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EDUCATIONAL PLANNING

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FROM THE EDITORS

This issue of Educational Planning is highlighted on how school feeding programs and school-college collaborative programs could help student performance and advancement. An educational planning tool is also evaluated in this issue to see how student educational process can be effectively planned. The first article of this issue is focused on examining if the school feeding program works in Ethiopian schools in helping students learn. In the second article, the author examined the outcomes of different school-college collaborative programs to bridge the gaps from high school to college. The third article is an evaluation of the effectiveness of Delphi Technique as an educational planning tool that could be used in many educational planning occasions.

In the first article, Easaw Alemayehu Assefa assessed the impact of school feeding program on the academic performance and class participation of Grade 8 students in the primary public schools in Gulele sub city, Ethiopia. Result of data analysis indicated the positive effect of school feeding program on academic achievement and attendance of Grade 8 students. School feeding was also found to have an effect on the students' attention span.

The paper by Nicholas Brake examined the dual credit and early college program options for school districts planning high school and college collaborations. It utilizes a quasi-experimental design from existing data at a community college that has a well-established dual credit and early college program that offers the students the option of Pell in high school as part of a USDOE program. The results indicate that early college students have significantly higher GPAs and more earn the bachelor's degree compared to dual credit, and traditional postsecondary students.

The study by Arvin Johnson and Tak Chan is aimed at determining the effectiveness of the Delphi Technique as an educational planning tool. The authors investigated the perceptions of sixty-two pre-service school administrators who participated in an actual Delphi Technique implementation process before they were asked to provide their responses to the research survey questions. The findings of the study have indicated the major strengths and weaknesses of the Delphi Technique. Most research participants agreed that Delphi Technique effectively sought consensus among diverse experts. The technique works best in planning situations of seeking for prioritization of possible options. However, they clarified that Delphi Technique did not fit all educational planning situations.

The articles selected in this issue have covered the planning effort in the school business area and school-college collaborative area. All the educational planning efforts have aimed at enhancing student academic advancement. The exploration of the use of an effective planning tool could further facilitate the process of planning for education.

Editor: Tak Cheung Chan
Associate Editors: Walt Polka and Holly Catalfamo
Assistant Editor: Selahattin Turan
February, 2023

ABOUT THE AUTHORS

Easaw Alemayehu Assefa completed his diploma from Kotebe Metropolitan University in geography teaching. Right after his diploma, he pursued his studies at Addis Ababa University and earned his BA degree in Geography and Environmental studies. He also holds Master's Degree from Addis Ababa University in Educational Leadership and Management. Currently, he is a PhD student in educational Policy and Leadership in the Department of Educational Planning & Management, College of Education and Behavioral Studies, Addis Ababa University. Presently Easaw is working as an Academic Director at Amigonian International School. He has served as a teacher and academic director for six different private schools for two decades. Easaw has published twelve articles in a reputable peer reviewed international journals in the field of educational policy and leadership.

Tak Cheung Chan, Professor Emeritus of Educational Leadership, Kennesaw State University, U.S.A. is a graduate of the University of Georgia. He was a secondary school teacher, assistant school principal, school principal, and district office administrator. His previous experience in higher education includes serving as a faculty member of educational leadership at Valdosta State University, Georgia Southern University and Kennesaw State University. His research interests include educational planning, facility planning, school business administration, school finance, and international education.

Nicholas Brake is an assistant professor of educational administration at Western Kentucky University. He has served as a public high school and community college faculty member and administrator, as well as a school superintendent. He teaches courses in educational policy, administration, and public administration at Western Kentucky University.

Arvin D. Johnson is an associate professor in the Department of Educational Leadership at Kennesaw State University, U.S.A. He holds a Doctorate in Educational Leadership from the University of North Florida. He is a former public-school administrator, and his research interests are school principal preparation, professional learning, best practices in curriculum and instruction and educational finance.

DO STUDENTS' ACADEMIC PERFORMANCE AND PARTICIPATION GET BETTER THROUGH SCHOOL FEEDING IN ETHIOPIA?

EASAW ALEMAYEHU ASSEFA

Addis Ababa University, Ethiopia

ABSTRACT

According to the Ethiopia Ministry of Education (2015), school feeding initiatives, such as feeding children in food insecure conditions, providing educational resources, and school meals are essential for supporting access to general education. The purpose of this study was to assess the impact of school feeding program on the academic performance and class participation of Grade 8 students in the primary public schools in Gulele sub city, Ethiopia. A quantitative research method with a quasi-experimental design was used in conducting the study. From Grade 8, two hundred students were selected by using purposive sampling technique. From five out of ten Woredas, the sample primary schools with Grade 8 were selected. Standardized Attentions Check List and the roster cards were used to solicit the primary and secondary sources of data. Difference in Difference linear regression and Independent Sample t- test were applied for analyzing academic achievement, attendance and attention data respectively. Result of data analysis indicated the positive effect of school feeding program on academic achievement and attendance of Grade 8 students. The school feeding also has an effect on the students' attention span. Providing for greater financing and more coverage for the school-feeding program at country level is recommended.

BACKGROUND OF THE STUDY

Over 1.2 billion people are affected by the persistent issue of hunger worldwide (Morrissey et al, 2014). School feeding programs (SFPs) are aimed at reducing temporary hunger, better children's diets and cognitive development, and give families more financial support (Jomaa et al., 2011). When we think of the very meaning of school feeding, it is nothing but the provision of food to school children on the school premises. But, the form of school feeding based on their modalities can be grouped into two categories, i.e., children in school eating and children taking food home for the family (Bundy et al., 2009). Providing high energy food, biscuits or snacks to the attending elementary school students are also the part of in school feeding according to the statement of World Food Program (WFP) (WFP, 2016). School feeding programs are considered as investments in the world's poorest children. Through this program as a catalyst, students can be out of hunger and can come to school to study.

In developing countries, everyday an average of 60 million students go to school hungry (Neeser, 2012). International and local organization policy makers use various mechanisms like social safety nets to minimize the problem of malnutrition and hunger in their countries. To tackle such problem, programs, such as food for education (FFE), are initiatives supported by public or private funding sources (Lawson, 2012). Since 2009 the world food program is working on the integration of school feeding program on the comprehensive and holistic system of government policies in education rather than focusing food as project approach (Alderman et al., 2012). The policy directive included a reformed focus on government ownership by having a strong local procurement (Abiy, 2017).

Linking with small holder farming and committing to a better nutrition's food baskets, the Home-Grown School Feeding Program (HGSFP) (WFP, 2016) is targeted to increase the students school performances, class attention, attendance, enrollment and retention rates (Bundy et al., 2009; Songa, 2011). The essential of better food and better learning capacity of students is emphasized by the Ethiopian government with initiatives of school health strategies. By the same token, various studies have also shown that the students' aptitude, concentration and attentiveness can be positively affected by food nutrition (Zenebe et al., 2018). Food in school can also help improve school attendance and decrease dropout (Kazianga et al., 2009).

An Ethiopian school health strategy is to recommend that schools need to promote a better nutrition practice of governmental and non-governmental organizations to integrate school feeding programs to reach the children and youth (MOE, 2008). It is true that children can be attracted to school if there is a strong implementation of school feeding programs (WFP, 2016). Since 2011, the Addis Ababa school feeding program has been operated by Yenate Weg Charity Organization providing meals for more than 25,000 school children. Food items distributed to school children were fresh traditional meals, locally purchased, and were more diversified than the food provided by the World Food Program. Additionally, Yeneat Weg Charity Organization has offered employment opportunities to 849 food cooking women living near the school areas (Abiy, 2017).

REVIEW OF LITERATURE

The urban food item price inflation affects urban school student's parents to fulfill their children's food need. However, a good number of government data failed to tell the urban school students' food insecurity status. According to the study done by Addis Ababa Women and Children Affair Bureau (AABWC) and Addis Ababa Education Bureau (AAEB), 26.5% of vulnerable primary school students eat once a day and 15.8% of them do have an experience of not taking any food for the whole day. The study also showed that 14.7% of the students were beggars. The information was gathered from 220 primary public schools and from 11,682 students in the capital city, Addis Ababa. (AABWC, & AAEB, 2015).

Various scholars have done their research on the negative impact of malnutrition and food insecurity on the students' academic performance. Belachew et al., (2011) showed by their findings as food insecurity affects academic performance and school attendance of the students negatively at Jimma Zone. These researchers applied the 2009 two consecutive surveys of a 5-year longitudinal family investigation and addressed on 2,100 adolescents in the age group of thirteen up to seventeen. The insecure students were absent from the school repeatedly where the researchers compared with similar age students with secured food supply.

Similarly, the negative effect of undernourishment on the students' average score, memory, attention and general school activities were studied by another researcher (Beminet, 2015). Income, occupation of the parents, household size and the sex of the household head affect the level of under nourishment. This study used qualitative method with 13 students who were learning at "Atse Libnedingel" primary public school in Gulele sub city of Addis Ababa. As a result of the study, the author recommended to follow school feeding program as a good strategy for addressing the under-nutrition problem among primary school students.

According to Lawson (2012), Food for Education Program (FFE) has encouraged parents to send their children to school. As a result of reviewing literature from twenty-six countries, he claimed that FFE helped improve school enrollment and attendance. He also suggested that FFE can also improve student performance and reduce dropout rate. He also verified that the health status of the targeted students can also be improved due to the impact of Food for Education program.

The impact of school feeding on the students' academic achievement was studied by Pope, Prollch and Haile in 2016 and it was found that providing meals both at school and at home has long lasting effect on the concentration power, reading, writing and arithmetic skills for students aging from seven to thirteen. Data in this study were collected from four regions of Ethiopia (Amhara, Tigray, Oromia and Southern Nation's Nationalities and Peoples) with the household survey conducted by the World Food Program of Ethiopia in collaboration with Mannheim University in 2010.

STATEMENT OF THE PROBLEM

The review of literature has shown somewhat a positive impact of the school feeding programs on the academic achievement of the students. However, the findings were superficial with no in-depth elaboration. This research has attempted to assess the impact of school feeding programs using difference in difference estimator at least to assess the listed three basic research questions to minimize the limitation of using cross sectional and time series quasi-experimental designs. Thus, this research has tried to evaluate how school feeding programs could impact the student academic achievement and participation in school in Gulele sub city in connection with the concept of the economics of education principles. The researcher hope that the findings of this study could lead to drawing an idea on the relevance and effectiveness of school feeding program that informs programmatic actions and policy guides to improve the program in the future.

RESEARCH QUESTIONS

1. What is the impact of school feeding program on the Grade 8 students' academic achievement at Gulele sub city's primary public schools?
2. What is the impact of school feeding program on the Grade 8 students' attendance at Gulele sub city's primary public schools?
3. What is the impact of school feeding program on the Grade 8 students' attention at Gulele sub city's primary public schools?

SIGNIFICANCE OF THE STUDY

Even though the Yenate Weg school feeding program was here in Addis Ababa city some 6 years back, the impact of the program on the student's academic achievement, attendance and attention was not evaluated by experienced researchers and by the project implementers themselves. This research will benefit schools and other concerned body to get involved in the issue of school feeding program on the policy and on research areas since the program focused vulnerable school aged children. Additionally, this research may provide useful suggestions and recommendations for school feeding program implementers and other interested stakeholders to improve the effectiveness of the current program.

OPERATIONAL DEFINITIONS

School Feeding is the provision of food to school children on the school premises.

School Performance refers to the extent to which a student has attended their short- or long-term educational goals or completion of educational benchmarks.

Academic Achievement is the level at which a student performs in education to achieve or score the entry point or pass mark of each grade according to the standard set by Ministry of Education or the Regional Bureaus of Education. It is measured in average pass marks awarded by the school.

Attendance Rate measures the percentage of students who are attending the classes within a given time frame.

Attention Measure is measuring how fast students can orient or shift their attention to a particular idea in response to a cue. In this research, Attention Check List (ACL) developed by Dr. Das was used to measure the student attention span by twelve items in four scales. (Papadopoulos, et al, 2002).

RESEARCH METHOD

A quantitative, quasi-experimental design was used in this study. A standardized Attention Check List (ACL) and the 2010 and 2011 students' pre-existing roster analysis was used to measure the attention span and academic performance of the students after attending the school feeding program in the selected government primary schools. Here, the roaster analysis was considered as secondary source and the attention checklist was the primary data source.

Research Design

Since the study was focused on evaluating the impact of school feeding program on the Grade 8 student performances of primary schools, quasi-experimented design approach was used having experimental and comparable groups at the same time. In doing so, experimental group and comparable group cannot be assigned randomly. Therefore, the researcher tried to match the experimental group with a comparison group from similar class that of Grade 8 and similar number of students, i.e., 100 as experimental and 100 as comparable group assigned. Additionally, the basic two groups "Pretest – Posttest" design is identical to that in pure experimental research in order to evaluate the very impact of school feeding program on the Grade 8 students' academic performance, attention span and attendance.

This quasi-experimental design used two sub-designs named as Difference in Difference (DID) to assess academic achievement and attendance and with in – without design (the two-group posttest only design) to evaluate the attention span of the Grade 8 students. In the DID design, the 2010 and 2011 roster data were used by having two comparable groups. DID is a stronger impact estimator than a single difference or within- without design which only compares the difference in outcomes between treatment and comparison groups (White & Sabarwal, 2014). DID controls all the characteristics that do not change over time either observable or unobservable (Pomeranz, 2015).

Description of The Study Area

Gulele sub city is one of the sub cities here in Addis Ababa city Administration. This sub city was established in the early Nineteenth Century in the northern part of the city having ten Woredas. In this sub city, there are 43 public primary schools, 464 sections, 21,461 primary school students

(12,321 boys and 9140 girls), and 1003 public primary school teachers in 2018/19 academic year. Thus, the primary school teacher student ratio was (1:21) and section student ratio was (1:46)

Sampling Technique

In this research, much emphasis was given to a quantitative approach and quasi-experimental design with two groups of samples. The experimental and comparable groups were selected by employing a purposive sampling scheme accordingly in eight primary schools. One hundred students who were in Grade 6 and 7 and currently promoted and attending in Grade 8 were chosen by calculating the 10% of the food feeding program attendances as experimental group. Another one hundred students who were learning in the selected schools since the very start at school feeding program by **"**Yenat Weg" charitable organization served as the controlled group. The sample schools were selected from five out of ten administrative Woredas. (See school demographics in Table 1.)

