

A Causal-Comparative Study of the Effect of Differing Levels and Years of Experience on Christian Teachers' Instructional Differentiation Scores

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ABSTRACT

This causal comparative study examines the differentiation practices Christian school teachers use in serving their students and whether these are impacted by their level of employment (elementary or secondary) and their length of employment. This study involved 123 U. S. Christian school teachers who were recruited through social media. Based on the results from the Classroom Practices Survey, statistical analysis was completed using a two-way ANOVA to examine the frequency of differentiation methods used by level of employment level and length of employment at Christian schools. Based on the results, the researcher accepted the two-way null hypothesis of no significant difference in the overall teacher differentiation score as measured by the Classroom Practices Survey, between levels of employment (elementary and secondary) and years of experience on the Classroom Practices Survey. However, there was a significant difference based on level of employment (elementary or secondary). Thus, the conclusion is made that the use of differentiated instructional strategies has a greater presence at the elementary level in Christian schools than at the secondary level.

Keywords: Christian school, cognitive psychology, differentiated instruction, elementary school, secondary school.

INTRODUCTION

Differentiated instruction is a method of teaching that recognizes the multiple needs, talents, and instructional preferences of students [1]. Effective use of differentiated instruction (DI) creates an intentional mindset that acknowledges the skills and strengths of learners by developing lessons that promote cooperation between students while fostering individual student's growth [2] [3]. Differentiation is "the process of modifying instruction, curriculum, and assessment to meet the varying needs of students" [1] thus allowing all students to progress to their highest level [3]. DI is a responsive method of teaching guided by assessments and learning environments that cultivates challenge, cherishes the students, and changes the pattern of teaching to the middle [2] [4]. Tomlinson [5] first proposed differentiated instruction in response to the extensive student discrepancies in mixed-ability classrooms. Tomlinson [5] defined differentiated instruction as instruction tailored to meet varying students' needs. When

teachers refined their teaching to support individuals or small groups for the best experience, they are differentiating their instruction. These findings align with the principles of student-centered pedagogies, emphasizing flexibility, choice, collaboration and active participation in the learning process, all of which are key traits of differentiated instruction [6].

The differentiation process encourages educators to alter content, process, product, and environment to create meaningful student-centered experiences [2]. Teachers integrate assessment data, purposeful planning lessons, and student choice based on the time and training that is essential to consistently employ differentiation [2]. Ma'youf and Aburezeq [7] determined that differentiation provided a rich experience where students were engaged with practices that addressed what they needed for growth between pre-tests and posttests. The statistically significant results they found were attributed to the integration of DI strategies, flexible grouping, and gradual activities [7]. Researchers have reported that differentiated instruction significantly improved students' academic performance [8] and achievement [9]. In addition, the use of differentiated instruction has increased students' cooperation, interaction, and classroom engagement [10]. This practice has encouraged students to be more actively involved in their learning [8] and increased learning motivation [9] [10]. Educators using differentiated instruction, combined with student-centered learning strategies, have reported positive increases in students' successful learning skills and experiences, classroom engagement, learning interests or social interaction [11].

THE PROBLEM

Haelermans' [12] research found that differentiation strategies involved routines and regular utilization of differentiated instruction for struggling students, average students, and high-achieving students. Ma'youf and Aburezeq [7] recognized the positive impact of differentiated instruction on reading comprehension but recommended more studies be completed in other subject areas. Van Vijfeijken et al. [13] identified the need for studies on differentiation in schools lacking a common vision concerning differentiation and its place in the classroom. A research gap concerning professional development involves the lack of training which may cause educators to struggle in utilizing differentiation in an appropriate and consistent manner [14] [7]. The complex classroom structure may have resulted in some educators feeling that differentiated instruction is too hard to facilitate and too tailored to effectively incorporate into a classroom setting [7]. A deeper understanding of differentiated instruction is needed because of its inconsistent use despite its perceived positive benefits [13]. However, the implementation of differentiated instruction in the Christian schools setting has not been investigated extensively. It is unknown the effects of level of instruction (elementary or secondary) or the length of employment in the Christian school setting have on teachers' likelihood to implement differentiated instruction.

