BILINGUAL PUBLISHING GROUP

Journal of International Education and Practice

Volume 6 · Issue 1 · June 2023 ISSN 2630-516X(Online)

Volume 6 Issue 1 • June 2023 • ISSN 2630-516X (Online)

Journal of International Education and Practice

BILINGUAL PUBLISHING GROUP

BILINGUAL PUBLISHING GROUP

Volume 6 | Issue 1 | June 2023 | Page1-44

Journal of International Education and Practice

Contents

Articles

BILINGUAL PUBLISHING GROUP

Journal of International Education and Practice

https://ojs.bilpubgroup.com/index.php/jiep

ARTICLE

The Effect of "Think-Talk-Write" Strategy on EFL Tenth-Grade Students' Writing Performance

Mohammad Mahmoud Azzam[1*] Abdallah Baniabdelrahman[2]

1 Ministry of Education, Yarmouk University, Irbid, Jordan.
2 Department of Curriculum and Methods of Instruction, Faculty of Education, Yarmouk University, Irbid, Jordan.

ARTICLE INFO

Article history
Received: 5 January 2023
Accepted: 30 January 2023
Published: 10 Feb 2023

Keywords:
EFL Jordanian Students
Reading Performance
TTW Strategy

ABSTRACT

This study investigated the effect of "*Think-Talk-Write strategy"* on English as a Foreign Language (EFL) tenth-grade students' writing performance. A quasi-experimental design with two groups was employed. The researcher randomly assigned two whole sections of grade 10 from Al-Kharaj Secondary School for Boys. The first section was chosen as the experimental group with (20) students, and the second as the control group with (20). To achieve the purpose of the study, a pre/post writing performance test was designed. In addition, *Think-Talk-Write* (*TTW) strategy* was used to teach the experimental group, whereas a control group was taught by the conventional teaching strategies, as suggested in the teacher's book. Results revealed that *TTW strategy* enhanced students' writing performance. In light of the research results, the researcher recommends to use *TTW strategy* on other genres of writing.

1. Introduction

It is essential for people to learn English as a second language because it can help them understand other people's cultures, communicate with them, and succeed in school and the workplace. In an English as a Foreign Language (EFL) setting, developing communication skills is essential for helping students become proficient in the target language. This calls for their capability for both the receptive (reading and listening) and the productive (speaking and writing) skills (Ivancic & Mandic, 2014).[11] Integrating skills plays a big part in assisting students in accurately practicing and learning the language (Ibnian, 2010;[9] Omaggio, 2001).[20]

Writing is one of the language communication skills. An efficient way to transfer knowledge and information from one generation to another is through writing (Xin, 2007).[29] Additionally, structuring and combining words and sentences in a meaningful way requires a lot of mental effort (Al-Abed Al Haq& Al-Sobh, 2010).[1] Writing is a problem-solving activity, in which the writer should come up with and organize ideas (Massi, 2001).[15]

Students benefit from writing. It is a crucial educational tool for academic success where they may exchange knowledge, hone their skills, and analyze data (Albert-Morgan, Hessler, & Konard, 2007).[2] Writing is, in general, done to express thoughts and send messages to readers. As a result, the writer needs to be knowledgeable about grammar, formal writing, and vocabulary (Ur, 1996).[28]

**Corresponding Author:*
Mohammad Mahmoud Azzam; Doctoral Candidate, Department of Curriculum and Methods of Instruction, Faculty of Education, Yarmouk University, Jordan; Email: Email: mohammad_azzam22@yahoo.com.

 DOI: https://doi.org/10.30564/jiep.v6i1.5388

The goal of EFL teachers is to motivate students to create a range of written pieces, most usually in their native language (Ur, 1996).[28] Writing is a complex activity; thus writers should be familiar with the alphabet and how letters combine to make words and convey meaning. They should also be proficient in sentence construction and writing mechanics. Additionally, they should be able to combine sentences to create well-organized paragraphs and essays (Al-Muawa &Taisser, 1989). [3]

Starkey (2004) [24] argues that successful writing should have the following elements. First, organization, which directs both the writer and the reader from the first to the final sentence, is essential. Second, clarity, which can be done by eliminating ambiguity, using modifiers and precision, employing strong, precise adjectives and adverbs, and remaining succinct by omitting superfluous words and informational repetition. Third, the word choice: When picking words, writers should consider two factors: denotation (they should be aware of the words' literal meanings) and connotation (writers should pay attention to positive or negative association that most word naturally carry with them).

Even though writing is one of the most crucial language acquisition abilities, it is nevertheless a challenging activity that requires students to master many different skills. For instance, Heaton (1975) [7] asserted that students should possess the following writing abilities: language use, mechanical skills, treatment of materials, stylistic abilities, and judgment abilities.

EFL teachers have recently shown a greater interest in finding ways to help their students learn to write. *"Think-Talk-Write" strategy* is one strategy for this help. *TTW strategy* emphasizes the importance of three distinct cognitive processes: thinking, speaking, and writing (Rahmah, 2017).[23]

TTW strategy, which consists of stages of thinking, talking, and writing, is a cooperative learning strategy (Supandi, Waluya, Rochmad, Suyitno, & Dewi, 2018).[26] This strategy constructs introspection, cognition, and concept structure. Students then need to write depending on their ideas. The three phases of the *TTW strategy* are as follows: first, students think about the content; second, students discuss the consequences of thinking about the material; third, students write the thoughts received from discourse.

According to Zulkarnaini (2012: 149) [30] "Huinker and Laughlin introduced the *TTW strategy*". This strategy aids in the practice of fluent spoken and written language. It is predicated on the idea that education is a social activity. Students are encouraged to think, talk, and write about the specific topic using it. *TTW strategy* is employed to improve writing fluency and language practice prior to writing.

According to Huinker and Laughlin in Zulkarnaini (2012),[30] *TTW strategy* incorporates time for students to reflect and deliberate before organizing and testing their ideas. The exchange of ideas evolves from students talking to themselves or having reflective dialogue to them conversing with one another.

Rahmah (2017) [23] claims that *TTW strategy* is a teaching strategy that can help students develop their ideas by comparing the testing ones that check presents with their ideas and knowing what thoughts that can be discussed, talk with their classmates can help students share and test their ideas to get better clues, and it helps students gain the confidence to use their own language in the writing activity because they are certain that their thoughts are sound.

TTW strategy includes three activities as the following: first, Think is preceded by looking at a picture or reading an idea written on the board by the teacher. After taking time in thinking, students are given time to write some notes about their thoughts to sort out their ideas with some help from the teacher about how to take notes. It is a way to integrate thinking and writing skills. Second, Talk is a stage where students can use the language orally in order to communicate with their peers. The importance of this stage comes from how students use their own language to produce clues and build on them by sharing with each other. In addition, it can create a socializing environment, which can enhance talking and communication skills of the EFL students. Third, Write is a phase where those thoughts, clues, discussions, and dialogues should be expressed through writing (Suminar and Putri, 2018).[25]

From first through twelfth grades, English is taught to students in Jordan. *The General Guidelines and General and Specific Outcomes for English Language Teaching* for both Elementary and Secondary Stages, students should improve their abilities so they can communicate in a range of situations (Ministry of Education, 2006).[16] Students receive English instruction for 45 minutes each, four or five times each week. English teachers are given textbooks, CDs, and flashcards to help them with their teaching duties. However, Jordanian students continue to struggle with weak writing abilities and other issues (Al- Abed Al-Haq & Sobh, 2010;[1] Al-Sawalha &Chow, 2012;[4] Toubat, 2003).[27]

2. Statement of the Problem

Writing paragraphs, informal letters, notes, and reports have been challenges that EFL students face. The

DOI: https://doi.org/10.30564/jiep.v6i1.5388

researcher, as an English language teacher for fifteen years in different educational stages in Jordan, Kuwait, and Qatar has noticed that there is a general weakness in students' ability to use the words properly, write structured sentences, and have the right cohesion in their writing. Such difficulty may be attributed to the fact that the conventional methods and strategies of teaching writing performance that are used by EFL teachers.

Therefore, Jordanian researchers (e.g., Al-Abed Al Haq & Sobh, 2010;[1] Rababah & Melhim; 2015)[22] stated that the lower level of students' writing performance might be due to the improper use of writing performance strategies. Thus, using *TTW strategy* in the teaching/learning process may be beneficial. Specifically, many studies (e. g., Qomariyah & Nafisah 2020;[21] Laoli & Harahap 2021;[14] and Nova, Umara, & Ginting 2022)[19] showed a positive effect of *TTW strategy* and recommended to use it in the learning process.

Purpose of the Study

The purpose of the current study is to examine the potential effect of *"Think-Talk-Write" strategy* on tenth-grade students' writing performance.

Question of the Study

The current study attempted to answer the following research question:

1. Are there any statistically significant differences at ($\alpha = 0.05$) in the tenth-grade EFL students' mean scores on the writing performance post-test that can be attributed to the teaching strategy (*TTW vs.* conventional instruction)?

Significance of the Study

The present study is significant as it enables the Jordanian EFL tenth-grade students to develop their performance in writing lessons through *TTW strategy*. Moreover, the researcher claims that this study is one of the first studies in Jordan, which investigates the effect of *TTW strategy* on tenth-grade students' writing performance. This study is important because it might enable EFL teachers in Jordan to adopt a new strategy to teach writing performance. The study is also important because it could help curriculum designers and decision-makers plan and create appropriate activities and tasks that enhance students' writing performance. Further, the results of the current study may encourage other researchers to conduct studies, particularly in Jordan, to investigate the potential effect of *TTW strategy* on subjects rather than English.

3. Operational Definitions of Terms

The following terms are defined as follows in the current study:

Writing Performance: Is the students' ability to convert their ideas and thoughts to a piece of written text (Forteza Fernandez & Gunashekar, 2009).[6] In the current study, it refers to Jordanian tenth-grade students' ability to express their ideas according to the writing rubric of focus, development, organization, conclusion, and word choice. It is measured by the writing post-test, based on the outcomes of some chosen units under the study in *Action Pack 10*.

"Think-Talk-Write": Is a strategy that requires students to think about a picture they would see or a text they would read. Then, they are asked to write some notes using their own language to express those thoughts. Next, they talk to each other as a cooperative work with their peers to discuss clues and notes. Finally, they express the result of the discussion through writing (Mulyarti, 2016).[17] In this study, *TTW* is a strategy of three stages used to teach tenth-grade students to improve their writing performance.

Limitations of the Study

The following limitations confine the results of the present study:

1. The generalizability of the study is limited to the tenth-grade male students in a public school, Al-Kharaj secondary school for boys in Irbid Directorate of Education, during the first semester of the academic year 2022–2023. So, the results reported in this study can be generalized to similar samples or contexts.

2. The duration of the study lasted only for seventh weeks. Longer duration may have different results.

3. The textbook used in this study is *Action Pack 10* (namely, units 1, 2 and 3), used in Jordanian public schools. Another textbook with another content may give different results.

4. The evaluation of students' writing performance is restricted the paragraphs, informal letters, notes, and reports. Other genres of writing may give different results.

Review of the Related Literature

After reviewing educational research, the researcher collected the following studies relevant and informative to the study of the *TTW strategy*.

Rahmah (2017) [23] analysis *TTW strategy* in writing descriptive text. Whether this strategy effects to improve the students' score or not. The participants of the study were 30 students. Data were collected through a pre/post-test and a questionnaire. The findings of the study showed

 DOI: https://doi.org/10.30564/jiep.v6i1.5388

that *TTW strategy* is effective to improve the students' score in writing descriptive text, and the students' responses towards the use of *TTW strategy* in writing descriptive text were positive response.

Istiara (2018) [10] investigated the impact of *TTW strategy* as a learning model on English essay writing ability. The participants of the study were 22 semester IV students. Data were collected through observation, interview, and tests. The findings of the study showed that there is a positive effect of *TTW strategy* on students' English essay writing ability.

Kurniaman, Yuliani and Mansur (2018) [13] investigated the effect *TTW* Learning Model on third-grade primary students' writing skill. Experimental design was used in this study. Data were collected through pre/post-test. The findings of the study showed that *TTW strategy* had a positive influence on third-grade students' narrative writing skill.

Kamilia (2019) [12] investigated the effect of *TTW strategy* on writing fluency. A quasi-experimental design was used in this study. Two groups were used as control and experimental ones. Data were collected through a pre-test, a treatment, and a post-test. The findings of the study showed that there is a significant effect of *TTW strategy* on the first-grade students' writing ability.

Darmawangsa, Mutiarsih, Karimah and Racmadhany (2020) [5] examined *TTW strategy* effect on university students' French writing skill through the Zoom video-conferencing platform. Two groups were used as control and experimental. Data were collected through a pre/post-test. The findings showed a positive contribution of *TTW strategy* on improving students' writing skill.

Muna, Aziz, and Muthalib (2020) [18] investigated the effect of *TTW strategy* on the students' writing analytical exposition improvement and to know their responses towards it. A quasi-experimental design was used in this study. A control and experimental groups were used to collect the data. The findings showed positive responses toward the implementation of *TTW strategy* on teaching writing analytical exposition text. In addition, applying *TTW strategy* showed improvement in students' ability to write an analytical exposition text.

Qomariyah and Nafisah (2020) [21] investigated the effect of *TTW strategy* in students' vocabulary mastery. Experimental design was used in this study. There were a control group and an experimental one. Data were collected through a pre/post-test. The findings of the study showed that there is a significant effect of *TTW strategy* in students' vocabulary mastery.

Laoli and Harahap (2021) [14] examined if *TTW strategy* has an effect on students' descriptive writing ability. Experimental design was used in this study. The participants of this study were 64 of eleventh grade students, who were divided into two groups. Data were collected through a pre/post-test. The findings of the study showed that *TTW strategy* had positive effect on students' writing ability.

Herlina, Rahman, and Abdul (2022) [8] examined if there is an effect of *TTW strategy* and Clustering Strategy on the students' achievement in their descriptive text writing. A quasi-experimental design with two groups was used in this study. The participants of this study were the 4th and the 6th semester of the English Department in the Faculty of Teacher Training and Education. They were divided into 22 students in an experimental group and 20 students in the control one. Data were collected through a pre/post-test. The findings of the study showed that using *TTW strategy* improves students' writing achievement.

Nova, Umara, and Ginting (2022) [19] investigated if there was an effect of T*TW strategy* on students' writing skill in recount text or not. A quasi-experimental design was used in this study. The participants of the study were taken from the tenth-graders who were divided into 30 students for an experimental group and 30 for the control one. Data were collected through a test. The findings of the study showed a positive effect of the *TTW strategy* on students' writing skill in recount text.

Concluding Remarks

Many studies (e.g., Darmawangsa, Mutiarsih, Karimah and Racmadhany, 2020;[5] Herlina, Rahman, and Abdul, 2022;[8] Istiara, 2018;[10] Kamilia, 2019;[12] Kurniaman, Yuliani and Mansur, 2018;[13] Laoli and Harahap, 2021;[14] Muna, Aziz, and Muthalib, 2020;[18] Nova, Umara, and Ginting, 2022;[19] Qomariyah and Nafisah, 2020;[21] Rahmah, 2017) [23] confirmed that *TTW strategy* is useful and successful as a teaching strategy. It also revealed that a few studies have been conducted to investigate the effect of *TTW strategy* on students' writing performance at school and university level. Yet the previous studies showed that *TTW strategy* has a significant positive effect on the improvement of EFL students' writing skill in general. Also, they were concerned to examine students' attitudes towards *TTW strategy* in learning writing skill.

Lots of studies were conducted to examine the effect of *TTW strategy* on EFL learners. However, few studies have been carried out on Arab learners of English. In the Jordanian context, there are no studies conducted to examine the effect of *TTW strategy* among Jordanian

DOI: https://doi.org/10.30564/jiep.v6i1.5388

learners' writing performance.

