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The Effectiveness of Project-Based and Traditional Instruction in Relation to 11th Grade Literacy

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Abstract

School leadership must address the challenge in determining if curricular reforms are effective and there is an expectation to advance learner outcomes while providing an engaging curriculum. Project-based learning (PBL) has received considerable support as being superior when compared to traditional instruction. It is believed students learn best when addressing problems that involve hands-on experiences in every-day authentic learning. This study compared project-based and traditional instruction scale scores on 11th grade students who took Arkansas's End of Course State mandated Literacy examination, controlling for race, gender, and socioeconomic status. More specifically, test data from two years of traditional instruction followed by two years of New Tech Network implementation of PBL instruction were compared. Findings among participants suggest that PBL does not increase mean scale scores over participating students taught through traditional instruction.

With resources limited, school leadership must address the challenge in determining if curricular reforms are effective; a burden that can prove to be quite challenging. With this challenge in mind, there is also an expectation to advance learner outcomes while providing an engaging curriculum. Data obtained needs to be both complete and accurate while insuring there

is a match between reforms and outcomes (Hummel-Rossi & Ashdown, 2002). School stakeholders continually press for more satisfactory results academically, making it increasingly important to be able to support instructional strategy benefits (Burns, Patterson, & LaFrance, 1993). Educational leaders must regularly analyze the effectiveness of the various forms of instruction and use the data to the benefit of current pedagogy (Calzini, 2011).

Teaching strategies with specific and expected outcomes require identifying teaching strategies that effectively engage students that result in the most effective learning (Zbiek & Larson, 2015). One such instructional strategy is Project-based learning (PBL) which has received considerable support as being superior when compared to traditional instruction (Hugerat, 2016; Munakata & Vaidya, 2015). Proponents of Project Based Learning believe students learn best when addressing problems that involve hands-on experiences in every-day authentic learning (Hung, Lee, & Lim, 2012; Jones & Hébert, 2012). Terms oftentimes associated with Project Based Learning are creative thinking, inquiry, amending knowledge, collaboration, and communication (Barron & Darling-Hammond, 2008).

Central to this article is that a working relationship was formed between the Department of Education in Arkansas and New Tech Network (NTN) to promote Project Based Learning (PBL) in selected high schools in Arkansas in 2012 (New Tech Network, 2016). In this initiative, ten Arkansas high schools implemented the NTN's PBL model (Clark, 2012) prompted by a decrease in graduation rates, school enrollment with most schools struggling in meeting the state's school improvement system expectations regarding the standardized test in math and literacy (Arkansas DOE, 2012).

In support of PBL, Batdi (2014) found that the instructional strategy made a dramatic positive and quantifiable effect on academic achievement. Twenty-six international studies regarding PBL student outcomes supported its superiority over traditional instructional models. However, Hattie (2012) was not supportive of PBL with regard to student' learning. Hattie identified two teaching strategies commonly associated with PBL: inquiry-based and problem solving learning; both strategies found within the NTN PBL model. He determined PBL strategies effected student learning differently with problem-based learning being least effective and the inquiry-based learning more effective. In addition, Hattie offered that Surface-level learning, often found on a standardized test, may be negatively impacted by Project Based Learning related instruction.

This article examines data representing four years of proficiency rates on the Arkansas state 11th Grade End of Course (EOC) State Literacy examination, a part of the Arkansas Comprehensive Testing, Assessment, and Accountability Program (ACTAAP). The four years included two years of traditional instruction followed by two years of Project Based Learning. Hence, the emphasis of our study focused on the following research question: Is there a difference between 11th grade student' scaled scores on the Arkansas 11th Grade End of Course Literacy exam who received project-based instruction and previous 11th grade students that received traditional instruction when controlling for gender, race and socio-economic status? Traditional instruction relies considerably on lecture that is teacher led, such as lecture and controls creativity and student engagement. Responsibility for instructional decisions rests with the teacher and lecture is the most common form of instructional delivery (Novak, 1998). School administrators and teachers strive to identify reform efforts providing the highest rate of return. Given what appears to be some disagreement regarding instructional models and their effectiveness, the comparison conducted in this article may serve them well when determining the most appropriate instructional model.

Method

Design

A quasi-experimental research design was used to examine whether the scale scores of 11th grade students on the Arkansas the End of Course (EOC) Literacy exams were significantly different before and after the PBL implementation. The assumption was that all EOC Literacy examinations were based upon similar tests prior to and after the PBL implementation. An analysis of covariance (ANCOVA) was used to determine whether the mean of the student scale scores was different under the two learning models (i.e., PBL and traditional), controlling for race, gender, and socioeconomic status.

Participants

The study participants were selected from the 10 Arkansas high schools (approximately 2,000 students) that participated in the Spring 2012 PBL in Arkansas. All chosen high schools were traditionally comprehensive high schools using traditional instructional models. PBL was implemented after being selected by the Arkansas Department of Education to receive the grant funding in Spring 2012. In this ANCOVA analysis, a sample size of 210 students was used according to G-power calculation. 105 students before PBL implementation and 105 students after implementation were selected from the 10 Arkansas high schools using the stratified random sampling method.