This study examined the use of differentiated instruction within private Christian schools due to a lack of knowledge about its implementation in that setting. Few studies have specifically examined differentiated instruction in only Christian schools. Many factors may impact teachers' decisions to work in a Christian school setting. However, it is unknown whether Christian and public-school teachers differ in their training and exposure to differentiated instruction. In an attempt to understand Christian school teachers' perspective, Montoro [15] surveyed 171 teachers from 9 evangelical Christian schools. The survey, which focused on learning communities, leadership, and resources, revealed limited professional development

opportunities and found a correlation with a mind-set of passive learners rather than active learners [15]. This mindset was evident in the delivery of Christian school teachers' professional development, since variety and choice in the professional development offerings was limited. This approach could correlate to the style of teaching found within the classroom [15]. The gap in the existing literature has not fully addressed factors that might impact variations in the implementation of differentiated instruction among educators in Christian Schools with different numbers of years of experience at different school levels (elementary and secondary). The problem is that the literature has not fully addressed how the amount of experience or the level of the education setting may impact Christian school teachers' use of differentiated instruction.

Any educational institution advocates for students to grow in knowledge. However, Christian schools have the task of providing students with this same experience but in a way that promotes a Father God who has a love for each student and a plan for their life. Christian education involves the efforts of the Christian community to guide learners toward an ever-richer possession of the Christian beliefs. It seeks to introduce persons to their religious heritage, with the aim of making religion a vital force in every response to life while cultivating creative experiences leading to growth in wisdom and stature and in favor with God and man [16]. Many Christian schools are built upon core values that are evidenced in multiple facets [17]. These values provide the structure and focus that drives the Christian School and the education they provide. Christian education must demonstrate how faith is present in instruction, preparation, assessments, goals and overall structure of school itself [18]. Augustine, an earlier Christian philosopher and teacher, adapted to his learners' needs by instituting reflection, questioning, and a variety of teaching methods that provided a learning environment where all students could find success as a learner [19] [20]. His reliance on internal and external investigations of the Bible provided an example of a Christian educator whose focus was on pointing hearts to Christ and opening minds to an intellectual level that is guided by God's love and one's personal devotion to learn and grow [19] [20]. Students are cherished as they are challenged to reach their highest level stressing the value of each learner being made in the image of God [21], which acknowledges and celebrates the God-given talents and abilities with which each student has been blessed [22].

Christian educators recognize two things: the world is God's creation, and His sovereign hand is present in all learning concepts [23]. All learners have their unique learning style and background experience. Education becomes a parent's primary responsibility with the church and the school having a presence within the educational process. Education itself is redefined as the time when a child is prepared, heart, mind, body, and soul, for this present life and their heavenly future [24]. Therefore, the recruitment and hiring of Christian educators must be done with vigilance as the students are exposed to their teaching, worldview, and example. These principles of Kingdom Education provide clarity to the fundamental core and the principles guiding Christian school teachers as they embrace differentiated instruction and what it can offer to learners of all grade levels [23] [24].

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METHODOLOGY

Significance

This quantitative causal comparative ex post facto study examined data on the methods and frequency of differentiated instruction used by Christian school educators with different number of years of experience and at different academic levels (elementary and secondary school). Supports educators offered throughout the implementation process may be impacted by the time, resources, and other support measures for the application of differentiated instruction within the Christian school [25]. A Christian school setting differs from the public-school setting and this factor could impact the use of differentiated instruction in the Christian school setting.

In a previous study [26], educators disclosed their use of differentiated instruction based on the four types of differentiation: content, process, product, and environment which were focal points as teachers reflected on how these four elements were altered in their classroom to provide a learner-centered classroom [26]. Educators make their own instructional decisions within the classroom and this study will examine two variables that might impact the implementation and consistent use of differentiated instruction within each classroom [26] [25] [27]. Christian school teachers can provide insight into how and to what extent they use of differentiated instruction to meet the needs of the students within their school community [27] [13]. This study adds to the existing knowledge about the methods and use of differentiated instruction in the Christian school setting. This information may help administrators determine how they can better support teachers in their implementation of differentiated instruction within the Christian school environment (elementary or secondary) through analyzing each of the six components of differentiated instruction to determine areas for professional development [28].