4. Method and Procedures

Design and Variables of the Study

In the current study, the quasi-experimental design was followed. The independent variable is TTW teaching strategy. The dependent variable was the students' performance in the writing performance post-test. In addition, *TTW strategy* was used to treat the experimental group, whereas a control group was taught by the conventional teaching strategies, as suggested in the teacher's book.

Participants of the Study

The current study consisted of two EFL tenth-grade sections of 40 students who were purposefully chosen by the researcher. They studied at Al-Kharaj Secondary School for Boys. The current study was carried out during the first semester of the academic year 2022/2023.

The first section was chosen as the experimental group with (20) students by flipping a coin, and the second as the control group with (20) students. The students in both groups were pre-tested to ensure equivalency. TTW *strategy* was used to teach the writing exercises of the Action Pack 10 textbook to the experimental group. The control group was taught using conventional teaching based on the Teacher's Book of Action Pack 10 with no indication of the use of TTW strategy.

Research Instrument

The pre/post-test of writing performance was designed to achieve the purpose of the study. The description of the instrument is as follows:

The Pre/Post-test for Writing Performance

A pre-post writing test was designed in light of the rubric of teaching writing skills for the tenth-grade students by the researcher himself after analyzing the content of 1, 2, and 3 units of *Action Pack 10* to find out how the writing activities should be taught and tested, and then administrated by the teacher; the students were sked to write a short paragraph about (protecting rainforests).

The pre-test was given to examine the students' writing performance and find out whether the two groups (experimental and control) were equivalent or not. Whereas the post-test was administrated at the end of the instructional program to find out the effect of *TTW strategy* on students' scores after controlling the effect of pre-test scores. The total score of the test was 25; the test was marked and graded in terms of five-writing rubric including focus, development, organization, word choice, and conventions.

To evaluate the construct validity of the test, correlation analysis was used. Results revealed that Pearson Correlation Coefficients between the item score and the total score of the test are between (0.55-0.93). Furthermore, Cronbach's alpha and test-retest coefficients for the test were extracted; Results revealed that Cronbach's Alpha Coefficients for the test are. 0.87, while, the test-retest coefficient is 0.91. Since the reliability coefficients are above the threshold value (0.70), the test is reliable and applicable to assess students' writing performance.

TTW Strategy-Based Instructional Program

To achieve the purpose of the study, the researcher designed *TTW strategy*-based instructional program to help participants improve their writing performance. The researcher additionally redesigned the writing activities in units (1, 2 and 3) so that the experimental group's participants used *TTW strategy* in their writing performance sessions.

The Instructional Material

The instructional material used in this study is based on the writing activities of three units from the *Student's and Activity Book* of *Action Pack 10*. The researcher redesigned these activities to incorporate *TTW strategy* for the participants in the experimental group. This instructional program lasted for seven weeks. It started on the 6th of October 2022 and ended on the 28th of November 2022. The writing activities of the units (1, 2 and 3) of *Action Pack 10* were redesigned in the light of TTW strategy. The writing activities of each unit were alienated into nine 45-minute sessions for seven weeks.

Procedures for Designing and Implementing the Instructional Program

In order to implement the current program, the following procedures were carried out:

1. Identifying the writing activities in units 1, 2, and 3 of *Action Pack 10.*
2. Identifying the activities in the student's and activity books of *Action Pack 10* in which *TTW strategy* can be implemented.
3. Modifying these activities per *TTW strategy*.
4. Identifying the procedures to be implemented in each lesson.
5. Allocating appropriate time for each activity.
6. Giving the control and experimental groups a writing

 DOI: https://doi.org/10.30564/jiep.v6i1.5388

performance test before introducing the targeted *TTW strategy*.

7. Introducing the targeted *TTW strategy* to the experimental group.

8. Teaching students the targeted activities per *TTW strategy* after training them on it.

9. Assessing the students' performance in writing through a post-test after implementing the program.

Validity of the Instructional Program

To ensure the validity of the instructional program, the researcher presented it to a jury of English curriculum and instruction specialists. The jury was asked to review the program and offer any ideas or suggestions to the researcher on the program that was handed out.

Results

To answer the research question, the means and standard deviations of pre/post-test scores in the five-writing rubric were calculated, as shown in Table 1.

Table 1 shows that the post-test scores of the experimental groups are higher than the mean scores of the control group in the five-writing rubric (focus, development, organization, conventions, and word choice) as measured by the writing performance test.

To investigate the effect of the teaching strategy (*TTW vs.* conventional instruction) on the linear combination of the five-writing rubric after controlling the effects of pre-test scores, a one-way multivariate analysis of covariance (one-way MANCOVA) using a multivariate test (Hotellings' Trace) was used, as shown in table 2.

Table 2 shows that the main effect of the teaching strategy was significant. This indicates that the linear composite of the five-writing rubric differs across the two groups. The partial eta square value of .603 indicates that 60.3% of the variance in the composite of the five-writing rubric is attributed to the teaching strategy. Since the effect of the teaching strategy is significant, a follow-up univariate analysis (Tests of between-subject effects) was conducted, as shown in Table 3.

Table 3 shows that there were statistically significant differences between the two groups in the five-writing rubric of the experimental group. The partial eta squared values of .232, .411, .560, .308, and .117 indicated that the teaching strategy explained 23.2%, 41.1%, 56.0%, 30.8%, and 11.7% of the variance in the focus, development, organization, conventions, and word choice respectively.

Additionally, the means, standard errors, and standard deviations of the two groups in the five-writing rubric before and after controlling the pre-test scores were extracted, as shown in Table 4.

Table 1: Means and Standard Deviation of Five Writing Rubric for the Pre-Test and Post-Test

Writing Rubric	Group	Pre-test		Post-test	
		Mean	S.D	Mean	S.D
Focus	Control	1.58	1.13	2.74	1.19
	Experimental	1.64	.96	3.95	1.02
	Total	1.61	1.03	3.38	1.25
Development	Control	.68	.67	1.42	.51
	Experimental	.71	.64	3.21	1.23
	Total	.70	.65	2.36	1.31
Organization	Control	.68	.63	1.26	.48
	Experimental	.83	.53	2.79	.78
	Total	.76	.58	2.06	1.01
Conventions	Control	.71	.67	1.39	.66
	Experimental	.86	.62	2.69	1.03
	Total	.79	.64	2.08	1.08
Word choice	Control	2.00	.94	2.84	1.36
	Experimental	2.64	1.04	3.81	1.02
	Total	2.34	1.03	3.35	1.28

Table 2: Results of Multivariate Test (Hotellings' Trace) for the Effect of Teaching Strategy on the Five-Writing Rubric

Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Teaching strategy	1.517	8.798	5.000	29.000	.000	.603

DOI: https://doi.org/10.30564/jiep.v6i1.5388

Table 3: The Effect of the Teaching Strategy on the Five Writing Rubric after Controlling the Effect of Pre-Test Scores

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Covariate1	Focus	2.113	1	2.113	2.333	.136	.066
Covariate2	Development	.119	1	.119	.126	.725	.004
Covariate3	Organization	.000	1	.000	.000	.983	.000
Covariate4	Conventions	.680	1	.680	1.631	.210	.047
Covariate5	Word choice	4.535	1	4.535	4.512	.041	.120
Teaching Modality	Focus	9.027	1	9.027	9.966	.003	.232
	Development	21.827	1	21.827	23.022	.000	.411
	Organization	16.704	1	16.704	42.002	.000	.560
	Conventions	6.131	1	6.131	14.710	.001	.308
	Word choice	4.387	1	4.387	4.364	.044	.117
Error	Focus	29.891	33	.906			
	Development	31.286	33	.948			
	Organization	13.124	33	.398			
	Conventions	13.755	33	.417			
	Word choice	33.170	33	1.005			
Corrected Total	Focus	61.375	39				
	Development	66.994	39				
	Organization	39.594	39				
	Conventions	45.775	39				
	Word choice	63.600	39				

Table 4: Adjusted and Unadjusted Means of the Five-Writing Rubric

Dependent Variable	Group	Unadjusted mean		Adjusted mean	
		Mean	S.D	Mean	S.E
Focus	Control	2.74	1.19	2.83	.228
	Experimental	3.95	1.02	3.87	.216
Development	Control	1.42	.51	1.52	.234
	Experimental	3.21	1.23	3.13	.221
Organization	Control	1.26	.48	1.33	.151
	Experimental	2.79	.78	2.73	.143
Conventions	Control	1.39	.66	1.63	.155
	Experimental	2.69	1.03	2.48	.147
Word choice	Control	2.84	1.36	2.97	.241
	Experimental	3.81	1.02	3.69	.228

Table 4 shows that there are differences between the two groups on the five-writing rubric (focus, development, organization, conventions, and word choice) that remain after the differences in the pre-test scores are controlled. As such, *TTW strategy* enhanced students' performance in focus, development, organization, conventions, and word choice.

5.Discussion

The results revealed that there are statistically significant differences in the participants' writing performance in favor of those in experimental group. This demonstrates the potential effect of *TTW strategy* on developing participants' writing performance. As a result, it can be stated that *TTW strategy* improved students' performance at all five- writing rubric in the experimental group.

Numerous factors may have contributed to the positive effect of *TTW strategy* on the experimental group of students' post-test writing performance overall and on their performance on the five-rubric writing performance.

 DOI: https://doi.org/10.30564/jiep.v6i1.5388

One of the potential deciding factors is the design of *TTW strategy*-based instructional program. *TTW strategy*-based instructional program was meticulously developed and approved for use in order to accomplish its objective. The writing exercises were thoughtfully planned by the researcher; they were concise and well-organized to generate better conversation topics, the subjects were drawn from the students' curriculum, and the time allotted was adequate.

The students themselves are one other factor that might have played a role in the experimental group's higher performance. Throughout the duration of treatment, they participated actively and attentively in the enjoyable activities. A further contributing factor to the experimental group's higher performance was the teachers' use of corrective feedback strategies while executing *TTW strategy* in the classroom.

6.Conclusion

Based on the discussion of the results of the study, conclusions were put forth, as follows:

1. *TTW strategy-based* instructional program enhanced the participants' writing performance and improved their cooperation in classroom activities.

2. The students' motivation increased when *TTW strategy* was used in the classroom, particularly during writing performance courses.

3. *TTW strategy*-based instructional program improved student performance on the post-test compared to the pre-test, suggesting the effect of this teaching strategy in enhancing the teaching/learning process and expanding the teaching content in the MOE textbook.

Recommendations

Based on the findings of this study, several recommendations are presented as follow:

1- EFL teachers are recommended to use the current instructional program to improve students' performance in writing lessons and help students interact, communicate with others, and get feedback from the teacher and peers.

2- The Ministry of Education is recommended to train teachers through conducting training sessions and workshops to qualify and educate them to use *TTW* strategy in their teaching.

3- EFL textbook designers should adopt *TTW strategy* activities when they design the English language curriculum, especially for grade ten. This feature makes EFL writing performance classes more active and enjoyable.

4- Researchers are invited to conduct different studies to investigate the effect of *TTW strategy* on other grades.

References

[1] Al-Abed Al-Haq, F., & Al-Sobh, M. (2010). The Effect of Web-Based Writing Instructional EFL Program on Enhancing the Performance of Jordanian Secondary Students. *The JALTCALL Journal, 6*(3), 189-218.

[2] Alber-Morgan, S. R., Hessler, T., & Konrad, M. (2007). Teaching writing for keeps. *Education and treatment of children, 30*(3),107-128.

[3] Al-Maawa, N. & Taisser, K. (1989). *Methods of Teaching English to Arab Students*. UK: Longman Group Limited.

[4] Al-Sawalha, A. M. S., & Chow, T. V. V. (2012). The effects of writing apprehension in English on the writing process of Jordanian EFL students at Yarmouk University. *International Interdisciplinary Journal of Education, 1*(1), 6-14.

[5] Darmawangsa, D., Mutiarsih, Y., Karimah, I. S., & Racmadhany, A. (2020). Think, Talk, Write Strategy in French Writing Skill Learning. *In 4th International Conference on Language, Literature, Culture, and Education (ICOLLITE 2020) (pp. 143-148)*. Atlantis Press. DOI: https://dx.doi.org/10.2991/assehr.k.201215.022

[6] Forteza Fernández, R., & Gunashekar, P. (2009). A socio-psycholinguistic model for English for specific purposes writing skill formation diagnosis. *Acimed, 20*(6), 141-160.

[7] Heaton, J. (1975). *Writing English Language Tests: A Practical Guide for Teachers of English as a Second or Foreign Lanuage*. London: Longman.

[8] Herlina, B., Rahman, M. A., & Abduh, A. (2022). Improving Students Skill in Writing Descriptive Text by Using Think-Talk-Write and Clustering Techniques. *Celebes Journal of Language Studies*, 23-40. https://doi.org/10.51629/cjls.v2i1.79

[9] Ibnian, S. S. K. (2010). The Effect of Using the Story-Mapping Technique on Developing Tenth Grade Students' Short Story Writing Skills in EFL. *English Language Teaching, 3*(4), 181-194.

[10] Istiara, F. (2018). The Effectiveness of Think Talk Write Model in English Essay Writing. In *Proceedings of the 1st International Conference on Science and Technology for an Internet of Things*. European Alliance for Innovation (EAI). DOI:10.4108/eai.19-10-2018.2282613

[11] Ivancic, M., & Mandić, A. (2014). *Receptive and productive language skills in language teaching.* Unpublished manuscript.

[12] Kamilia, M. A. (2019). The Effect of Think Talk

  DOI: https://doi.org/10.30564/jiep.v6i1.5388

Write Strategy on the Students' Writing Ability in Recount Text of the First Grade Students of SMK PLUS ALMAARIF. *Language-Edu*, *8*(2). Retrieved 20 May 2021 from https://core.ac.uk/download- / pdf/229627341.pdf

[13] Kurniaman, O., Yuliani, T. and Mansur, M. (2018). Investigating Think Talk Write (TTW) Learning Model to Enhance Primary Students' Writing Skill. *Journal of Teaching and Learning in elementary Education (JTLEE) 1.* Retrieved 11 March 2021 from https://jtlee.ejournal.unri.ac.id/index.php/JTLEE/article/view/5394

[14] Laoli, S., & Harahap, D. I. (2021). The Effect of Think, Talk, Write (TTW) Strategy on Students' Descriptive Text Writing Ability. *Journal Mahasiswa Fakultas Ilmu Sosial dan Kependidikan, 2*(1), 1-8. Retrieved 18 July 2022 from https://mail.ejournal.potensiutama.ac.id/ojs/index.php/FISK/article/-view/1258

[15] Massi, M. P. (2001). Interactive writing in the EFL class: A repertoire of tasks. *The Internet TESL Journal, 7*(6).

[16] Ministry of Education in Jordan. (2006). General Guidelines and General and Specific outcomes for the English Language, Jordan, Amman.

[17] Mulyarti, M. (2016). *Using the Think-Talk-Write Strategy to Improve Students Descriptive Writing Ability at the Eighth Grade of Junior High School 1 Tanete Rilau.* Unpublished Doctoral Dissertation, Universities Islam Negeri Alauddin Makassar).

[18] Muna, I. A. A., Aziz, Z. A., & Muthalib, K. A. (2020). Using Think-Talk-Write Strategy in Teaching Writing an Analytical Exposition Text. *English Education Journal, 11*(3), 347-366. Retrieved 18 July 2022 from http://202.4.186.66/EEJ/article/view/15849

[19] Nova, I., Umara, U., & Ginting, S. U. B. (2022). The Effect of Think-Talk-Write(TTW) Strategy on Students' Writing Skill in Recount Text of the Tenth Grade Students' of SMA Swasta Pelita Bulu Cina. *Jurnal Serunai Bahasa Inggris, 14*(1), 16-22. Retrieved 22 July 2022 from https://ejournal.stkipbudidaya.ac.id- /index.php/jd/article/view/581/381

[20] Omaggio, A. (2001). Teaching Language in Context. Boston: Heinle & Heinle.

