterogeneity of English as a Foreign Language (EFL) classrooms worldwide compels teachers to reconsider traditional teaching methods. There is a significant difference between them in terms of cognitive readiness, linguistic background, learning styles, and motivational levels, justifying that a single teaching method cannot suffice to meet all the learners' needs (Lorenz et al., 2021; Paetsch et al., 2023). Differentiated Instruction (DI) began to emerge as a response from pedagogy to learner diversity, as a promising framework to accommodate the different needs of the students concerning the

adjustments in content, process, and product (Economidou Stavrou, 2024; Taylor, 2015). DI has increasingly shifted from being an instructional option to an essential requirement among all mixed-ability EFL contexts.

DI's global appeal comes from its roots in constructivist foundations, where student engagement and learning outcomes have consistently increased. DI has been found to create an inclusive learning environment, address student needs, and enhance motivation and collaboration and collaboration among learners, although significant results have been observed for students at public schools in Hungary and Indonesia (Kótay-Nagy, 2023; Rahmaniar et al., 2024). Evidence from Pakistan and Morocco also points to similar results, particularly evident in deprived settings, for the enormous potential of DI to cater to learner diversity (Khdar, 2024; Rehman & Baig, 2024). Integration of digital tools and flexible grouping strategies further enhanced the feasibility and adaptability of DI in the contemporary EFL classroom Aziz & Andanty, 2024; Hasibuan & Wariyati, 2024).

Several empirical studies support the argument that DI can enhance the English proficiency of learners. Meta-evaluations in Ecuador and Kosovo showed an improvement in reading comprehension and an increase in self-efficacy after applying DI (Hidalgo-Camacho, Hernández-Chérrez, & Galora-Moya, 2019; Naka, 2017). In an action research study, differentiated tasks improved speaking skills and confidence (Boonkit, 2010; Figueras, 2019; Jaramillo, 2021; Maxfuza & Nasibabegim, 2025). Students in DI-enriched classrooms in Hungary and Taiwan demonstrated deeper personalization and engagement than those in traditional settings (Chien, 2012; Kótay-Nagy, 2023). These findings confirm the effectiveness of DI in enhancing receptive and productive language skills.

Although gaining prominence on theoretical grounds, the implementation of DI is hampered by notable barriers. Limited preparation time, lack of administrative support, and dearth of professional development continue to be among the main constraints reported by the teachers (D'Intino & Wang, 2021; Kanapathy, 2024). Many teachers understand the basic tenets of DI, but have not been formally trained to develop and implement it. DI is implemented sporadically in Pakistan and Morocco, and documentation remains scanty (Liu, 2008; Tanjung & Ashadi, 2019). Collectively, all these studies speak of the pressing need for more capacity-building efforts in this field (Rehman & Baig, 2024).

Besides institutional challenges, another limitation involves the fragmented settings in which existing research on EFL DI could be found. Many studies focus on narrow situations or isolated skills, often employing small-scale qualitative methods that limit generalizability (Bajrami, 2015). Although an increasing number of documents on DI have begun to appear, Although an increasing number of documents on DI have begun to appear, systematic syntheses that consolidate diverse empirical findings, contextual variations, and methodological approaches remain limited, leaving the cumulative evidence on DI's direct influence on English proficiency insufficiently integrated (Hu, 2024; Smale-Jacobse et al., 2019) A consolidated pattern of evidence is missing that would synthesize these results to assess the overall effectiveness of DI.

This meta-analytic review fills a gap by examining the effects of DI on English language proficiency in an EFL context. To achieve its objectives, the study investigates a body of research from 2020 to 2024, examining effect sizes, implementation methods, learner age, instruction duration, and targeted language skills. The data thus produced aim to present a robust and quantitative evaluation of DI's contribution to EFL learning. The contribution of this research is theoretical as well as practical. Theoretically, it combines divergent evidence from various

contexts into a unified framework on DI's role in language acquisition. It provides empirical data to inform teacher training, instructional design, and educational policy, especially in large classes with diverse learners (Hasibuan & Wariyati, 2024; Rahmaniar et al., 2024). This study demonstrates that DI is an effective instructional model, as evidenced by its measurable results.

Questions

To achieve these aims, the study is guided by the following research questions:

1. What are the learner and instruction-related factors that may serve as moderators of DI?
2. To what extent is DI effective for enhancing English language proficiency in the EFL classroom?

METHOD

Research Design

The study employed a combined analytical and quantitative methodology, adhering to the PRISMA protocol, which synthesized findings from seven distinct studies. The studies were conducted between 2020 and 2024, with each one focusing on the implementation of DI within an EFL classroom context, particularly emphasizing skills such as reading, writing, speaking, and overall proficiency. The use of random-effects models allowed for the determination of the effect size by taking into account various factors, including participants, settings, and types of interventions.

Search Strategy

A methodical search was conducted on the Scopus, Crossref, and Google Scholar databases to identify and select documented research in their respective fields that was published between 2020 and 2024. The Boolean search strategy was a combination of different keywords that were very much related: ("Differentiated Instruction" OR "DI") AND ("EFL" OR "English as a Foreign Language") AND ("English language proficiency" OR "reading" OR "writing" OR "speaking" OR "listening" OR "grammar") AND ("experimental" OR "quasi-experimental" OR "quantitative study" OR "effectiveness"). Furthermore, a review of the reference lists and citation networking was performed to obtain additional studies and ensure that the inherent bias of overlooking studies was minimized to a great extent.

