

Student IAAT (IOWA Algebra Aptitude Test)

Project STAIR

Technical Report #10

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Purpose

The purpose of this technical report is to examine the student level performance improvement in *Iowa Algebra Aptitude Test* (IAAT) for students of teachers participating in Project STAIR.

Method

Setting and Participants

The *Iowa Algebra Aptitude Test* (IAAT) was administered to a total of 46 students at pretest, 28 of whom attended classes with treatment group teachers, and 18 were from control group teachers. At posttest, only 13 students were assessed, 7 of whom were from treatment group teachers' classrooms, and 6 students were from control group teacher. Due to COVID-19, post test data were not collected from 21 students in treatment group classrooms and 12 from control group classrooms.

Measures

The IAAT (University of Iowa, 2006) is a written assessment administered in four separate and timed sections. IAAT is designed to measure students' Algebra readiness. The assessment uses the National Council of Teachers of Mathematics' standards (Schoen & Ashley, 2020). The four sections of the assessments include: pre-algebraic number skills and concepts, interpreting mathematical information, representing relationships, and using symbols (Schoen & Ashley, 2020). Each of the four sections contains 15 questions, and students are given 10 minutes to answer the questions in each section. The test administrator follows a script and times students (Schoen & Ashley, 2020).

Procedures

For Project STAIR, the IAAT was given to students in two forms: Form A and Form B. All students were given Form A in the fall as a pre-test, and Form B in the spring as a post-test. The

assessments were scored by hand by a GRA, using the answer key and a spreadsheet designed by the researchers to calculate scores. All tests were scored twice, and all discrepancies were resolved.

Results

First, to investigate students' change on IAAT score at pre- and posttest in both treatment and control group, descriptive statistics were conducted (see Table 10.1).

Table 10.1

Descriptive Statistics for IAAT Score in Treatment and Control Group at Pre- and Posttest

Variables	N	M	SD
Treatment group			
pretest	28	13.39	5.38
posttest	7	15.00	7.57
Control group			
pretest	18	16.06	6.15
posttest	6	16.33	3.27

Second, to evaluate the significance of the difference between the means of treatment and control group at posttest, *Mann-Whitney U test* was conducted. Note that we used nonparametric *t*-test since the data did not meet the assumption about normal distribution. Before the analysis, to test the assumptions of homogeneity of variance, nonparametric independent *t*-test were conducted (see Table 10.2). The Significant value of IAAT score at pre-test was more than .05, we accepted the null hypothesis for the assumption of group's variance and concluded that there is no significant difference between treatment and control group.

Table 10.2

Mann-Whitney U test for Comparing the Means in Pre-test of Treatment and Control group to Test Homogeneity on IAAT Score

Variable	Treatment group			Control group			z	p
	n	M	SD	n	M	SD		
IAAT pretest	28	14.71	6.78	18	18.50	8.89	-0.719	0.472

Table 10.3 present the result of Wilcoxon test on IAAT at pre- and posttest for treatment group and control group. For treatment group, the result showed that there was no significant difference in the pre- and posttest, $z = -0.16$, $p = 0.86$. For control group, the result showed that there was no significant difference in the pre- and posttest, $z = -0.36$, $p = 0.71$.

Table 10.3

Wilcoxon test on Content Knowledge in Multiplicative Reasoning for Treatment and Control Group

Group	Pretest			Posttest			z	p
	n	M	SD	n	M	SD		
<i>Treatment group</i>	7	14.71	6.77	7	15.00	7.57	-0.16	0.86
<i>Control group</i>	6	18.50	8.89	6	16.33	3.27	-0.36	0.71

Reference

University of Iowa. (2006). *Iowa Algebra Readiness Assessment: Manual for Test Use, Interpretation, and Technical Support*. Rolling Meadows, IL: Riverside Publishing.