[21] Qomariyah, S. S., & Nafisah, B. Z. (2020). Examining Think Talk Write (TTW) Strategy in Students' Vocabulry Mastery. *Journal of Languages and Language Teaching, 8*(1), 72-82. Retrieved 18 July 2022 from http://e-journal.undikma.ac.id/index.php/jollt/article/view/2240

[22] Rababah, L., & Melhem, N. B. (2015). Investigation into strategies of creativity in EFL writing in Jordan. *Journal of Literature, Languages and Linguistics, 3*(5), 14-25.

[23] Rahmah, L. S. (2017). Improving students' score in writing descriptive text through Think Talk Write Strategy. *International Journal of English and Education, 6*(4), 180-193.

[24] Starkey, L. B. (2004). How to Write Great Essays. New York: Learning

[25] Suminar, R. P., & Putri, G. (2018). The effectiveness of TTW (Think-Talk-Write) strategy in teaching writing descriptive text. *Academic Journal Perspective: Education, Language, and Literature, 2*(2), 300-305. Retrieved 18 May 2021 from http://jurnal.-ugj.ac.id/index.php/Perspective/article/view/1666/1029

[26] Supandi, S., Waluya, S. B., Rochmad, R., Suyitno, H., & Dewi, K. (2018). Think-Talk-Write Model for Improving Students' Abilities in Mathematical Representation. *International Journal of Instruction, 11*(3), 77-90.

[27] Toubat, M. (2003). *The effect of a discoursal technique on the writing skills of Jordanian academic eleventh graders.* Unpublished Doctoral Dissertation, Amman Arab University, Amman, Jordan.

[28] Ur, P. (1996). A Course in Language Teaching. Practice and Theory: Teaching Writing. United Kingdom: Cambridge.

[29] Xin, Z. (2007). Reflective Thinking on Communicative Teaching in Writing. *Us-China Education review, 4*(5), 19-25.

[30] Zulkarnaini. (2012). Model Kooperatif Tipe Think Talk Write (TTW) Untuk Meningkatkan Kemampuan Menulis Karangan Deskriptif dan Berpikir Kritis. UPI Press.

 DOI: https://doi.org/10.30564/jiep.v6i1.5388

BILINGUAL PUBLISHING GROUP

Journal of International Education and Practice

https://ojs.bilpubgroup.com/index.php/jiep

ARTICLE

Improved Behavioural Engagement of Students through Low-stakes Online Tests and Immediate Dialogic Feedback

Glen Currie*, Tracii Ryan

Faculty of Engineering and Information Technology, The University of Melbourne, Australia

ARTICLE INFO

Article history
Received: 01 December 2022
Accepted: 10 February 2023
Published: 28 February 2023

Keywords:
Behavioural engagement
Immediate dialogic feedback
Low-stakes tests
Mixed-methods
Online learning
Quantitative, Survey

ABSTRACT

The engagement of students is a recognised challenge for teachers. Technology offers some practical student engagement tools, and this paper examines the use of low-stakes online tests and immediate dialogic feedback to improve behavioural engagement. The academic exploration of low-stakes tests and dialogic feedback has been extensive, and they are credible teaching tools. In this study, we explore the learning benefit of their combination. Postgraduate engineering students' self-reported and learning analytics data shows conclusive evidence of improved behavioural engagement. We measured a 500% increase in the Learning Management System (LMS) page views on the days when we ran the low-stakes tests (each worth 2% of the marks for the subject) and engaged in immediate dialogic feedback. To interpret these results, we draw on theories of behavioural engagement, low-stakes tests, and feedback. We conclude that the combination of low-stakes tests and immediate feedback improves student behavioural engagement.

Implications for practice or policy:

- Course leaders may gain efficacy (as it relates to student engagement and experience) by aligning dialogic feedback with low-stakes online tests.
- For students, this mix of low-stakes online tests and dialogic feedback will act as an incentive to increase their behavioural engagement.

1. Introduction

Student engagement has seen increased focus since the introduction of emergency online teaching due to the COVID-19 pandemic in 2020 (Aguilera-Hermida, 2020).[1] Although researchers have been developing techniques for online engagement (Sinfield & Cochrane, 2020),[39] this remains a complex challenge. The student must feel supported, and teachers must provide authentic learning, promote problem-solving and link theory to real-life scenarios (Sugden et al., 2021).[41] Therefore, student engagement cannot rely solely on technology tools but must also include mediation of that learning (Devlin & McKay, 2016).[13]

Engagement is key to student success in higher education, and learning design should aim for behavioural and cognitive engagement (Kahu, 2013).[21] The literature supports the learning value of low-stakes tests (Evans et al., 2021,[14] van Alten et al., 2019) [43] and online low-stakes tests (Van der Kleij et al., 2015).[44] Immediate

*Corresponding Author:
Glen Currie, Lecturer, Faculty of Engineering and Information Technology, The University of Melbourne, Australia; Email: glen.currie@unimelb.edu.au ORCID ID 0000-0003-1239-1443

DOI: https://doi.org/10.30564/jiep.v6i1.5295

dialogic feedback can foster productive student learning (Yang & Carless, 2013) [51] and encourages both behavioural (Thomas, 2012) [42] and cognitive engagement (Laurillard, 2013).[24]

This study assessed whether online low-stakes tests and immediate dialogic feedback developed behavioural engagement (Steen-Utheim & Wittek, 2017;[40] Willis et al., 2021;[49] Yang & Carless, 2013).[51]

2. Literature Review

The research consensus is that engagement can be encouraged with software that facilitates discussion with the teacher and other students (Devlin & McKay, 2016;[13] Williams et al., 2012) [48] and immediate feedback (Sugden et al., 2021; [41] Van der Kleij et al., 2015).[44] We, therefore, review the literature on behavioural engagement, low-stakes online tests and immediate dialogic feedback.

Behavioural Engagement

Engagement can be viewed as a "meta" construct that includes an interplay of "behavioural, cognitive, and affective (emotional) dimensions" (Fredricks et al., 2004).[17] Behavioural engagement relates to what the student does actively, and cognitive engagement relates to the student's investment in intellectual resources (Ryan et al., 2019).[35] Engagement is "strongly associated with high levels of learning and personal development" (Kuh, 2001).[22] It is challenging to engage students, and only some will engage, even with well-designed learning activities (Laurillard, 2013).[24]

Educational technology offers tools for engagement. It can help teacher-student engagement and enable learner-content engagement and peer-to-peer interaction (Bedenlier et al., 2020; [3] Vygotsky & Cole, 1978).[45] These three aspects of engagement should be considered when designing educational technology, including low-stakes online testing.

Low-stakes Online Tests

Low-stakes online tests are online and have a low impact on the student grade. Student learning is improved by frequent practice (Roediger III, 2013),[34] and low-stakes online tests offer an efficient method of frequent practice. In addition, online tests can provide students with unique feedback for each answer and include illustrations and other digital innovations. Software can also help improve the test questions by calculating "difficulty index (DIF), discrimination index (DI), item-total score correlation coefficients (RPB), and Kuder–Richardson 20 (KR-20) reliability index" (Malau-Aduli et al., 2014, p. 512).[26]

Universities have explored quality low-stakes online tests (Forbes, 2018) [16] and found that they may achieve formative feedback and high-order learning outcomes (Finley, 2019)[15] and motivate learning (Wise & DeMars, 2005).[50] Low-stakes online tests must be well-designed to engage students (Nicol, 2007).[30] Low-stakes tests can serve as formative assessments in that that the student answers the question and then their understanding is

moderated, so they can help students know their level of learning and help staff know where students have problems (Shuhidan et al., 2010).[37] Immediate feedback makes this moderation the most effective (Kulik & Kulik, 1988; [23] Van der Kleij et al., 2015).[44] Students are not taking too much of a risk in taking the low-stakes test, and once they are engaged, there is an opportunity for immediate dialogic feedback, which we now explore.

Immediate Dialogic Feedback

Dialogic feedback includes all dialogue to support learning (Askew & Lodge, 2004),[2] and we adopt a definition of "immediate" as being within the lecture period. Dialogic feedback can include automatic dialogic loops (Willis et al., 2021),[49] can benefit from the use of exemplars (Carless & Chan, 2017),[8] and can be seen as framed in terms of the content, interpersonal negotiation, and the organisation of feedback (Yang & Carless, 2013).[51] Most importantly, dialogic feedback can enhance students' understanding (Carless et al., 2011) [9] and can overcome limitations of feedback, such as being too late for students to enhance their learning (Higgins et al., 2002).[19] Carless (2012, p. 90) [7] demonstrated the role of trust in dialogic feedback and reports that feedback messages can flourish if we show "empathy, tact and a genuine willingness to listen".

Dialogic feedback has four dimensions: "emotional and relational support; maintenance of the feedback dialogue; opportunities for students to express themselves; and contribution to individual growth" (Steen-Utheim & Wittek, 2017, p. 18).[40] It is, at its essence, a conversation between the student and the teacher and can provide error correction, exemplars and explanation of responses' relative consequences and appropriateness (Carless & Chan, 2017).[8]

Feedback improves learning (Carless & Winstone, 2020) [10] and is considered the most critical factor in learning design (Boud & Molloy, 2013, [4] Hattie & Timperley, 2007).[18] Feedback frequency is also important (Broadbent et al., 2018);[5] the test should be conducted during the course, and the feedback should include suggestions for improvement (Shute & Kim, 2014).[38]

 DOI: https://doi.org/10.30564/jiep.v6i1.5295

It should also be noted that feedback is constrained by resources (Broadbent et al., 2018),[5] and a lack of feedback can limit student learning outcomes and even limit student engagement (Maringe & Sing, 2014).[27] Fortunately, learning technologies offer timely feedback and benefit learning outcomes if well-designed (Van der Kleij et al., 2015).[44]

Students prefer immediate feedback and spend far more time reading it than delayed feedback (Kulik & Kulik, 1988; [23] Van der Kleij et al., 2015) [44]. Kulik and Kulik found that students prefer immediate feedback for lower-order learning. They also found that immediate feedback improved student learning in tasks with higher cognitive demands.

The literature concludes that dialogic feedback immediately after the low-stakes online tests will encourage engagement. There is little research on the nexus of online low-stakes testing and immediate dialogic feedback, and our study focused on this nexus. The dialogic feedback was expected to be effective because it helps students relate concepts to everyday experiences, relate evidence to conclusions, and connect new ideas to previous knowledge (Ramsden, 2003).[32] The following questions guided this research:

1. Is there a measurable effect of a low-stakes test and immediate dialogic feedback on behavioural engagement?
2. Do students reflect that low-stakes tests and immediate dialogic feedback contributed to their learning?

Context of the Present Study

We conducted this research over three subsequent postgraduate Engineering classes at a large (over 50,000 students) research-intensive university in a metropolitan Australian city. The university community includes over 20,000 international students from 130 nations, and 69% of Engineering students are international, many of whom are students with English as an additional language.

The 2020 teaching year started on 2nd March 2020 with face-to-face teaching, which then switched to online learning on 24th March, when the COVID-19 lockdown started and remained online for our entire study period (March 2020 to October 2021).

One change we made at that time was to set up tutorials to suit the different time zones of our students. Half of our students needed to return to, or remain in, their home country because of the COVID-19 pandemic. Another critical contextual issue was changes brought about by the COVID-19 isolation, which had a measurable psychological impact on staff and students (Brooks et al., 2020) [6] and created a concern about whether students were learning well. The teaching team felt empathy for students experiencing financial and emotional strain, and staff communications took on a tone of reassuring and supporting students. It was notable that the messages shifted from an authoritarian tone to an empathetic tone as soon as the COVID-19 pandemic struck. COVID-19 has hugely affected enthusiasm. There has been insufficient security which means teachers and students are unsure of the future, and in many cases, some students face financial and emotional pressure (Brooks et al., 2020).[6]

Our study kept the teaching content and people in the teaching team the same as in previous years. We only changed from face-to-face delivery to delivering lectures and tutorials online. We introduced low-stakes online tests students completed during class and followed these with immediate dialogic feedback. We used Zoom software, and the online test used our LMS software Canvas (Whitmer & Daley, 2020) [47] and included four questions each, with a ten-minute time limit. Then there was an intensive discussion between the lecturers and students about the questions. This included industry experts supporting the lecturer and offering professional context for the discussion. We also increased students' pre-reading and preparation for the lectures using Perusall software (Perusall, 2021), [31] which also played a role in the student preparation for the low-stakes tests. The dialogic feedback took about 30 to 40 minutes after the test and developed a high level of engagement. In previous years in face-to-face classes in the subject, 30% of students were present. However, with this new online format, we normally had 75% of the students in the cohort students present and remain engaged for the one hour online.

This dialogic feedback allowed students to communicate with the teacher to help clarify concepts and co-construct meaning (Steen-Utheim & Wittek, 2017).[40] We did not discuss questions that most students answered correctly, as we assumed most students understood the concept. The teachers would discuss questions where students had trouble, and then students were encouraged to query their scores, which led to further discussion of the low-stakes online tests and the answers (Ingram & Nelson, 2006).[20]

We used dialogic feedback in the classes in this study. The dialogic feedback occurred immediately after the low-stakes online test. We showed the test answers and discussed the associated theory. For example, Figure 1 shows the type of data we used for the dialogic feedback and shows that 42 respondents answered the question correctly, which would guide our conversation.

Dialogic feedback included conversations between the lecturers and students and student-to-student interaction.

DOI: https://doi.org/10.30564/jiep.v6i1.5295

Figure 1: Example of test results for discussion with the class, n=54

We encouraged debate, which was enabled with the Chat function in the Zoom software, with two tutors helping the professor manage the discussion. Few students spoke, but their preference was to use the chat.

3. Methods

Our general approach to this research design was to use action research (Crawford & Jenkins, 2017; [11] Lewin, 1946) [25] as the study required a focus on our local issues, such that our conclusions could be applied to a broader context. We evaluated the use of low-stakes tests combined with immediate dialogic feedback using analysis of the mean number of "page views" each day per student. We also designed and surveyed one cohort to collect student reflections.

Participants

This research was conducted in three masters by coursework classes in an engineering faculty in 2020 and 2021 (N=361). On average, these student cohorts were 34% female, and 39% international students, and all classes were online. It was the first time these subjects ran online in 2020, and the change was due to COVID-19 restrictions.

Materials

The Learning Management System (LMS) was a source for grades and learning analytics. The page views data were from the LMS. The LMS data included over one thousand records showing the categories of LMS page views (not individual student activity). A "page view" measure is a measure for each different page in the LMS that students opened.

We also used an online survey to measure student perceptions of learning with Cohort A, a class of 55 students.

Procedure

We measured students' behavioural engagement by evaluating LMS page views in the LMS for the three classes in our study.

We also developed an online student survey to measure student experience with online learning. The questions for that survey arose out of the discussions with teaching peers and were designed to measure student experience with the LMS and online learning. The survey was conducted as an anonymous quiz in the student LMS and had not been pilot tested or based on a previous survey. We invited all 55 students to participate in the survey, and 46 students responded, which meant 84% of the students in the study group filled out the survey. The student names were never collected. The survey includes six two-part questions, which invited students to rate with a 5-point scale and then elaborate their response with a text answer.

Table 1 Students Participating in the Study

Group	Number of students	Reflections recorded
Cohort A (Semester 1, 2020)	54	46
Cohort B (Semester 2, 2020)	246	
Cohort C (Semester 1, 2021)	61	
Total	**361**	**46**

 DOI: https://doi.org/10.30564/jiep.v6i1.5295

The survey questions were carefully worded, but there was a risk of measurement error due to varying degrees of language fluency. The analysis used descriptive statistics.

We ran the survey late in the teaching semester. Survey results were anonymised by never showing the student names in the file, and there was great care in supporting confidentiality. The lead researcher was involved in teaching the class, so we were careful not to pressure the students. Also, no incentives were offered.