Inclusion and Exclusion Criteria

Studies meeting specific criteria were the target of this research. The study (1) had to make use of the Differentiated Instructions method in the field of English as a Foreign Language; (2) had to be a quantitative research design that allowed the researcher to find statistics that could be put into tables; and (3) had to deal with measuring one or more of the English language skills (reading, writing, listening, or speaking). Also excluded from this study were qualitative and theoretical studies, abstracts that did not include the complete text, and all studies where DI was not central to the method employed. The study sample was selected by two independent reviewers who reviewed all the articles and resolved their differences primarily through discussion, as outlined in the PRISMA guidelines.

Data Extraction

Data from eligible studies were extracted using a structured coding sheet. The extracted information included the following: author(s), year of publication, country, characteristics of participants (sample size, age, proficiency level), research design, type and duration of DI intervention, targeted language skills, and other primary outcomes. Corresponding authors were contacted to supply the missing data for studies with insufficient statistics in reporting. Extraction was undertaken independently by two persons to ensure accuracy and reliability.

Risk of Bias

This assessment of methodological quality was conducted only for studies that met the inclusion criteria, as determined by a modified version of the Cochrane risk of bias tool for intervention studies. Aspects assessed include randomization procedures, allocation concealment, blinding, completeness of outcome data, and selective reporting. Each domain may be rated 'low', 'high', or 'unclear' for risk of bias. Any disagreement will be resolved through consensus meetings. The inter-rater reliability was computed to ensure consistency in the overall assessment process.

Data Analysis

Meta-analysis applied random-effects models, considering anticipated differences in participants, contexts, and intervention designs across studies. Effect sizes (Cohen's d or Hedges' g) were calculated for each survey and subsequently synthesized into overall estimates. The overall heterogeneity was explored with the Q statistic and the I^2 index. A series of subgroup analyses and meta-regressions was conducted to identify possible moderating variables, such as learner age, instructional duration, and targeted language skill. The evaluation of publication bias was conducted using various techniques, including funnel plots, Egger's regression test, and the trim-and-fill procedure. The Egger's regression test revealed a statistically significant intercept, specifically â€ = 9.2234, SE = 2.369, t = 3.893, p = 0.011, indicating substantial asymmetry in the funnel plot and a potential for publication bias, which was also visually confirmed through the funnel plot. However, the posterior check with the trim-and-fill analysis of the data already reported did not reveal any material that could be missing in the reviewed studies; thus, no attempt was made to fill in data, implying that the observed orientation has had a very slight effect on the overall conclusion. Therefore, the adjusted standardized mean difference figure kept its ground at (SMD) = 1.41 [95% CI: 0.48, 2.34], underlining that even though the publication bias was statistically caught in action, its effect was only minor and could not cause a remarkable result, which totally ignores the merit or reliability of the meta-analytic outcome.

■ RESULT AND DISCUSSION

Study Selection from Database Search

A total of 1,487 records were initially identified through database searches, with contributions from Scopus (n = 184), Web of Science (n = 106), Crossref (n = 503), and Google Scholar (n = 694). Before the formal screening process, 281 duplicate records were removed, 766 entries were marked as ineligible by automated tools, and 46 were excluded for other reasons. There are 1,093 records for title and abstract screening. During this screening phase, 298 records were excluded for not meeting the inclusion criteria, resulting in 96 articles retained for full-text assessment. Following retrieval, 89 reports proceeded to eligibility assessment, while seven were not retrieved. Among the 89 assessed articles, 35 were excluded for not providing quantitative evidence on DI and English proficiency, 21 for not having control or comparison groups, 16 for non-experimental design, and 10 due to insufficient data for meta-analysis. As a result, seven (7) studies were finally included in the systematic review and meta-analysis of DI Studies in EFL Contexts.

The primary reason for the strict methodological parameters that formed the foundation of this meta-analysis is the relatively small number of studies (k = 7) that met the inclusion criteria. Only in the case of quantitative studies in EFL contexts using DI and providing complete statistical information (mean, SD, and sample size) was the survey considered eligible. Many potentially relevant manuscripts were excluded because they employed qualitative or

mixed-methods approaches, did not fully report their statistics, or measured language proficiency other than English. The limitation imposed here was a guarantee of the highest standard in methodology and a similarity of the features across studies. Still, the small number of studies is a possible limitation of the current analysis, which may limit the generalizability of the findings.

