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Academic achievement of standardized assessment in English language and arts

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Abstract

The Florida Standards Assessments (FSA) has been used in Florida to test school children's proficiency in English Language and Arts (ELA), starting from the third grade. As the first group taking the test, the third graders were examined on their achievement in ELA on the FSA test from 2015 to 2018. Also, this study explores the probability of the results in 2015 to predict ELA achievement in 2018. Using an SPSS based analysis on the publicly available FSA results dataset, the two-factor split-plot ANOVA indicated a variation between students' annual achievement, with no indication of variation in different areas in Florida. A simple linear regression suggests that the achievement in 2015 can significantly predict the output of similar assessments in 2018, F (1, 65) = 197.867, $p < .001$. Approximately 75 percent of the variation in the 2018 FSA ELA results was predicted by the 2015 results. This study, however, did not closely analyze skill domains (listening, speaking, reading, writing), and thus, future studies should look at these areas to recognize patterns, predictors, and long-term effects of FSA in assessing students' ELA achievement.

Introduction

A prevalent topic in education is the academic performance of school children in mainstream classrooms. The diverse population has grown tremendously in Florida, and the increase has led to complexity along with instructional challenges in teaching and learning, especially English language. With the Florida standards designed to help students succeed, the Florida Standards Assessment (FSA) measures the educational gains and progress of all learners in Math and Language and Arts, starting from the third grade to the tenth grade. English Language Arts (ELA) includes "the capacity to accomplish a wide range of reading, writing, and language tasks," which are needed in other academic subjects, and to bridge disparities in narrowing the achievement gap (English Language Arts, 1996, p. 2). With a strong focus on development and growth on the FSA, the

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implementation of state standards can highlight a collective view of increased academic performance in proficiency areas of ELA.

According to research, the rising proportion of students is inevitable, therefore, comprehensive data can be utilized to analyze the required academic growth among this heavily populated group of learners. FSA reports can provide reliable data, which could identify characteristics and relevant information that is pertinent to individual learners regarding their development in ELA. A close analysis of test data addresses language proficiency skills and overall academic subject knowledge in English (Martin, 2015).

With a particular interest in 3rd-grade schoolers, the first group that receive the standardized test in Florida, this study investigates the achievement of 3rd graders in ELA, by comparing the percentages of passing students in the 67 districts in Florida. It closely examines the difference in achievement in 2015 to 2018 and focuses on seeing the extent to which the test results in the prior year can or cannot predict the test results in a later year.

Literature Review

Florida Standards Assessment (FSA) refers to an assessment system used by the state of Florida to measure students' achievement based on the state's educational standards (Florida Standards, 2019), which were developed and implemented to ensure that all students graduate from high school ready for success in college, career, and life" (Florida Assessments, 2019, p.1). Based on Common Core-based standards, students must demonstrate knowledge of academic standards at the end of each grade. This examination tests students' performance in reading, writing, and math from grades 3 to 10. Students are scored on various item types in multiple ways, and questions are designed to assess higher-order thinking skills. The test for ELA includes multiple-choice items and enhanced response items, which allow students to answer by selecting and providing support (English Language Arts, [ELA], 2019).

English Language Arts (ELA) is defined as a language subject that includes the development of competencies in the four language skills (listening, speaking, reading, and writing), and also grade-level academic content (Greer et al., 1996). The FSA in ELA contains between 55 and 66 items and is administered over two days with two 80-minute test session lengths (Florida Standards Assessments Fact Sheet, 2019). With level 3 indicating passing, achievement level cut scores include: Level 1 Inadequate (240–284), Level 2 Below Satisfactory (285–299), Level 3 Satisfactory (300–314), Level 4 Proficient (315–329), Level 5 Mastery (330–360). Ranging from "highly likely to need substantial support for the next grade," to "highly likely to excel in the next grade," the achievement levels and descriptors specify students' performance concerning what they should know and be able to perform at each grade level as indicated in the Florida Standards (FSA Fact Sheet, 2019, p. 3).

Studies focusing on students' performance on ELA scores on FSA have explored several areas that could affect students' test output. The publicly accessible data set on all subjects tested in FSA (including ELA) has contributed to a more reliable and valid analysis of this assessment. Some studies have looked through differences in students' achievement due to several factors, such as students' cultural background, Black versus White (Aldrich, 2021; Kelce, 2017), and gender and ethnicity (Allen, 2017). In a comparison of the Black and Hispanic students' FSA ELA scores from third to fourth grade, Aldrich (2021) sees trends in learning gains or declines, and the impact of the school environment on these students' academic achievement. A series of statistical tests (Kruskal-Wallis, chi-square goodness-of-fit, sign test, log-linear, and paired tests) on the students' FSA reading examinations in the third-grade and the fourth grade from 2017–2018 to 2018–2019 revealed that the majority of competent students, regardless of race/ethnicity, failed to make learning improvements from third to fourth grade. Nevertheless, a greater number of Black and Hispanic kids failed to show learning gains than their White counterparts.