Table 1

Selected Primary Public Schools Data

Name of Selected Primary Public Schools	Number of Grade 8 Students			Number of Grade 8 Students Taking School Feeding			Number of Grade 8 Students Not Taking School Feeding		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
No 1 Primary Public School	197	225	422	121	74	195	76	151	227
No 2 Primary Public School	102	126	228	50	60	110	52	66	118
No3 Primary Public School	139	157	296	68	64	132	71	93	164
No 4 Primary Public School	26	29	55	11	13	24	15	16	31
No 5 Primary Public School	44	130	174	21	71	92	23	59	82
No 6 Primary Public School	28	52	80	14	22	36	14	30	44
No 7 Primary Public School	127	180	307	64	98	162	63	82	145
No 8 Primary Public School	78	88	166	29	61	90	49	27	76
Total	741	987	1728	378	463	841	363	524	887

All the 100 comparable group of Grade 8 students are purposively selected since they were registered in the waiting list of additional school feeding needy students in the sub city education office. The reason why the researcher chose both the experimental group (100) and the comparable group only those permanent students who were learning in the selected schools for the past three years is for the sake of getting base line data from the roster analysis which was helpful to follow up with their progress in their academic attendance and attention.

Sample Size

A sample size between 10% and 20% of the total population is representative (Gay & Airasian, 2003). Similarly, the researcher took 13% and 14 % of the experiment and the comparable Grade 8 students totaling 200 (100 for the experiment group and 100 for the controlled group).

Data Collection Instrument

In this school feeding program impact analysis research, the data were selected by using both primary and secondary data sources. The standardized attentions check list (ACL) was the primary data source and the students' 2010 and 2011 roster card was the secondary source. The change in the academic performance and attendance was seen using the roster card data obtained from the selected schools' record offices.

Roster Card

The researcher used the 2010 and 2011 rosters of Grade 8 students of the selected 8 sample schools. There was no need of taking the 2012 Grade 8 students roster card since the 2012 Grade 8 student were grade 6 and 7 during 2010 and 2011 respectively.

The Standardized Scale

Doctor J. P. Das in 1989 has developed a standardized instrument called Attention Check List (ACL) which was useful to measure attention span. This standardized instrument was used by the researcher to measure the attention span of the selected 100 experimental and 100 controlled group of Grade 8 students. Twenty-four subject and home room teachers also participated in administering the measuring instrument. The maximum score of the measuring scale is 46 and the minimum score is 11.

Data Analysis and Interpretation Procedure

The Difference in Difference linear regression analysis was performed for controlling of difference in initial characteristics between comparable and treatment groups and for the changes in exogenous variables. Regression analysis was done to see the difference in academic and attendance before and after the implementation of the school-feeding program.

To test the impact of school feeding program on the Grade 8 students attention measure, an Independent t – test analysis was used. This was done by the assumption of no significant difference between the mean value of school feeding program participants and that of the non – participants.

The computer software, SPSS version 24.00 and STATA 13 were used to transfer the inferential statistical data to be analyzed. The effect of the school feeding program on Grade 8 students' academic performance and attendance were generalized. Similarly, The Independent t-test analysis was calculated by using SPSS to determine if there was any significant difference in student class attention span between the experimental group and the controlled group.

Ethical Considerations

Ethical issues are often demanded to be resolved by procedures such as voluntary participation, informed consent, absence of risk or harm, confidentiality and anonymity. Creswell (2003) described research ethics as referring to the moral dimensions of researching about what right and wrong are engaged in research. With this regard, the researcher has in person communicated with the selected 8 primary school principals and 24 teachers about the purpose of conducting this study and the issue of anonymity. On top of using fictitious names for the schools, the researcher has also used official

support letter of Addis Ababa University to get the permission of the selected 8 schools in the sub city. In addition, the school students, teachers and record offices were informed that the information they provided would be kept confidential and undisclosed to anyone else including members of their school community.

DATA PRESENTATION AND INTERPRETATION

Participants' Demographic Characteristics

From 200 students of Grade 8, 100 students were in the treatment group and the remaining 100 were in the comparable group. Below in Table 2, the demographic characteristics of Grade 8 students in the treatment and controlled groups are presented.

Table 2

Participants Demographic Characteristics

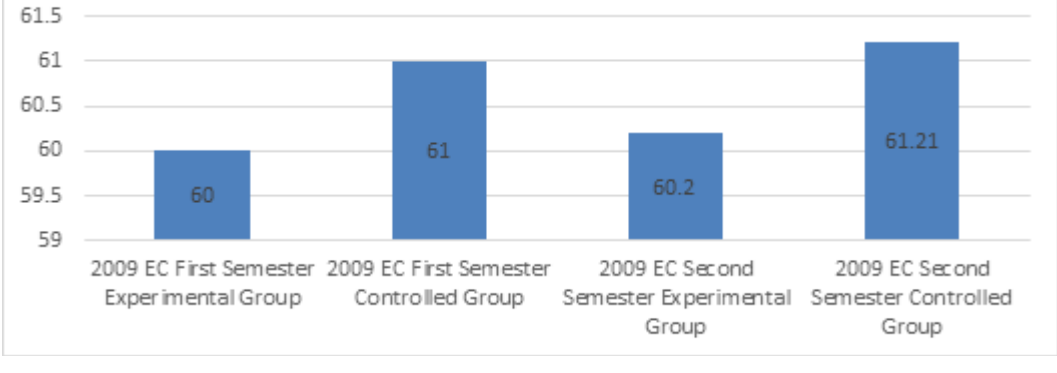
Demographic Characteristic	Category	Groups			
		Controlled Group		Experimental Group	
		NO	%	NO	%
Sex	Male	67	67	52	52
	Female	33	33	48	48
Age	13-15	64	64	59	59
	16-18	36	36	41	41
Grade	8	100	100	100	100

From the above Table 2, we can see that male Grade 8 students had a larger number in both controlled and treatment groups than their female counterparts. The mean age in the study group was 15.5. In terms of age, there was no significant difference between the two groups of students. This is crucial for determining the study's goals.

Average Scores Before School Feeding

Figure 1

Year average of 2009 (score Source: Roster of 2009)

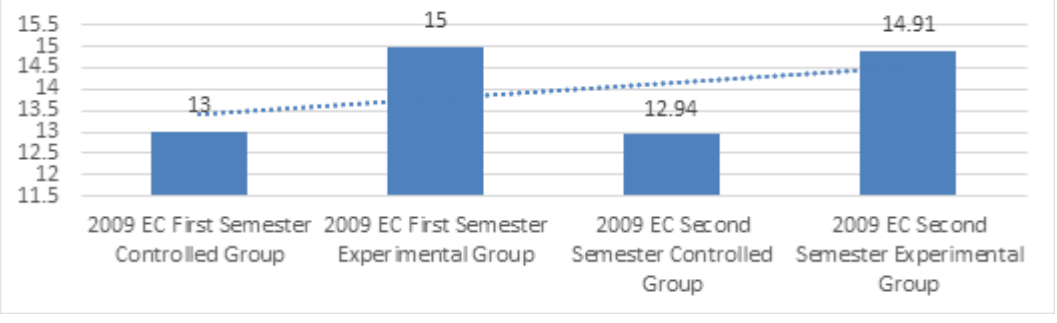


As it is kept in the figure above, the main score of the experiment group in the second semester of 2009 increased by 0.2 mean differences**.** Similarly, the comparable groups have shown an increment of 0.21 mean values. These mean values are implying that both the experimental and controlled groups had identical average score before the school-feeding program started.

By the same token, the figure below shows the movement of absence score using parallel trend assumption by referring the 2009 academic year data for both the comparable and experimental group.

Figure 2

The movement of absence score before the implementation of the treatment in 2009



As it can be clearly seen from the Figure 2 above, a decrease of (0.06) absenteeism from the controlled group is observed during the first semester of 2009. Similarly, the experimental group has shown a decreasing of (0.09) mean score absenteeism for the mentioned consecutive semesters i.e. (2009). By reviewing the above finding, one can easily notice that before the very start of the school feeding program at the study area, the experimental group and the controlled group had almost similar class attendance records.

Average Score and Absence Score Movement per Group and Year

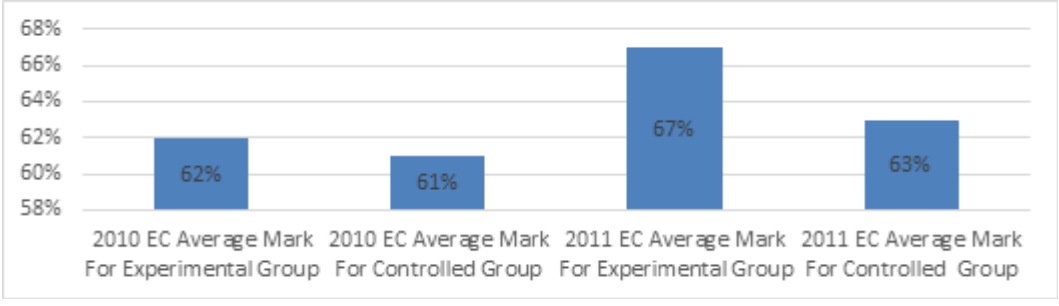
In the presented two figures below, a descriptive analysis of both average and absence score of change done. On top of this analysis, more scientifically, these are analyzed using Different in Different estimator (DID) which are presented later. The DID method is a better way to identify the net difference and the school feeding program level of significance.

Average Scores of Movements per Group and Year

By referring to the students' roster result, for an academic year of 2010 and 2011 respectively, the average score changes were calculated and analyzed for both comparable and experimental group. Consequently, the Figure 3 below shows the change shift pattern.

Figure 3

Average scores movement per group and year

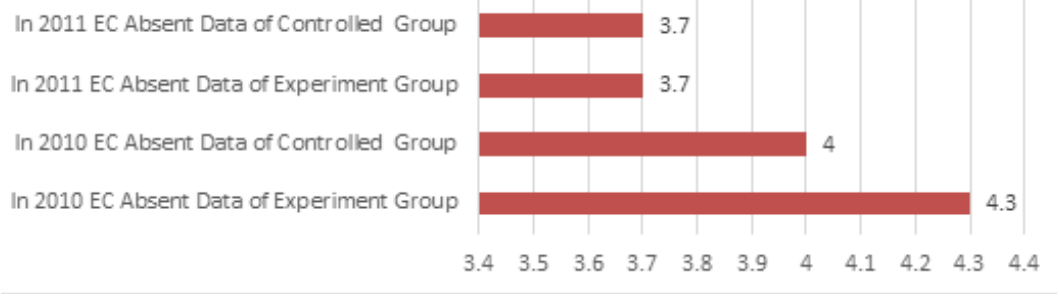


As one can easily see the above Figure 3, the average score result for both groups increased significantly. However, the increasing rate for the experimental group is 5% since there is a clear shift of 62% to 67%. And, by the mentioned year, the comparable group also had indicated an increase of 2%, which is from 61% to 63 %. Therefore, since there is a remarkable shift particularly for those who used the school meal, the effect of the school feeding program cannot be ignored.

Absence Score Movement Per Group and Year

Figure 4

Absence scores movement per group and year



In the above Figure 4, for both experimental and controlled groups, the absent score data were analyzed. And, as the figure clearly shows both the experimental and controlled groups have shown a decreasing rate of absenteeism i.e., 0.3 for the comparable group and 0.6 point for experiment group. Here, as there is a double change difference for the experimental group, the very effect of providing school meal cannot be overlooked.

Average Score Difference between Two Different Periods per Group

By referring again to the data from 2010 and 2011, the average result difference for both the experimental and controlled group were analyzed so as to observe the movement of change during the mentioned years. In Table 4 below, the very result of the analysis is well presented.

Table 4

Average score difference between two different periods per group

Academic Year with Average Score			Groups	Number of the Group
2010 EC	2011 EC	(d)		
62	67	5	Experimental Group	100
61	63	2	Controlled Group	100

Referring to Table 4 above, in the academic year of 2010 and 2011, the experimental group (those who were using school feeding) has shown an average mark improvement of 5%. Similarly, although comparatively speaking with experimental group the increasing is lesser, the controlled group (those who were not using the school feeding) also have shown a 2% performance improvement in the identified years.

Absence Score Difference between Two Different Periods per Group

For the academic year of 2010 and 2011, the absence score improvement and shift for both experimental and controlled groups were analyzed by using the data found in the roster. The analysis result is presented in Table 5 below.

Table 5

The two groups Absence score difference

2010 EC Absent Score Difference in Semester Based Time			The Two Groups	Absent Score Difference in Two Years, Time		
1st Semester	2nd Semester	(d)		2010 EC	2011 EC	(d)
1.56	1.49	0.07	Experimental	1.525	1.32	0.205
1.39	1.36	0.03	Controlled	1.375	1.32	0.055

As it is clearly indicated, in the above Table 5, the absent score substantially differed in both groups. Consequently, the experimental groups had an absent score difference of (d= 0.07 to d= 0.205). Similarly, the controlled group had an absent score difference value of (d= 0.03 to d= 0.055). Since this difference between the two groups is statistically large, there is a remarkable uniqueness at both groups.

Difference in Difference Analysis of Academic Achievement

In a basic inferential statistics concept, Difference in Difference (DID) is one of the analysis methods that allow researchers just to find out the very effect of a given treatment by clearly examining the pretreatment background case of the study groups. In connection with this, Table 6 below shows the result of DID linear regression analysis using time and group variables for a simple case column.

Table 6

DID Regression results for average score

Variables	Coef.
Time	0.382
	(0.24)
Group	2.24*
	(-2.41)
DID	0.046
	(0.29)
P>| t |	0.043
_Cons	51.81
	(42.33)
N	532
t statistics in parentheses ***p*< 0.05	

As it is indicated in Table 6 above, gradually, the time variable does have differences, which are not connected to the treatment. This variable group tells us making pretreatment group was essential. Regarding the time value significant level, statistically speaking, it was not significant at a .05 level. However, it is technically significant for the group alone. From this statistical data, we can conclude that for the base line data of 2009, there was significant mean score initial difference, which are 61.6 for experimental group and 62 for comparable group. Surprisingly speaking, the difference between the mentioned groups was amazing. It tells technically that as the given treatment was not random, the result of analysis is affected. The DID method analyzed the change of mean difference rather than the groups raw mean score. Since there is a coefficient value of 0.046, P= 0.29, the estimated DID coefficient for the school feeding program is POSITIVE and SIGNIFICANT for the average score difference after the very implementation of the program. Again, statistically speaking, having such value is interpreted as the school feeding program provides relatively less as a catalyst and incentive factor for the experimental group average score improvement.

Difference in Difference Analysis of Attendance

For performing the attendance change of the students, the DID linear regression method was also performed in order to estimate the net effect of time both for experimental and comparable groups. Below, in Table 7, I have clearly provided the DID analysis of attendance.

Table 7

DID regression results for attendance score

	time	group	DiD	p>| t |	_cons	*N*
Coefficient	0.023	-0.003	0.044	0.041	0.453	532
	(0.431)	(0.31)	(0.021)		(432.4)	

As indicated in Table 7, there is a positive and significant estimated coefficient with a statistical numeric value of coefficient of DID = 0.044 and p =0.041 which tells us there was an improvement of student's attendance right after starting to use the school feeding program.