4. Results

This section presents results for low-stakes online tests and immediate dialogic feedback.

Some chat comments said the peer pressure to speak up, and chat comments would sometimes answer questions from other students. Student feedback was a mix of caution about the chaotic "noisy" class, and comments such as "I love the debate and look forward to next week". Active dialogue rose from about 5% of students in comparable lectures to about 40% in these three cohorts.

Effect of Low-stakes Tests on Behavioural Engagement

Figures 2, 3 and 4 show the daily LMS page views per student for the three cohorts (N=361). We noticed approximately a 500% increase in LMS page views for each test, worth 2% of the mark in all three cohorts.

Figures 2, 3 and 4 show LMS page views rising 500% on the day of a low-stakes online test worth 2% of the students' marks. The other peaks in these tables show for the final exam, primary assignment, and the first weeks of the semester, but none reach more than 300% of the underlying trend.

Student Reflections

We collected student reflections from students in Cohort 1 (n=54). All students were asked to complete the survey, and forty-six students replied. There were two questions regarding online learning, with results shown in Figure 5. Our results showed that students were confident learning online and could collaborate with other students.

Students commented on the support from the teachers online and in tutorials. Also, three students commented on the speed of responses from teachers. Three students said they preferred Zoom meetings as they believed they met more often with group members and did not waste their transportation time. Eight students commented that online learning was challenging initially but became more manageable after a few weeks. Fifteen students commented about internet connection problems and difficulties with motivation to study at home. However, one student commented, "these challenges taught me some valuable lessons to study hard and increased my self-confidence."

Students were asked two questions about their view of low-stakes testing, and the results are shown in Figure 6.

Students felt the low-stakes tests were fair and increased their preparedness for the exam. Student comments were that the teaching staff had supplied detailed feedback during the dialogic feedback after the low-stakes tests.

The two survey questions shown in Figure 7 tested the student relationship with the lecturer, which relates to the dialogic feedback process.

The students perceived the availability of teachers as good. Students felt their teachers were successful in their transition into e-learning, as shown by the student's

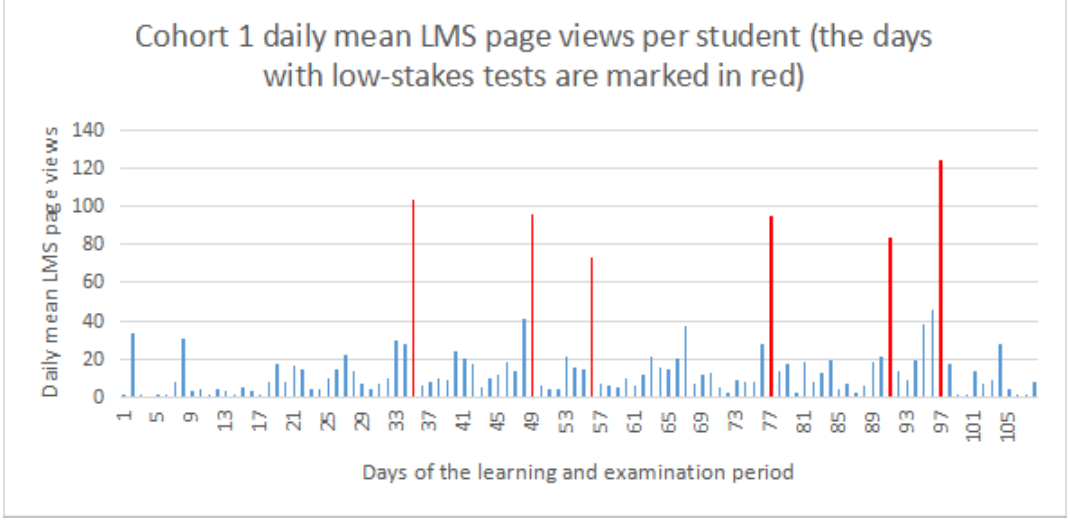

Figure 2: Daily mean LMS page views per student each day for Cohort 1 (Semester 1, 2021), n=54.

DOI: https://doi.org/10.30564/jiep.v6i1.5295

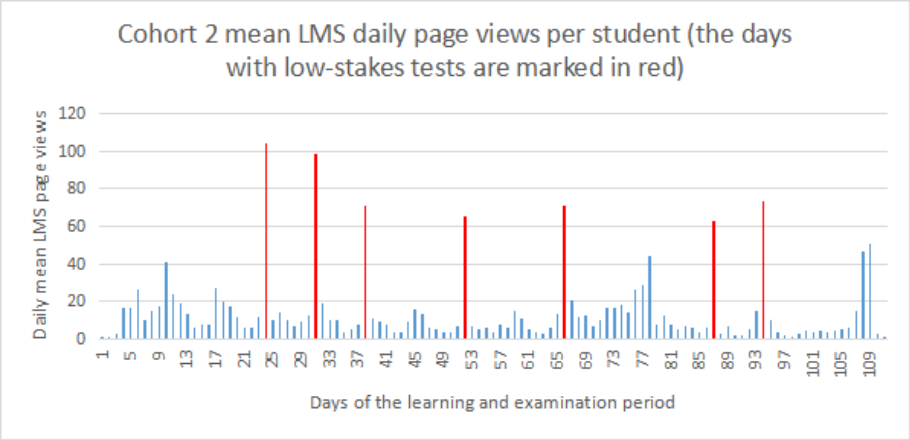

Figure 3: Daily mean LMS page views per student for Cohort 2 (Semester 2, 2020), n=246.

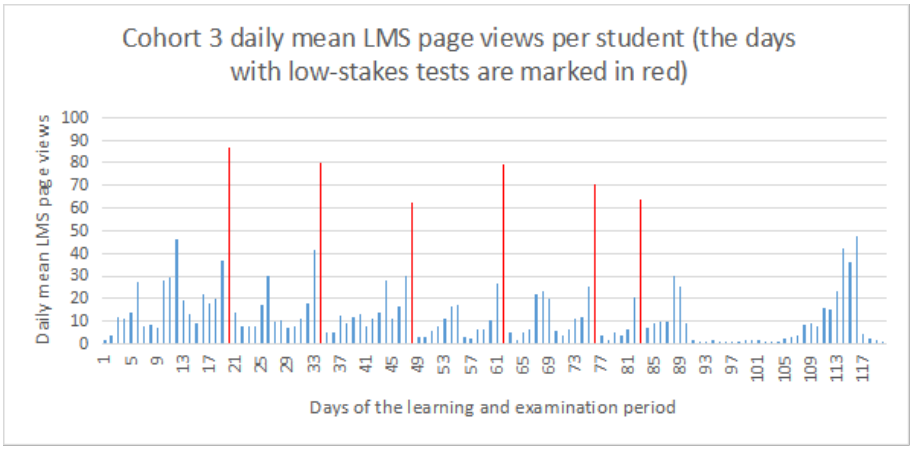

Figure 4: Daily mean LMS page views per student for Cohort 3 (Semester 1, 2021), n=61

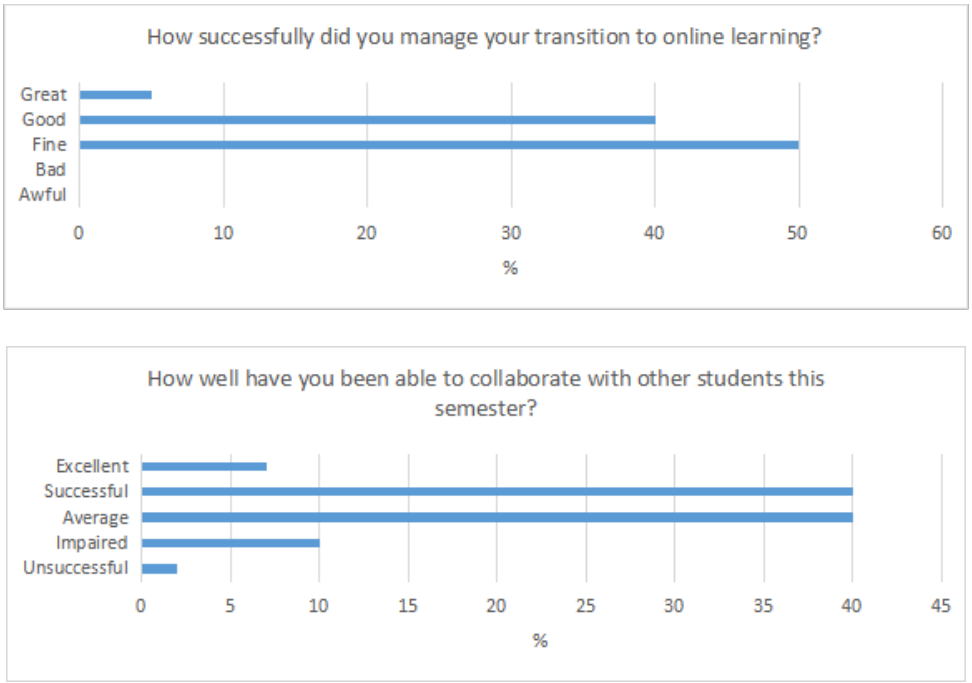

Figure 5: Student's transition to online learning (N=46) (As a percentage of all survey answers)

 DOI: https://doi.org/10.30564/jiep.v6i1.5295

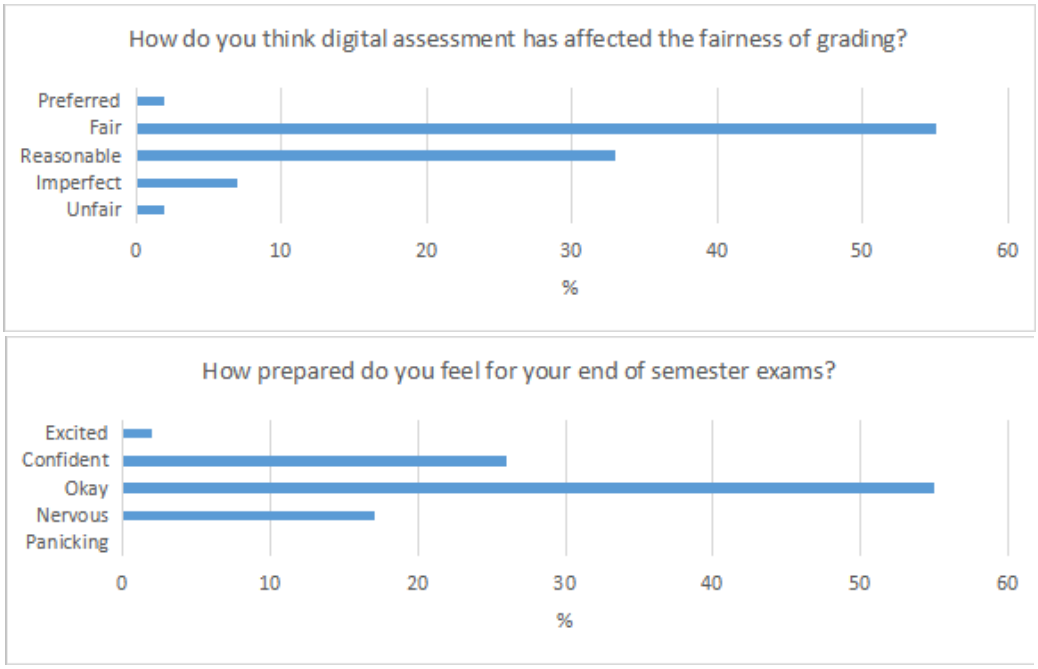

Figure 6: Digital assessment with online learning (N=46) (As a percentage of all survey answers)

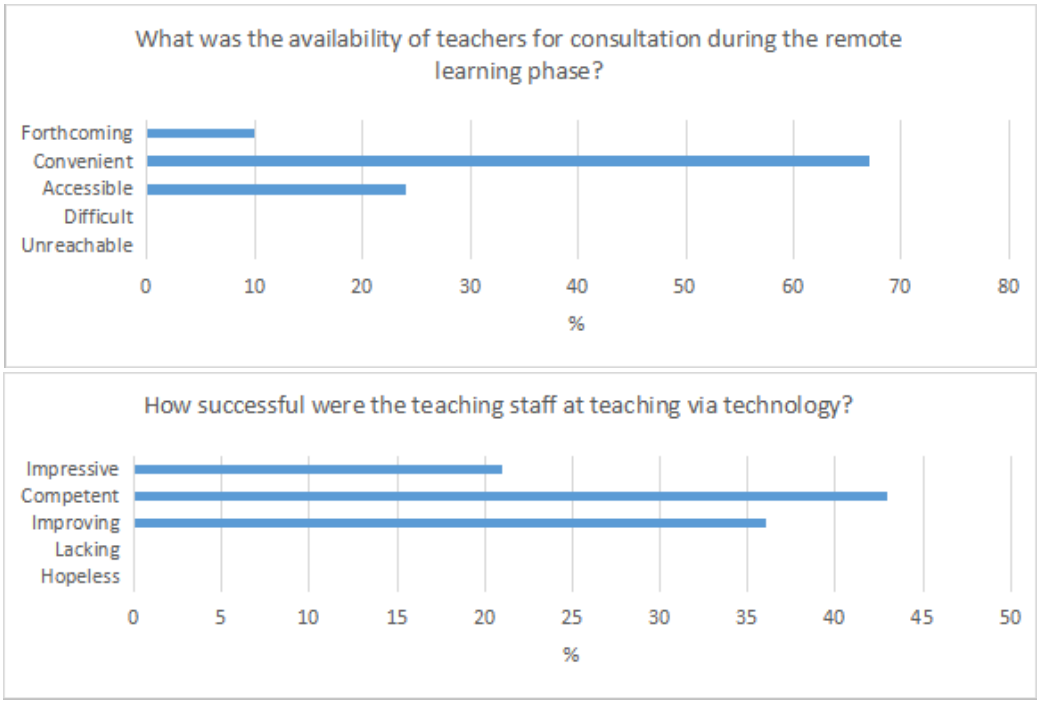

Figure 7: Teacher access (N=46) (As a percentage of all survey answers)

comment about "the vastness of materials distributed to students throughout the semester." Students particularly commented on the speed of responses to emails to teachers, which led them to perceive the teachers as "consistent in their efforts to convey relevant information regarding the tests and assignments and commented that their "emails in other subjects received responses more slowly".

The students reported that they adapted to online technology with minimal issues in the survey. A response from one student highlighted the importance of interaction to keep them accountable in lectures and keep them engaged. We used Zoom Breakout rooms to allow small group discussions.

DOI: https://doi.org/10.30564/jiep.v6i1.5295

Three students stated they liked variability in online interaction to encourage participation. Options we used included: Padlet; the annotate function in Zoom (being invited to write on slides); Poll Everywhere; polls within Zoom; calling directly on students; and using chat. The variability in online interaction led to the following student comments: "It's good because I can participate, but it's more in the background. I'm not being called on to answer in front of everyone," and "Mixing things up keeps me on my toes".

5 Discussion

This study aimed to investigate low-stakes online tests followed by immediate dialogic feedback that affected students' behavioural engagement and learning. We used two measures. One measure examined students' behavioural engagement in the LMS, and the other measure analysed student survey responses.

(RQ1) Discussing Whether We Achieved a Measurable Effect on Behavioural Engagement

The measure of behavioural engagement used in this research was the daily average student LMS page views which increased 500% for each low-stakes test and immediate dialogic feedback. This extraordinary focus on student online activity on the days of the low-stakes tests shown in Figures 2, 3 and 4 suggests that although the individual tests were worth only 2% of the marks, they could significantly affect student learning. This phenomenon was consistent across the three cohorts in this research. This increase in behavioural engagement links to student learning (Dawson et al., 2018, p. 19, [12] Sancho-Vinuesa et al., 2013).[36] Our students' engagement in debating the answers to the tests suggested that the immediate dialogic feedback contributed to student learning and underscored the importance of feedback speed (Miller, 2009).[29]

We built student engagement through regular dialogue about the low-stakes tests. Interestingly, even sending an email offering to help students who did poorly on the tests generated a response from more than 30% of these students each time. In past years, students would ignore those invitations. Each time we invited students to extra tutorials, the 30-40% response rate suggested the students felt safe in taking up the added tutorial.