In terms of the students' education level, the comparison controlled by the students' education level at all FSA level tests shows the trend of the higher performance of middle school students on the test (Asplen, 2019) than those in elementary (i.e. third to fifth grade), or in high school level (i.e. ninth to twelfth grade). While middle school students seem to perform better on the test, little is known on how other external factors such as the year of the test and the location of school districts might contribute to the trends of the students' achievement on FSA ELA.

Methodology

The subjects under investigation in this study are the percentages of students who passed the FSA ELA (scored

300 or higher) of the 67 school districts in the state of Florida. In this non-experimental study, the information was obtained from publicly accessible data. The data set was taken from the result of the FSA test by the third-grade students in 2015 to 2018, which can be freely accessed from http://www.fldoe.org/accountability/assessments/k-12-student-assessment/results/. All units of study (67 school districts) are included in this study. Therefore, there is no randomization procedure applied, and thus, there is no specific sampling method. The data were analyzed using the SPSS program to calculate the descriptive statistics and the repeated measure of Analysis of Variance (ANOVA) of both within and between-subjects factors.

Results and Discussion

A descriptive analysis and a repeated measure ANOVA were computed on the data of the third graders' achievement on the FSA test of ELA in 2015 to 2018, to see the trends in achievement and the differences in their annual performance in 67 school districts from 2015 to 2018. A two-factor split-plot (one within-subjects factor and one between-subjects factor) analysis of variance (ANOVA) was conducted. The within-subjects factor was the annual results of FSA on ELA subjects (four consecutive years of 2015, 2016, 2017, and 2018) and the between-subjects factor was the school district regions, Northern districts (N = 35), and Southern districts (N = 29). The following sections discuss the study findings in further detail.

The Third Grade Achievement on FSA ELA

The annual performance of the third graders in 67 school districts on FSA ELA shows that more than half of the total population passed the test or reached level 3 (Satisfactory; 300–314), or above (see Figure 1). The data indicate increasing percentages of students passing the test from 2015 to 2017, while in 2018, the number slightly decreased. A closer look at the achievement in different areas in Florida, Northern (N = 36) and Southern (N = 31) regions suggests slightly higher FSA ELA results of the northern school districts throughout 2015 to 2018.

From the data set of the FSA ELA results from 2016 to 2018, there was no missing data, and both the sphericity assumption (chi-squared = 10.700, Mauchly's W = .838, df = 5, p = .058), and the assumption of homogeneity of variance were met for the annual result in 2015 to 2018 [Year_2015, F (1, 62) = .009, p = .923; Year_2016, F (1, 62) = .223, p = .638; Year_2017, F (1, 62) = 1.072, p = .305; and Year_2018, F (1, 62) = .219, p = .641]. Additionally, the assumption of normality was a reasonable assumption for all years (2015, 2016, 2017, and 2018), and thus, the test of normality for the two-factor split-plot ANOVA is robust to violations of normality.

The univariate test of mean differences for the within-subjects factor (i.e. 'Year') and within-between subjects' interaction (i.e. 'Year*Region') as shown in Table 1, found a statistically significant difference within-subjects main effect for time (Year) (Fyear = 45.185, df = 3,18, p = .000) (Year 2015, M = 52.375; Year 2016, M = 54.000; Year 2017, M = 58.125; Year 2018, M = 56.688). This finding suggests mean differences in the annual results of the FSA ELA in the consecutive years. Effect sizes were considered large based on Cohen's guidelines (partial η^2_{year} = .422, power = 1.000; partial $\eta^2_{\text{year x region}}$ = .011, power = .193), meaning approximately 42 percent of the variation in the annual results is accounted for by the differences in the time (Year). Moreover, the Year factors were consistent in that Bonferroni's multiple comparison procedures revealed statistically significant differences among all pairs of FSA ELA test results in 2015, 2016, 2017, and 2018.