Research Questions

- RQ: Is there a difference in Christian school teachers' differentiation survey scores among teachers' level of employment (elementary and secondary) and their length of employment (zero to five years or greater than five years)?

The three null hypotheses for this study are:

- H01: There is no significant difference in the overall teacher differentiation score, as measured by the Classroom Practices Survey, between levels of employment (elementary and secondary).
- H02: There is no significant difference in the overall teacher differentiation score, as measured by the Classroom Practices Survey, between the years of employment (zero to five years or greater than five years).
- H03: There is no significant interaction on the overall teacher differentiation score, as measured by the Classroom Practices Survey, between levels of employment

(elementary or secondary) and the number of years of experience (zero to five years or greater than five years).

Identification of Variables

The dependent variable in this study was the total earned on the *Classroom Practices Survey* instrument [29]. The *Classroom Practices Survey* is an instrument that was designed to assess educators' use of differentiated instruction with students achieving at varying achievement levels. The *Classroom Practices Survey* yields reliable and valid data and can be used to evaluate teachers' differentiation practices. The total differentiation score generated by this instrument uses a 6-point response scale which encompasses six categories of differentiated classroom practices identified as (a) Questioning and Thinking, (b) Providing Challenges and Choices, (c) Reading and Written Assignments, (d) Curriculum Modifications, (d) Enrichment Centers, and (f) Seatwork [29] [30]. The total possible continuous score ranges between 0 and 195. Participants earned a continuous score based upon the combined total earned in each of the six categories by the responses to each of the individual questions on the *Classroom Practices Survey* [29] [30].

Answers to demographic questions were used to categorize responses for the two independent variables. The number of years of teaching experience served as the first categorical independent variable [29] [30]. The variable years of experience was divided into two categories (zero to five years or greater than five years) [29]. The second categorical independent variable pertained to the division in which the participants taught (elementary (K-5) or secondary school (6-12)) [29].

Research Design

This study investigated the relationships between the total survey score (the dependent variables), the number of years of teaching experience (0 to 5 or more than 5), and the grade level of employment (elementary or secondary) of Christian school educators. This causal comparative design was chosen based on its ability to examine differences between groups and the information that it provided about the relationships among the given variables [31]. The goal was to determine whether school level and years of experience impacted teacher differentiation scores. If statistically significant differences were found, inferences that these independent variables were related to differences in teacher differentiation scores would be noted, but it was important to acknowledge that other factors may also influence the observed differences in the combined total of the six differentiation scores.

Setting and Participants

The setting of this study was multiple U. S. private Christian schools that were providing instruction for students in Kindergarten through twelfth grades. A Christian school incorporates curriculum and practices by the Christian community to guide learners toward an ever-rich possession of the Christian beliefs by introducing learners to their religious heritage, with the aim of making religion a vital force in every response to life while cultivating creative experiences leading to growth in wisdom and stature and in favor with God and man [16]. Participants self-disclosed if they were employed in a Christian school.

The survey collected views of teachers through Facebook groups and snowball sampling who are employed by a Christian school in the Continental United States. This method allowed for

the sample to be gathered from a larger geographic area rather than limiting the study to employees of a few Christian schools [32]. This method increased the possible pool of participants. Although the majority of the participants were from the South, other regions were represented (See Table 1).