Independent t-test Analysis for Attention Measure

Statistically, by using sample t test, it is possible to test the effect of school feeding program on attention span of the students. Consequently, as it is presented in Table 8 below, by calculating the mean score of difference and standard deviation values for the two groups, the needed t- test analysis with its result is performed.

Table 8

Number of grade 8 students and groups' mean of attention

The Two Groups	N	Mean	SD
Experimental Group	100	43.21	6.42
Controlled Group	100	41.33	5.91

The Independent t- test value presented in Table 8 was performed by making an assumption of no significant difference between both the comparable and experiment groups by considering the little works which was done in school feeding program previously here in Ethiopia. Consequently, the mean numeric value and standard deviations are M=43.21, SD =6.42, N= 100 and M=41.33, SD =5.91, N= 100 are the final values for both experimental and comparable groups respectively.

Table 9

Independent t-test analyses (equal variance assumed) for attention

t	Sig. (2-tailed)	Mean Difference
0.024	*0.012*	*0.012*

Concerning attention span and SFP, a mean difference of (d=0.012) is observed. And since p<0.05 value, statistically, two tailed significant effect is found by employing that school feeding program do have strong contributions for the program participants. In simple term, from the result of the analysis, we can observe that there is a causal relationship between school feeding program and attention span.

MAJOR FINDINGS OF THE STUDY

After completing the major analysis part in above, the major findings of the study on school-feeding program are presented in this session. This study was designed to examine the effect of SFP on the Grade 8 students' academic achievement, attendance and attention. Consequently, the following parts will discuss the findings of the research by making a logical connection with the related theoretical explanations, previous similar empirical work on this specific topic and in line with the specific basic research questions.

Between the experimental and comparable groups, if there is an identical movement on the parallel trend assumptions, it is possible to use Difference in Difference (DID) regression analysis with other descriptive measures (White & Sparawal, 2014). Hence, in this school feeding impact assessment research, before the program implementation or before using school meal, the test of parallel assumption has indicated that in similar fashion, the two groups were moving on the variables of average and absence score. Besides, in sex, age and grade level too, demographically speaking, proportional distribution is found.

Numerous studies have shown that having a balanced diet meal affects students' ability to attend school on a regular basis, perform better, and other things of the like. Conversely, when there is a shortage of food and malnutrition, students will find it difficult to attend school consistently, and their attention span and academic ability will suffer. The intervention of the school food program had a considerable favorable influence on the academic success of the study participants in Gulele Sub city, according to this study. This suggests that program participants benefited significantly from the school food program, especially in terms of achieving the necessary academic goals.

This study attempted to examine how the school food program affected the Grade 8 students' attendance in detail during the specified academic years, as stated in the fundamental research question section. By comparing what was provided before the school feeding program with what is currently provided, the research findings indicated that the experimental group of children have experienced a pretty excellent improvement as a result of the SFP. The SFP significantly contributes to improving student attendance at school and can reduce absenteeism rates, according to the statistical findings that are shown in the analysis section.

This study has produced findings by demonstrating the considerable shift in attention span on the part of the experiment group, which are similar to the fundamental notions mentioned above. This finding was reached because, informally and with the use of reliable statistical techniques and a psychological standard attention assessment, the researcher was able to determine that the SFP is effective in increasing pupils' attention spans.

DISCUSSION

School Feeding Program and Academic Achievement

A good number of studies have indicated that getting a balanced nutrition has a long-lasting impact for children to attend school regularly and to have improved performance. On the other hand, where there is lack of food and malnourishment, children will have a problem to attend class regularly, their attention span and academic performance will be lower. According to Kazianga et al (2009), Vermeersch and Kremer (2004) and Neeser (2012), sufficient and balanced school feeding program helped children to have a better educational performance. As the findings of this study indicated

that the intervention of school feeding program showed significant positive effect on the academic achievement of the study participants in Gulele Sub city. This implies that the program participants gained a significant benefit of school feeding program particularly for the needed academic achievements. Thus, the findings of this study echo the prior studies done by Ahmed (2004), Afridi et al (2013), and Chepkwony et al (2012). These researchers have concluded that providing school feeding has a positive impact for the students' academic performance. However, at the same time, the Grade 8 students themselves and other concerned stakeholders also contributed much to the students' academic improvement.

As can be seen from the result of the statistical analysis, the experimented Grade 8 students showed a better average academic performance than the controlled group Grade 8 students. This finding is again similar with the study of Hinrichs (2010) which indicated that the school feeding program impacted various educational performances for different class levels. In line with this, similarly, Kaziang et al (2009) have also shown students' performance improvements due to the usage of school feeding program. However, Kaziang`s study showed no improvement on attendance of students. Here, in our study case, other variables affecting the performance of students have not been investigated.

By making the comparison of the student academic performance, it is confirmed that the gain of 0.8 for the experiment group and 0.1 for the controlled groups were observed, definitely right after using the school meal. If the school-feeding program continues, student performance will continue to improve. Some of the drawbacks of the school feeding program can be worked on over time.

School Feeding Program and Attendance

The findings of this research showed that the SFP has resulted in relatively a good improvement on the attendance of the experimental group of students. The statistical data presented clearly indicated that the SFP has a significant contribution for improving the students school attendance as well as the absenteeism rate. Alderman and Bundy (2012) and Ermias (2008) have done somehow similar research on this topic and, on the parameter of attendance improvement, all have said that the SFP has a significant effect on improving the students' attendance rate.

School Feeding Program and Attention

Many scholars have agreed that there is a strong causal correlation between the school feeding program and attention span. On this topic, Kazianga (2009) stated that hungry students had difficulties in focusing and performing complex tasks when compared with those who had a balanced diet. Poor nutrition among children affects their cognitive function and hence limits them not to be active participants in the school. Abraham Maslow also argued that from the psychological point of view human beings cannot be well concentrated and attended school unless their basic nutritional need is fulfilled. The findings of this study agree with the many known scholars that the school feeding program is helpful for improving the attention span of the students.

CONCLUSION

By using a strong statistical test, this research has been made to assess the effect of school feeding programs on the educational performance of Grade 8 primary public-school students who were initially benefiting from Yenat Weg charity organization in Gulele Sub city before the formal start of SFP by Addis Ababa city administration officially in 2012. In doing so, the researcher did his level best by having a similar comparable group by controlling sex, age, and grade distribution

and providing both the experiment and control groups similarly on their average and attendance score. By the same token, regarding the attention span of the two groups, before doing the research, by making prior correlation analysis from their average score recorded on their roster, a careful background check was done. With respect to educational progress, attendance rate, and attention span, it is reasonable to assume that the impact of SFP is responsible for the observed difference between the experiment and control groups. This conclusion is supported by the study's utmost professionalism.

Thus, the finding of this research showed that the already started school-feeding program has positive effect on the Grade 8 academic achievements and school attendance. And because there were registered valid numerical data, this outcome was determined statistically to be significant. Similarly, in relation to the improvement of the attention span of the selected school feeding beneficiary students, relatively a good change had been observed. And, we can say that the SFP has served as catalyst and motivational tools for the improvement of the students' attention span level.

Generally speaking, to the best of this research data finding, the SFP has a significant impact on the students' academic performance, attendance and attention rate in addition to minimizing the hunger and malnutrition problem of the city`s students. As it was presented clearly in the general finding part, the mentioned experiment groups of Grade 8 students have shown a valid difference from their controlled groups counterpart on their learning improvement, attendance and attention span condition. The very difference of these students before starting the school feeding program was totally different and the experiment groups have had a lesser average mark, attendance problem that is already recorded on the roster card. However, regarding the performance average result of the controlled group, since their average result and attendance is recorded in the students' roster, they have shown a bit change only as opposed to the SFP beneficiary students. This finding definitely will lead us to conclude as the School Feeding Program has a significant effect on the teaching and learning process.

It was not possible to employ difference in difference (DID) design to measure attention due to impossibility of getting baseline data regards to attention. Therefore, the researcher used the cross sectional (within - without) design by assuming as if no difference between the mean value of school feeding participants and non-participants. The researcher tried to do his level best to minimize the limitation of within – without approach by dividing the groups in different strata and tried to match the experimental and comparable groups.

RECOMMENDATIONS

Considering the effectiveness of the school-feeding program, the author would like to make the following recommendations:

1. Policy makers, donors, school staff and legislators need to watch for the implementation of the school feeding program for improvement.
2. Research work on the school feeding program in the Addis Ababa City Administration needs to be continuously performed.
3. Sufficient public funding needs to be allocated to continue to enrich the school feeding program.
4. Government policies need to be made to have the school feeding program to cover the entire country including the poor rural areas.

REFERENCES

Abiy, Y. (2017). *The effect of school feeding program on the school performance of primary public school children in Arada Sub City, Addis Ababa*. Unpublished MA Thesis, Addis Ababa University, Ethiopia.

Afridi F., Barooah B., & Somanathan R. (2013). *School meals and classroom effort*: Evidence from India. Working paper, International Growth Center, Delhi, India

Ahmed, A. U. (2004). *Impact of feeding children in school: Evidence from Bangladesh*. *Washington, DC: International Food Policy Research Institute*.

Alderman, H., & Bundy, D. (2012). *School feeding programs and development: Are we framing the question correctly?* http://wbro.oxfordjournals.org/ at Addis Ababa University Libraries.

Alderman, H., Gilligan, D. O., & Lehrer, K. (2012). The impact of food for education programs on school participation in northern Uganda. *Economic Development and Cultural Change, 61*(1), 187-218.

Belachew, T., Hadley, C., Lindstrom, D., Gerbilarium A., Lachat C., & Kolsteren. P. (2011). Food insecurity, school absenteeism and educational attainment of adolescents in Jimma Zone Southwest Ethiopia: A longitudinal study. *Nutrition Journal, 10(29), 1-9.* DOI: 10.1186/1475-2891-10-29

Beminet, S. (2015). *Assessment on the effects of child undernourishment on the academic performance of students in governmental primary school: The case of "Atselibnedingel" Governmental Primary School in Addis Ababa.* Master's Thesis, Addis Ababa University, Addis Ababa, Ethiopia.

Bundy, D., Burbano, C., Grosh, M., Gelli, A., Jukes, M., & Drake, L. (2009). *Rethinking school feeding: Social safety nets, child development, and the education Sector*. Washington DC: World Bank.

AABWC, & AAEB, (2015). *A survey study to assess the situation of primary school students who are attending school in difficult situations*. Unpublished manuscript, Addis Ababa Education Bureau & Addis Ababa Women & Children Affair Bureau, Addis Ababa, Ethiopia.

Chepkwony, B. C., Kariuki, B. M., & Kosgei, L. J. (2013). School feeding program and its impact on academic achievement in ECDE in Roret Division, Bureti District in Kenya. *Journal of Emerging Trends in Educational Research and Policy Studies, 4(3),407-412.*

Creswell, J. H. (2003). *Research design: Qualitative, quantitative, and mixed methods approach*. Thousand Oaks: Sage.

Ermias, A. (2015). *The impact of school feeding program on students' academic performance: the case of selected elementary schools in Debrelibanos wereda, Oromiaregion* (Master"s Thesis, Addis Ababa University, Addis Ababa, Ethiopia)

Gay, L. R., & Airasian, P. (2003). *Educational research: Competencies for analysis and application*. (7th ed.). Pearson Education.

Hinrichs, P. (2010). The effects of the national school lunch program on education and health. *Journal of Policy Analysis and Management, 29(3), 479-505*.

Jomaa, L. H., McDonnell, E., & Probart, C. (2011). School feeding programs in developing countries: impacts on children's health and educational outcomes. *Nutrition reviews*, *69*(2), 83-98.

Kazianga, H., Dewalque, D., & Alderman H. (2009). *Educational and health impacts of two school feeding schemes: Evidence from a randomized trial in rural Burkina Faso*. Policy Research Working Paper No. 4976. Washington, D.C.: World Bank

Lawson, T. M. (2012). *Impact of school feeding programs on educational, nutritional, and agricultural development goals: a systematic review of literature.* (Master"s Thesis, Michigan State University, USA)

MOE (2012). *National school health and nutrition strategy*, Ministry of Education, Addis Ababa, Ethiopia.

MOE (2015). *Education Sector Development Program V (ESDP V)* 2015/16 - 2019/20 G.C, *Program action plan*. Ministry of Education, Addis Ababa, Ethiopia.

Morrissey, T. W., Hutchison, L., & Winsler, A. (2014). Family income, school attendance, and academic achievement in elementary school. *Developmental psychology*, *50*(3), 741.

Neeser, K. (2012). *Home Grown School Feeding: Smallholder farmers providing local food for local children*. Imperial College, London.

Papadopoulos, T. C., Das, J. P., Kodero, H. N., & Solomon, V. (2002). Assessment of attention in school children: Teachers' ratings related to tests of attention. *European Journal of Special Needs Education*, *17*(1), 15-32.

Pomeranz, D. (2015). *Impact evaluation methods in public economics*: *A brief introduction to randomized evaluations and comparison with other methods*, Working Paper 16-049. http://nrs.harvard.edu/urn-3:HUL.InstRepos:25757697

Songa, W. (2011). *School feeding programmes in Kenya.* Paper presented in Levaraging Agriculture for Improved Nutrition and Health International Conference. India: New Delhi.

Vermeersch, C., & Kremer, M. (2004). *School meals, educational achievement and school competition: Evidence from a randomized evaluation.* Policy Research Working Paper, No. 3523, Washington, D.C.: World Bank.

WFP (2008). *Children in Local Development [CHILD] –Food for education program* (2nd Ed.). Addis Ababa, Ethiopia

WFP (2016). *Feeding minds, change lives: School feeding: The millennium development goals and girls' empowerment.* http://www.wfp.org

White, H., & Sabarwal, S. (2014). *Quasi-experimental design and methods*. Methodological Briefs: Impact Evaluation 8, UNICEF Office of Research, Florence.

Zenebe, M., Gebremedhin, S., Henry, C. J., & Regassa, N. (2018). School feeding program has resulted in improved dietary diversity, nutritional status and class attendance of school children. *Italian Journal of Pediatrics, 44*(1), 1-7.

EARLY COLLEGE VS. DUAL CREDIT: PLANNING THE MOST EFFECTIVE HIGH SCHOOL – COLLEGE COLLABORATION BASED ON STUDENT OUTCOMES

NICHOLAS BRAKE
Western Kentucky University. U.S.A.

ABSTRACT

This research examines the dual credit and early college program options for school districts planning high school and college collaborations. It utilizes a quasi-experimental design from existing data at a community college that has a well-established dual credit and early college program that offers the students the option of Pell in high school as part of a USDOE program. The study uses logistic regression and covariate analysis of students in an early college program comparing their college GPA, cumulative credits, ACT scores, and bachelor's degree attainment to dual credit students as well as traditional postsecondary students from three comprehensive high schools that matriculated to the college after high school. The results indicated that early college students had significantly higher GPAs and more of them earned the bachelor's degree as compared to dual credit, and traditional postsecondary students.