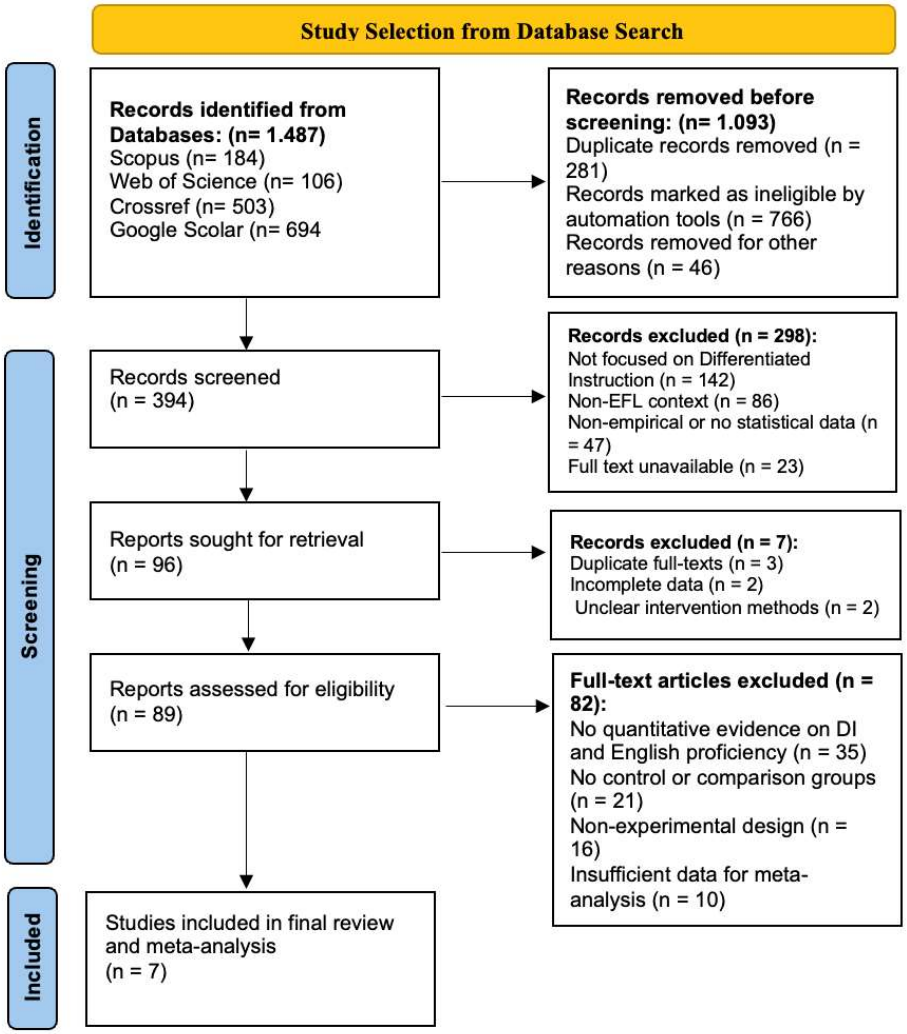

Figure 1. Study selection from database search

Characteristics of Included Studies

Table 1 presents the seven studies and their findings regarding the effectiveness of DI in various settings. The participants were students of all levels, from elementary to junior high and senior high school, with sample sizes oscillating between 24 and 90, probably from the Philippines, Malaysia, Turkey, Iraq, and Jordan. The language skills covered are reading comprehension, writing, speaking, and general English proficiency. The interventions for these studies lasted approximately 5 to 10 weeks, encompassing customized or differentiated materials, leveled tasks, scaffolding, group work, and feedback tailored to the learners' needs. Most of these studies employed a pre-test/post-test quasi-experimental design with a control group receiving traditional instruction, except for one study that compared only within the experimental group. Various settings were chosen, including

public elementary and high schools, as well as private institutions. Researchers developed and administered tests to measure achievement, motivation, autonomy, and engagement. An extended discussion is provided in Table 1 below.

Table 1. The characteristics of included studies in EFL contexts

Author(s) and Year	Sample Size & Demographics	Language Skills Targeted	Description of Intervention	Control Group	Educational Setting	Assessment Instruments
Angilan (2021)	Grade 10 Filipino students (exact number unspecified), aged around 15–16; various proficiency levels	Literary competence – reading comprehension, thematic analysis, and appreciation of literary devices	DI was applied over five weeks using leveled literary texts, graphic organizers, and collaborative interpretation tasks	Both experimental and control groups underwent pre- and post-assessments; DI was used only in the experimental group.	Public High School (Philippines)	Cognitive Domain Achievement Test; Literary Competence Test developed by the researcher and validated by experts
Ghazali et al. (2024)	60 Year Four students from a Malaysian elementary school, aged 10; 30 in the experimental group, 30 in the control group	Writing – focus on narrative and descriptive text development, coherence, vocabulary, and mechanics	Differentiated writing instruction applied over six weeks using modified tasks, scaffolding, and peer-feedback techniques	The control group received standard instruction without differentiation; both groups were assessed pre- and post	Public Elementary School (Malaysia)	Pre/post writing tests rated using an analytic rubric; student attitude questionnaire adapted from validated models.
Grain et al. (2022)	200 second-year English major students at public universities in Iraq (100 males, 100 females)	General English proficiency	DI tailored to students' learning readiness, interest, and profiles; implemented via pre-/post-test design to evaluate impact.	The control group received standard, non-DI; both groups underwent pre- and post-tests	Public Universities (Iraq)	Researcher-developed English achievement test; statistical analysis using descriptive and inferential methods
Labordo (2024)	60 Grade 11 students from a senior high school in the Philippines; 30 in experimental, 30 in control	English proficiency – reading comprehension, vocabulary development, and critical analysis	Six-week DI using differentiated materials for vocabulary, comprehension, and scaffolding strategies	The control group used traditional instruction; both underwent pre- and post-tests	Senior High School (Philippines)	Researcher-made tests based on DepEd standards; validated engagement perception questionnaire
Megableh (2023)	60 tenth-grade EFL students from a public secondary school in Jordan; 30 in each group	Speaking skills – fluency, pronunciation, confidence	Eight-week differentiated oral tasks, including role-play and discussions, adjusted by level and interest	The control group was taught traditionally; the experimental group received DI-based instruction	Public Secondary School (Jordan)	Researcher-made oral proficiency test with a rubric adapted from established speaking scales.
Melka (2022)	84 Grade 12 students (EG = 41, CG = 43) from Keftegna 23 Secondary School, Addis	English grammar learning achievement in the EFL context.	12-week Differentiated Instruction using flexible grouping, tiered instruction,	Traditional textbook-based teaching without differentiation or adaptation.	Secondary school, EFL classroom in Addis Ababa, Ethiopia.	Utilized an English Grammar Achievement Test, developed,

	Ababa, Ethiopia. Intact classes were randomly assigned.		scaffolding, and anchored activities.			validated, and piloted by experts.
Yavuz (2020)	76 Turkish 5th graders from a public school; experimental (38) and control (38)	Reading comprehension – literal, inferential, and critical reading levels	Six-week DI using tiered reading texts, guided reading strategies, and interest-based grouping	The control group received regular reading instruction; the experimental group was exposed to DI	Public Elementary School (Turkey)	Researcher-developed reading comprehension test aligned with national curriculum standards.