Table 1: Teachers by Region

School	North East	South	West	North Central	Total
Elementary	9	34	8	6	57
Secondary	9	37	7	12	65
Total	18	71	15	18	122

Interested Christian school educators were invited to participate in an anonymous online survey using the provided Survey Monkey link [32]. The sample consisted of 10 elementary teachers and 12 secondary teachers with zero to five years' experience and 47 elementary teachers and 54 secondary teachers having greater than five years' experience. The sample consisted of 1 male and 55 females from elementary school (K-5) and 12 males and 53 females from secondary schools (6-12). The sample included significantly more female experienced teachers, but it was more equally divided between elementary and secondary teachers. The majority of the sample consisted of participants holding a bachelor's or a master's degree. The combined total possible score of the *Classroom Practices Survey* ranges from 0 to 195. A score of 0 is the lowest possible score meaning that the teacher is not using any differentiation strategies. The highest score of 195 means that the teacher uses multiple differentiation strategies on a consistent basis in the classroom.

RESULTS

Descriptive Statistics

For each group, descriptive statistics were obtained on the dependent variable (overall differentiation score). Descriptive statistics are found in Table 2. The minimum overall differentiation score was 33 with the maximum being 136. The mean of the overall differentiation score for elementary participants was 82.04 while the mean of the overall differentiation score for secondary participants was 65.58.

Table 2: Descriptive Statistics

Dependent Variable: Overall Score				
Experience	Level	n	M	SD
Less than 5	Elementary	10	84.2	15.92
	Secondary	12	63.5	13.37
	Total	22	72.91	17.71
Greater than 5	Elementary	47	81.57	21.04
	Secondary	54	66.04	17.47
	Total	101	73.27	20.64
Total	Elementary	57	82.04	20.13
	Secondary	66	65.58	16.73
	Total	123	73.2	20.08

Inferential Statistics

A Two-Way ANOVA was conducted to answer the research questions. The data was downloaded and cleaned to remove incomplete surveys. The 123 surveys containing complete data were used in the data analysis. A differentiation score based on the participant's classroom practices survey was calculated following the instructions provided by the developers of the instrument. For each participant, the sum of the total responses was determined, generating an overall score between 0 and 195. With data cleaning and descriptive statistics generation, the researcher continued to assumption testing.

The assumptions for a two-way ANOVA include a continuous dependent variable (total survey score), two independent variables (experience and level), no significant outliers, normal distribution, and homogeneity of variance. The assumption of a continuous dependent variable and two independent variables were assured by the design of the study.

Before an Analysis of Variance (ANOVA) could be used to test the null hypotheses the ANOVA required that the assumption of normality and the homogeneity of variance be met. Normality was examined using the Shapiro-Wilk test. Shapiro-Wilk was used because the sample size was smaller than 50 [33]. No violations of normality were found (See Table 3).

Table 3: Shapiro-Wilk Tess of Normality

Years of Experience	Level	Statistic	df	Sig.
Less than 5	1 - Elementary	.950	10	.668
	2 - Secondary	.985	12	.996
Greater than 5	1 - Elementary	.981	47	.627
	2 - Secondary	.973	54	.255

The assumption of the homogeneity of variance was used in order to test that the variances were equal. The assumption of variance was confirmed by the use of Levene's test as seen in Table 4. There was homogeneity of variances, as assessed by Levene's test for equality of variances, $p = .296$. The assumption of homogeneity of variance was met.

Table 4: Levene's Test of Equality of Error Variances^{a,b}

Overall Score	Levene Statistic	df1	df2	Sig.
Based on Mean	1.25	3	119	.296
Based on Median	1.23	3	119	.302
Based on Median and with adjusted df	1.23	3	113.135	.302
Based on trimmed mean	1.26	3	119	.290
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.				
a. Dependent variable: Overall Score				
b. Design: Intercept + Experience + Level + Experience * Level				

Thus, the research data passed all of the assumption tests required to use a Two-Way ANOVA. A Two-Way ANOVA was conducted to test each Null Hypothesis. The level in which a teacher teaches (elementary versus secondary), is significant at the 0.05 level with a p -value of < 0.001 . There was a statistically significant difference between the level at which the participant teaches in correlation to the overall differentiation score, $F(1, 119) = 17.174$, $p = < .001$, partial

$\eta^2 = .126$. Therefore, the researcher rejects the first null hypothesis. The second hypothesis of the number of years of experience was not statistically significant at the experience level and overall differentiation score, $F(1, .035) = .00$, $p = .992$, partial $\eta^2 = .000$. There was no significant difference between the years of experience in correlation to the overall survey score. Thus, the researcher fails to reject the null hypothesis 2. There was no statistically significant interaction between the teaching level and experience for overall differentiation score, $F(1, 119) = .349$, $p = .556$, partial $\eta^2 = .003$. This means that the effect of teaching level on differentiation does not depend on the experience of the teacher. Due to this, the researcher fails to reject the null hypothesis 3.