BACKGROUND

A significant body of research indicates that a high school diploma is not sufficient for the skills required in most jobs of the 21st century (Carnevale et al, 2018). As educators seek to provide students with the academic, employability, and occupational skills needed to succeed in the workplace, an emphasis on life-long learning and training beyond high school is critical. One means of helping students learn these needed skills and experience postsecondary training is through dual credit courses and early college programs.

Over the past few decades, the boundaries that separate secondary and postsecondary education have increasingly blurred as more high school students enroll in college before they graduate high school (Taylor et al, 2022). This research is intended to help school and district leaders and educational planners evaluate and plan the most effective options for high school and college collaboration by comparing the student outcomes in dual credit as compared to early college at a well-established program in a community college.

National estimates suggest about 1.4 million high school students—or 9% of all high school students—are enrolled in college courses each year, but this number has grown tremendously in recent years. The growth of dual enrollment programs is difficult to assess at the national level due to limited data, but state-level data often show astounding growth (Taylor, et al 2022).

In dual credit, a student is enrolled in a course which allows him/her to earn high school credit and college credit simultaneously. This course may be taught on a college campus, on a high school campus, online, or at an area technology center, but it will be in conjunction with a college or university. Dual enrollment is very similar to dual credit. However, with dual enrollment, the student will actually be enrolled in both high school and college. The classes are nearly always taught on the college campus and the student will often be taking multiple college courses. Dual enrollment programs allow high schools and community colleges to share limited resources while offering students opportunities to take college classes, explore careers, save money, and shorten their time to a degree (NACEP, 2022). Once intended for high-achieving students, dual enrollment is now

perceived as a means of helping more students, especially low-income students and first-generation college-goers, get and stay on pathways to postsecondary attainment (NACEP, 2022).

The terms dual credit, dual enrolment, and concurrent enrolment are commonly used to refer to high school students taking college courses. States and localities use different terms, and these terms may have different meanings by location. This paper uses the term dual credit to include all types of programs and courses that enable high school students to enrol and earn college credit.

Unlike dual credit or dual enrolment programs, where students take college courses as part of their high school schedule either on campus or at their high schools, early colleges involve students attending college fulltime on campus with courses taught by college faculty during the last two years of high school. Early college high schools and early college programs combine high school and the first two years of college into a coherent educational model. By minimizing the physical transition between high school and college and allowing students to move ahead in subjects as they demonstrate success, early colleges enable students to earn a high school diploma and complete two years of college credit (or an associate degree) within 4-5 years of entering ninth grade (Kisker, 2006).

This study will analyze the data from a dual credit and an early college program at a community college with students from three feeder comprehensive high schools in a small city in rural middle America to examine the role of the dual credit as compared to early college in improving outcomes for students, including students of color and low-income students receiving Pell grants as high school students. The community college program that is the subject of this study has operated a dual credit program for over 20 years and early college program for the past eight years. The programs are accredited by the National Association of Concurrent Enrolment Partnerships (NACEP) and have built-in supports, collaborative measures, and quality control mechanisms shared between the three high schools and the college.

This study hypothesizes that students in early college high school programs outperform dual credit and traditional postsecondary students. Specifically, early college high school students are more likely to complete bachelor's degrees and have higher cumulative college GPA than students that enter community colleges with dual credit courses or directly from high school. Furthermore, we hypothesize that early college is a more effective option for student of color and a more effective investment of Pell funds for high school students compared to the Pell investments made in dual credit tuition for low-income high school students using Pell.

REVIEW OF LITERATURE

Dual credit is an evidence-based practice broadly supported in research literature. Although the effects of dual credit are not always equitable, the evidence is clear that on average, dual credit positively impacts student outcomes (Taylor, et al, 2022). Dual credit expands learning opportunities and college access to college-level education which can translate to positive contributions to local communities and the overall economy (Taylor, et al, 2022).

Dual credit is a common practice in most U.S. high schools and the number of students participating continues to grow. Nearly 1.4 million high school students participate in dual credit programs each year and in some states as many as 60% of high school graduates participated in dual credit options (Jenkins & Fink, 2020; Taie & Lewis, 2020). Although widespread and growing, the purpose,

design, and participation in dual credit programs can vary dramatically by state and locality (Indiana Commission on Higher Education, 2021; Jenkins & Fink, 2020).

Dual Credit Outcomes

The opportunity to participate in dual credit is unequal. Fink (2021) and Harlow (2018) show that students of color, low-income students, lower achieving students, and those with disabilities participate in dual credit at lower rates than their counterparts. Research on equity in dual credit outcomes is mixed. Struhl and Vargas (2012), Taylor (2015), and Liu et al. (2020) find that dual credit helps reduce inequities. While Kentucky Council on Postsecondary Education (2020), Miller et al (2018), Birkeland (2019), Harlow (2018), Welsh et al (2005), and Brake (2003) found that dual credit yielded either no difference or further contributions to inequities.

Research consistently shows that dual credit programs have positive impacts on high school and college outcomes such as high school graduation (Miller et al, 2018), college enrolment (Britton et al, 2019; Dash, 2017; Miller et al, 2018), college success (Allen & Dadgar, 2012; Grubb, 2015; Karp et al, 2007), and college completion (Allen & Dadar, 2012; Ingham, 2018; Kentucky Council on Postsecondary Education, 2020; Loftin, 2012; Rowett, 2012). For some outcomes, such as college enrolment and completion, the effects of dual credit are stronger and more consistent than the effects of high school graduation and college success (Miller et al, 2018; Struhl & Vargas, 2012; Taylor, 2015).

Two specific aspects of dual credit outcomes relevant to this research are the academic momentum of students enrolled in dual credit courses as well as the intensity or dosage of dual credit courses students are exposed to while in high school. Academic momentum is a term often referred to in the dual credit literature to refer to the pace at which high school students accumulate college credits (Taylor et al, 2022). It is also an important indicator in college degree attainment literature (Adelman, 1999, 2006). Attewell and Monaghan (2016) found that students who take 15 credits in their first semester of college are more likely to complete a bachelor's degree compared to those that take 12 hours. Calcagno et al (2007) find earning 20 credits or completing 50% of a program are significant milestones in obtaining a community college credential. Dual credit plays an important role in college credit accumulation providing students academic momentum to complete their initial college credential. This momentum allows them to persist at a better rate than traditional postsecondary students and ultimately complete a college degree. Research shows that participation in dual credit courses increases the total number of credits earned. Karp et al (2007) estimate that students who participated in dual credit earned 15.1 more college credits within three years after high school graduation than nonparticipants. Allen and Dadgar (2012) and Grubb (2015) report that dual credit students earn more credits during their first semester in college than students who did not enrol.

There are mixed results on the importance of where students take dual credit courses. Some evidence shows that dual credit on a college campus yields better results than on a high school campus (Speroni, 2011). DeHay (2019) and Liu et al (2020) find effects of dual credit similar regardless of where classes are offered. Other concerns about the location of dual credit courses focuses on the instructional quality of dual credit courses taught by high school faculty despite a lack of supporting evidence. Birkeland (2019) found positive associations for student outcomes for such high school-based options.

Dual Credit Policy and Practice

Allen et al (2019), Battle (2020), Hart (2019), and Kanny (2015) report that students enroll in dual credit because it is affordable, it can help save money, and helps them get a head start and save them time in college. Many others take dual credit because it is a more rigorous alternative to traditional high school or provides an educational environment that is more conducive to learning and development (Adams et al, 2020; Battle, 2020; Hart, 2019).

Dual credit funding is largely guided by state policies, so the funding structures and mechanisms reflect 50 different policies. Education Commission of the States (2019), Hoffman and Vargas (2010), and Taylor et al (2015) show that some states have streamlined their finance policies such as school and college reimbursement and tuition policies, but overall funding structures vary considerably and revenue sources for dual credit can be a combination of federal, state, local, private, and student funding. There is limited research examining the cost-benefits of dual credit programs, but Atchison et al (2019) and Reichardt and Christeson (2020) indicate that dual credit is a cost-effective strategy for students, schools, colleges, and states. The Pell sites experiment opened the door for access to dual credit and early college so that students could access Pell while in high school, thus leveling the playing field. However, the USDOE discontinued the "Pell Sites" project that enabled high school students to access Pell citing mixed results (Bettinger, et al, 2022).

State-level dual credit policies vary extensively and often drive local policy and practice in areas such as access (Bartlett, 2008; ECS, 2019; Zinith, 2014), equity (Barnett, 2019; Bartlett, 2008; Brake, 2003; Taylor et al, 2015;), finance (ECS, 2019; Williams & Perry, 2020), quality (Taylor, et al 2022; Zinth, 2014), and transferability (ECS, 2019; Williams & Perry, 2020). Research by Perry and Williams (2020), ECS (2019), Bartlett (2009), Zinth (2014), and Barnett (2019) shows that critical state policy issues such as inadequate funding, restricted eligibility, and inflexible quality control can restrict dual credit access and equity.

Career and technical education (CTE) is a prevalent dual credit model, but the scope of CTE participation varies across states. CTE dual credit models have evolved from Tech Prep to career academies, to pathway programs, to technology-CTE driven high schools such as P-TECH (Taylor et al, 2022). Evidence of their impact is promising and shows that many CTE dual credit programs are helping students to better complete the transition from high school to college and careers (Bragg et al, 2006; Rosen et al, 2020; Warner et al, 2016). Bragg et al (2006) and Orr et al (2002) also suggest that CTE supports secondary and postsecondary alignment.

Early College Model

Early college high schools (ECHS) are a comprehensive school reform model that includes dual credit as one element. Many ECHS are designed to enroll students who are underrepresented in college. Berger et al (2010) and Edmunds et al (2020) show that ECHS have achieved that purpose. Edmunds et al (2017) shows that ECHS have positive impacts on overall outcomes, especially for students who are historically underserved in college. ECHS have shown a large outcome on postsecondary degree attainment (Edmunds, 2020).

There is an abundance of literature advocating better integration of the high school and community college. The earliest model, Leonard Koos's 6-4-4 plan that integrated the last two years of high school with the first two years of "junior college," was implemented over a century ago (Kisker, 2006). The modern version of the model emerged in the early 1970s with the Middle College High School at LaGuardia Community College in New York (Lieberman, 2006). Since then, groups like

the Gates Foundation, Jobs for the Future, and others have championed the model as among the most successful approaches to high school reform (Bush, 2017; Jett & Rinn, 2020; Schwartz, 2016).

The outcomes have been promising. Wechsler (2001) found that the early colleges enhance curricular unity and allow for accelerated, rigorous, and flexible coursework. Powell (2003) advocated the approach to expand a general liberal arts education to those that do not attend university. Lieberman (2006) emphasized the advantages of keeping students in the same institution through adolescence. Edmunds, et al (2020) found that early colleges generate more students on-track for college than traditional high schools. They also found that early colleges provide students significant cost savings compared to students that enter postsecondary education using the traditional route. Schwartz (2016) found that early colleges prepared students at a level commensurate with the global standard of secondary education compared to the traditional high school diploma.

Early colleges have also been a successful pathway for underserved, disadvantaged and minority students (Barnett et al, 2015). Jett and Rinn (2020) did a systematic review of research on student experiences and outcomes of early college programs. Their meta-analysis found that early colleges have powerful teacher-student relationships and students in early colleges outperform high school peers academically, socially, and emotionally. They also found that the academic culture benefits students as they complete college and enter the workforce.

In sum, the literature on dual credit and early college strongly supports various models of college-level learning in high school as a method of better preparing students for the attainment of college credentials and preparing them to successfully contribute to the economy and modern society.

RESEARCH QUESTIONS

This study addressed the following research questions:

1. Does early college participation more strongly predict bachelor's degree attainment than cumulative GPA, and credits controlling for ACT score, race, and Pell status compared to dual credit and traditional postsecondary community college enrollment?

2. Does the early college program status have an effect on cumulative college GPA for students compared to dual credit and traditional college students, and do ACT and college status (early college, dual credit, or traditional postsecondary) interact?

3. Does the early college program status have an effect on cumulative college GPA for Pell students compared to dual credit and traditional college Pell students, and do ACT and college status (early college, dual credit, or traditional postsecondary) interact?

4. Does the early college program status have an effect on cumulative college credits for students compared to dual credit and traditional college students, and do ACT and college status (early college, dual credit, or traditional postsecondary) interact?

5. Does the early college program status have an effect on cumulative college credits for Pell students compared to dual credit and traditional college Pell students, and do ACT and college status (early college, dual credit, or traditional postsecondary) interact?

SIGNIFICANCE OF THE STUDY

This research is significant because it examines the dual credit and early college program options for school districts planning high school and college collaborations. The community college that is the focus of the study has a well-established dual credit and early college program that offers the students the option of Pell in high school as part of a USDOE program.

The study provides a framework based on outcomes of a successful program as an avenue for education planners and policymakers to begin to evaluate the overall role that dual credit and early college should play in the scope of P-16 educational reform.

METHODOLOGY

The research sample included a total of 2,248 students from the population of the graduating classes of 2016-2021 from three comprehensive high schools that subsequently enrolled in a nearby community college. Of this sample, 236 were early college students, 1,382 were enrolled in dual credit courses, and 639 were traditional postsecondary students coming from high school to the community college without any dual credits. All three high schools are located within three miles of the community college. The college was one of the USDOE designated "Pell Sites" experiment that allowed high school students in both the dual credit program as well as the early college to access federal Pell money to cover the cost of tuition while in high school. Data were disaggregated to include a subsample of students that received Pell funding for early college, dual credit, or as postsecondary students.

This research utilized a quasi-experimental study design using existing data supplied from the state community college system and state postsecondary education authority. The study used three postsecondary performance and academic momentum factors, bachelor's degree attainment, cumulative community college GPA, and cumulative college credits earned. The ACT test score of students served as a covariate, testing for the effect of the college program status while controlling for prior high school achievement. The independent variable was the college program status: early college, dual credit, or traditional postsecondary attendance at the community college.

RESULTS

For Research Question 1, a logistic regression was performed using SPSS to ascertain the effects of enrolment status, race, Pell, ACT, cumulative GPA, and cumulative college credits earned on the likelihood of a student attaining a bachelor's degree. The logistic regression model was statistically significant (7) = 182.7, $p < .001$. The model explained 25.1% (Nagerlkerke) of the variation in bachelor's degree attainment and correctly classified 86.4% of cases. Early college Pell students are 2.5 times more likely to earn a bachelor's degree than dual credit or traditional students. Dual credit students are 1.4 times more likely to earn a bachelor's degree than traditional college students. Students with high grades and test scores were significantly more likely to complete a bachelor's degree. Students with higher GPAs were 4.7 times more likely to earn a bachelor's degree. Race as Pell status did not add significantly to the model, indicating that differences of race and socio-economic status as defined by Pell do not significantly predict a bachelor's degree. (See Table 4.)