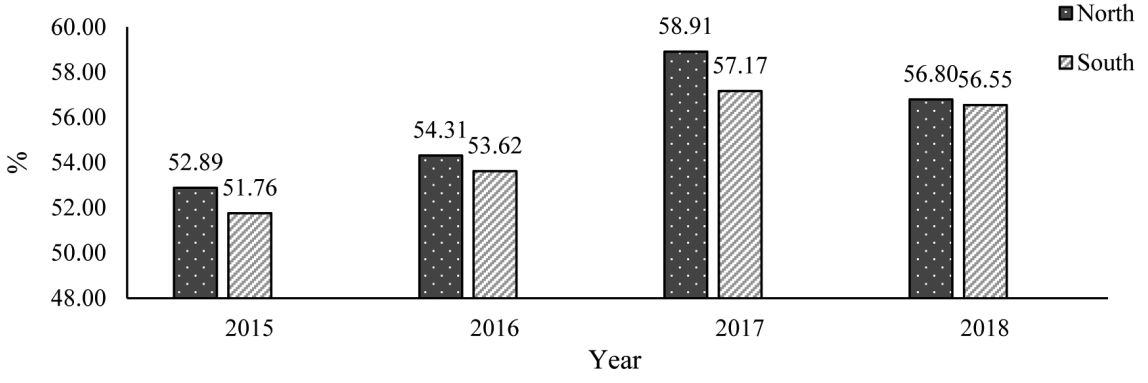

Figure 1 Average percentages of students passing FSA ELA in northern and southern districts

However, Table 1 shows a statistically nonsignificant within-between subjects' interaction effect between year and region (*F*year x region = .685, *df* = 3,186, *p* = .562). Similarly, a statistically nonsignificant between-subjects main effect for region (Fregion = .175, *df* = 1,62, *p* = .677) (region 1, *M* = 55.729, *SE* = 1.534; region 2, *M* = 54.776, *SE* = 1.685) were found (see Table 2). These findings indicate that there are no differences, on average, in the annual result of the FSA ELA test per region.

Having examined the univariate ANOVA results of the third grade's FSA test scores on ELA from 2015 to 2018, the results indicate that when compared based on 'Year', the significant difference indicates a variation between students' annual output. However, there is an indication of no variation among students' results regarding 'areas/districts' in Florida. They are approximately similar in this case showing no variation. The result suggests that regardless of the different levels of performance that the third-grade students might show every year of the test, the student's achievement in each region in Florida shows a quite similar result. Thus, the third-graders performance is most likely affected by the year the test was taken, while the students' regional background does not seem to play a significant role in the score difference on the test. Each region generally shows quite similar performance in the Language and Arts of the FSA test. Overall, the findings show improvement in FSA ELA annual scores, which added to other external conditions, might contribute to the results of FSA ELA in addition to gender (Allen, 2017), ethnicity and cultural background (Aldrich, 2021; Allen, 2017; Kelce, 2017), and education level (Asplen, 2019). Due to the limitation of information in the data set, this study does not break the third graders annual FSA ELA performance based on gender, ethnicity, and education level, the factors that are worth looking at for future investigations.

Predicting the Third Graders Future Performance on FSA ELA

Following the significant effect of 'Year' factor on the test variation result, a Simple Regression analysis was implemented to measure the extent to which third Grade ELLs' performance on ELA based on the results of the FSA in 2015 can predict the result of a similar test in 2018. A test of linearity provided evidence of a linear relation (t = 14.067, p < .001.), and the assumption of normality tested via examination of the unstandardized residuals suggested that normality was a reasonable assumption (SW = .979, *df* = 67, *p* = .317; skewness = -.483; and kurtosis = .395), there is no evidence for outliers in the data. Moreover, the spread of residuals appears fairly constant over the range of values of the independent variable (in the scatterplot of studentized residuals against values of the independent variable), providing evidence for the homogeneity of variance.

Table 1 Tests of within-subjects effects

Source	Type III Sum of Squares	*df*	Mean Square	*F*	*p*	Partial Eta Squared	Noncent. Parameter	Observed Powera
Year								
Sphericity Assumed	1272.11	3	424.035	45.185	.000	.422	135.554	1.000
Greenhouse-Geisser	1272.11	2.662	477.900	45.185	.000	.422	120.275	1.000
Huynh-Feldt	1272.11	2.837	448.352	45.185	.000	.422	128.202	1.000
Lower-bound	1272.11	1.000	1272.106	45.185	.000	.422	45.185	1.000
Year * Regions								
Sphericity Assumed	19.29	3	6.431	0.685	.562	.011	2.056	0.193
Greenhouse-Geisser	19.29	2.662	7.248	0.685	.545	.011	1.824	0.183
Huynh-Feldt	19.29	2.837	6.800	0.685	.554	.011	1.944	0.189
Lower-bound	19.29	1.000	19.294	0.685	.411	.011	0.685	0.129

Note: a. Computed using alpha = .05.

Table 2 Tests of between-subjects effects

Source	Type III Sum of Squares	*df*	Mean Square	*F*	*p*	Partial Eta Squared	Noncent. Parameter	Observed Power
Intercept	774649.892	1	774649.892	2351.175	.000	.974	2351.175	1.000
Regions	57.579	1	57.579	0.175	.677	.003	0.175	0.070

Following a significant relationship of the results of FSA ELA in 2015 and 2018 (see Table 3), the results of the simple linear regression also show that a significant proportion of the total variation in the results of FSA ELA in 2018 was predicted by the results of FSA ELA in 2015. In other words, the test result in 2015 is a good predictor of similar standardized assessment in 2018, F (1, 65) = 197.867, $p < .001$ (see Table 4).