Table 5: Multiple Comparisons of groups

Pairwise Comparisons					
Dependent Variable: Overall Score					
Experience	Level	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Less than 5	Elementary	84.200	5.854	72.609	95.791
	Secondary	63.500	5.344	52.919	74.081
Greater than 5	Elementary	81.574	2.700	76.228	86.921
	Secondary	66.037	2.519	61.049	71.025

Tukey's post hoc test showed that there was a significant difference between the level at which one taught and the years of experience. In all three cases where the level of teaching was different, the 95% confidence interval did not contain 0 and the p -value was <0.05 . Since $\eta^2_p = 0.13$ for the level of teaching (elementary versus secondary), the effect of the level has a significant magnitude of effect on the use of differentiation within the classroom. The interactive plots also show that the elementary level tends to have a higher use of differentiation than the secondary level. This is shown in Figure 1.

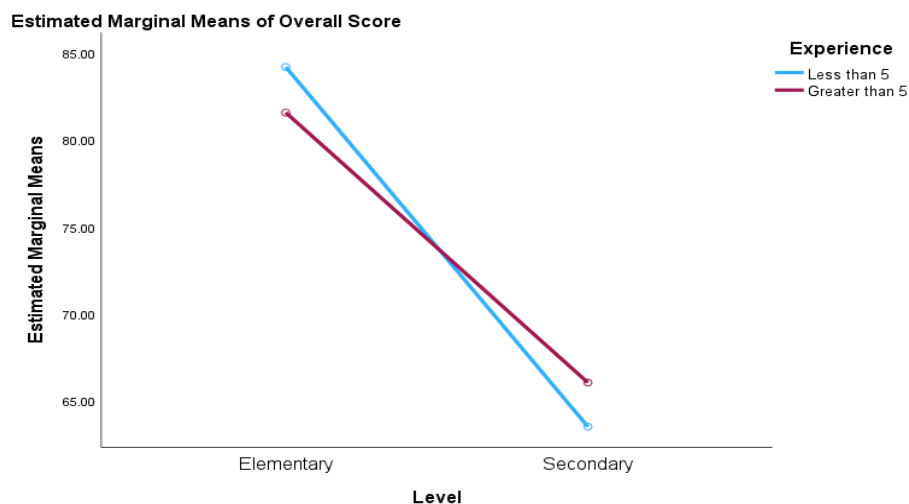


Figure 1: Interactive Plot

Discussion

This quantitative causal-comparative study was conducted to determine if a difference in the composite teacher differentiation scores exist among elementary and secondary Christian

school teachers with either less than five years or more than five years of teaching experience. A two-way ANOVA was conducted to test multiple null hypotheses. The researcher rejected the null hypothesis of there being no significant difference in the overall teacher differentiation score, as measured by the *Classroom Practices Survey*, between levels of employment (elementary and secondary) on the *Classroom Practices Survey*. The researcher failed to reject null hypothesis 2 that there is no significant difference in the overall teacher differentiation score, as measured by the *Classroom Practices Survey*, between the years of employment (zero to five years or greater than five years) on the *Classroom Practices Survey*. The researcher also failed to reject null hypothesis 3 that there is no significant interaction on the overall teacher differentiation score, as measured by the *Classroom Practices Survey*, between levels of employment (elementary or secondary) and the number of years of experience (zero to five years or greater than five years) on the *Classroom Practices Survey*.