To further explore the outcomes of early college students based on race or Pell status, a follow up Pearson independent samples chi square test was used to determine if the number of Pell students earning a bachelor's degree based on enrolment status are independent of one another. The proportion of Pell early college students earning a bachelor's was 32% compared to 10% of Pell

dual credit students, and 6% of traditional postsecondary Pell students. Bachelor's degree attainment of early college students was found to be significantly independent of dual credit and traditional postsecondary enrolment students receiving Pell, $(2, n = 921) = 28.1, p < .001$. The same procedure was used to determine if the number of non-white students earning a bachelor's degree based on enrolment status are independent of one another. The proportion of non-white early college students earning a bachelor's was 27% compared to 14% of dual credit students, and 10% of traditional postsecondary students. Bachelor's degree attainment of early college students was found to be significantly independent of dual credit and traditional postsecondary enrolment students that are non-white, $(2, n = 221) = 13.27, p < .001$.

For Research Questions 2-3, an analysis of covariance was run to determine if there is a statistically significant difference between the variance in the data of the GPA for students that attended early college programs as compared to those that attended as dual credit or traditional postsecondary students. The same test was run on the subsample of Pell students to determine the difference between Pell student GPA by enrolment status. Post-hoc tests using the independent samples Kruskal-Wallis test was used to further determine the significance of the variance between each independent variable group. The Levene's test for equality of variances was conducted to test the assumption that equal variances are not assumed. The Kruskal-Wallis test was selected as the post-hoc analysis for pairwise comparisons to account for the unequal variances and unequal sample sizes.

For question 2, the ANCOVA determined there was a statistically significant interaction between the effects of college status and ACT score on college GPA, $F(2, 2{,}111) = 5.51$, $p = .004$. These results indicate that the covariate of ACT as a measure of high school achievement is found to have a significant effect on cumulative college GPA indicating the high achieving students regardless of program status perform well. Follow-up post-hoc tests using the Kruskal-Wallis test to analyze the simple main effects showed that GPAs were still significantly higher for early college ($M = 3.33$) students than dual credit ($M = 3.08$, $p < .000$) or traditional postsecondary Pell students ($M = 2.72$, $p < .001$)., $H(2) = 79.05$, $p = .000$. The dual credit mean ($M = 3.08$) was significantly higher than traditional college students ($M = 2.72$, $p < .001$). (See Table 3.)

For question 3, the ANCOVA determined there was not a statistically significant interaction between the effects of Pell student college status and ACT score on college GPA, $F(2, 1{,}058) = 1.31$, $p = .271$. These results indicate that differences in cumulative college GPA for Pell students could be more influenced by the early college program status than the ACT measure of high school achievement. Follow-up post-hoc tests using the Kruskal-Wallis test to analyze the simple main effects showed that GPAs were significantly higher for early college ($M = 3.05$) students than dual credit ($M = 2.51$, $p < .001$) or traditional postsecondary Pell students ($M = 2.02$, $p < .001$), $H(2) = 13.71$, $p = .001$. The dual credit mean ($M = 2.51$) was not significantly higher than traditional college students ($M = 2.02$, $p = .072$). (See Table 3.)

For research questions 4-5, an analysis of covariance was run using SPSS to determine if there is a statistically significant difference between the variance in the data of the cumulative college credits for students that attended early college programs compared to those that attended as dual credit or traditional postsecondary students. The same test was run on the subsample of Pell students to determine the difference between Pell student college credits by enrolment status. Post-hoc tests using the independent samples Kruskal-Wallis test was used to further determine the significance of

the variance between each independent variable group. The Levene's test for equality of variances was conducted to test the assumption that equal variances are not assumed. The Kruskal-Wallis test was selected as the post-hoc analysis for pairwise comparisons to account for the unequal variances and unequal sample sizes.

For question 4, the ANCOVA determined there was a statistically significant interaction between the effects of college status and ACT score on college cumulative credits earned, $F(2, 2{,}111) = 7.92$, $p < .001$. These results indicate that the covariate of ACT as a measure of high school achievement is found to have a significant effect on cumulative college credits earned. Follow-up post-hoc tests using the Kruskal-Wallis test to analyze the simple main effects showed that cumulative credits earned were significantly higher for early college ($M = 63.4$) students than dual credit ($M = 43.8$, $p < .001$) or traditional postsecondary students ($M = 48.5$, $p < .001$), $H(2) = 185.69$, $p = .000$. The dual credit mean ($M = 43.8$) was significantly higher than traditional college students ($M = 48.5$, $p < .007$). (See Table 3.)

For question 5, the ANCOVA determined there was not a statistically significant interaction between the effects of Pell student college status and ACT score on college GPA, $F(2, 1{,}058) = 1.11$, $p = .329$. These results indicate that differences in cumulative college credits earned for Pell students could be more influenced by the dual credit and early college program status than the ACT measure of high school achievement. Follow-up post-hoc tests using the Kruskal-Wallis test to analyze the simple main effects showed that cumulative credits were significantly higher for early college ($M = 58.3$) Pell students than traditional postsecondary Pell students ($M = 45.4$, $p < .005$), but not significantly different for early college compared to dual credit Pell students ($M = 52.2$, $p = .097$), $H(2) = 44.40$, $p = .001$. (See Table 3.)

LIMITATIONS

While the results are very promising for early college as a model to serve both Pell as well as all students in high school, there are some limitations with this research. First, while the sample included a large low-income Pell population, it was not racially diverse (15% non-white, 85% white) with sample sizes too small to use race as a variable in the ANCOVA, however, the results from the logistic regression and chi-square tests painted an overall positive picture of non-white student performance in the early college program. The paired sample method of comparison was not utilized in this study. Rather, it compared a smaller population cohort of early college students with larger populations of postsecondary students and dual credit students. The fact that all the students in the sample attend the same community college matriculating from the graduating classes at the same three high schools eliminates some confounding variables, a more detailed cohort-based study may be needed to yield more robust quasi-experimental results. In addition to examining cohorts of students, additional quantitative and qualitative methods incorporating student voice, their experiences with the program and its impact on their educational trajectory would further compliment and add needed depth to the outcomes-based data analysis provided here. Finally, despite the statistically significant p-values, the effect sizes using Cohen's ($d = 0.1$) for the ANCOVA were all below the 0.2 level, suggesting low practical significance. The difference between the groups could have more to do with the large and unequal sample sizes.

DISCUSSION

The results of this study are consistent with other research that support dual credit, dual enrollment, and early college programs as successful models in higher education as well as high school reform circles (Zeiser, 2019). As previously discussed, such programs have been shown to boost college attendance, reduce the time it takes to complete a degree, and add rigor to the last two years of high school (Edmunds, et al, 2020). Because most programs require students to pay full or reduced tuition and book costs, early college and dual enrollment have been out of reach for lower income and disadvantaged students (Ndiaye & Wolfe, 2016). Historically dual enrolment and early college students have come from wealthy, high achieving students (Schwartz, 2016).

The interaction effect of the ACT result in this study is in line with the historical trend of dual credit access limited to high achieving students. The covariate of ACT as a measure of high school achievement was found to have a significant effect on cumulative college GPA and cumulative college credits earned by high school students in both early college and dual credit options in the analysis of the overall student population of this sample. A bright spot of these results indicate that a Pell financed early college model provides a viable option to serve students that are not necessarily wealthy high achievers. These results indicate that when controlling for prior achievement using ACT scores, the Pell eligible high school students in an early college model perform better than traditional postsecondary and dual enrollment students.

The Pell sites experiment opened the door for access to dual enrolment and early college so that students could access Pell while in high school, thus leveling the playing field. While the results focusing on dual enrolment have been mixed, the results here indicate that early college model, which offers a more intensive program with more supports, may be the best method to deploying resources such as Pell for lower socio-economic populations.

IMPLICATIONS

The student outcomes highlighted in this study and previous studies focusing on dual credit and early college programs have several implications for educational leaders and planners. A critical design element of dual credit and dual enrolment programs is an effective high school and college collaboration with a partnership to provide increased access, flexibility, funding, and student support. The results here emphasize a particular focus about how dual credit and early college programs can support more diverse student populations, especially students of color and those with financial challenges to pay for the cost of college courses. The community college programs that served as the subject of this evaluation was the result of 20 years of intensive collaboration with the regional high schools, including the three that were part of this research.

Early college is a challenging model to implement, it poses different sets of planning issues, even for districts and high schools that have long-term dual credit options and partnerships. The positive outcomes of early college students suggest that the implementation challenges pay off with the expanded access to college success by more underrepresented populations.

The physical location on a college campus along with a supportive policy framework that involves the state, the local board of education, and the community college system are two significant issues. Funding is perhaps the most significant issue for the early college design. Studies from Jobs for the Future (2019), Webb (2004), Zeiser (2019) and the Washington Institute for Public Policy (2019) estimate that early colleges cost more to operate, ranging from $1,000 to $4,000 more per student.

But the return on investment was approximately $15 for every dollar invested. The burden of tuition cost on students and families is also much greater in an early college since students are enrolled as full-time degree seeking students. While the USDOE discontinued the "Pell Sites" project that enabled high school students to access Pell (Bettinger, et al, 2022), they are currently exploring options for an "Early Pell" for high school students. Such a program would be structured using similar parameters to the "Second Chance Pell" program that is currently on the books. The results here indicate such a policy approach is a worthy investment to consider and would be a potential game changer for districts and community colleges planning an early college model.

Overall, these results are indicating a positive step and are consistent with other research evaluating the dynamic impact of early colleges, especially in serving low-income students. However, more research is needed to warrant sweeping conclusions about early college as a model for high school students accessing Pell funding. These results also carry implications about how early college contributes to the academic momentum and the importance of the intensity or dosage of dual credit courses on student outcomes, specifically high school students in the Pell experiment. More research is also needed connecting the dual credit and early college research with the postsecondary research on academic momentum.

CONCLUSION

The findings of this study provide strong evidence for the positive impact of early colleges on students. Early college students had a greater opportunity than their peers to enrol in and graduate from college. They also appeared to be on a different academic trajectory, with early college students earning college degrees at higher rates than other students in the comparison. In addition, the results here from the Pell students offer evidence that early colleges can play a role in mitigating the traditional educational attainment gaps between advantaged and disadvantaged students.

Dual credit and early college programs are one of the most significant educational trends over the past few decades. This research provides a framework from the outcomes of a successful program as an avenue for education planners and policymakers to begin to evaluate the overall role that dual credit and early college should play in the scope of P-16 educational reform. Early college and dual credit programs have facilitated the transition between secondary and postsecondary education and offered greater productivity of P-16 learning.

REFERENCES

Adams, T. R., Robinson, D. E., & Lewis, C. W. (2020). Developing scholar identities: A case study of black males in an early college high school. *Journal of African American Males in Education, 11*(1), 6-22.

Adelman, C. (1999). *Answers in the tool box: Academic intensity, attendance patterns, and bachelor's degree attainment.* U.S. Department of Education. https://www2.ed.gov/pubs/Toolbox/toolbox.html

Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college.* U.S. Department of Education. https://www2.ed.gov/rschstat/research/pubs/toolboxrevisit/index.html

Allen, D., & Dadgar, M. (2012). Does dual enrollment increase students' success in college? Evidence from a quasi-experimental analysis of dual enrollment in New York City. *New Directions for Higher Education, 2012*(158), 11–19. https://doi.org/10.1002/he.20010

Allen, T. O., Thompson, M. L., & Martinez-Cosio, M. (2019). Message, hope, and reality: How do Latinx students access dual credit and leverage their experiences in engineering programs? *The High School Journal, 103*(1), 38-52.

Atchison, D., Zeiser, K. L., Mohammed, S., Levin, J., & Knight, D. (2019). *The costs and benefits of early college high schools.* American Institutes for Research. https://www.echs-nm.com/wp-content/uploads/2020/04/Costs-Benefits-Early-College-High-Schools-508-report-Dec-2019.pdf

Attewell, P., Heil, S., & Reisel, L. (2012). What is academic momentum? And does it matter? *Educational Evaluation and Policy Analysis*, *34*(1), 27–44. https://doi.org/10.3102/0162373711421958

Attewell, P., & Monaghan, D. (2016). How many credits should an undergraduate take? *Research in Higher Education, 57*(6), 682–713.

https://doi.org/10.1007/s11162-015-9401-z

Barnett, E. (2018). *Differentiated dual enrollment and other collegiate experiences: Lessons from the STEM Early College Expansion Partnership.* Columbia University, Teachers College, National Center for Restructuring Education, Schools, & Teaching. https://www.tc.columbia.edu/ncrest/publications--resources/Differential-Dual-Enrollment-030518.pdf

Barnett, E., Maclutsky, E., & Wagonlander, C. (2015). Emerging early college models for traditionally underserved students. *New Directions for Community Colleges, 2015*(169), 39–49. https://doi.org/10.1002/cc.20131

Bartlett, W. C. (2008). *Dual credit /concurrent enrollment initiatives: A study of influences on students' postsecondary decisions* (Publication No. 304534410) [Doctoral dissertation, The University of North Carolina at Greensboro]. ProQuest Dissertations & Theses Global.

Bettinger, E. P., Lu, A., Matheny, K.T., & Kienzl, G. S. (2022). Unmet need: Evaluating Pell as a lever for equitable dual enrolment outcomes. *Education Evaluation and Policy Analysis*, DOI:10.3102/01623737221091574

Battle, K. A. (2020). *The experiences of dual enrollment students on completion of the baccalaureate degrees in North Carolina* [Unpublished doctoral dissertation]. North Carolina State University.

Berger, A. R., Adelman, N., Cole, S. (2010) The Early College High School Initiative: An overview of five evaluation years. *Peabody Journal of Education, 85*(3), 333-347.

Birkeland, A. (2019). *Dual-credit access, participation and outcomes in Washington state* [Unpublished doctoral dissertation]. University of Washington. https://www.proquest.com/docview/2281198822

Bragg, D. D., Kim, E., & Barnett, E. A. (2006). Creating access and success: Academic pathways reaching underserved students. *New Directions for Community Colleges, 2006*(135), 5-19.

Brake, N. (2003). *Predictors of student success in dual credit programs* [Unpublished doctoral dissertation]. University of Louisville.

Britton, T., Chelliah, B., Symns, M., & Campbell, V. (2019). *College now…or later: Measuring the effects of dual enrollment on postsecondary access and success* (19-118). Annenberg Institute at Brown University.

Bush, B.V. (2017). Building as we go: Secondary schools, community colleges, and universities in partnership: The early college high school initiative. *Community College Journal of Research and Practice, 41*(10), 623–638. https://doi.org/10.1080/10668926.2016.1214089.

