



EXPLORING NEW HORIZONS: ASSESSING THE INFLUENCE OF INNOVATIVE CURRICULUM DEVELOPMENT STRATEGIES ON HIGH SCHOOL STUDENTS' ACADEMIC PERFORMANCE AND ENGAGEMENT

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Abstract

The examples of the innovative approaches to curriculum development are project-based learning, interdisciplinary approaches, and technology enhanced instruction, which have turned out becoming imperative tools in enhancing high school education. This paper will deal with the lack of this feature of traditional curricula, which often do not encourage such values as critical thinking and intrinsic motivation by evaluating the impact of these strategies on academic performance and interest among students. The research design employed in the study is mixed-methods primary research design where both qualitative data that is provided in the form of teacher and student interviews carried in three high schools and quantitative data in the form of normalized test scores are utilized. Findings indicate that, in spite of continuing teacher training and resource demands, novelized curriculums have become very effective in improving the quality of student learning experiences and academic performance, particularly among lower-represented students. The article helps to fill the gaps in the current discourse on curriculum change by suggesting specific interventions to be implemented by the educators and policymakers who strive to establish dynamic and inclusive learning environments.

Keywords: Curriculum Development, High School Education, Educational performance, student engagement, project based learning, interdisciplinary learning, integration of technology.

Introduction

Setting the Scene for Change

Education in the high school is at crossroad; it bears the responsibility of preparing the students to stand up in the fast expanding world with critical thinking, team work and flexibility being the main characteristic. The traditional curricular programs tend to be rigid and subject-siloed and hence fail to accommodate these requirements, and that is why there is boredom among students and they do not improve their graduation levels. The standardized techniques are less concerned with creativity and the outcomes are that majority of the learners are ill equipped to attend college or even the work force (Darling-Hammond, 2010). Innovative curriculum development models that can change high school education include project based learning, the interdisciplinary structures, and technology enhanced instruction. The techniques are created to favor a deeper knowledge, self motivation and real world problem solving.

The potentials of such strategies in academic performance and participation are not fully studied despite their potential particularly in heterogeneous high school settings. The existing body of research is inclined to focus on a non-cumulative intervention and the school of higher education, and knowledge of the entire scale of alteration of the curriculum on students in heterogeneous populations at the secondary level remains a blank. Moreover, such aspects in the practice are hindrances to the universal implementation the willingness of teachers and the just access to the resources. This will close these gaps with a primary research design study, which will be conducted to investigate the effects of innovative curricula in three high schools, as they differ in



Socioeconomic factors. The research will incorporate a mixture of quantitative and qualitative researches to illuminate on how the same strategies can transform high school education and also prescribe ways in which the challenges can be overcome in implementing the strategies.

Building on Past Knowledge

A development of the curriculum is a strength of the realization cognizant of the necessity to equate the society and economic demands during education. Contemporary education such as the project-based education is based on the depictions of the pioneers of progressive education such as Dewey (1938) who emphasized on experiential learning. It would assist the students in tackling real-world problems by involving the group projects to enable them acquire such skills as inquiry and communication (Thomas, 2000). The interdisciplinary curriculums on whose courses include science and history, in an effort to discern the intricate themes, have gained popularity due to their ability to promote the comprehensive wisdom (Jacobs, 1989). Technology is also applied in online learning to enrich the digital simulation and online platforms so that they provide interactive and personalized learning (Penuel, 2006).

The benefits of these strategies are uncovered in empirical studies. As pointed out by a meta-analysis by Strobel and van Barneveld (2009), project based learning proves to be much more effective in improving the conceptual knowledge and interaction between the students compared to conventional instruction. Interdisciplinary approaches have also been linked to enhancing critical thinking particularly in the STEM subjects (Wang et al., 2015). Application of technology in virtual laboratory has resulted in possibilities to increase motivation of students and their academic performance (Dede, 2014). However, there is still a gap in literature. Lots of research works are conducted on the short-term outcomes or a specific area, and little is accomplished on the long-term impacts on various groups of students. The other area that could be delved into further is the implementation issues such as lack of professional development of the instructors and an imbalance in access to technology (Ertmer and Ottenbreit-Leftwich, 2010).

The paper is informed by these pillars where a concerted group of project-based, interdisciplinary and technology-enhanced curriculum is examined with an aim of establishing the impact it has on the academic performance and engagement of the students in high schools. The research satisfies the demand of universal and generalizable curriculum modifications by focusing on the multiple settings of the school, and the information about opportunities and challenges is also presented.

In an effort to evaluate the impact of the innovative curriculum development strategies, the study was conducted as a mixed-method primary research design, i.e. by employing both quantitative and qualitative data to test the strategies altogether. The research was conducted in three USA high schools that were selected due to the diversification of the student population and variation in the amount of resources. This study took one academic year and this allowed the researcher to have a close analysis of the implementation of the curriculum and its effect.



The study background and the research participants.

The schools that took part in the research were one urban school with majority of low-income and minority students, one suburban school with a mixed socioeconomic status and one rural school with low technological status. A sample of 450 students in the 9-12 grades and a sample of 30 teachers who embraced the new curriculums was the given sample used. Table 1 has shown the demographic data of the participants of the student population.

Table 1

Demographic Characteristics of Student Participants

Characteristic	Urban School (n=150)	Suburban School (n=150)	Rural School (n=150)
Gender (Female)	52%	49%	51%
Race/Ethnicity	60% Hispanic, 30% Black, 10% Other	50% White, 25% Hispanic, 20% Asian, 5% Other	70% White, 20% Hispanic, 10% Other
Free/Reduced Lunch	80%	30%	45%
English Language Learners	25%	10%	5%

Data Collection

The research was undertaken in the schools which gave some uQuantitative data in terms of the pre and post intervention standard test scores on mathematics, science and English and attendance and disciplinary action as measures of the engagement. Semi-structured interviewing of 45 students (15 students in five schools), 15 teachers (5 teachers in five schools) and observing classrooms every other week were used to collect the qualitative data. Curriculum changes included project-based learning units, interdisciplinary courses that combined STEM and humanities or activities that are technology-supported, which were developed based on the digital platform like Google Classroom and virtual simulation.