Data Collection

In Arkansas, all 11th grade students participate in the Arkansas Comprehensive Testing, Assessment, and Accountability Program (ACTAAP) during the Spring testing window. In this study, four years of scale scores of EOC Literacy exams were obtained from the Arkansas Department of Education Data Center. The data of 2010--2011 and 2011-2012 academic years were used to measure students' performance before the implementation of PBL, and the data for 2012-2013 and 2013-2014 academic years were used to measure after PBL. The test scores before and after PBL implementation were based upon different students thus between-subject design was appropriate. Permission was obtained from the Arkansas Department of Education and data for the ten participating schools were collected with no students' information identifiable. Students' gender, race, EOC literacy score, and socioeconomic status (i.e., free and reduced status) were collected.

Data Treatment

In this study, an ANCOVA was used to examine whether there existed a significant difference in scores of EOC Literacy exams between the students who received the traditional instructional model and those who received PBL instructional models, controlling for students' gender, race, and socioeconomic status. The traditional instruction model was used in the school years of 2012-2013 and 2013-2014 and the PBL instructional model was implemented in the schools years of 2014-2015 and 2015-2016.

Results

This study was to determine whether the scale scores of students' EOC Literacy exam were the same between those who received instruction through PBL instruction model (2012-2013 and 2013-2014) and those receiving traditional learning model (2010-2011 and 2011-2012) in the 10 high schools participating in the state of Arkansas' NTN grant. Students' Literacy EOC scale scores, gender, socioeconomic status, and race were acquired from the 10 participating schools after getting permission from the Arkansas Department of Education. A total of 6,562 students were included in the data file: including 1,635 from 2011; 1,605 from 2012; 1,631 from 2013; and 1,691 from 2014. There were 3,323 (50.64%) female students and 3,239 (49.36%) male students. 4,077 (62.13%) students were classified as low socioeconomic status. There were 4,069 (62%) Caucasian students, 1,452 (22%) African-American students, 761 (11.59%) Hispanic students, and 279 (4%) students that were classified as others.

Levene's test showed that the homogeneity of variances assumption was assumed (F = 1.407, p = .102). The classroom utilizing the traditional instructional model produced a slightly higher score (M = 212.84, SD = 17.149) than the classroom utilizing the PBL model (M = 210.35, SD = 21.556), with a net decrease of 2.49. The data results of the ANCOVA indicated that there was no statistically significant difference in 11th grade students' literacy EOC scores between those receiving the traditional instructional model and those receiving the PBL instructional model, F = 1.354, p = .246, when controlling for gender, race and socioeconomic status.

Discussion

Support for Project Based Learning over traditional forms of instruction was not found in this research and differed from the findings of Batdi (2014), Bradford (2005), Hung, et al. (2012), and Jones and Hébert (2012) who proposed that project based learning increased academic achievement. The difference between many previous studies regarding project based learning and this study's findings may have as its basis the nature of the subject content and teacher practice, beliefs, and the professional development experienced.

Habók and Nagy (2016) suggested that the teacher's self-perceived classroom role impacted the success or failure of Project Based Learning. Most teachers in the traditional classrooms perceived themselves as educators rather than facilitators, whereas those who teaching in PBL classrooms tended toward taking the opposite position. The results of this study may have been influenced by the teachers' perceived classroom role. In addition, New Tech Network provided professional development in support of their PBL model while implementing the program at participating high schools. Professional development can be perceived quite differently from teacher to teacher and this perception could, according to Hattie (2012), be an important predictor of student success.

Condliffe et al. (2017) found Project Based Learning research promising but not definitive and suggested that PBL may not be more effective than traditional learning. Condliffe stated that many PBL proponents believe the instructional method superior, but more in-depth studies were needed to quantify this view to support implementation within classrooms. Studies involving the effectiveness of PBL are typically of short timeline, thus PBL may present a problem of inaccuracy when measuring PBL promoted skills. Also, many PBL studies use methods of evaluation which allow the opportunity for confounding variables to impact findings.

This article, while providing no definitive answer in comparing Project Based Learning and the traditional learning model, may aid the educator in determining both productivity and student achievement when selecting an appropriate instructional model. This study also suggested that when gender, race, and socioeconomic status were controlled, Project Based Learning may not be any better in providing for student achievement than traditional instruction. In this study, gender and race showed no significance between the PBL and traditional learning; however, socioeconomic status had less than a .05 level of significance which echoes Engberg and Allen's (2011) and Klingbeil's (2013) conclusion that students with a lower socioeconomic status could benefit from PBL. The evidence for effectiveness of instruction is limited in literacy classes is somewhat limited, especially when referring to the PBL model and the impact of differing student characteristics on outcomes through PBL instruction.

Conclusion

The findings suggested Project based Learning as a teaching strategy may impact students' scale scores on standardized tests negatively. Further research needs to be conducted in order to better understand how standardized test' scale scores and instructional models may be impacted by differing demographic groups. Controlling for variables of gender, race and poverty in relation to scale scores and the various learning models might benefit the school administrator and teachers to effectively match instructional models to the population most benefited. The replication with schools of a different student population; community characteristics (e.g., rural and urban) along with socioeconomic status are needed. This study did not take into consideration all demographics of possible influence and narrowed its emphasis to only the NTN participating Arkansas high schools.

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