Calcagno, J. C., Crosta, P., Bailey, T., & Jenkins, D. (2007). Stepping stones to a degree: The impact of enrollment pathways and milestones on community college student outcomes. *Research in Higher Education, 48*(7), 775–801. https://doi.org/10.1007/s11162-007-9053-8.

Carnevale, A., Strohl, J., Ridley, N., & Gulish, A. (2018). *Three educational pathways to good jobs: High school, middle skill, and the bachelor's degree.* Georgetown University Center for Education and the Workforce. https://cewgeorgetown.wpenginepowered.com/wp-content/uploads/3ways-FR.pdf.

Cellini, S. R. (2006). Smoothing the transition to college? The effect of Tech-Prep programs on educational attainment. *Economics of Education Review, 25*, 394-411.

Dash, K. (2017). *An evaluation of the impact of dual credit and dual enrollment on college-going in Nebraska.* Nebraska Department of Education. https://cdn.education.ne.gov/wp-content/uploads/2017/07/Dual_Enrollment_and-Credit_Study.pdf.

DeHay, D. G. (2019). *Does location matter? Evaluating the influence of dual enrollment program location on noncognitive measures of college readiness and academic performance: A multiyear study* [Unpublished doctoral dissertation]. Clemson University.

Edmunds, J. A., Arshavsky, N., Lewis, K., Thrift, B., Unlu, F. & Furey, J. (2017). Preparing students for college: Lessons learned from the Early College. *NASSP Bulletin, 101* (2), 117-141.

Edmunds, J., Unlu, F., Furey, J., Glennie, E., & Arshavsky, N. (2020). What happens when you combine high school and college? The impact of the early college model on postsecondary performance and completion. *Educational Evaluation and Policy Analysis, 42*(2), 257–278. https://doi.org/10.3102/0162373720912249.

Education Commission of the States. (2019). *50-state comparison: Dual/concurrent enrollment policies.* Education Commission of the States. https://www.ecs.org/dual-concurrent-enrollment-policies/.

Fink, J., Jenkins, D., & Yanagiura, T. (2017). *What happens to students who take community college "dual enrollment" courses in high school?* Community College Research Center, Columbia University.

Grubb, J. M. (2015). *Dual enrollment and community college outcomes for first-time, full-time freshmen: A quasi-experimental study* [Unpublished doctoral dissertation]. East Tennessee State University.

Grubb, J. M., Scott, P. H., & Good, D. W. (2017). The answer is yes: Dual enrollment benefits students at the community college. *Community College Review, 45*(2), 79–98. https://doi.org/10.1177/0091552116682590.

Harlow, K. J. (2018). *Evaluation of college credit plus: Dual enrollment in Ohio* [Unpublished doctoral dissertation]. Ohio State University.

Hart, L. K. (2019). *Three-quarters college student: A multiple case study of dual credit at a high school site and on a college campus* [Unpublished doctoral dissertation]. Kent State University.

Hoffman, N., & Vargas, J. (2010). *A policymaker's guide to early college designs: Expanding a strategy for achieving college readiness for all.* Jobs for the Future. https://files.eric.ed.gov/fulltext/ED520109.pdf.

Howley, A., Howley, M.D., Howley, C.B., & Duncan, T. (2013). Early college and dual enrollment challenges: Inroads and impediments to access. *Journal of Advanced Academics, 24*(2), 77-107. https://doi.10.1177/1932202X13476289.

Indiana Commission for Higher Education. (2021). *Indiana early college credit report.* https://www.in.gov/che/files/2021_Early_College_Credit_Report_01_28_2021.pdf.

Inghram, C. S. (2018). *Student attributes related to dual enrollment baccalaureate degree outcomes in a rural state* [Unpublished doctoral dissertation] Marshall University.

Jenkins, D., & Fink, J. (2020, April 30). How will COVID-19 affect community college enrollment? Looking to the Great Recession for clues. *CCRC Mixed Methods Blog*. https://ccrc.tc.columbia.edu/easyblog/covid-community-college-enrollment.html.

Jett, N. & Rinn, A. N. (2020). Student experiences and outcomes of early college: A systematic review. *Roeper Review*, *42*(2), 80 https://doi.org/10.1080/02783193.2020.1728801.

Jobs for the Future. (2019). *Achieving equity in College in High School Programs: Practitioner-informed policy design commitments and principles.* Jobs for the Future. https://files.eric.ed.gov/fulltext/ED603696.pdf.

Kanny, M. A. (2015). Dual enrollment participation from the student perspective. *New Directions for Community Colleges, 2015*(169), 59–70. https://doi.org/10.1002/cc.20133.

Karp, M. M., Calcagno, J. C., Hughes, K. L., Jeong, D. W., & Bailey, T. R. (2007). *The postsecondary achievement of participants in dual enrollment: An analysis of student outcomes in two states.* Community College Research Center, Columbia University. https://files.eric.ed.gov/fulltext/ED498661.pdf.

Kentucky Council on Postsecondary Education. (2020). *Dual credit & student success: The effect of high school dual credit on educational outcomes at Kentucky public universities.* Kentucky Council on Postsecondary Education. https://files.eric.ed.gov/fulltext/ED608256.pdf.

Kisker, C. B. (2006). Integrating high school and the community college: Previous efforts and current possibilities. *Community College Review*, *34*(1), 68–86.

Lewis, T. L. (2009). Student reflections: The impact of dual enrollment on transitions to a state university. [Unpublished doctoral dissertation]. University of South Florida.

Lieberman, J. (Ed.) (2006). Collaborating with high schools. *New Directions for Community Colleges*. San Francisco: Jossey-Bass.

Liu, V. Y. T., Minaya, V., Zhang, Q., & Xu, D. (2020). High school dual enrollment in Florida: Effects on college outcomes by race/ethnicity and course modality. Community College Research Center, Columbia University. https://ccrc.tc.columbia.edu/media/k2/attachments/dual-enrollment-florida-race-ethnicity-course-modality.pdf.

Loftin, T. A. (2012). *Concurrent and dual credit: The bridge to postsecondary education for first-generation college students* [Unpublished doctoral dissertation]. University of Arkansas.

Marken, S., Gray, L., & Lewis, L. (2013). *Dual enrollment programs and courses for high school students at postsecondary institutions: 2010–11* (NCES 2013–002). U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. https://nces.ed.gov/pubs2013/2013002.pdf.

Miller, T., Kosiewicz, H., Tanenbaum, C., Atchison, D., Knight, D., Ratway, B., Delhommer, S., & Levin, J. (2018). *Dual-credit education programs in Texas: Phase II*. American Institutes for Research. https://www.air.org/project/dual-credit-education-programs-texas.

National Association of Concurrent Enrollment Partnerships (2022). *What is concurrent enrollment.* https://www.nacep.org/about-nacep/what-is-concurrent-enrollment/.

Ndiaye, M. & Wolfe, R. E. (2016). Early college can boost college success rates for low-income, first-generation students: giving students a taste of college early can encourage them to persist in high school and through higher education. *Phi Delta Kappan*, *97*(5), 32–32.

Orr, M. T., Hughes, K. L., & Karp, M. M. (2002). *Career academies: Designing improved education for students, teachers' work and employer participation.* Institute on Education and the Economy, Teachers College, Columbia University.

Perry, L. M. (2013). A case study market analysis of acceleration mechanisms in Florida: Dual enrollment positioning (Publication No. 1698505490) [Doctoral dissertation, Nova Southeastern University]. ProQuest Dissertations & Theses Global.

Powell, A. (2003). American high schools and the liberal arts tradition. *Brookings Papers on Education Policy*, *2003*(1), 7–53. https://doi.org/10.1353/pep.2003.0018.

Reichardt, R., & Christeson, R. (2020). *Colorado concurrent enrollment return on investment and cost model.* Grantee Submission. https://eric.ed.gov/?id=ED608037.

Rosen, R., Byndloss, D. C., Parise, L., Alterman, E. & Dixon, M. (2020). *Bridging the school-to-work divide: Interim implementation and impact findings from New York City's P-TECH 9-14 Schools.* New York: MDRC. https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED605308.

Rowett, C. (2012). *Exploring college readiness: The role of dual credit and SES on college persistence and student success* [Unpublished doctoral dissertation]. University of Texas at Arlington.

Speroni, C. (2011). *Determinants of students' success: The role of Advanced Placement and dual enrollment programs.* National Center for Postsecondary Research, Teachers College, Columbia University. https://ccrc.tc.columbia.edu/publications/role-advanced-placement-dual-enrollment.html.

Struhl, B. (2013). *Rewarding dual enrollment in performance-based funding formulas: How states can create incentives for college to high school partnerships.* Jobs For the Future. https://files.eric.ed.gov/fulltext/ED561309.pdf.

Struhl, B., & Vargas, J. (2012). *Taking college courses in high school: A strategy for college readiness: The college outcomes of dual enrollment in Texas.* Jobs for the Future. http://www.jff.org/publications/taking-college-courses-high-school-strategy-college-readiness.

Taie, S., & Lewis, L. (2020). *Dual or concurrent enrollment in public schools in the United States* (NCES 2020-125, Data Point). U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. https://nces.ed.gov/pubs2020/2020125.pdf.

Taylor, J. L. (2015). Accelerating pathways to college: The (in)equitable effects of community college dual credit. *Community College Review, 43*(4), 355–379. https://doi.org/10.1177/0091552115594880.

Taylor, J. L., Allen, T. O., An, B. P., Denecker, C., Edmunds, J. A., Fink, J., Giani, M. S., Hodara, M., Hu, X., Tobolowsky, B. F., & Chen, W. (2022). *Research priorities for advancing equitable dual enrollment policy and practice.* University of Utah.

Taylor, J. L., & Yan, R. (2018). Exploring the outcomes of standards-based concurrent enrollment and advanced placement in Arkansas. *Educational Policy Analysis Archives, 26*(123), 1–22. https://doi.org/10.14507/epaa.26.3647.

Warner, M., Caspary, K., Arshan, N., Stites, R., Padilla, C., Patel, D., McCracken, M., Harless, E., Park, C., Fahimuddin, L., & Adelman, N. (2016). *Taking stock of the California Linked Learning District Initiative. Seventh-year evaluation report.* Menlo Park, CA: SRI International.

Washington State Institute for Public Policy (2019). *Early college high school (for high school students).* http://www.wsipp.wa.gov/BenefitCost/Program/789.

Webb, M. (2004). *The Early College High School Initiative: What is the cost of planning and implementing early college high school?* https://files.eric.ed.gov/fulltext/ED497817.pdf.

Wechsler, H. S. (2001). *Access to success in the urban high school: The middle college movement*. New York: Teacher's College Press.

Welsh, J. F., Brake, N., & Choi, N. (2005). Student participation and performance in dual-credit courses in a reform environment. *Community College Journal of Research and Practice, 29*(3), 199–213. https://doi.org/10.1080/10668920590901158.

Williams, A., & Perry, A. (2020). *Prioritizing equity in dual enrollment.* Education Commission of the States. https://www.ecs.org/prioritizing-equity-in-dual-enrollment/.

Zeiser, K. (2019). *The cost and benefits of early college high school programs*. American Institutes of Research. https://www.air.org/resource/costs-and-benefits-early-college-high-schools-0.

Zinth, J. D. (2014). *Increasing Student Access and Success in Dual Enrollment Programs: 13 Model State-Level Policy Components.* Education Commission of the States. https://files.eric.ed.gov/fulltext/ED561913.pdf.

Table 1. STUDENT DEMOGRAPHICS

Demographic Groups	n	%
Early College		
Non-White	27	12%
White	201	88%
Female	156	68%
Male	70	32%
Dual Credit		
Non-white	155	11%
White	1,271	89%
Female	767	54%
Male	652	46%
Postsecondary Enrollment		
Non-white	108	21%
White	416	79%
Female	255	49%
Male	263	51%
Total Sample		
Non-white	290	13%
White	1,888	87%
Female	1,178	54%
Male	985	45%
Early College- Pell		
Non-white- Pell	20	19%
White- Pell	87	81%
Female- Pell	83	78%
Male- Pell	24	22%
Dual Credit- Pell		
Non-white- Pell	81	16%
White- Pell	414	84%
Female- Pell	294	60%
Male- Pell	199	40%
Postsecondary Enrollment-Pell		
Non-white- Pell	127	28%
White- Pell	329	72%
Female- Pell	248	54%
Male- Pell	200	45%
Total Sample- Pell		
Non-white- Pell	228	22%
White- Pell	830	78%
Female- Pell	625	59%
Male- Pell	423	41%

Table 2. DESCRIPTIVE STATISTICS FROM STUDY VARIABLES

Variable	n	M	SD
	All Students		
College GPA			
Early College	226	3.33*	0.65
Dual Credit	1,382	3.07*	0.75
Postsecondary Enrollment	506	2.72	0.84
Cumulative College Credits			
Early College	226	63.4*	15.6
Dual Credit	1,382	43.8	26.1
Postsecondary Enrollment	506	48.5*	23.5
Bachelor's Degree Completion (%)			
Early College	95	35.8%*	
Dual Credit	1,255	15.5%*	
Postsecondary Enrollment	667	7.2%	
	High School Pell Students		
College GPA			
Early College- Pell	106	3.1*	0.71
Dual Credit- Pell	481	2.8	0.74
Postsecondary Enrollment- Pell	456	2.6	0.79
Cumulative College Credits			
Early College- Pell	106	58.3	15.4
Dual Credit- Pell	481	52.2*	25.7
Postsecondary Enrollment- Pell	456	45.4	23.5
Bachelor's Degree Completion (%)			
Early College- Pell	44	31.8%*	
Dual Credit- Pell	403	9.7%*	
Postsecondary Enrollment- Pell	283	6.4%	

*$p < .05$

Table 3. UNIVARIATE ANALYSIS OF COVARIANCE CUMULATIVE COLLEGE GPA

Variable	Sum of Squares	df	F	Sig.
GPA-All Students				
Enrollment Status	3.9	2	3.67	.026
ACT Score	27.2	1	50.3	<.001
Status*ACT Interaction	5.6	2	5.5	.004
GPA- Pell Students				
Enrollment Status	8.19	2	3.79	.025
ACT Score	21.2	1	19.3	<.001
Status*ACT Interaction	2.88	2	1.31	.271
Credits-All Students				
Enrollment Status	4709.3	2	3.93	.004
ACT Score	4232.3	1	7.06	.008
Status*ACT Interaction	9505.9	2	7.92	<.001
Credits- Pell Students				
Enrollment Status	735.4	2	.65	.525
ACT Score	2309.8	1	4.06	.044
Status*ACT Interaction	1268.1	2	1.11	.329

Table 4. LOGISTIC REGRESSION FOR BACHELOR'S DEGREE COMPLETION

Variable	B	SE	Weld	Sig	Exp(B)
Step 1					
Enrollment Status			5.93	.051	
Enrollment Status (EC)	.925	.40	5.33	.021	2.5
Enrollment Status (DC)	.349	.21	2.68	.102	1.4
ACT Score	.127	.03	24.26	<.001	1.4
College GPA	1.56	.19	71.01	<.001	4.7
Cumulative Credits	-.009	.004	4.11	.043	.99
Race (white, non-white)	-.610	.342	3.12	.074	.54
Pell Status	-.527	.189	9.21	.002	.57

EFFECTIVENESS OF THE DELPHI TECHNIQUE AS AN EDUCATIONAL PLANNING TOOL

ARVIN JOHNSON
TAK C. CHAN
Kennesaw State University, U.S.A.