(RQ2) Do Students Reflect that Low-stakes Tests and Immediate Dialogic Feedback Contributed to Their Learning?

We conclude that low-stakes tests followed by immediate dialogic feedback can effectively engage students and result in student learning. The survey results suggested that the low-stakes tests contributed to student learning and were considered fair. Students were confident with their online learning transition, although they initially found the change troubling. Student reflections in the survey showed evidence that they thought the low-stakes tests contributed to their learning, reinforcing Nicol's (2007) [30] argument that low-stakes tests can contribute to learning. While the evidence in our results was not conclusive about the role of immediate dialogic feedback, when we consider the strength of the literature supporting dialogic feedback, we are confident of its contribution to learning (Carless & Chan, 2017; [8] Steen-Utheim & Wittek, 2017; [40] Willis et al., 2021; [49] Yang & Carless, 2013).[51]

Further Research and Limitations

Limitations of the research design include testing only three cohorts of postgraduate engineering students. A broader sample of classes would allow us to generalise the results. Further research using design-based research (Reeves, 2015) [33] could also explore ways to achieve higher-order learning with low-stakes online tests and empirically measure the student learning related to the low-stakes tests and immediate dialogic feedback. The four stages of design-based research are: analyse and explore; design; evaluate; develop a matured intervention (McKenney & Reeves, 2018, p. 16).[28] This approach would gradually increase the staff involved and develop a community of practice (Wenger, 2009)[46] to investigate ways of achieving higher-order learning with low-stakes tests and the role of dialogic feedback. Another suggested research focus would be the role of low-stakes tests as gamification of learning.

6 Conclusion

This research posed two research questions to help develop methods for student engagement. The two questions were: "Is there a measurable effect of the low-stakes test and immediate dialogic feedback on behavioural engagement?" and "Do students reflect that low-stakes tests and immediate dialogic feedback contribute to their learning?"

We conclude that a low-stakes test and immediate dialogic feedback had a measurable effect on behavioural engagement, as shown by the high student engagement with the low-stakes tests in Figures 2, 3 and 4. Students responded to a minor assessment task with extensive use of the LMS for 2-3 days, even when the task was worth as

 DOI: https://doi.org/10.30564/jiep.v6i1.5295

little as 2% of the subject mark. Therefore, the low-stakes test was shown to be of far more value in behavioural engagement than might be expected.

Our second conclusion is that student reflections showed that students believed low-stakes tests contributed to their learning. While we were not able to definitively demonstrate the role of immediate dialogic feedback in learning, the existing literature does strongly support the contribution of dialogic feedback to higher cognitive engagement and therefore improved student learning outcomes (Carless & Chan, 2017; [8] Steen-Utheim & Wittek, 2017;[40] Willis et al., 2021; [49] Yang & Carless, 2013).[51] Future research could use design-based research with a community of practice drawn from the engineering faculty and tertiary teaching and learning experts.

Students might use these findings to understand the role of low-stakes online tests, and the results are valuable to course designers. The authors have started implementing these lessons in other subjects, and we believe this has wide application and is of international significance. Hence, we recommend future research to test our conclusions in different contexts.

Data Availability

Datasets and appendices related to this article can be requested from the Author.

Statements and Declaration

This research did not receive any specific grant from funding agencies in public, commercial or not-for-profit sectors. The authors did not have any financial interests of relevance to this research.

References

[1] Aguilera-Hermida, A. P. (2020). College students' use and acceptance of emergency online learning due to COVID-19. *International Journal of Educational Research Open*, *1*, 100011. https://doi.org/10.1016/j.ijedro.2020.100011

[2] Askew, S., & Lodge, C. (2004). Gifts, ping-pong and loops–linking feedback and learning. In *Feedback for learning* (pp. 13-30). Routledge. https://doi.org/10.4324/9780203017678

[3] Bedenlier, S., Bond, M., Buntins, K., Zawacki-Richter, O., & Kerres, M. (2020). Facilitating student engagement through educational technology in higher education: A systematic review in the field of arts and humanities. *Australasian Journal of Educational Technology*, *36*(4), 126-150. https://doi.org/10.14742/ajet.5477

[4] Boud, D., & Molloy, E. (2013). *Feedback in higher and professional education: understanding it and doing it well*. Routledge. https://doi.org/10.4324/9780203074336

[5] Broadbent, J., Panadero, E., & Boud, D. (2018). Implementing summative assessment with a formative flavour: a case study in a large class. *Assessment & Evaluation in Higher Education*, *43*(2), 307-322. https://doi.org/10.1080/02602938.2017.1343455

[6] Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The Lancet*. https://doi.org/10.1016/S0140-6736(20)30460-8

[7] Carless, D. (2012). Trust and its role in facilitating dialogic feedback. In *Feedback in higher and professional education* (pp. 100-113). Routledge. https://doi.org/10.4324/9780203074336

[8] Carless, D., & Chan, K. K. H. (2017). Managing dialogic use of exemplars. *Assessment & Evaluation in Higher Education*, *42*(6), 930-941. https://doi.org/10.1080/02602938.2016.1211246

[9] Carless, D., Salter, D., Yang, M., & Lam, J. (2011). Developing sustainable feedback practices. *Studies in Higher Education*, *36*(4), 395-407. https://doi.org/03075071003642449

[10] Carless, D., & Winstone, N. (2020). Teacher feedback literacy and its interplay with student feedback literacy. *Teaching in Higher Education*, 1-14. https://doi.org/10.1080/13562517.2020.1782372

[11] Crawford, R., & Jenkins, L. (2017). Blended learning and team teaching: Adapting pedagogy in response to the changing digital tertiary environment. *Australasian Journal of Educational Technology*, *33*(2). https://doi.org/10.14742/ajet.2924

[12] Dawson, P., Henderson, M., Ryan, T., Mahoney, P., Boud, D., Phillips, M., & Molloy, E. (2018). Technology and feedback design. *Learning, Design, and Technology, Michael J Spector, Barbara B Lockee, and Marcus D. Childress (Eds.). Springer International Publishing, Cham*, 1-45. https://doi.org/10.1007/978-3-319-17727-4_124-1

[13] Devlin, M., & McKay, J. (2016). Teaching students using technology: Facilitating success for students from low socioeconomic status backgrounds in Australian universities. *Australasian Journal of Educational Technology*, *32*(1). https://doi.org/10.14742/ajet.2053

[14] Evans, T., Kensington-Miller, B., & Novak, J. (2021). Effectiveness, efficiency, engagement: Mapping the

  DOI: https://doi.org/10.30564/jiep.v6i1.5295

impact of pre-lecture quizzes on educational exchange. *Australasian Journal of Educational Technology*, *37*(1), 163-177. https://doi.org/10.14742/ajet.6258

[15] Finley, S. (2019). Writing effective multiple choice questions. In *Learning and Teaching in Higher Education*. Edward Elgar Publishing. https://doi.org/10.4337/9781788975087.00046

[16] Forbes, H. a. M., Suzie. (2018). *Professional development: Enhancing the MCQ item writing capability of academic staff*. https://blogs.deakin.edu.au/deakin-learning-and-teaching-conference/wp-content/uploads/sites/319/2018/11/E1-S2-sp3-Forbes-Macfarlane_ProfessionalDevelopmentMCQs_East1_1.40pm.pdf

[17] Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of educational research*, *74*(1), 59-109. https://doi.org/10.3102/00346543074001059

[18] Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of educational research*, *77*(1), 81-112. https://doi.org/10.3102/003465430298487

[19] Higgins, R., Hartley, P., & Skelton, A. (2002). The conscientious consumer: Reconsidering the role of assessment feedback in student learning. *Studies in Higher Education*, *27*(1), 53-64. https://doi.org/10.1080/03075070120099368

[20] Ingram, E. L., & Nelson, C. E. (2006). Using discussions of multiple choice questions to help students identify misconceptions & reconstruct their understanding. *The American Biology Teacher*, *68*(5), 275-279. https://doi.org/10.2307/4451988

[21] Kahu, E. R. (2013). Framing student engagement in higher education. *Studies in Higher Education*, *38*(5), 758-773. https://doi.org/10.1080/03075079.2011.598505

[22] Kuh, G. D. (2001). *The National Survey of Student Engagement: Conceptual framework and overview of psychometric properties*. https://nsse.indiana.edu/nsse/about-nsse/conceptual-framework/index.html

[23] Kulik, J. A., & Kulik, C.-L. C. (1988). Timing of feedback and verbal learning. *Review of educational research*, *58*(1), 79-97. https://doi.org/10.3102/00346543058001079

[24] Laurillard, D. (2013). *Rethinking university teaching: A conversational framework for the effective use of learning technologies*. Routledge. https://doi.org/10.4324/9780203160329

[25] Lewin, K. (1946). Action research and minority problems. *Journal of social issues*, *2*(4), 34-46. https://doi.org/10.1111/j.1540-4560.1946.tb02295.x

[26] Malau-Aduli, B. S., Assenheimer, D., Choi-Lundberg, D., & Zimitat, C. (2014). Using computer-based technology to improve feedback to staff and students on MCQ assessments. *Innovations in Education and Teaching International*, *51*(5), 510-522. https://doi.org/10.1080/14703297.2013.796711

[27] Maringe, F., & Sing, N. (2014). Teaching large classes in an increasingly internationalising higher education environment: Pedagogical, quality and equity issues. *Higher Education*, *67*(6), 761-782. https://doi.org/10.1007/s10734-013-9710-0

[28] McKenney, S., & Reeves, T. C. (2018). *Conducting educational design research*. Routledge.

[29] Miller, T. (2009). Formative computer-based assessment in higher education: The effectiveness of feedback in supporting student learning. *Assessment & Evaluation in Higher Education*, *34*(2), 181-192. https://doi.org/10.1080/02602930801956075

[30] Nicol, D. (2007). E-assessment by design: using multiple-choice tests to good effect. *Journal of Further and higher Education*, *31*(1), 53-64. https://doi.org/10.1080/03098770601167922

[31] Perusall. (2021). Perusall. Retrieved 2 June 2021 from www.perusall.com.

[32] Ramsden, P. (2003). *Learning to teach in higher education*. Routledge. https://doi.org/10.4324/9780203507711

[33] Reeves, T. C. (2015). Educational design research: Signs of progress. *Australasian Journal of Educational Technology*, *31*(5). https://doi.org/10.14742/ajet.2902

[34] Roediger III, H. L. (2013). Applying cognitive psychology to education: Translational educational science. *Psychological Science in the Public Interest*, *14*(1), 1-3. https://doi.org/10.1177/1529100612454415

[35] Ryan, T., French, S., & Kennedy, G. (2019). Beyond the Iron Triangle: improving the quality of teaching and learning at scale. *Studies in Higher Education*, 1-12. https://doi.org/10.1080/03075079.2019.1679763

[36] Sancho-Vinuesa, T., Escudero-Viladoms, N., & Masià, R. (2013). Continuous activity with immediate feedback: A good strategy to guarantee student engagement with the course. *Open Learning: The Journal of Open, Distance and e-Learning*, *28*(1), 51-66. https://doi.org/10.1080/02680513.2013.776479

[37] Shuhidan, S., Hamilton, M., & D'Souza, D. (2010). Instructor perspectives of multiple-choice questions in summative assessment for novice programmers. *Computer Science Education*, *20*(3), 229-259. https://doi.org/10.1080/08993408.2010.509097

 DOI: https://doi.org/10.30564/jiep.v6i1.5295

[38] Shute, V. J., & Kim, Y. J. (2014). Formative and stealth assessment. In *Handbook of research on educational communications and technology* (pp. 311-321). Springer. https://doi.org/10.1007/978-1-4614-3185-5_25

[39] Sinfield, D., & Cochrane, T. (2020). A framework for rethinking the pedagogy of studio-based design classrooms. *Pacific Journal of Technology Enhanced Learning*, *2*(2), 31-44. https://doi.org/10.24135/pjtel.v2i2.77

[40] Steen-Utheim, A., & Wittek, A. L. (2017). Dialogic feedback and potentialities for student learning. *Learning, Culture and Social Interaction*, *15*, 18-30. https://doi.org/10.1016/j.lcsi.2017.06.002

[41] Sugden, N., Brunton, R., MacDonald, J., Yeo, M., & Hicks, B. (2021). Evaluating student engagement and deep learning in interactive online psychology learning activities. *Australasian Journal of Educational Technology*, *37*(2), 45-65. https://doi.org/10.14742/ajet.6632

[42] Thomas, L. (2012). *Building student engagement and belonging in Higher Education at a time of change*. https://www.heacademy.ac.uk/system/files/what_works_final_report_0.pdf

[43] van Alten, D. C., Phielix, C., Janssen, J., & Kester, L. (2019). Effects of flipping the classroom on learning outcomes and satisfaction: A meta-analysis. *Educational Research Review*, *28*, 100281. https://doi.org/10.1016/j.edurev.2019.05.003

[44] Van der Kleij, F. M., Feskens, R. C., & Eggen, T. J. (2015). Effects of feedback in a computer-based learning environment on students' learning outcomes: A meta-analysis. *Review of educational research*, *85*(4), 475-511. https://doi.org/10.3102/0034654314564881

[45] Vygotsky, L. S., & Cole, M. (1978). *Mind in society: Development of higher psychological processes*. Harvard university press.

[46] Wenger, E. (2009). Communities of practice. *Communities*, *22*(5), 57-80. https://doi.org/10.1017/CBO9780511803932

[47] Whitmer, B., & Daley, D. (2020). *Canvas LMS*. In Infrastructure.

[48] Williams, B., Brown, T., & Benson, R. (2012). Feedback in the digital environment. In *Feedback in higher and professional education* (pp. 135-149). Routledge. https://doi.org/10.4324/9780203074336-13

[49] Willis, J., Gibson, A., Kelly, N., Spina, N., Azordegan, J., & Crosswell, L. (2021). Towards faster feedback in higher education through digitally mediated dialogic loops. *Australasian Journal of Educational Technology*, 22-37. https://doi.org/10.14742/ajet.5977

[50] Wise, S. L., & DeMars, C. E. (2005). Low examinee effort in low-stakes assessment: Problems and potential solutions. *Educational assessment*, *10*(1), 1-17. https://doi.org/10.1207/s15326977ea1001_1

[51] Yang, M., & Carless, D. (2013). The feedback triangle and the enhancement of dialogic feedback processes. *Teaching in Higher Education*, *18*(3), 285-297. https://doi.org/10.1080/13562517.2012.719154

DOI: https://doi.org/10.30564/jiep.v6i1.5295

BILINGUAL PUBLISHING GROUP

Journal of International Education and Practice

https://ojs.bilpubgroup.com/index.php/jiep

ARTICLE

Adapting the Concept Attainment Strategy to Teach Math

Khodadad Kaviani*

Department of Education, Central Washington University, United States

ARTICLE INFO

Article history
Received: 15 January 2023
Accepted: 20 February 2023
Published: 02 March 2023

Keywords:
Assessment
classifying
Graphic organizer
Constructivist
Teaching strategy

ABSTRACT

This paper argues for the adoption of concept attainment strategy when teaching math and shows the structure of this curriculum design that can substantially improve math instruction and comprehension in K-12 education. Initial findings based on informal surveys of teacher candidates indicate many of them do not have a clear understanding of the concepts they are expected to teach. The concept attainment strategy is a proven effective method used in social studies for teaching powerful concepts like democracy and liberty. One reason for many students feeling inadequate about their math skills stem from their lack of understanding of the key math concepts like area, perimeter, percent, and others. Poor understanding of the math fundamentals in early grades if not rectified, develops into a dislike for an incomprehensible subject. The concept attainment strategy is an inductive approach that allows the students to participate in knowledge construction and master the fundamental math skills. This paper shows how the structure of this social studies curriculum design can be adapted for teaching mathematics and invites practitioners and scholars to consider this approach to improve math instruction.