Outcome Measures

The specific measurement variables used in the studies considered from 2020 to 2024 varied according to the language skill targeted and the educational context in which they were applied. Most of the studies used pre-test and post-test measures to delineate student improvement after DI. Studies by Ghazali et al. (2024) and Melka & Jatta 2022) Evaluated writing skills using analytic rubrics and writing proficiency tests based on standardized EFL assessments alongside attitude surveys. Labordo (2024) and Yavuz (2020) Carried out studies with tests of reading comprehension and vocabulary according to National or Department of Education standards. In contrast, oral proficiency, according to Magableh & Abdullah (2022), was given a rating with a researcher-constructed rubric validated against established speaking scales. Similarly, Sapan & Mede (2022) Offered a broader view by including cognitive and affective outcomes using the Motivated Strategies for Learning Questionnaire (MSLQ), an EFL achievement test, and the Learner Autonomy Scale. (Alavinia & Sadeghi, 2013), likewise, assessed engagement and alignment of instruction through the Kolb Learning Style Inventory and structured observation. These instruments provide both quantitative and qualitative information on the impact of DI on English language acquisition.

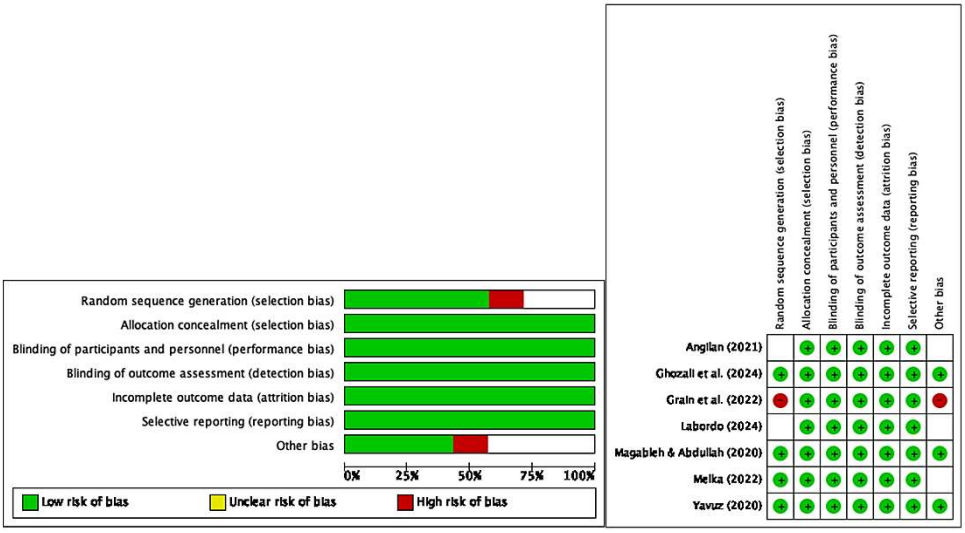

Figure 2. Risk of bias graph and summary

Study Quality

Figure 2 presents the sixth risk-of-bias results from several studies based on the Cochrane Risk of Bias Tool. The assessment covers seven important domains: random sequence generation, allocation concealment,

blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other bias. Most studies maintain a low risk of bias (approximately 90%) (marked in green), meaning methods carried out were logical and consistent for most of the studies. Some exceptions do exist, as noted in Grain et al. (2022) and Labordo (2024), where particular domains are found to have a high risk of bias (approximately 10%), specifically in random sequence generation and other biases. Additionally, no cases of unclear bias risk (yellow) were identified, as all other studies provided sufficient methodological information. This holistic interpretation highlights that, even if the body of evidence is deemed generally reliable and methodologically sound, specific weaknesses in individual studies must be critically considered to prevent the incorrect synthesis of evidence.

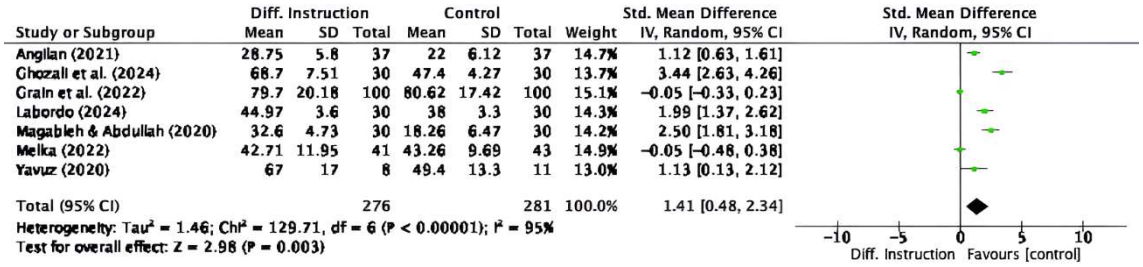

Figure 3. Meta-analysis and forest plot of overall english language proficiency scores

Figure 3 shows the results of a meta-analysis, calculating that the intervention significantly and positively affects participants, with a pooled mean difference of 1.41 (95% CI [0.48, 2.34]; Z = 2.98; p = 0.003), indicating that experimental group participants consistently returned higher scores as opposed to participants in control groups. The heterogeneity statistics also indicate considerable variability among the studies ($\times^2$ = 129.71, df = 6; p < 0.00001; I^2 = 95%), implying that other moderator variables may influence the effect size. The net results are also influenced by the weighting applied to select studies, with greater weight given to large-sized studies with narrow confidence intervals, such as Labordo (2024). The net results suggest that the intervention may be considered adequate; however, further investigations are needed into contextual differences, which could explain the highly variable results in this meta-analysis.