ABSTRACT

This study aims to determine the effectiveness of the Delphi Technique as an educational planning tool. The authors investigated the perceptions of sixty-two pre-service school administrators who would most likely use the Delphi Technique for educational planning purposes. They were invited to participate in an actual Delphi Technique implementation process before they were asked to provide their responses to the research survey questions. Data collected in the study were carefully examined by coding category and identification of major themes to answer the research questions. The findings of the study have indicated the major strengths and weaknesses of the Delphi Technique. Most research participants agreed that Delphi Technique effectively sought consensus among diverse experts. The limitation of the technique was identified to be tedious and time-consuming. The research participants also recommended to improve Delphi Technique by allowing longer lapse of time between rounds of survey. However, they clarified that Delphi Technique did not fit all educational planning situations. The technique works best in planning situations of seeking for prioritization of possible options.

INTRODUCTION

Delphi Technique is a process in which a group of experts are invited to determine the future demands of business. It is designed as an approach to reach a consensus among experts about business plans or priorities. In the Delphi technique, a panel of experts are selected on the basis of their knowledge of the general business plans of the organization. As indicated by the Icfai Business School (2022), the main objective of the Delphi technique is to predict future developments in an identified area by incorporating the independent expert opinions. This process would avoid face-to-face criticism in group discussions among the experts.

This article started with a brief review of significant literature on the Delphi Technique, highlighting the areas of the orientation, application and evaluation of the technique. Based on the literature review, the major research question and sub-questions were developed for the study on the effectiveness of the Delphi Technique as an educational planning tool according to the perceptions of pre-service school administrators. Then, the methodology of the study was fully described followed by a report of the major findings as a result of the analysis of the responses from the pre-service school administrators. The findings of the study were discussed with reference to the reviewed literature. The implications of the findings for educational planning processes were also noted. This article concludes by recommending directions for future research on Delphi Technique as an educational planning tool.

REVIEW OF LITERATURE

Literature written on Delphi Technique is enormous. It covers from introduction to origin, design, modification, utilization, advantages and disadvantages. Some of them take a theoretical approach to discuss the use of the technique while others include empirical studies to verify the outcomes of the technique. For this study, the literature review in this article is focused on the orientation, application and critique of the Delphi Technique as a planning tool.

The Orientation of the Delphi Technique

The Delphi Technique is a planning approach widely used for gathering data from a group of experts with diverse opinions. It is a group communication process aiming to converge opinions on a specific issue. The Delphi process has been used in various planning fields, such as human needs, curriculum issues, resource allocation, etc. (Icfai Business School, 2022). As Hsu and Sandford (2007) described, "The Delphi technique is well suited as a method for consensus-building by using a series of questionnaires delivered using multiple iterations to collect data from a panel of selected subjects." (p. 2) Twin (2022) also confirmed that Delphi Technique is a forecasting process and structured communication framework based on the results of multiple rounds of questionnaires sent to a panel of experts. He also added, "After each round of questionnaires, each expert is allowed to adjust their answers. This process combines the benefits of expert analysis with elements of the wisdom of crowds."

The Application of the Delphi Technique

Delphi Technique has been applied to planning and decision-making processes in many fields. Because of its special characteristics of seeking consensus, concealing privacy, and allowing position changes, Delphi Technique has been identified as a relatively objective and commonly acceptable tool to generate solutions to complicated issues. Some specific examples of its application are highlighted in the following:

Seemiller and Whitney (2020) used the Delphi Technique to categorize the level of complexity of sixty leadership competencies. Thirty-one leadership educators were invited to participate in the study by ranking in two rounds. The result of the study was the generation of a five-tier taxonomy based on the level of complexity of each of the sixty assessed competencies.

Sitlington and Coetzer (2015) analyzed the use of the Delphi Technique to support curriculum development in the renewal of school business courses. The authors clarified the Delphi Technique implementation process for obtaining curriculum opinion consensus in a diverse group of experts. The value of the Delphi Technique was demonstrated by providing an overview of the results of analysis.

Altinpulluk, Kesim, and Kurubacak (2020) conducted a study to determine the usability of augmented reality in open and distance learning environments following universal design principles. They made future forecasts of usability by gathering expert opinions on this subject using the Delphi technique. As a result, in analyzing the primary data collected, 92 themes were evaluated by experts and accepted as usability principles within the framework of universal design principles in open and distance learning.

Balasubramanian and Agarwal (2012) confirmed the use of the Delphi Technique in the planning aspect of the dental field. It is through a set of carefully designed sequential questionnaires that

judgments on a particular topic are derived from the opinions of field experts. They claimed that, on top of quantitative data analysis, professionals use their training and personal experience to assist decision-making by consensus of expert opinions through the use of the Delphi Technique.

Critique of the Delphi Technique

In applying the Delphi Technique to different tasks in different fields, researchers observed the advantages and disadvantages of using the technique. While Delphi Technique works very effectively in one area, it may not perform as well as a forecasting tool in another. The following cases demonstrate the different perspectives of the Delphi Technique as analyzed by academic researchers.

Rowe and Wright (1999) systematically reviewed empirical studies looking at the effectiveness of the Delphi Technique and provided a critique of their research. Their findings suggested that Delphi groups outperformed statistical groups in their forecasting capabilities. However, they believed that the original concept of Delphi made generalizations about systematic phenomena difficult because the technique process lacked control of group differences and technique characteristics.

Sitlington and Coetzer (2015) analyzed the use of the Delphi Technique to support curriculum renewal. The research participants identified the strengths and limitations of the Delphi Technique process. Participants considered the process efficient and could draw out varied views on particular curriculum issues. The researchers identified the restrictive process of the technique as the limitation because the technique provided only a fragmented approach to curriculum design.

Nworie (2011) explained that Delphi Technique was initially used in the business settings but now has been widely used in other environments, including the educational arena. The benefits of using the Delphi Technique include obtaining expert opinions, building consensus, determining the suitability of the application of instructional interventions, forecasting trends, and interacting with research subjects with no time and space limitations.

Fink-Hafner, Dagen, Douˇsak, Novak, and Hafner-Fink (2019) investigated the strengths and weaknesses of using the Delphi Technique in social science research. They found that Delphi Technique avoids confrontations of the experts, reduces the opportunity for participants to conform with the dominant view, enables anonymity, minimizes manipulation or coercion, reduces the effect of noise, allows participants to correct any early misconceptions, and enables group communication free from geographical constraints. The weaknesses of the technique included a lack of guidance and agreed standards on interpretation and analysis, agreed on definitions of consensus, and selection criteria of participants. Delphi is also quite time-consuming and laborious for researchers and participants, and the result is limited in generalization due to the small sample size.

Donohoe, Stellefson, and Tennant (2012) explored the scope of identifying the Internet as a means for mitigating Delphi's limitations, maximizing its advantages, and expanding the breadth of its application. They claimed that e-Delphi has a range of effective and efficient benefits in assuaging traditional Delphi limitations. However, they clarified that a set of methodological issues about e-Delphi remain unaddressed.

SIGNIFICANCE OF THE STUDY

The literature review has shown that Delphi Technique has been employed as a planning tool in many fields, including education. Researchers have narrated the effectiveness of the technique through a conceptual approach. Some scholars have even experimented with it with real cases to demonstrate its forecasting capabilities. However, this study takes up a unique approach by having the participating pre-service school administrators go through the real process of implementing the Delphi Technique first. Then, they were asked to share their experiences by identifying the strengths and weaknesses of the technique and suggesting ways to improve Delphi Technique as a planning tool. This study sets the precedent of such a unique research design to verify the effectiveness of the Delphi Technique. Additionally, the researchers intend to invite pre-service school administrators to participate in the study so that they can be well prepared to consider using the Delphi Technique when they start assuming their roles as school administrators.

RESEARCH QUESTIONS

Major research question:
Is Delphi Technique an effective planning tool?
Research Sub-questions:

1. What are the pre-service school administrators' general perceptions of Delphi Technique as an educational planning tool?
2. What do the pre-service school administrators perceive as the strengths and weaknesses of the Delphi Technique as an educational planning tool?
3. How do the pre-service school administrators perceive the effectiveness of the procedure of implementing the Delphi Technique?

METHODOLOGY

Research Design

Fraenkel and Wallen (2009) described the qualitative research design as referring to studies that investigate the quality of relationships, activities, situations, or materials. They stated that qualitative researchers are especially interested in how things occur and particularly in the perspectives of the subjects of a study. This study aims to investigate how pre-service school administrators respond to their experiences in employing Delphi Technique to solicit average ratings of a previous task. The research setting of this study fits nicely into the characteristics of qualitative research design of "investigating the quality of relationships activities, situations, or materials."

Research Participants

A total of sixty-two students from three graduate classes participated in this study. All the students were pre-service school administrators enrolled in the Master's level Educational Planning class in which implementing Delphi Technique was a class exercise. All the participants in this study have earned their Bachelor's degrees and are currently teaching at elementary, middle, or high schools. They are enrolled in the Master of Education (Administration) program of a university in southern United States, preparing themselves to be educational administrators. The demographic distributions of the research participants are displayed in Table 1.

Table 1. Demographics of Research Participants

Class	Enrolment	Race	Gender	School Level	Degree earned
1	24	14 White 7 Black 3 Others	15 Male 9 Female	12 Elementary 8 Middle 4 High	20 Bachelor 4 Master
2	18	10 White 6 Black 2 Others	8 Male 10 Female	12 Elementary 4 Middle 2 High	18 Bachelor 0 Master
3	20	8 White 10 Black 2 Others	13 Male 7 Female	10 Elementary 4 Middle 6 High	18 Bachelor 2 Master

Research Instrument

The research instrument is a researcher-constructed survey consisting of thirteen open-ended questions soliciting participants' qualitative answers. The survey is intended to ask the general perception of the participants relating to the use of the Delphi Technique as an educational planning tool. The participants were asked to identify the strengths and weaknesses of the Delphi Technique. They were also asked to evaluate the procedures of implementing the Delphi Technique to solicit a consensus of opinions. Additionally, they were invited to make recommendations for improvement to the use of the technique for educational planning. For the instrument's validity, six school principals, two from each school level, were invited to review the first draft of the instrument in terms of contents, language, and format for the application. The principals' recommendations for revision of the instrument were well taken, and needed revisions were made. The revised version of the instrument was used as the survey in this study. (Please see Appendix for a copy of the instrument.) For reliability of qualitative studies, "consistency over time with regard to what researchers are seeing or hearing is a strong indication of reliability." (Fraenkel & Wallen, 2009, p. 454) It was observed that in the three rounds of data collection, the participants' responses to the survey did not change significantly. Therefore, the reliability of the survey instrument is well confirmed.

Research Procedure and Data Collection

This research was conducted in three graduate educational administration classes at a university in southern United States. Sixty-two pre-service school administrators (24 in Class 1, 18 in Class 2, and 20 in Class 3) participated in the survey. The same research procedure was used in these three classes for research preparation and data collection. First, the Goals of Education survey by Shilvock (2018) was used as a class exercise to solicit the participants' opinions about the goals of education. After two weeks, the same survey was again administered to each of the three classes with no prior notification. All the classes were asked to respond to the same survey the third time after another

two weeks. All the research participants were unaware that the same survey would be given to them three times, one after another. At the time of the second survey, a summary result of the first survey was presented to the participants for reference. At the time of the third survey, a summary result of the second survey was also presented to the participants for reference. This is the typical procedure of using the Delphi Technique to solicit the participants' average responses three times.

After responding to the same survey three times, all the pre-service school administrators in the three classes were asked to answer open-ended questions of a survey soliciting their opinions of their experiences in going through the different rounds of ratings as the Delphi Technique implementation process. The responses to their participation experiences in the Delphi Techniques implementation form the data collected for conducting this study.

Data Analysis

As Creswell (2009) described, analyzing qualitative data involves making sense of text and image data. All the data collected in this study are the expressions of the participants who voice their opinions about the use of the Delphi Technique. They are qualitative data in the form of sentences or phrases. The collected data were classified by category and coded by nature of their respective references. Creswell (2009) identified four types of codes: codes expected, codes unanticipated, unusual codes and theoretical codes. All the codes and their related data, then, were closely observed for possible emerging themes or emphases that reflect the foci of the study. All the themes with their affiliated raw data were then analyzed and cited to provide answers to the research questions.

FINDINGS

Data collected in this study were systematically analyzed, and significant findings were generated accordingly to provide answers to the research questions. In presenting the findings of this study, the researchers follow the sequence of the research questions developed. The following sub-sections are laid out in presenting the findings: Delphi Technique as a Planning Tool; Strengths and Weaknesses of Delphi Technique; and Effectiveness of Implementing Delphi Technique.

Delphi Technique as a Planning Tool

This section reports on the results of data analysis in response to Research Sub-question 1: What are the pre-service school administrators' general perceptions of Delphi Technique as an educational planning tool?

The pre-service school administrators were asked about their general perceptions of the Delphi Technique as an educational planning tool. Their responses were tabulated as frequency checks as shown in Table 2.

Table 2. Research Participants' General Perceptions of the Delphi Technique

Themes identified	Number of Checks out of 62 participants
• See yourself change position over time.	48
• Lose interest after three rounds of survey.	35
• Time consuming process.	28
• Restrictive in expressing opinions.	30

Many of them perceived the technique to be effective in pursuing educational planning processes. They found it particularly interesting to see how their positions on educational issues change over time. Some of their suggestive comments are:

> "I enjoyed doing the Delphi Technique and could see myself doing it again."
>
> "I think it is a good idea. It makes one think about various aspects of an issue."
>
> "I like it because it's interesting to see where and how your view of important issues change."

Approximately one-third of the pre-service school administrators considered Delphi Technique to be too tedious and time-consuming. They thought that people's viewpoints should not significantly change after a short lapse of time, and the waiting time spent on this process was not worth the effort. One participant said,

> "It is not a very effective tool because after doing it several times, people lose interest."

Another participant also stated,

> "It takes a long time to think through the questions to complete one round. Afterall, in all three rounds, the answers repeat and do not vary much."