1. The Problem

"I'm not good in math" is the mantra I hear from most of the teacher candidates that are enrolled in my math methods courses at a major university in the Pacific Northwest. It is as if these teacher candidates have already made up their minds that they will never become good in math and their efforts in learning math are futile. I have been shocked to see teacher candidates who did not know the difference between area and perimeter, and they were expected to teach math when they earned their teaching certificate. Richards (2020)[7] reports that the United States of America ranked "31st in math literacy out of 79 countries and economies" in the international exam given to teenagers. Based on the informal surveys I have conducted at the beginning of each academic term and the conversations I have had with the teacher candidates in my classes, it is clear to me that most of them have math anxiety and feel unsure whether they can master the skills necessary to become effective math teachers. Therefore, the claims I make in this paper are based on my observations of the teacher candidates I have been working with and their direct feedback to me regarding their experiences.

To build their confidence and provide opportunities for them to practice their math skills, I have relied heavily on math games that use selected math algorithm (e.g., steps involved in solving addition, subtraction, multiplication, and division problems) while collaborating with their peers. They appear to enjoy the process and find card and dice games can teach math content and fluency by emphasizing targeted mathematical skills that they can

**Corresponding Author:*
Dr. Khodadad Kaviani, Department of Education, Central Washington University, United States; Email:khodi.kaviani@cwu.edu.

 DOI: https://doi.org/10.30564/jiep.v6i1.5404

learn and practice together. In addition to gaining content knowledge, they also rehearse their social skills by taking turns answering questions, listening to each other, sharing their answers, cooperating with each other in maintaining the score sheet, and resolving issues that may arise during the friendly and competitive math games. They also practice higher order thinking skills when choosing a strategy, prioritizing their actions, verifying their answers, and so on.

The literature on gamification supports the claim that online math games were utilized by teachers during the COVID-19 pandemic to motivate children to practice certain math skills related to recognizing patterns, mathematical operations, and others (Lavidas, Apostolou, & Papadakis, 2022).[5] The shift from in-person attendance to online classes added self-paced virtual math games to the resources that teachers were using. Children's misconceptions about number sense and how different operations produce new numbers are among the reasons for using games and manipulatives to clarify math meanings (Hulse, Daigle, Manzo, Braith, Harrison, & Ottmar 2019;[4] Clements, 2000;[1] Doig & Ompok, 2010;[2] Shute, 2011).[9] Sun-Lin and Chiou (2019)[10] found that sixth grade algebra students were able to not only improve their confidence in solving algebraic story problems, but also scored higher in a gamified environment. Watson-Huggins and Trotman (2019)[12] conducted a quantitative study at a primary school in Jamaica that showed students who used games to learn math had higher math scores and increased motivation with the subject than the controlled group.

The gamification of mathematics teaching is a viable strategy that can help students overcome their math anxiety and become more confident in their abilities to solve certain types of math problems. All games have rules that need to be understood and followed by all the players which are like the abstractions found in teaching multiplication, division, and other mathematical operations. Decoding symbols and applying the right algorithm are necessary when solving math problems. As a person who learned English as my second language, I find many similarities between learning a new language and mastering the skills necessary for solving math problems. In both subjects, words have loaded meanings and those meanings are socially constructed. Understanding the words makes it possible to decode the text. I often remind my students that math should be treated like a foreign language that can be understood if we know how to decipher the abstract codes correctly and translate the words and symbols. Mastering the mathematics requires "precise and accurate language" (Hughes, Powell, & Stevens, 2016, p. 13)[3] which translates into paying closer attention to how ideas are spoken in a math class by using appropriate academic language like vertex instead of point or minute hand instead of long hand, etc. I propose embracing the concept attainment strategy as a viable curriculum design option in K-12 math education to ensure important math concepts are taught properly, and students are given the necessary scaffold to perform at the top of their abilities within a clearly defined structure. Next, I explain how the constructivist approach of concept attainment strategy can improve math instruction, leading to increased fluency and deeper understanding of the math concepts.

A Novel Approach

How should teachers teach key concepts like percent, function, area, perimeter, Greatest Common Factor, and others that are fundamental in math education? Two constructivist approaches that I advocate are from the social studies discipline, and they are called concept attainment and concept formation (Parker, 2012).[6] These curriculum design approaches are constructivist in nature. They are credited to a curriculum theorist and education reformer named Hilda Taba, who argued, "No one should be asked or induced to try to do what he cannot be taught or be helped to learn how to do" (Taba, 1962, p. 462).[11] What makes Taba's approach unique is the recognition that when teachers overwhelm their students with too many details, the students cannot make the necessary connections between the new information and what they have already learned. Thus, relying on rote memorization becomes necessary in the absence of fully understanding the concepts derived from specific examples.

In this paper, I focus on the concept attainment model (Parker, 2012;[6] Sunal & Haas, 2005)[8] borrowed from the social studies discipline because it is more straight forward and less time consuming to use in the classroom. I have been using this model in my social studies method courses for years. I have recently decided to teach this model to my undergraduate students to see if their misconceptions about certain math concepts could be remedied and boost their confidence. Based on the verbal and written comments I received from them throughout the term, it was clear that this way of learning was new to them, and they were challenged by it. The deep learning that occurred was due to the rigor embedded in the built-in assessments that accompanied this effective teaching strategy. The teacher candidates who experienced this form of constructivist approach to learning, remembered their involvement in the lesson and could recognize and articulate the essential features of the concept that they

DOI: https://doi.org/10.30564/jiep.v6i1.5404

had studied. Let us examine the details of this curriculum design.

2. Concept Attainment Strategy

The concept attainment strategy uses an inductive approach that relies on studying specific examples of a given concept and distinguishing it from nonexamples, before developing a relevant theory for the examples observed in different settings. A concept is an idea, sharing common attributes that without one of its key attributes, the concept loses its status and becomes a nonexample. To help visualize a nonexample, one can think of a violation that may happen during the game of volleyball. If a player holds the ball for too long or touches the net with their body, then it is foul.

The concept attainment model follows a clear and methodical path that is logical and engaging. However, the challenging parts of this curriculum design starts with establishing the main features of the concept based on reliable sources. This means, the teacher needs to become a researcher and consult reliable sources (e.g., dictionaries, encyclopedia, scholarly articles, etc.) that define the concept under examination. Next, they need to synthesize those four to five researched descriptions into one coherent definition of the concept with the main features highlighted. Finding clear examples that have all the essential characteristics of the concept is a must, so that the common threads shared among the examples are exposed. Furthermore, finding nonexamples that lack at least one key characteristic is not an easy task.

I have found the teacher candidates have difficulties in establishing the critical attributes of the concept they want to teach (e.g., prime numbers, equivalent fractions, etc.) because it requires careful reading of the various definitions that exist in multiple reliable sources like dictionaries and math textbooks. They are not used to questioning the descriptions from various sources and synthesizing them into one coherent sentence.

This model of teaching is very precise and language sensitive. Therefore, it becomes necessary to find out how a chosen concept has been defined by reliable online and/or print sources. The first place to read about the origin and history of the word should be the online etymology dictionary at etymonline.com. Next, dictionaries and encyclopedias should be consulted. Finally, additional research is needed to document how scholars and experts in the field have used the concept in their peer-reviewed published work in reputable journals. With all this data, a clear definition for the chosen concept can be written with each of the essential attributes distinguishable from each other. For instance, in fourth grade the concept of percent is introduced and here is what I came up with for its main features. Percent is a number (1) expressing a ratio (a part of something) (2) compared to 100, (3) that are equal segments, (4) and using the percentage symbol % that is equivalent to hundredths.

Next, these main features of percent are used to create "Focus Questions" (Parker, 2012, p. 321)[6] that students can use to record and organize their answers when studying flawless examples of percent. Choosing examples that are clear and easy to understand is important in this phase of the lesson design. I present each example and evaluate it based on the listed Focus Questions that target the uncompromising features of percent. These examples are from local grocery store advertisements, online shopping, discount offers by car dealers, news stories, stock market data, and other sources that report on real world events. This segment can be seen as the "I do" and "We do" parts of the lesson development where the teacher presents three to five flawless and clear examples of percent that come from everyday life. One such example could be this: Dave saves 27 dollars out of 100 dollars he earns from babysitting. Can we use % to show this relationship?

The students need to see a few nonexamples of percent too. For a nonexample to exist, all required is at least a clear absence of one of the essential features of percent (e.g., not a ratio, unequal parts, or not compared to 100).

Table 1: Graphic Organizer with Focus Questions for the Concept Percent

Examples	Is this a ratio? Explain.	Does it compare a number to 100? Explain.	Are the divided parts equal? Explain.	Can % be used to represent this ratio? How?
Saving $27 out of $100 earned.	Yes, because it compares money saved to total money earned.	Yes. $27 is compared to $100.	Yes. The total amount is divided into 100 one-dollar bills.	Yes. 27% = 27/100 = 0.27 of every dollar saved, or 73% = 73/100 = 0.73 of every dollar spent.
B				
C				
D				
E				

 DOI: https://doi.org/10.30564/jiep.v6i1.5404

A similar graphic organizer is used to show the absence of at least one main feature of each nonexample under examination. I would present each of the nonexamples and explain the reasons for why "F" and "G" are nonexamples of percent. Finding nonexamples can be challenging. One such nonexample can be a whole pizza that is cut into five unequal pieces, making it impossible to claim that a piece is 20% of the whole pizza (Figure 1).

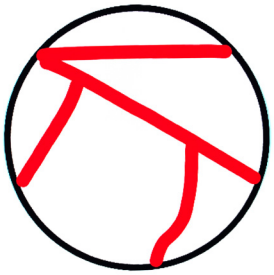

Figure 1: A pizza cut into five unequal pieces

Table 2: Graphic Organizer with Focus Questions for the Concept Percent

Nonexamples	Is this a ratio? Explain.	Does it compare a number to 100? Explain.	Are the divided parts equal? Explain.	Can % be used to represent this ratio? How?
F				
G				

By this point in the lesson, I have introduced 3-5 flawless examples of percent along with two nonexamples. One can say, this lesson has been introduced adequately, but what about student learning? Have the students learned this concept? Can they explain percent in their own words?

To provide additional opportunities to study percent by reinforcing its main features, students are challenged by four "classifying" (Parker, 2012, p. 322)[6] activities. Each of these classifying activities can be seen as "You do" assessment that helps the student clarify any misconceptions they may still have regarding percent. Teachers can also see which students are still struggling with understanding the concept and need additional practice by monitoring what the students write in their graphic organizers.

3. Assessment: Four Types of Classifying

In this part of the lesson, students' understanding of the concept is deepened by engaging them in four types of classifying activities that checks their comprehension of the concept and invites them to showcase their knowledge of percent in different ways.

Classifying Type 1: In this assessment, I present one scenario to my students and ask them to evaluate it based on the main features they have been learning about. Then, I ask them to justify their answers as they work independently or with a study buddy to determine whether this single item is an example of percent by answering the Focus Questions. The graphic organizer developed for this purpose is an essential part of providing the necessary scaffold for the students to organize their answers (see Table 3).

It is important to use neutral language like scenario, situation, story, item, or problem when presenting the case to the students for classifying. A common mistake novice teachers make during the assessment phase of this model is using the word "example" which is a giveaway of the answer. The mistake looks like this: "Study this example and tell me if it is an example of percent." The correct way of asking the question is: "Study this problem and tell me if it is an example of percent. Be ready to justify your answer based on the Focus Questions." Teachers should be using a neutral language so that the student decides how to classify it as an example or a nonexample of percent. In other words, by not paying attention to the labelling when presenting this problem to the students, the teacher may confuse the students by already classifying the task for them.

Table 3: Graphic Organizer for Classifying Type 1

Single Item	Is this a ratio? Explain.	Does it compare a number to 100? Explain.	Are the divided parts equal? Explain.	Can % be used to represent this ratio? How?
Adam collected one hundred candies of different sizes when he went trick-or-treating. He ate three candies. How would you express the number of candies eaten vis-à-vis the entire stash?	Yes, because the question is asking about the ratio of eaten candies to the entire stash.	Yes, the problem is comparing 3 to 100.	Student A: Yes, because the unit of measurement is candy. Student B: No, because some of the candies were smaller than the others, and we don't know enough about the candy sizes.	Student A: Yes. 3% =3/100 = .03 Student B: I'm not sure. The candies had different sizes.

DOI: https://doi.org/10.30564/jiep.v6i1.5404

After sharing their answers with their study buddies, I call on volunteers to come up to the board and present their answers to the class. This segment can be seen as the "You do" part of the lesson presentation where students can assess their understanding of percent. It is important to listen to the justifications offered by the students when answering the Focus Questions. In Table 3, I have provided a sample for two different answers for the third and fourth attributes of percent. The rich conversation generated in the classroom regarding these answers help deepen students' understanding of percent.

Classifying Type 2: I present a minimum of three items for the students to classify based on the main features of percent. I would say, "Please study these problems and tell me which ones are examples of percent. Be sure to warrant your claims based on the main features of the concept." These problems are a mix of examples and nonexamples taken from real life situations (e.g., grocery advertisements, shopping coupons, news events, etc.). It is important to always ask students to justify their answers and defend their decisions based on the established key characteristics of the concept. They can work by themselves or in small groups when making their decisions. The conversation generated during this exercise is not trivial because students learn to discuss math when translating abstract ideas and symbols into spoken academic language. They are learning to support their claims with evidence. The graphic organizer used for this assessment can showcase how the students have understood the concept. (see Table 4).

Table 4: Graphic Organizer for Classifying Type 2

Mixed Items	Is this a ratio? Explain.	Does it compare a number to 100? Explain.	Are the divided parts equal? Explain.	Can % be used to represent this ratio? How?
I				
J				
K				

Classifying Type 3: During this phase of continued assessment, I ask my students to produce an example of percent by inventing or finding an example of percent from selected online sources or print advertisements that are made available to them. What they produce can be a poster, a story problem, an advertisement, or other mathematical expressions or sentences of their choosing. Once again, I ask them to justify their answers by evaluating their answers based on the Focus Questions that are tied to the main characteristics of percent.

Classifying Type 4: This classifying activity is about turning a nonexample of percent into an example. Imagine we had a partial pizza that was cut into different sizes and shapes that was impossible to determine the percentage of each piece compared to the entire pizza. For instance, I would ask my students to think about the changes that they would make to this chopped up pizza so that a given percent (e.g., 20%, 25%, etc.) can be accurately shown. I remind my students to always justify their decisions based on the Focus Questions that are tied to the main features of the concept. I call on my students to share their work in small groups before presenting their answers to the whole class. One approach is asking all the students to stand up and form two rows facing each other. Then, they can explain to each other the changes they recommend for turning this nonexample into an example of percent. This kinesthetic approach gets them out of their seat to interact with their classmates.

Limitations and Future Research

There are three main factors that limit the claims of this study. First, the concept teaching as described in this paper needs to be understood and duplicated by other math teachers and researchers to see if they can replicate my results in formal longitudinal studies. Second, the findings are based on the information my students provided voluntarily as a part of their assignments. Third, the anecdotal evidence presented in this paper comes from a relatively small sample of the 61 teacher candidates over a six-month period. Thus, additional formal studies can build upon these initial findings to see the extend of success that other math instructors may experience by using the concept attainment strategy.

4. Discussion

There is no quick solution to improving children's math skills in the American public schools. Teachers are the educational leaders in their classrooms, and it is expected that they know the math they are expected to teach. Games can help reinforce the concepts the students have learned. The concept attainment strategy can provide the necessary foundation for deep learning that games alone cannot provide.