Data Analysis

Paired t-tests were used to compare the pre and post intervention of the academic performance and computed the effect sizes to establish the practical significance. Engagements metrics were tested using descriptive statistics and chi-square tests to check whether they were different among schools. The thematic coding of the qualitative data was also done using NVivo software and inter-rater reliability was realized by use of an independent coding of the data conducted by two researchers. The quantitative and qualitative analysis was triangulated because it was considered to give strength and richness in the analysis.

Disclosing the Findings The outcomes of the research reveal the radicality of the innovative approaches to the curriculum development, the problems that need to be addressed to gain the



maximum impact. The two primary outcomes, academic performance and student engagement are used to group the findings.

Academic Performance

The results in all the three schools showed high improvements in standardized tests on students who were exposed to innovative curricula. Table 2 will illustrate the outcome of the pre- and post-intervention.

Table 2
Pre- and Post-Intervention Standardized Test Scores

Subject	School	Pre-Intervention (SD)	Mean Post-Intervention (SD)	Mean p-value	Effect Size (Cohen's d)
Mathematics	Urban	65.2 (12.3)	72.8 (11.5)	<0.001	0.63
	Suburban	78.4 (10.1)	84.2 (9.8)	<0.001	0.58
	Rural	70.5 (11.7)	76.9 (10.9)	<0.001	0.56
Science	Urban	62.8 (13.2)	71.4 (12.0)	<0.001	0.67
	Suburban	80.1 (9.5)	86.7 (8.9)	<0.001	0.71
	Rural	68.3 (12.4)	75.2 (11.3)	<0.001	0.58
English	Urban	67.5 (11.8)	74.3 (10.6)	<0.001	0.61
	Suburban	82.3 (8.7)	87.9 (8.2)	<0.001	0.66
	Rural	71.2 (10.9)	77.8 (9.8)	<0.001	0.63

The most significant effect was observed in the sciences, with the highest effect in the suburban school where interdisciplinary modules of biology and history generated a Cohen d, 0.71. Observations of the developments in mathematics were found in urban students who were mainly English language learners forming one of the building blocks of the project based learning unit which resulted into the coming up with strategies that identified the real world applications. Technology maximized teaching assisted the rural learners, though it was less beneficial as people had fewer access to the internet.

Student Engagement

The attendance, disciplinary cases, and measures of engagement increased remarkably. The urban, suburban and rural school had a larger percentage of 8, 5 and 6 attending respectively



($p < 0.01$). The number of discipline incidences was actually reduced by 15 percent with the largest percentage being in the urban school (20 percent). These trends were more informed in the qualitative data. Project-based learning was characterized by students more frequently than not as exciting and relevant, and one of the urban-based students referred to it as I used to hate science, however, building a model of a sustainable city made me feel like learning more. The teachers indicated that the interdisciplinary units created collaboration but others did not blend the subjects with ease.

Challenges and Barriers

Despite these successes, implementation had some challenges. Teachers indicated that the absence of professional development was perceived as a barrier to staff life within all schools, and only a half of them were confident in their skills in developing interdisciplinary lessons. It also differed in their resources, namely in the rural school where the uncertain internet was not a determinant in maximizing activities of using technology. There was also the question of equity where the urban students who had less background exposure to technology had to be made to find more assistance to navigate the digital platforms. The findings point to the urgent need in the special measures in order to have the equity in implementation.

Looking back on the Way Ahead.

The findings of the research demonstrate that the strategies of innovative curriculum development influence significantly the academic achievements and the interest of high school students. Project based learning is associated with intrinsic motivation because it is in relation to point of the real world where classroom contents are associated with real world problems whereas interdisciplinary cross-subject approach promotes critical thinking across subjects. In its presence, technology-enhanced instruction provides students with the chances to explore complex concepts in an interactive way. Such findings coincide with the past research, and it emphasizes the role of student-centred pedagogies (Hattie, 2009).

Nevertheless, there are also very significant gaps that were identified in the study. These features are crucially dependent on teacher training and the availability of resources so that when it comes to innovation of the curriculum, the current systems of education have failed in these aspects. The professional development programs should be primarily concentrated on the practical strategies in the integration of the project-based and interdisciplinary approach that will be customized based on the subject knowledge of the teachers and the situation in the school. The policy makers should address the imbalance in infrastructures particularly in low-income and rural areas to be equalized with regard to technological access. The changes in the curriculum reforms are also to be constantly reviewed in order to follow the long-term impacts of the changes, as well as to streamline the implementation strategy.

The outcomes of the research can be implemented to other stakeholders. The areas of progressive curricula that the teacher may adopt include moving slowly starting with small scale project/integrations of technology. School leaders should also invest in professional learning communities to make them ways in which they encourage teamwork among teachers. Policymakers must focus



more on infrastructure and training and more so in underserved communities to abolish equity gaps. The long term effects of this strategies and their generalizability in global contexts should be explored in the future whereby the aim of future study may include cultural as well as systemic differing diversities.

The study becomes an extension of the body of literature on curriculum change having a clear understanding of how the innovative practices can transform the high school education. Being able to overcome the challenges of the implementation and take the advantages of the models of project-based, inter-disciplinary, and technology-enhanced learning, the educators can create the learning environment that inspires and empowers the new generation.

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