Moderators Variables of DI

Language Skills Targeted

Figure 4 presents the results of the meta-analysis suspended over four language-skill moderators (Writing, Speaking, Reading, and General English) to show that the intervention program's strength depends on the particular language domain being taught$ There was a substantial positive effect favouring the experimental groups in terms of any level of intervention, a pooled mean difference of 1.41 (95% CI [0.48, 2.34]; Z = 2.98; p = 0.003)$ However, the presence of quite a high heterogeneity among studies is also supported by evidence (Chi^2 = 129.71, df = 6, p < 0.00001; I^2 = 95%) and the presence of very high variation between moderator variables (Chi^2 = 57.01, df = 3, p < 0.00001; I^2 = 94.7%), meaning that the intervention effect depends heavily on what is the actual specific language skill being measured$ Among the four groups, Writing showed the most significant population mean effect (SMD)= 1.68, 95% CI ["1.74, 5.10]; I^2 = 98%), with Ghazali, et. al, (2024) showing the most significant individual mean difference of 3.44, indicating that the intervention effect was robust and consistent in that category$ Speaking also supported substantial effects (SMD)= 2.50, 95% CI [1.81, 3.18]) with no heterogeneity detected, indicating

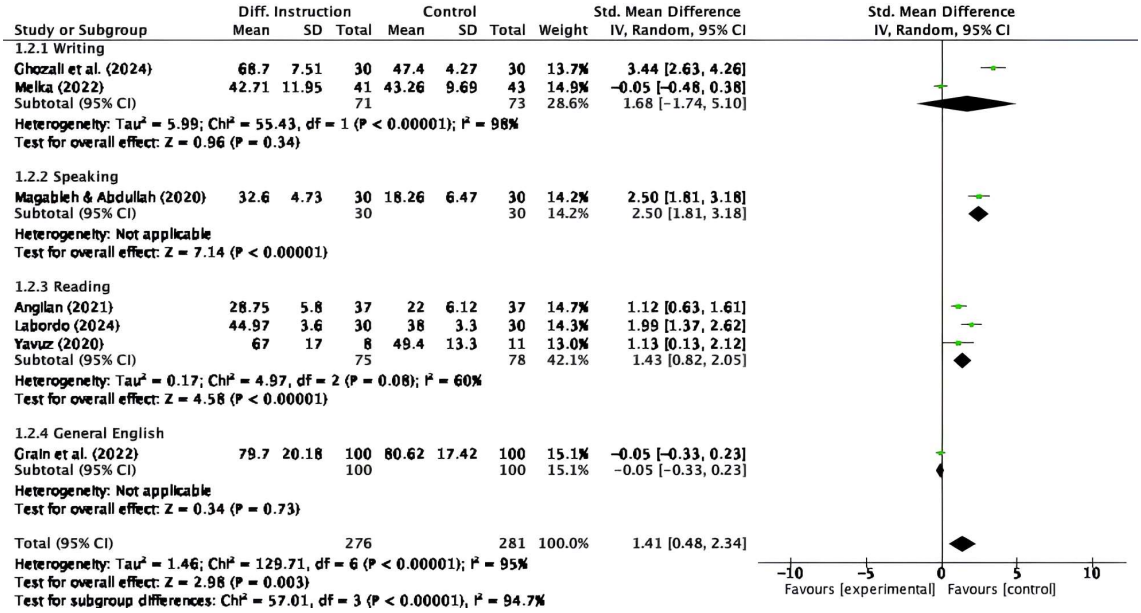

Figure 4. Meta-analysis and forest plot of moderator variable scores of language skills targeted

stable results for such studies$ Reading showed moderate yet significant effects (SMD)= 1.43, 95% CI [0.82, 2.05]; I^2 = 60%), indicating consistent results with little variability$ In contrast, General English returned from a single study by Grain et al. (2022) irrelevant and slightly adverse effects (SMD)= "0.05, 95% CI ["0.33, 0.23]), suggesting that the intervention may not be effective when applied broadly rather than towards finer language subskills$ These results stress the importance of considering the type of language as the moderator in assessing the intervention effect.

Educational Setting

Figure 5 presents a series of meta-analyses examining intervening effects across four education-level moderating variables: University,

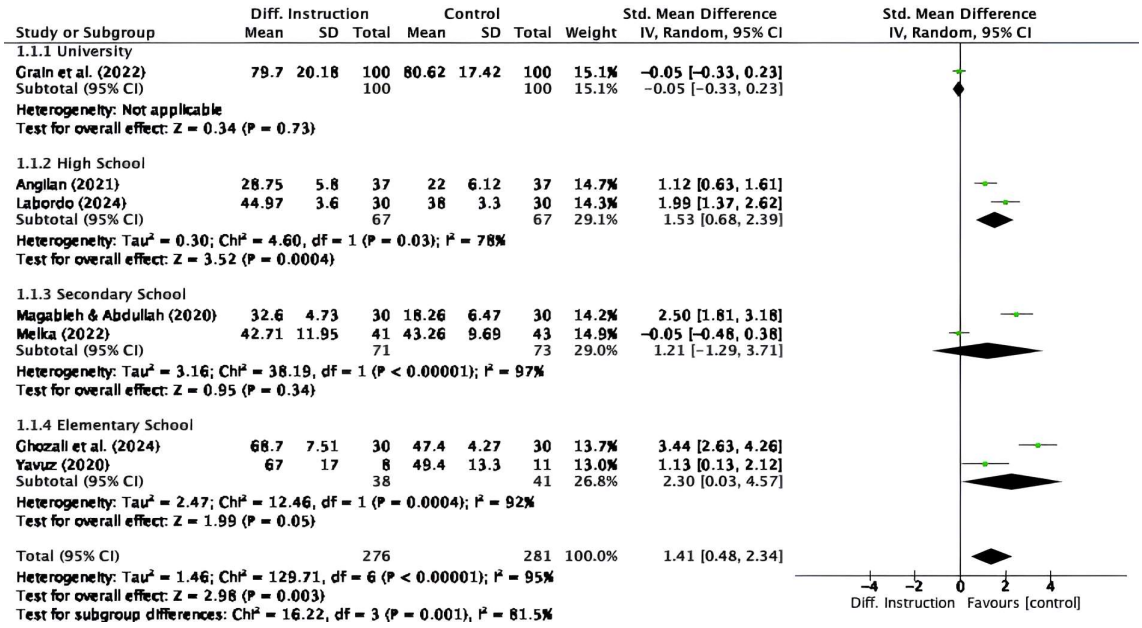

Figure 5. Meta-analysis and forest plot of moderator variable scores of educational setting