An important message of this paper is about advocating the use of the concept attainment strategy in teaching key math concepts. Math and social studies go together, and it is time for math teachers to test this proven strategy that is not new to experienced social studies teachers who teach about what is common good and what is democracy. I have not seen this strategy taught or used by math teachers in my professional experience.

 DOI: https://doi.org/10.30564/jiep.v6i1.5404

Based on the anecdotal evidence I have gathered during the last two quarters I am convinced that this teaching strategy can benefit math teachers and their students, because it forces the teachers to have a deeper understanding of the concept themselves before trying to teach it to their students. It is not reasonable to expect math teachers to teach concepts that they do not know well. I have seen the marked improvements in the attitudes and skills of the teacher candidates that I have taught. I have seen their confidence grew as they clarified their own misconceptions with the concepts that they chose to teach. I met with them individually and in small groups to answer their questions regarding the critical attributes of their concepts and the classifying activities they planned to use in their lessons. Lasting confidence happens by acquiring the necessary knowledge and skills that come from hands-on experiences and applying those learned skills to new situations. It would be ideal to follow up with these teacher candidates after they have become elementary school teachers to see how exposure to this teaching strategy influenced their confidence and competence when teaching math.

Concept teaching is not easy. However, it should be a viable option for math teachers so that they can add this strategy to their repertoire of teaching methods. This constructivist approach to teaching and learning advocates deep learning, instead of rote memorization.

Concept attainment follows a rational model that is step-by-step and at each level, students have a chance to test their understanding. They also have a direct personal experience with the knowledge construction through the four types of assessments that exemplify the best form of learning.

There is no question that card and dice games can bring some excitement to math classrooms and make math fun and accessible to reluctant learners. However, the concept attainment strategy offers something more. It offers a proven approach to engage children in math conversation with each other that demystifies the language of mathematics. Speaking mathematics is empowering and all children can learn to speak math.

The concept attainment strategy offers a logical and practical approach to showcasing real-world examples of math that are used in the economy and our daily lives. The teacher candidates that I have worked with have good intentions and kind hearts. They want to teach and help all children learn. What they also need are the necessary pedagogical skills to design effective lessons that are inclusive, empowering, and practical. What I have presented in this paper shows how math teachers can benefit from a powerful strategy that social studies teachers have been using with success when teaching about complex concepts like the common good and democracy. It is time to integrate this effective social studies method into teaching math.

References

[1] Clements, D. H. (2000). 'Concrete' manipulatives, concrete ideas. *Contemporary Issues in Early Childhood, 1*(1), 45–60.

[2] Doig, B., & Ompok, C. (2010). Assessing young children's mathematical abilities through games. *Procedia - Social and Behavioral Sciences, 8,* 228–235. https://doi.org/10.1016/j.sbspro.2010.12.031

[3] Hughes, E. M., Powell, S. R., and Stevens, E. A. (2016). Supporting clear and concise mathematics language, instead of that, say this. *Teaching Exceptional Children,* 49(1), 7-17.

[4] Hulse, T., Daigle, M., Manzo, D., Braith, L., Harrison, A., & Ottmar, E. (2019). From here to there! Elementary: a game-based approach to developing number sense and early algebraic understanding. *Educational Technology Research Development, 67, 423-441* https://doi.org/10.1007/s11423-019-09653-8

[5] Lavidas, K., Apostolou, Z., & Papadakis, S. (2022). Challenges and Opportunities of Mathematics in Digital Times: Preschool Teachers' Views. *Education Sciences*, *12*(7), 459. MDPI AG. Retrieved from http://dx.doi.org/10.3390/educsci12070459

[6] Parker, W. C. (2012). *Social Studies in elementary education* (14th ed.). Pearson.

[7] Richards, E. (Feb. 29, 2020). Math scores stink in America. Other countries teach it differently –and see higher achievement. USA Today. https://www.usatoday.com/story/news/education/2020/02/28/math-scores-high-school-lessons-freakonomics-pisa-algebra-geometry/4835742002/

[8] Sunal, C. S., & Haas M. E. (2005). *Social Studies for the elementary and middle grades* (2nd ed.)Pearson.

[9] Shute, V. J. (2011). Stealth assessment in computer-based games to support learning. *Computer games and instruction, 55*(2), 503–524.

[10] Sun-Lin, H.-Z., & Chiou, G.-F. (2019). Effects of Gamified Comparison on Sixth Graders' Algebra Word Problem Solving and Learning Attitude. Educational Technology & Society, 22 (1), 120–130.

[11] Taba, H. (1962). *Curriculum development: theory and practice*. Harcourt Brace Jovanovich, Inc.

[12] Watson-Huggins, J., & Trotman, S. (2019). Gamification and motivation to learn math using Technology. *The Quarterly Review of Distance Education, 20(4), 79-91.*

DOI: https://doi.org/10.30564/jiep.v6i1.5404

BILINGUAL PUBLISHING GROUP

Journal of International Education and Practice

https://ojs.bilpubgroup.com/index.php/jiep

ARTICLE

Education Voucher Scheme in India: Would Lead to School Choice and Universal Education?

Athar Ullah*

Department of Sciences and Humanities, Rajiv Gandhi Institute of Petroleum Technology (RGIPT), Jais, Uttar Pradesh-229304, India

ARTICLE INFO

Article history
Received: 06 February 2023
Accepted: 18 April 2023
Published: 30 April 2023

Keywords:
Quality education
Educational choice
Education to all
Government schools
Private schools

ABSTRACT

To remove obstacles in the path of 'Education for All', the government of India launched several programs, Sarva Shiksha Abhiyan (SSA) being one of them. Despite several attempts, the government has failed to be successful in providing education to all students and the impact of such schemes has not been very good at the ground level. In India, children are not absent from school owing to a lack of demand; rather, low quality of government education delivery is a major cause for their absence. There is a need to redefine the Indian education system or policy to a new level as government schools are unable to fulfil the growing demand for high-quality education. Direct government funding to children or parents rather than schools can provide parents or children with the ability to select the school of their choice, whether it is a government or private school. This may be accomplished through the education voucher scheme. Governments do not need to spend any additional public funds on vouchers to implement this approach. The education voucher scheme deserves an effort among the several approaches that are being pursued to improve school education.

1. Introduction

Education is the bedrock of any person on earth. It is being observed that education is necessary not only for humans but also for the success of the whole nation. Education to all is one of the major concerns of the government. To remove obstacles in the path of 'Education for All', the government launched several programs, Sarva Shiksha Abhiyan (SSA) being one of them. The government intends to provide universalise elementary education through community ownership of the school system under the SSA scheme. The SSA also strives to provide opportunities for all children to improve human abilities (SSA, 2000).[15] Despite many efforts, the government has not yet been able to provide education for all. To ensure 100 percent accessibility of education, the government has enacted the 'Right to Education' bill (RTE, 2009)[11] but systemic changes are needed for grassroots impact. More than 90 percent of the country's population is able to reach the primary school which is located within a kilometer radius, but the conditions of our government schools are deplorable and not conducive to learning (Singh, 2010).[14]

Every nation has its unique education system in some way and each country tries to fix its problems in its own way. Not only India but also the whole world is facing the problem of the poor performance of government schools. Most people are unhappy with the performance

**Corresponding Author:*
Athar Ullah, Senior Research Scholar, Department of Sciences and Humanities, Rajiv Gandhi Institute of Petroleum Technology (RGIPT), Jais, Uttar Pradesh-229304, India; Email: athar.ifham@gmail.com/ps18001@rgipt.ac.in.

 DOI: https://doi.org/10.30564/jiep.v6i1.5449

of government schools in their countries. The United State spends the highest amount per student in the world, yet after the economy, education is the second major issue of the people in the US (Shah, 2009).[13]

The government of India is running various programs to improve quality education and enrollment rate, but still, the impact of all the schemes has not been very good at the ground level. Some recent surveys and data reveal that there is a big difference between our aspirations and actual achievements. In this process, the two-tier system of school education is working in our society. Those parents who can pay high fees, send their children to private schools and those parents who cannot afford, send their children to government schools. Our current approach to education creates a wide gap in equal schooling opportunities for all (Shah, 2009).[13] It is necessary to restructure education policies and redefine the roles of education stakeholders (government, schools and families) in the delivery of education because the educational demands of society have not yet been met by a centrally managed education monopoly (Weidrich, 2003).[16]

A study of United Nations Educational, Scientific and Cultural Organisation (UNESCO) stated that the Indian literacy rate is one of the lowest literacy rates in Asia, while India spends around four percent of the gross domestic product (GDP) on education which is also higher than the Asian average of 3.6 percent (Singh, 2010).[14] The problem is not in the budget but in its inefficient implementation and corruption. One of the main reasons for the poor effectiveness of government spending on school has been the government's inability to provide targeted assistance to needy students in India. The government is funding schools in place of children's funding. There is a requirement for appropriate changes in the policy framework, without which an increase in public expenditure of six percent of GDP will not help in correcting the current state of poor education and reducing illiteracy (Singh, 2010).[14]

One thing that has been common in many reforms is the empowerment of parents and it gives them more voice in the system. There is also a reform required in the education system which makes schools accountable to education authorities as well as parents (Shah, 2009).[13] Provision of direct government funds to children or parents instead of schools can provide parents or children power to choose the school they prefer, whether it is a government, private or non-government organisation school. This can be done through the education voucher scheme, which transfers purchasing power to needy students instead of schools. We can also say that aid goes to providers who prove themselves better than others through competition but only through parents/ children and not directly. Public expenditure would be more effective in increasing both quality and accessibility if it was to produce competition, choice and enhanced quality through the demand side. It provides additional purchasing power to parents, to compete for funds flowing into the system of all schools through additional educational expenses by parents (Singh, 2010).[14]

Quality education increases the demand for different quality schools. Different quality schools increase the demand for educational choice. The voucher scheme emerged based on the demand for quality education to all. Many researchers suggest that the voucher scheme can be one of the major schemes which can help to improve quality education, school choice and provide equal opportunities for education to poor students (Gomathi and Sudhakar, 2014).[6]

2. Educational Voucher System

a) *Origin of Educational Voucher Scheme*

The idea of voucher education was given by 'Milton Friedman' in '1955' (Friedman, 1995).[5] It was given with the idea that it would be able to improve educational outcomes (Friedman, 1955).[3]. He described the education vouchers as a tax-funded certificate (Singh, 2010).[14] Economist Milton Friedman conceptualized the Modern Education Voucher Program in 1962 for government support of education to encourage the development of a stable and democratic society (Dixon et al., 2019).[2] The voucher empowers parents to pay for schooling and to choose schools for their children.

Friedman (1995)[5] said that "*Our elementary and secondary educational system needs to be radically restructured. Such a reconstruction can be achieved only by privatising a major segment of the educational system [...] that will provide a wide variety of learning opportunities and offer effective competition to public schools. The most feasible way to bring about such a transfer from government to private enterprise is to enact in each state a voucher system that enables parents to choose freely the schools their children attend. The voucher must be universal, available to all parents, and large enough to cover the costs of a high-quality education.*"

Since then, the debate has been started the use of vouchers to improve choice, efficiency, and equity. Usually, all or most of the school's tuition fees are paid by education vouchers. Through the education vouchers, parents are free to spend the liquidity embodied in government schools as well as private schools. Education voucher involves

DOI: https://doi.org/10.30564/jiep.v6i1.5449

all schools in the competition, whether government or private. This forces schools to improve their quality to attract students (Singh, 2010).[14] School performance will depend upon the students' success and able to redeem many vouchers. Schools will have to improve or close under the performance (Weidrich, 2003).[16]

b) *Basic Objectives or Principles of Educational Voucher Scheme*

The main objective of the education voucher is to increase the opportunity for parents to choose the school for their child's education. Education vouchers specifically focus on low-income families, minority groups, and deprived section of the society so that they can access private schools. Education vouchers create competition among every eligible school, and it will increase the quality education.

West (1997)[17] suggested that the educational voucher system relies on four principles: *"consumer choice, personal advancement, school competition, and promoting equity in an already unequal system".*

First, 'Consumer choice' describes the parental choice through parental authority. Parents are the decision-makers for their child's school selection and try to choose the best school for the child to provide quality education (Weidrich, 2003[16] and Gomathi & Sudhakar, 2014).[6] Second, 'Personal advancement' suggests that human wants to shape their own life through this. It provides an opportunity to choose and therefore promotes interest, participation, and dedication to decision making (Weidrich, 2003).[16] Third, 'School competition' argues that the purpose of the voucher scheme is to challenge government schools to compete with each other and also with private schools. This occurs through quality enhancement, cost reduction and the beginning of innovation as it depends on the parental school choice decision (Weidrich, 2003).[16] Fourth, 'Promoting equity or Equality of opportunity' aims to increase the opportunity to access private schools for low-income families and/or minority groups. Voucher scheme provides the opportunity for students to get the education in private schools so the student from low-income families can also go along with the mainstream in the society. The education voucher system is a way in which low-income parents can move forward for better education of their children and can also get equal educational opportunities in their society (Weidrich, 2003[16] and Gomathi & Sudhakar, 2014).[6]

c) *Models of Educational Voucher Scheme*

There are various models of education voucher schemes. Here we discuss the voucher model of Friedman and Jenk –

"Friedman's (1962)[4] proposal advocates freedom of choice for both parents and schools, i.e. parents should be given freedom to spend vouchers allocated to them on any school and schools should be free to choose their intake and organisation." Topping of vouchers by parents, even if they do not fully cover school fees, is still permitted under this model. This model also said that the value of each voucher is decided according to the average cost of schooling or a proportion of this average cost (Singh, 2010).[14]

On the other hand, Jenk's (1970)[7] proposed a liberal view and more concern about equity. He said that "*while topping up should be allowed, the value of vouchers allocated to parents should be dependent on income - lower income households should get larger vouchers, implying that schools catering to a larger extent to financially disadvantaged children would receive extra resources."*

d) *Design of Educational Voucher Scheme*

Levin (2002)[8] suggested three categories of building voucher design decisions that can be taken to systematically evaluate any voucher program: (a) finance, (b) regulation, and (c) support services. It included freedom of choice, productive efficiency, equity, and social cohesion. Finance suggests that the overall value of the voucher, whether it is allocated equally or differently and whether the schools can require co-payment from parents, other than vouchers. The regulation suggests that the government regulates program participation by eligible families and voucher-accepting private schools. Support services refer to funding for school transportation and mechanisms for the provision of information to parents about school programs, effectiveness, philosophy, and practice.

e) *Types of Educational Voucher Scheme*

In a broader way, education vouchers provide funds to parents by the government rather than the school chosen by the parents. The education voucher covers the most or all of the tuition fees and it is tax-funded. The Foundation, Trust or philanthropists also sponsored education vouchers which we called private suppliers of vouchers (Weidrich, 2003).[16]

Education voucher systems are flexible, and it depends on the particular problems of a country, region or state. Three types of education voucher system are working in society –

First, 'Tax-funded' voucher systems are found

 DOI: https://doi.org/10.30564/jiep.v6i1.5449

fundamentally where education is mandatory up to the school-leaving level. Parents are allowed to choose among the alternative of compulsory service. We also can say that parents can choose any eligible school. Second, the 'Funds-follow-the-child' voucher system, "*in which government funding is directed to the chosen school in exact proportion to enrolment has been the most popular in developing countries, e.g., Bangladesh, Belize, Chile, Colombia, Guatemala, and Lesotho" (Weidrich, 2003).*[16] Third, the 'Universal' voucher system, the government provides vouchers representing a certain amount to all individuals in a certain age group (Weidrich, 2003).[16]

3. Globally Experiences of the Educational Voucher Scheme

The education voucher scheme is in vogue not only in principles but also on the ground level. There are various countries that are running voucher schemes such as the US (Milwaukee, Wisconsin, Cleveland, Vermont and Ohio), UK, Spain, Colombia, Chile, Sweden, Netherlands, New Zealand, Poland, Czech Republic, Bangladesh, etc. Here we are focusing on the voucher scheme of different countries.