The findings of this study build on the application of Vygotsky's theory, which supports understanding the learners' differing needs in the application of classroom differentiation strategies [34]. Hersi and Bal [35] utilized authentic assessments to understand how students build their knowledge based on constant feedback and student choice [36]. Their findings implicated that knowledge construction occurred through student engagement and meaning-making where students built their knowledge through problem solving, collaborative learning, and autonomy [35]. The results of the present study indicate that there was no statistical significance in teachers' utilization of differentiation strategies associated with questions and thinking or challenge and choice by either elementary or secondary teachers.

Melesse and Belay's [36] study of 364 primary school teachers indicated that differentiation in learning content exhibits a relatively stronger direct influence on instructional process differentiation. Another study by Bi et al. [37] that surveyed 1,689 teachers about the influence of specific factors and their differentiation practices revealed a correlation between the adaptable grouping practices among Chinese lower secondary school teachers and their inclination towards differentiation instruction teaching methods and growth mindset [37]. The results of this study correlate to the aforementioned studies as there was a statistical significance in teachers' use of differentiation strategies associated with curriculum modification based on the level at which the participants taught.

This study calls into question the Yuen study of 2022 [38] which indicated that quantitative data pointed to teachers' use of DI as frequent. The findings of this study indicated that at the Christian elementary level the lowest overall differentiation score was 38 while the highest was 136. The mean at the elementary level for the overall teacher differentiation score was 82.04 indicating that elementary respondents vary in their use of Differentiated Instructional strategies between once a month or less frequently to a few times a week. At the secondary level, the lowest overall Christian teacher differentiation score was 38 while the highest was 117. The mean, at the secondary level of the overall teacher differentiation score was 65.58. The overall total mean of all levels was 73.20. This indicates that the respondents employ DI strategies less than a few times a month.

The overall differentiation score based on years of experience and level of employment indicates that the Christian teachers applied the specified DI strategies at an inconsistent rate throughout the month. This aligns with Letina's [4] study, indicating that there was an

inconsistent implementation of DI practices. This study also added to the body of knowledge gained from Graham et al. [39] and Unal et al. [40], which indicated that the experience level of respondents as teachers did not equate to a more frequent use of DI strategies. Similar to Dema et al.'s [41] study, which presented knowledge concerning teaching qualification and experiences, this study did not indicate significant differences in the overall differentiation score based on qualification or experience.

The study indicated a statistically significance difference in the use of DI strategies based on the level at which one taught (elementary or secondary). Out of the six categories in the survey, curriculum modifications, reading and writing, seat work, and enrichment centers were used more frequently than the other categories within the survey. This agrees with several studies that found the most effective DI strategies involved monitoring processes throughout the learning process [42] [43] [44] [37].

CONCLUSION AND FURTHER STUDY

The data from this study implies that the use of DI strategies had a greater presence at the elementary level rather than at the secondary level which is consistent with other studies on this topic. However, there was no indication of years of experience resulting in a more consistent use of DI strategies nor was interaction between years of experience and level taught established by the data. Since this was a quantitative study there is no way to determine why differentiated instruction is used more frequently on the elementary level. Further qualitative research is needed to answer this question.

Since the length of time of employment did not seem to impact the frequency of use of differentiated instruction, administrators might want to investigate how professional development could be implemented to help instructors expand their differentiated instruction skills. Teacher perceptions would be needed to understand this more fully.

In addition, further qualitative research on the factors elementary and secondary educators perceive to be impacting their use of differentiated instruction could expand our understanding of their use or lack of use of differentiated instruction. This would include investigating administrative decisions, professional development, and support provided for DI. It would be beneficial to investigating factors that encourage or discourage the consistent use of DI strategies as teachers engage learners in experiences that are student-centered rather than teacher-centered or textbook driven.

This study only examined the frequency of differentiated instruction used. Another study could disaggregate the data to help identify more specifically which differentiation strategies are being used most frequently and their impact of academic achievement. Identifying the impact of these differentiation strategies on student achievement would provide additional information about the most effective differentiated instructional strategies to use. It can be concluded that teachers in both elementary and secondary settings used any given DI strategy approximately a few times per month. However, elementary teachers' overall differentiation scores indicate a statistical significance difference compared to that of the secondary teachers' overall differentiation scores.

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