High School, Secondary School, and Elementary School. A pooled mean difference of 1.41 (95% CI [0.48, 2.34]), with a Z value of 2.98 and a p-value of 0.003, indicates that the interventions have a significant beneficial effect on the experimental group. Only some drawbacks are heterogeneous: heterogeneity among the studies themselves was high ($Chi^2 = 129.71$, $df = 6$, $p < 0.00001$; $I^2 = 95\%$) and, in addition, among the levels of education ($Chi^2 = 16.22$, $df = 3$, $p = 0.001$; $I^2 = 81.5\%$), implying that the intervention effect changes according to students' stages in their educational career. The Elementary School category possesses the most substantial effect (SMD)= 2.30, 95% CI [0.03, 4.57]; $I^2 = 92\%$) with a powerful, consistent impact at the early education level, mainly carried by (Ghazali, et. al (2024), (SMD)= 3.44). Although with moderate heterogeneity is found a significant effect for the Secondary School (SMD)= 1.21, 95% CI ["1.29, 3.71]; $I^2 = 97\%$) is found. For the High School band, a moderate but reliable effect (SMD = 1.53, 95% CI [0.68, 2.39]; $I^2 = 76\%$) exists, which is a positive aspect in terms of the consistency of the studies involved. In contrast, the University group, domiciled by Grain et al. (2022), held that the lowest and non-significant effect (SMD)= "0.05, 95% CI ["0.33, 0.23]), implying that perhaps at higher education levels, the intervention is rendered ineffective. This suggests that the intervention should carry weight at lower educational levels, and as learners progress to higher levels, the weight must lessen.

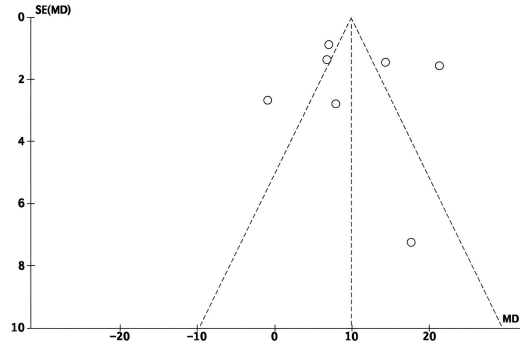

Figure 6. Funnel plot analysis for overall English language proficiency

Publication Bias

Figure 6 presents a funnel plot aimed at detecting publication bias in the meta-analysis, plotting the Standard Error (SE) of SMD against the effect size. The distribution of the studies around the mean effect size, with which it should form an inverted funnel shape, should be almost symmetrical, given that there is no bias shown. In contrast, there is this asymmetry, with more studies concentrated on the right side showing positive results. In contrast, the left side is less explored, with fewer studies reporting adverse or no effects. This imbalance poses a considerable risk of potential publication bias, where more minor or insignificant studies may remain unpublished, or worse still, never be referenced. Furthermore, the few smaller studies showing magnitude effects on the right possibly have significant standard errors, suggesting that small-study effects differ- less precise studies yield exaggerated findings. Altogether, this pattern suggests that the pooled mean difference estimate is likely exaggerated to some extent, raising doubts about the final result, possibly due to selective reporting and/or publication.

Discussion

The meta-analytic findings show that, in all contexts with EFL, DI addresses and enhances English language competence in almost every possible way$ In the studies considered, learners exposed to DI showed more significant improvement in the basic language skills, mainly writing and speaking, than those treated through the traditional EFL methods$ Therefore, it can be supported, with these findings, that DI is undoubtedly an educational mechanism that addresses linguistic diversity; studies from Southeast Asia and Europe support the fact that it has a role in DI and raises academic performance (Chien, 2012; Meºe & Mede, 2023)$

Nevertheless, under the influence of moderating variables such as language skills or educational level investigated, the magnitude of

the effect size of DI could vary$ Most significant changes were observed in writing, followed by speaking and then reading, while the least changes appeared to be in general English proficiency$ In line with these findings, DI interventions also appear to be more efficacious at the elementary and secondary levels than at university levels$ The mentioned patterns indicate that younger learners will favour scaffolded interest-driven learning via interest stemming from developmental factors that make them receptive toward the structured support and external motivation (Acosta-Gonzaga & Ramirez-Arellano, 2022; Alfares, 2025; Kim et al., 2022)$ The findings of the studies further corroborated this, carried out in Kosovo and Morocco, whereby DI positively influenced the reading performance of young students (Hidalgo-Camacho et al$, 2019; khdar, 2024)

However, DI has not always been effective at the tertiary level$. A quasi-experimental study showed that low-ability students improved on one topic, but there were no significant gains in confidence, engagement, or performance in general (Chue, 2017)$ Likewise, Bangladeshi instructors valued DI but could not differentiate goals, content, and assessments in their instruction (Ferdousy, 2017)$ These constraints are commonly associated with inflexible curricula and lecture-oriented teaching formats$. Kosovo provided similar findings questioning the long-term viability of DI to be incorporated into the higher education curriculum (Naka, 2017).