Some participants thought the Delphi Technique device was too restrictive of people's thinking and should not be used as an educational planning tool. They felt that participants should be allowed to express their ideas to enrich their responses openly. Some others also considered the technique suitable for use only in particular circumstances.

Strengths and Weaknesses of the Delphi Technique

This section reports on the results of data analysis in response to Research Sub-question 2: What do the pre-service school administrators perceive as the strengths and weaknesses of the Delphi Technique as an educational planning tool?

The following table shows the frequencies of theme appearance with reference to the strengths of the Delphi Technique:

Table 3. The Strengths of the Delphi Technique

Themes identified	Number of Checks out of 62 participants
• See everybody's viewpoints and change.	40
• Have the opportunity to refocus/rethink.	35
• See what is consistently deemed important.	42
• The entire process is anonymous.	29

Most of the pre-service school administrators considered the strengths of the Delphi Technique to be the device of allowing respondents to try their answers two to three times. They were able to see the group responses of the previous times and make adjustments to their positions. They appreciated the technique's setup to respect respondents' privacy and felt free to express themselves openly. Some of their typical responses are shown below:

> "By answering the question or listening twice you get a good idea of people's opinion."
>
> "Great overview feeling of a group. Great to see results of thinking if there was a shift in beliefs."
>
> "It shows a variety of points of views and shows how people's view change."
>
> "You have the opportunity to refocus/rethink about the questions/topics."
>
> "You are able to see how opinions change; you are able to see what is consistently deemed important."
>
> "Everyone's opinion is given and then everyone has a say. Nobody's feelings get hurt because it is anonymous."

The pre-service school administrators also commented on the weaknesses of the Delphi Technique, with most of them focusing on the number of rounds in administering the survey instruments. While the repeated application of the same survey could be a strength in certain circumstances, they thought it could also become a serious weakness of the technique. Let us hear what they said,

> "People may not read the questions as carefully the 2nd and 3rd time – may not take it as seriously."
>
> "It is redundant and time consuming."
>
> "People may get tired and simply guess the answers in the 2nd and 3rd time."
>
> "It can possibly aggravate or annoy the person that must continue taking the survey several times."

Additionally, many pre-service school administrators also thought that the Delphi Technique process takes too long from start to finish. Decision-makers must wait several weeks from the first round of the survey to the last round to come to a recommended solution to a problem. Time is of the essence. They complained,

> "It takes a long time to make a decision. People may grow weary of the procedure."
>
> "The process takes a while to collect data to come to a conclusion."

Table 4 below shows the frequencies of theme appearance with reference to the weaknesses of the Delphi Technique:

Table 4. The Weaknesses of the Delphi Technique

Themes identified	Number of Checks out of 62 participants
• It is redundant and time consuming.	50
• People get tired and simply guess the answers.	42
• It takes a long time to make a decision.	48

Effectiveness of Implementing the Delphi Technique

This section reports on the results of data analysis in response to Research Sub-question 3:

How do the pre-service school administrators perceive the effectiveness of the procedure of implementing the Delphi Technique?

When the pre-service school administrators were asked if they knew why they were requested to respond to the same survey three times, most thought the purpose of repeatedly taking the survey was to check for consistency of responses. They stated,

> "Check to see if the ranking would change."
>
> "The purpose is to compare each set of results and come to a consensus."
>
> "It is intended to allow participants time to give further thought to their previous viewpoints."

Some of the pre-service school administrators also thought that the multiple times of using the same survey was to provide sufficient research data to compare and test the reliability and validity of the survey instrument. It is assumed that people's positions should not change significantly in a short time. If the instrument is good, it should yield consistent outcomes over a reasonable length of time.

The frequencies of the participants' responses to the reasons of repeated surveys in the Delphi Technique are displayed in Table 5 in the following:

Table 5. The Frequencies of Participants' Responses to Reasons of Repeated Surveys

Themes identified	Number of Checks out of 62 participants
• See if the ranking would change.	45
• Compare each set of results to reach consensus.	55
• Test the reliability of the survey instrument.	24

When the research participants were asked if they could remember their responses to the same questions in the same previous surveys, over half of them indicated that they either could not remember or could only slightly remember their previous responses.

The pre-service school administrators were asked how serious they were in doing the same ratings the second and the third time versus the first time rating in the survey. Approximately two-thirds of them openly admitted that they were not as serious when completing the second and third-time ratings as they were doing the first-time rating. An overwhelming majority of them indicated that they made slight changes in their viewpoints in the second and third times of the survey. However, they claimed that their viewpoints in the first round survey were more representative of their own.

Table 6 below shows the frequencies of the participants' responses to their seriousness in answering the same questions repeatedly at different times:

Table 6. Frequencies of Participants' Indication of their Seriousness of Repeated Surveys

Themes identified	Number of Checks out of 62 participants
• Remember answers to previous rounds of survey.	22
• Seriousness in the second and third rounds of survey.	25
• Answers to the first round of survey are more representative.	50

As to the improvement of the Delphi Technique, most of the pre-service school administrators recommended a longer lapse of time between rounds of the survey. They thought that allowing longer waiting time between any two survey rounds would give the participants a more stable opportunity to re-evaluate their positions on particular planning issues. They agreed that employing a repeat pattern of two to three rounds was common and appropriate in a typical Delphi process.

Finally, the pre-service school administrators were asked if they would recommend using Delphi Technique as a tool for educational planning. Their opinions were split into three groups. The first group of participants considered the technique effective, particularly in seeking consensus among the staff of divided viewpoints. The second group rejected the technique simply because it was time-consuming and would not fit in many educational planning situations. The third group claimed that the determination to use Delphi Technique depended on the demands and outcomes of different planning tasks. Some planning issues, such as group consensus and prioritization of options, can accommodate Delphi Technique better than others. They made it clear that:

> "Not for high important items that are time sensitive."
>
> "I suppose it works if we are trying to prioritize items that have been agreed upon."
>
> "For priority planning/goal setting tasks – beneficial. For measurement tasks – no."

DISCUSSION

Most of the pre-service school administrators in this study agreed that Delphi Technique was too time-consuming in its application. This statement agrees with what Fink-Hafner, Dagen, Douˇsak, Novak, and Hafner-Fink (2019) claimed that Delphi Technique was not suitable for planning projects of constrained timing.

Fink-Hafner and his colleagues also found in their study that the identities of all the participating experts in Delphi Technique implementation were not disclosed. This practice could avoid any

confrontations among the experts in the field. The findings in this study also indicated that anonymity was a strength of the technique. The participants felt free to express their opinions with no tracking record of who they were.

Sitlington and Coetzer (2015) thought that the design of the Delphi Technique did not offer many other open options for the participants to select. The participants in this study also agreed that the technique was developed with too much restriction. Respondents should be allowed to open themselves to offer out-of-the-box opinions.

A significant finding of this study is also in agreement with Nworie (2011) that, in the implementation of the Delphi Technique, there is no time and space limitation. Participants' geographical locations and time availability do not become barriers for participation in Delphi surveys.

The pre-service school administrators in this study could see the group responses of the previous times and adjust their positions. Fink-Hafner, Dagen, Douˇsak, Novak, and Hafner-Fink (2019) also complimented on Delphi Technique designed with the opportunity to allow the participants to make corrections to their previous responses.

While some of the findings of this study agree with previous research, some are unique of its own. First, the participants in this study honestly admitted that they did not respond as seriously to the survey questions in the second and third rounds as they did in the first round. They even claimed that their opinions in the first round were more representative of their own. Second, they recommended a longer lapse of time between any two rounds of the survey to improve the design of the Delphi Technique. These research findings were not reported in previous studies.

Additionally, an examination of the findings of this study has disclosed some conflicting opinions among the research participants. While some of them thought Delphi Technique was too time-consuming to be efficient, some indicated that the strength of the technique was actually in the time taken to allow the participants to reconsider their previous responses more carefully. In applying the Delphi Technique to a particular planning project, consideration has to be given to the nature of the project and how it could match the special properties of the technique.

IMPLICATIONS TO EDUCATIONAL PLANNING

As indicated by some of the pre-service school administrators in this study, Delphi Technique can be used effectively in specific educational planning tasks such as goal setting and priority decisions. Because of the drawbacks of the technique, it may not be suitable for use in some time-sensitive issues and case studies. As Weatherman and Swenson (1974) suggested, Delphi Technique has had some basic applications in educational planning, including forecasting probes, strategy probes, preference probes, and perceptions of a current situation. In deciding to use Delphi Technique, Weatherman and Swenson recommended that educational planners seriously consider modifying the technique in terms of the participant constituencies, the procedural variables, and the outcome qualities.

The findings of this study have indicated that Delphi Technique is unsuitable for all educational planning occasions. While we could make the best use of the technique's advantages for the benefit of planning, other planning strategies could be employed to complement the weaknesses of the technique. To make the instrument less restrictive, open-ended questions can be added to

quantitative surveys. Face-to-face interviews of representative participants could also supplement the Delphi Technique's multiple rounds to confirm the outcomes of the technique.

The findings of this study also indicated that research participants did not like to have their identities disclosed. This finding is valid in all kinds of educational planning processes. Therefore, seeking consensus in Delphi Technique helps protect the participants' identities and is a preferred approach to secure solutions to educational problems rather than going by majority votes.

LIMITATIONS OF THE STUDY

Even though the meaning of qualitative research is not intended for generalization purposes, the extent of the findings of this study is limited to its representation. The perceptions of the pre-service school administrators in this study are limited to only one graduate program of one university. It is not easy to convince others to believe that similar studies elsewhere could generate similar results. Additionally, the findings of this study are solely based on the responses of the pre-service school administrators to the open-ended questions of the survey. No other data from personal interviews or documentary records were used for cross-checking to verify the findings of the survey results. Furthermore, the findings of this study were created under the research setting of a total of three rounds of survey and a two-week lapse of time between any two rounds. A variation of this research setting could come up with different results.

CONCLUSION

This article is the report of a study conducted to investigate the effectiveness of the Delphi Technique as an educational planning tool. The investigation is based on the perceptions of a group of pre-service school administrators in a university's graduate program in southern United States. The design of this study is unique. Since educational administrators most likely use Delphi Technique in educational planning for all kinds of planning tasks, this study has involved the pre-service school administrators in all the implementation activities of the Delphi Technique. The purpose is to prepare them early enough to consider using the technique in the real world and identify its strengths and weaknesses. When they participated in the Delphi Technique implementation before the research survey, they would experience the efficiency and effectiveness of the technique personally. After the participants' personal experiences, their responses to the research survey would be more realistic.

The major research question,"Is Delphi Technique an effective planning tool?" was first established. Then, the research sub-questions were developed around the central theme of the major research question. Therefore, the answer to the major research question is sought from answers to all the research sub-questions. The findings of this study indicated that Delphi Technique was an effective planning tool, particularly in seeking group consensus. However, the findings also showed that the technique was too tedious and time-consuming for use in educational situations with a set time constraint. Future studies about the critique of the Delphi Technique are recommended to involve teachers, current school administrators, and professional experts. To investigate their perception differences, comparative studies can be conducted between school administrators and teachers. Expert opinions could bring unique perspectives to improving Delphi Technique as a planning tool.

REFERENCES

Altinpulluk, H., Kesim, M., & Kurubacak, G. (2020). The usability of augmented reality in open and distance learning systems: A qualitative Delphi study. *Open Praxis, 12*(2), 283-307.

Balasubramanian, R., & Agarwal, D. (2012). Delphi technique – A review. *International Journal Of Public Health Dentistry, 3*(2). About This Publication – Gale Academic OneFil

Creswell, J. W. (2009). *Research design*. (3rd Ed.) Sage.

Donohoe, H., Stellefson, M., & Tennant, B. (2012). Advantages and limitations of the e-Delphi Technique: Implications for health education researchers. *American Journal of Health Education, 43*(1), 38-46. ERIC Document: EJ978262

Fink-Hafner, D., Dagen, T., Douˇsak, M., Novak, M., & Hafner-Fink, M. (2019). Delphi method: Strengths and weaknesses. *Metodoloˇski zvezki, 16*(2), 1–19.

Fraenkel, J. R., & Wallen, N. E. (2009). *How to design and evaluate research in education*. (7th Ed.) McGraw Hill.

Hsu, C. C., & Sandford, B. A. (2007). The Delphi Technique: Making sense of consensus. *Practical Assessment, Research, and Evaluation, 12*(10), 1-8. DOI: https://doi.org/10.7275/pdz9-th90 https://scholarworks.umass.edu/pare/vol12/iss1/10 Icfai Business School (2022). Human resource planning. The author. https://Delphi Technique – Human Resource Planning (ibsindia.org)

Nworie, J. (2011). Using the Delphi Technique in educational technology research. *TechTrends: Linking Research and Practice to Improve Learning, 55*(5), 24-30.

Rowe, G., & Wright, G. (1999). The Delphi technique as a forecasting tool: Issues and analysis. *International Journal of Forecasting, 15*(4), 353-375.

Seemiller, C., & Whitney, R. (2020). Creating a taxonomy of leadership competency development. *Journal of Leadership Education,19*(1), 119-132.

Shilvock, K. (2018). The purpose of education: What should an American 21st Century education value? *Empowering Research for Educators, 2*(1), 7-14.

Sitlington, H. B., & Coetzer, A. J. (2015). Using the Delphi Technique to support curriculum Development. *Education & Training, 57*(3), 306-321.

Twin, A. (2022). Delphi method forecasting: Definition and how it's used. Delphi Method Forecasting Definition and How It's Used (investopedia.com)

Weatherman, R., & Swenson, K. (1974). Delphi Technique. In S. P. Hencley & J. R. Yates (1974). *Futurism in education – Methodologies*. McCutchan.

APPENDIX

Evaluation of the Delphi Technique

In the following survey, please respond honestly to each of the open-ended questions about the use of the Delphi Technique as an educational planning tool. Your responses will help educational planners improve the implementation of the Delphi Technique.

1. What is your opinion of the Delphi Technique as a planning tool?

   _____

   _____

2. What is/are the strengths of the Delphi Technique?

   _____

   _____

3. What is/are the weaknesses of the Delphi Technique?

   _____

   _____

4. Do you remember the first rating when you were asked to do the same rating the second time?

   _____

   _____

5. Do you remember the first and the second ratings when you were asked to do the same rating the third time?

   _____

   _____

6. Did you do the second and third ratings as seriously as the first-time ones?

   _____

   _____

7. Of the three ratings, which one do you think is more representative of your own opinion?

   _____

   _____

8. Do you know why you were asked to do the same rating three times?

_____

_____

9. Do you believe that allowing a longer lapse of time between two ratings could affect the result of the ratings?

_____

_____

10. Would you recommend the use of the Delphi Technique in educational planning tasks?

_____

_____

11. How many times of rating would you recommend using Delphi Technique for the best planning purposes?

_____

_____

12. Other comments:

_____

_____

End of Survey

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