Furthermore, as can be seen from Table 5, it was discovered that the unstandardized slope (.980) and standardized slope (.868) are statistically significantly different from zero ($t = 14.067$, $df = 65$, $p < .001$.); with every one-point increase in the results of the FSA ELA for 2015, would be followed by an increase of approximately the same point of the results of the FSA ELA for 2018. Additionally, the confidence interval around the unstandardized slope does not include zero (.841, 1.120), which further confirms that the test result in 2015 is a statistically significant predictor of the third graders' performance in 2018.

Multiple R^2 indicates that approximately 75 percent of the variation on the FSA results in the year 2018 was predicted by the results of the FSA in the year 2015. According to Cohen (1988), this suggests a large effect. A calculation on the power analysis resulted in very high power (1.000, $df = 65$).

Table 3 Correlation result of the third-grade performance on ELA

Correlation		2018	2015
Pearson Correlation	2018	1.000	.868
	2015	.868	1.000
Sig. (1-tailed)	2018	.	.000
	2015	.000	.
N	2018	67	67
	2015	67	67

With further analysis of the simple regression, it was found that the results of 2015 can statistically predict the performance of the same test in 2018. This means the results of the test in the previous years would not show much of a difference over consecutive years. Specifically, through this procedure, the results showed that the FSA in 2015 could largely (about 75%) predict the results of the FSA in 2018. There is an indication that third graders in Florida are likely to show stagnant performance in the test of Language and Arts of the FSA. Thus, any increase or decrease in the test's overall score will not differ so much from the result of the same test in the previous year.

The result is disheartening in that achievement on the FSA in 2015 is most likely to predict their performance in 2018. However, it is important to note that significant improvement is more likely to be seen as a result of long-term effect. Moreover, the data in this study present the FSA ELA results in a bigger scope, that is the data by districts in Florida. Thus, differences may be more apparent when the data are presented by school or per student. In addition, the third-grade students are the first group to experience the FSA. It is expected that their score in third grade would not predict their score three years later because of the support and help they should be receiving. While the gap only widens from 2015 to 2018 it can only be expected that their scores from 2015 would predict the results on a similar assessment in 2018. In three years, these students have tripled their workload in comparison to the same grade level native speaker colleague to acquire general language, academic language, and content-specific language to make sense of the content expected to be mastered.

Table 4 Regression result of the third-grade performance in ELA

Model	Sum of Squares	*df*	Mean Square	*F*	*p*
1 Regression	4579.186	1	4579.186	197.867	.000[b]
Residual	1504.277	65	23.143		
Total	6083.463	66			

Note: a. Dependent Variable: 2018, b. Predictors: (Constant), 2015.

Table 5 Coefficients result of third grade performance on ELA

Model		Unstandardized Coefficients		Standardized Coefficients	*t*	*p*	95% Confidence Interval for B		Correlations		
		B	*SE*	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	5.436	3.706		1.467	.147	-1.966	12.838			
	2015	0.980	0.070	.868	14.067	.000	.841	1.120	.868	.868	.868

Note: a. Dependent Variable: 2018.

Conclusion and Recommendation

English Language Arts is an important academic subject, and in the state of Florida, students must show growth on the FSA and demonstrate passing achievement scores to proceed to the next grade level. This study presents evidence for the significant mean differences in students' achievement from 2015 to 2018. Based on the information and data analyzed in the study, the importance of this research is vital concerning predicting students' performance on the assessment each year. As specific roles of accountability and testing play a critical part in measuring ELA achievement, the testing data and analysis may provide solid, as well as accurate information based on a breakdown of test data from the first level of students experiencing the assessment. This information addresses language proficiency skills and overall academic subject knowledge in English.

There are some limitations of the research. First, the data show the overall language skills in ELA, and thus, do not provide specific information on every language skill. Therefore, the analysis of specific skill domains was not included (listening, speaking, reading, writing). This was partly due to the limitation of access to the data set. Second, only data from grade 3 was obtained, which gave a limited comprehensive view of the results, according to test years and elementary grade level performance and predictions. Future research studies should look at these areas to compare performances between every language skill over consecutive years on the FSA in ELA, analyze additional elementary grade(s) academic performance on the FSA in ELA, and also look at data from the most recent years to represent ELLs most current achievement and performance status. Outdated information may not be effective.

While the limitations may interfere with further analysis and investigation of English language abilities, more variables in future research can be considered, which will contribute to more information from close analysis of the data on the FSA in ELA. It is vital to recognize patterns, predictors, and long-term effects of the FSA in assessing ELA achievement in terms of validity and reliability. Further investigation can address these limitations and provide valuable information for educators, school systems, and the school children population as a whole.

Conflict of interest

The authors declare that there is no conflict of interest.

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