Successfully implementing DI requires enabling conditions that are rarely ever present$. Barriers, such as insufficient teacher training and rigid curricula with limited planning time, were classically cited challenges arising from institutional resistance (Ab Hajis & Othman, 2024; de Jager, 2017; Unal et al., 2022). This practically means that the effectiveness of DI cannot solely be an attribute of it but, instead, has to do with the context$. If there is no strong pedagogical structure and leadership support, there will be inconsistency and superficial application of DI.

Another important consideration regarding publication bias comes up$ Any asymmetries in the funnel plot for the data included in some meta-analyses suggest a possibility of null or negative results going unreported, giving the artificial impression that DI has been successful$ Moreover, very few studies take into consideration long-term retention or transfer of learning; most are reliant on short-term post-tests only$ The DI carries a potentially significant power of change, but one must be wary of considering it as such$ In the practical usage of this system, one should consider several contextual realities, teacher competency, and institutional support$ An indiscriminate application of DI betrays its own premise: personalisation.

In addition to the risk of publication bias, another primary methodological concern for this meta-analysis is the extremely high heterogeneity ($I^2 = 95\%$). Such variability needs to be located within the broader context of educational intervention research. The type of heterogeneity observed in this meta-analysis is consistent with that commonly found in meta-analyses of complex educational and pedagogical interventions. Educational research is often confronted with such heterogeneity due to the inherently different nature of interventions, learner populations, and instructional contexts (Williams et al., 2022). Large-scale syntheses of educational interventions often report similarly wide dispersion of effects, the variability between studies resulting from such factors as duration of the intervention, fidelity of implementation, socio-economic context, and assessment type (Jonkman et al., 2017). Meta-analyses conducted in areas such as mathematics education or mindset interventions have found heterogeneities exceeding 90%, underscoring that the differences in local program implementations and the variations in the types of students capable

of undergoing a treatment can often outweigh the consistency of the treatment effects (Tipton et al., 2023).

According to methodological authorities, such as Borenstein and colleagues, the I^2 statistic should not be interpreted as an absolute measure of inconsistency, since it is sensitive to the scale and number of included studies; instead, prediction intervals and moderator analyses are more informative indicators of practical variability (Borenstein et al., 2017). In the context of educational interventions, an I^2 above 75% often reflects legitimate diversity in implementation rather than a methodological flaw (Choi & Kang, 2025). Therefore, the heterogeneity at stake should be considered an inherent attribute of pedagogical research, representing actual variations in the operationalization of Differentiated Instruction across different educational levels and socio-cultural contexts.

However, exploring possible unmeasured moderators is critical. Variability in teachers' pedagogical competence, institutional support for education, or learner socio-economic grounds may well comprise the universe of heterogeneity (Pigott & Shepperd, 2013). The fidelity of DI implementation, coupled with the degree of adaptation that is made to lessons and the use of formative assessment, will differ significantly from one teacher to the next and will affect both short-term and long-term learning (Diamond et al., 2019). Given such diverse contextual moderators, meta-regression or hierarchical modeling must therefore be applied in future analyses, as summarized by (Melendez-Torres et al., 2015).

Taken together, while an I^2 of 95% may initially appear excessive, it remains consistent with expectations for complex educational interventions where contextual variability and implementation quality drive much of the observed dispersion. Rather than undermining the reliability of findings, such heterogeneity reinforces the importance of interpreting DI's effects as context-dependent, dynamic, and sensitive to local educational ecologies.

Role of Moderator Variables

Language Skill as a Moderator

DI realized various impacts on the language skills$ Writing took the highest response to differentiation, with speaking ranking second and reading third; general language ability was a far second away from having any effect$ This ranking finds support from those scholarly works stating that skill areas of production benefit more from differentiation and autonomous systems of learning (El-Maghraby, 2021; Mohamed et al$, 2025)$ Writing improvement was found from a scaffolded instruction approach with tiered-level prompts and focused feedback that ultimately fostered metacognitive regulation and self-monitoring (Alshahrani & Storch, 2025; Xu, 2024$ Multimodal approaches and graphic organizers were proven effective, especially with youngsters (Anderson et al$, 2018)$ Speaking improvement developed when students were engaged in role play and collaborative discourse, conversational in nature, intended to build fluency and reduce learner anxiety (Rababah, 2025; Szyszka et al., 2024; W. Wang et al., 2024).

The individualized engagement central to DI supports communicative competence in real-time scenarios$ Reading showed moderate but consistent progress, particularly when DI involved leveled texts and flexible grouping strategies (Badawy, 2024; Magableh & Abdullah, 202; Saleh, 2021)$ Experimental studies demonstrated statistically significant reading score gains among differentiated cohorts$ In contrast, general English proficiency outcomes were weak, likely due to unspecific instructional objectives and broad assessments (Capacio & Datugan, 2024; Puzio et al$, 2020)$ This aligns with critiques emphasizing the need for targeted, measurable outcomes in DI applications

Educational Level as a Moderator

DI has its most significant impact on learning outcomes during the elementary years, with its benefits gradually diminishing in secondary and tertiary contexts (Chue, 2017; Smale-Jacobse et al., 2019). At this foundational stage, strategies such as visual scaffolding, thematic integration, and phonemic awareness are purposefully aligned with children's developmental profiles (Ping Liu, 2021; Tomlinson, 2005). Drawing upon Piaget's framework of cognitive development, children aged between seven and eleven occupy the concrete operational stage, where reasoning is grounded in tangible experiences and guided by explanations. Within this period, DI serves as a natural conduit for learning, translating abstract language concepts into manageable and meaningful classroom activities through guided modeling, stepwise feedback, and tiered writing tasks (Vygotsky, 1978). Vygotsky's notion of the Zone of Proximal Development (ZPD) reinforces this approach, highlighting that timely scaffolding allows learners to function just beyond their independent ability, thereby strengthening metacognitive control and self-efficacy in literacy development.

Empirical research has consistently shown that environments with structure and rich feedback at the core of God's Image (DI) model offer young learners significant advantages (Hendel, 2022; Siegler & Chen, 2008). Additionally, differentiated writing and progressive task sequencing for children's compositions have been reported to contribute to improved fluency, grammatical control, and overall coherence (Magableh & Abdullah, 2020; Potot et al., 2023). There are standard features of these practices and teacher mediation, clear formative assessment, and the use of repetition, all of which are essential for cognitive and linguistic development. Developmental psychology also supports the theory that immediate reinforcement and predictable instructional patterns are the basis of effective learning at this age, thereby demonstrating the congruence between DI principles and children's needs for regulation (Chen & Liu, 2017; Hendel, 2022; Siegler & Chen, 2008).

Educators in primary and secondary schools are slowly but surely weaning the students off the adoption of DI as they advance through the education system. First, through the differentiation of plants, teachers achieve good results in language instruction at high schools when they integrate the methodology into holistic and group projects connected to real-life problem-solving (Melka & Jatta, 2022). On the other hand, at the university level, the very same scaffolding mechanisms that assist children may be perceived as intrusive or overly prescriptive in an environment where intellectual autonomy and abstract reasoning are valued. Throughout this development phase, learners enter the period of formal operations, during which they are inclined towards independence and self-guided exploration. The excessive structuring could thus be at odds with their orientation, thereby adversely impacting their intrinsic motivation and ownership of the learning process. From the standpoint of the Self-Determination Theory, the limitation is a blow to the two basic psychological needs for autonomy and competence, which are critical for maintaining engagement; hence, it becomes a disservice (Levesque et al., 2004; Y. Wang et al., 2024).

Cognitive factors, along with structural and institutional factors, play a significant role in determining the situation. Nevertheless, the main elements of university programs are usually composed of modules, standardization, and assessments, wherein personalized teaching is offered minimally (Saleh, 2021). Furthermore, large classes, strict syllabi, and heavy teaching loads make it a challenging task to modify teaching resources to meet the diverse needs of students (Alhameedyeen, 2023). In a study from Bangladesh and Kosovo, it was found that

teachers are always theoretically on the side of DI. However, in practice, they encounter difficulties caused by inflexible policies, inadequate resources, and students' reluctance to participate in activities structured from the outside (Ferdousy, 2017; Naka, 2017). These realities suggest that the issue lies not in the theoretical defeat of DI, but instead in the inconsistency between its pedagogical structure and the organizational setup of higher education.

Cultural traditions in teaching only widen the gap. In various areas, such as Turkey and Hong Kong, the deeply rooted teacher-centered practices have been opposing the DI's student-centered approach (Uçarkuº, 2024; Yuen, Leung, & Wan, 2022). However, there are growing proofs that digital and hybrid models, particularly flipped classrooms, are effective in overcoming some of these gaps. The combination of DI with online tools and adaptive technologies has been recognized as a measure to help personalize pacing and differentiate feedback, thereby benefiting even adult learners from improved performance (Sapan & Mede, 2022). The theoretical foundations of DI remain strong across different levels, with Vygotskian scaffolding and motivational frameworks consistently supporting the use of differentiated methods when finely tuned to learners' readiness and autonomy (Hasibuan & Wariyati, 2024; Mohamed et al., 2025).

These patterns together suggest that the effectiveness of DI in different educational stages is primarily determined by developmental and systemic factors rather than by weaknesses in the concept itself. In primary education, structure, modeling, and immediate reinforcement are the three main supports that children receive, and DI provides all of these. In contrast, college students do well in an environment that offers them freedom and intellectual exploration, which is not the case with prescriptive differentiation. On one hand, DI's success in early education, and on the other, its limited impact in higher education, should not be seen as contradictions but rather as continuities in development and context, each based on different cognitive needs, curricular structures, and sociocultural expectations.

■ CONCLUSION

Results of the meta-analysis provide strong evidence that Differentiated Instruction (DI) is a powerful tool in EFL contexts, as it dramatically improves English language proficiency. It is a method that works for everybody, since no one is left behind, and the learning is also very effective. The most significant difference lies in the area of production skills, particularly writing and speaking, where DI leverages its combined strength of customized scaffolding and individual practice. The improvement in receptive skills such as reading and general proficiency, although modest, is still significant, and these results together point to DI's ability to cater to different kinds of learners through flexible teaching. Furthermore, the broader educational context encompasses these results, which advocate for differentiated instructional strategies to optimize student involvement and support various learning paths, ultimately leading to education that conforms to the principles of learner-centeredness.

In this case, the study implications extend beyond mere confirmation of methods and delve into the practical aspects of the application in schools. For DI to be really effective in the long term, it is going to be on the support of the institution, the teachers' training, and aligning with the curriculum objectives. The observed variation in benefits and moderate effect sizes suggests that DI needs to be implemented in the right context and with proper support, such as teacher quality, class size, and instructional duration. As a consequence, while DI is certainly a potent educational paradigm, this research also highlights its limitations – the small number of studies that met the inclusion criteria, the varied quality of research, and the short duration of the interventions are all factors that underscore these

limitations. The robustness of the findings notwithstanding, the small number of studies fulfilling the eligibility criteria (n = 7) must be taken into consideration as a limitation, which invites further meta-analyses to draw upon a wider selection of resources, including unpublished or grey literature, in order to improve the representativeness of the characteristics. Thus, future studies will focus on the long-term impact across different educational levels, culturally responsive adaptations, and the integration of technology to enhance consistency, scalability, and relevance in the EFL instructional setting.

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