Bangladesh

Bangladesh's Female Secondary School Assistance Project (FSSAP) is not a specific example of an education voucher, but it can be the basis of a voucher scheme. The main objective of the FSSAP project is to encourage an increase in enrollment of girls in secondary schools (Liang, 1996).[9] The first component of the project was to provide stipend to the girls. Grade 6 girls received US $ 12 and Grade 10 girls received US$36 as a stipend, who enrolled in secondary schools in 118 targeted districts. The stipend addressed the direct cost of education and personal expenses (school fees, tuition, transport, books, stationery and uniforms). It covered the 30-54 percent of direct school expenses and paid directly to the account of each girl, in a nearby commercial bank. In addition, FSSAP paid tuition fees directly to the schools where the girls were enrolled (Weidrich, 2003).[16]

The project was surely called successful because it had a positive effect on enrolment, attendance, drop-out rates and (partly) on student's performance (Weidrich, 2003).[16]

Chile

After the introduction of the voucher scheme in 1980, the number of students in private schools was increased. The voucher program was funded by the government and applicable to all school-going children (public and private schools). Both public and private vouchered schools were treated equally by the system. In the beginning, the government did not allow schools to charge any additional tuition fees but due to the rise in inflation and no modification in the value of vouchers, the government allowed private voucher schools to charge tuition fees from parents. On the other hand, public schools did not charge any additional tuition fees. It was found that private schools got higher academic achievement than public schools in the middle-class area but it was the opposite in low-income areas. This increased competition among private schools and improved overall achievement at the district level despite higher disparities (Singh, 2010).[14]

Colombia

The voucher program was initiated in 1992 and by 1994 the education voucher program was implemented in 1,789 schools, serving 90,807 low-income students in Colombia. It was targeted those children from low-income families who have completed their middle schooling but did not get admission to public secondary schools. Students entering the sixth grade were given vouchers worth approximately $ 143. Primarily, it was introduced to solve the problem of shortage of places in public secondary schools in Colombia, where 40 percent of the secondary schools were privately owned. The government and municipalities financed the vouchers on 80:20 sharing and municipalities conducted the program. As intended, Vouchers help poor students access to private schools; together, vouchers benefit to reducing overcrowding in public secondary schools. Elite private schools did not participate in the program. After the introduction of vouchers, the number of commercially oriented schools increased and enrollment in secondary schools also increased and overall academic achievement also improved (Weidrich, 2003[16] and Singh, 2010).[14]

Sweden

The Swedish legislature granted the power to parents, municipalities, and independent schools from the central government in 1991. For the first time, parents were free to send their children any government school within their municipality or to an independent school. Independent schools got 85% cost of educating a student in municipal schools. In 1994, the school choice and benefit of the voucher already became evident. This was realized not only by the student but also by those who were in the education system. The first independent school was started in a low-income immigrant suburb of Stockholm. It was

DOI: https://doi.org/10.30564/jiep.v6i1.5449

focused on the individual student responsibility, familial involvement, and efficient use of technology. It had over 2000 students in 240 places. In 1997, the voucher amount was increased to 100 percent of the per-pupil of the Municipal School funding (Weidrich, 2003).[16]

The Sweden voucher system was a major step towards decentralization, but still, all schools were regulated by the central government.

United Kingdom (UK)

An education voucher scheme was established in 1981. In England and Wales, the voucher scheme differed from other countries, it covered only public schools and provided the opportunity to poor but able students. The voucher scheme had little effect on competition between public and private schools due to the non-inclusion of private schools thus public schools did not have the motivation to improve their quality of education. Research also shows that after the introduction of the voucher scheme, factors other than education were also responsible for improving educational achievement (Singh, 2010).[14]

As of 1995 in England, around 29800 students in 294 specified independent schools were using the voucher scheme. Around 5000 new students aged eleven or thirteen entered the voucher program every year. The voucher principle also extended in higher education colleges which reestablished as autonomous institutions independent of the local governments. In 1995, the Department of Education announced that its objective was to provide free quality education for all four-year-old students in private schools as well as public schools and nursery education. Under the scheme, low-income parents could receive assistance with educational fees for any eligible independent school. Under the scheme now a days, low-income parents can get assistance with tuition fees for any eligible independent school (Weidrich, 2003).[16]

USA (Cleveland, Milwaukee and Vermont)

Cleveland

Cleveland Scholarship programme was the first publicly funded American voucher programme. It included both secular and parochial (also called local & rural) schools. The voucher provided up to 90% of student tuition fees (maximum US$2,250). It was equivalent of just over a third of the cost of a school going child to Cleveland government schools. The Cleveland plan was based on students' academic tests and interviews with parents of low-income families. There were two main reasons for parents apply for an education voucher: *"first, parents looked for 'improved academic quality' in their children's education (85 percent); second, they wanted 'greater safety' in their school environment (79 percent)" (Weidrich, 2003)*.[16]

Milwaukee

The Milwaukee Parental Choice Program (MPCP) was privately sponsored in 1990, the voucher program was started in six private schools for 300 students. At that time, there was some restriction on the voucher scheme, in which the number of voucher students was 49 percent of the total strength and the selection was based on the lottery method. Voucher scheme can be used in private schools and it chooses recipients from low-income applicants. It did not charge any additional tuition fees from the students (Singh, 2010).[14] The cost of the voucher was less than half the cost of a child going to a government school. The Milwaukee voucher programme is one of the most powerful examples of a successful voucher system for the poor (Weidrich, 2003).[16]

Vermont

Vermont had an experience of Colombia, where voucher systems were introduced to reduce the problem of shortage of places in public secondary schools. About 95% of the state's 246 communities had no public secondary schools in Vermont. Parents in these communities preferred to send their children to private high schools or public high schools in other cities to give tuition. The scheme was established to provide communities with access to high school education to students without the expense of building their own public schools. The Vermont voucher experience indicated that cities, parents, and private schools could work creatively together (Weidrich, 2003).[16]

Globally experiences embark to suggest that direct support to children can benefit them in terms of quality and emphasis public schools to improve their quality. Through the voucher scheme, children can be offered the choice between government and private schools. Private schools in rural areas may be encouraged to open after the expansion of the voucher scheme (Singh, 2010).

4. Education Voucher Initiatives in India

PAHAL in Uttarakhand

The scheme was launched in Dehra Dun City in 2007. It was an innovative PPP (Public-Private Partnership) program that offered education vouchers for children aged 6-14 years. Programme included those children who are rag-pickers, scavengers, snake-charmers, or orphans. The eligibility criteria are that children have never enrolled or

 DOI: https://doi.org/10.30564/jiep.v6i1.5449

have been a drop out for at least one year and there is no government school / EGS center (Education Guarantee Scheme) within one kilometer of residence. Based on its progress, the program was extended to Nainital and Udham Singh Nagar after one year with a total of 651 students (Shah, 2009).[13]

Delhi Voucher Project

The Center for Civil Society (CCS) launched an education voucher programme in 2007. It was a privately funded programme. The worth of CCS vouchers was up to Rs. 3600 per year and it provided vouchers to 408 students in 68 wards of Delhi. More than 50 school choice activists reached out to more than 12 lakh parents in these 68 wards. All those students who were studying in class 5 or below in government schools were eligible for the voucher program. More than 1.2 lakh parents applied for voucher programme. CCS applied lottery methods in each ward. For the selection of students, the local ward councilor picked the 12 students- 6 for the first list and 6 for a buffer list. More than 2.5 lakh parents who could not win the CCS voucher lottery submitted a petition to their respective ward councilor demanding school vouchers from the government (Shah, 2009)[13]

Gyanodaya Yojana, Rajasthan

The main objective of the scheme is to provide the facility of opening new schools from class 6th to 12th under public-private partnerships on the basis of the BOO (Build, Operate and Own) scheme. In the first phase, the scheme will establish a maximum of five schools in each district and fifty percent of the seats would be sponsored by the state government through the school voucher in these schools. Yojana provides the preferences to girls and underprivileged children and it also has inbuilt monitoring and evaluation mechanisms (Shah, 2009).[13]

Shikshak Ka Apna Vidyalaya, Rajasthan

Special attention has been given to the role of trained unemployed teachers under this scheme. It aims to increase the reach and quality of primary schools by enabling these teachers to adopt government-run one-teacher primary schools in rural and backward areas of the state or to open new schools in public-private partnership (PPP). With government-sponsored vouchers, all children in an area of 3 km can attend these schools. These students will make up 50% of the school strength and while the remaining students will pay their school fees (Shah, 2009).[13]

The Rumi Education Foundation

The programme was running by the Rumi education foundation also known as Rumi Bright Futures (RBF) Voucher Programme. The organisation is based on Hyderabad. The organisation has been running education vouchers for school dropouts since 2009. The organisation includes students who have dropped out of school for not less than one year and more than two years. The organisation does not support leaving existing schools to avail the scheme to existing students. The basis of the selection is eligibility test those who have performed well in the exam then they avail the benefit of the voucher and continue to their study (Gomathi and Sudhakar, 2014).[6]

RBF has covered 151 students under the scheme. There have been 110 families who have participated in this programme, which have more than one child, who have got the benefit of education vouchers. There were 18 schools in REF vouchers that provided education for dropout children. Education Voucher was valid till class 10^{th}. All schools were located far from each other. Education vouchers and school choice were a new concept for the parents in Hyderabad. REF created awareness for the voucher scheme among the community through various sources like; door-to-door canvassing, through print media (leaflet), word of mouth through schools, teachers and parents. Schools' managers played a vital role in the awareness of voucher schemes (Gomathi and Sudhakar, 2014).[6]

Almost 50% of parents have considered the REF voucher as a kind of scholarship and financial support for child education. Parents did not experience the other benefit of the voucher system which was school choice. REF could not spread the voucher information to the target population. When we focus on other countries such as Milwaukee, Colombia and Chile, education voucher encourages school choice and also help in financing child education. The REF voucher could not be able to provide information to the community about school choice, but it encouraged parents to educate their children (Gomathi and Sudhakar, 2014).[6]

The ENABLE School Voucher Programme

'Absolute Return for Kids (ARK)', a London-based charity organization, formed a think tank in collaboration with the Center for Civil Society (CCS) in Delhi, India, to implement a school voucher program– Ensure Access to Better Learning Experiences (ENABLE) in 2011. It was concentrated within a 20 square kilometer radius of Shahdara known as a highly urbanized slum area, situated in East Delhi on the banks of river Yamuna. It

DOI: https://doi.org/10.30564/jiep.v6i1.5449

was focused on underprivileged children between the ages of five to seven years living in families with an income below 8000/per month as per below the poverty line (BPL). The program considers students who had not previously attended schools or were currently enrolled in a government school. 1618 children applied for the voucher program and 835 children were selected through the lottery, with the remaining 783 children being served as experimental groups. Organisation provided four vouchers to lottery winners- tuition costs, books funding, uniforms, and meals. Tuition costs are covered by a yearly voucher of Rs. 4800, books covered Rs. 900 voucher, school uniform covered Rs. 600 vouchers, and meals covered Rs. 1000 voucher. The total cost of the combined annual voucher was Rs.7300 which was to be provided on an annual basis for five years. The organisation provided the certificate, parent handbook, and school preference forms to lottery voucher winners. It provided the list of 110 private unaided schools for parental preference that had signed a Memorandum of Understanding (MOU) with ARK. Handbook helped parents to make an informed decision (School choice, 2007).[12] It provided information about the facilities offered by the participating schools in their area and guidance on what families should do after receiving their vouchers. Organisation used traditional and cultural communication activities to deliver key messages about the programme. The organization consisted of banners, posters, field offices, leaflet drummers, puppet shows, and community members who explained the program, also used cycle rickshaws equipped with public address systems, toured the local areas to encourage participation and community engagement (Dixon et al., 2019).[2]

5. Potential Voucher Model for Country

As Friedman stated, vouchers must be universal, this means that all parents should be given the opportunity to choose schools independently for their children. Second, the voucher amount should be sufficient to cover students' high-quality education.

Policy Design of Voucher Programs

The design of the voucher programme depends to some extent on how policymakers value the different endorsed voucher results.

First, policymakers should ensure that voucher schools will be 'academically and economically impressive' and that a sufficient number of autonomous schools will be available. Second, policymakers should ensure that autonomous schools will provide the opportunity to 'low-income and special needs students'. Third, there is also a possibility in the policy that the 'systemic impact' on students without vouchers will be positive**.** Fourth, policymakers must set up communication between schools and ensure that voucher schools will actually 'socialise their students' to become responsible citizens of India's democracy (Weidrich, 2003).[16]

Voucher Distribution Parameters

A voucher can be given- to low-income families students of all groups, to the random selection of large group through lottery method, to under-achieving students of a small and specific group such as dropout children, migrant children, out of- school children, street children, girl children (on the basis of gender primarily for girls,), ST/SC/OBC, differently-abled children (to provide special need children), orphans, children from economically backward families, children of refugees, migrating tribes, prisoners, those living in peri-urban areas (e.g., resettlement colonies), on the basis of caste, class or regional disparities, to students of minority groups which primarily means Muslims, and to provide the students of 'specific areas' (Shah, 2009[13] and Weidrich, 2003).[16]

To qualify for a voucher, applicants must enter the Indian primary school cycle, and age should not be less than six years, which is when compulsory education starts in India. The voucher must be given both public and private schools and within private schools, both non-profit and for-profit schools must participate. Each municipality will decide how many vouchers to fund, subject to a maximum allocated to the areas by the central government (Weidrich, 2003).[16]

Voucher Amount

The voucher amount could be given on the basis of family income, there should be also a special focus on the female children within each group or also could be given a separate voucher programme to support them. The voucher amount can also be given by the government on the basis of the amount spent per student (Weidrich, 2003).[16] Voucher amounts can be also given through different pattern percentages, dividing the total amount e.g. 70% pay by the government, and 30% pay by the parents.

6. Country Would Gain to Apply Voucher Scheme

In the present scenario, the Government of India provides funds to schools, higher institutions, colleges and universities to improve the quality of education, but much evidence shows that private schools, institutions, colleges and universities are more efficient as compared

 DOI: https://doi.org/10.30564/jiep.v6i1.5449

to government schools. For the improvement of 'quality education', 'education for all', the government of India must apply the education voucher scheme. If the government would implement it then there are some factors that will help us to improve the condition of our current education system.

School Accountable

Education voucher is an instrument to change the finances of governments, especially the education of the poor. This is a coupon offered by the government. The government pays the full or partial cost of schooling that a student chooses to study. Education vouchers provide the opportunity for poor parents to choose schools for the education of their children (Shah, 2009).[13]

In the current education system, schools are accountable to the government but in the voucher system, schools are accountable to students and parents because they pay for their education through vouchers. In the current education system, 'money follows schools' but in the voucher system, 'money follows students'. In this way, the schools collect the vouchers from the students and deposit them to the government and the government sends the same amount of the vouchers to the school account. So, the route only changes, money remains in the same hand and vouchers go from students to schools and schools to the government (Shah, 2009).[13]

Educational Gap

In the present scenario, rich parents have the power of educational choice who can easily select private schooling. On the other hand, rural and urban poor students get trapped in government school buildings and neither have the power to choose schools nor are they able to get quality education (Weidrich, 2003).[16] When we focus on the education voucher programme, it provides the opportunity to low income or other at-risk students. Eligibility depends on the student's family income and performance of the student or local public school. In this way, it would be increased the range of educational choices of low-income families and reduces the educational gap (Weidrich, 2003).[16]

Status Quo

When we focus on socio-economic factors, private schools lead to qualitatively higher output in verbal, mathematical and cognitive abilities. Private schools have a high degree of accountability because they operate according to market mechanisms but on the other hand, the level of accountability in government schools is very low (Weidrich, 2003).[16]

Children in India are not out of school due to lack of demand, poor quality of government education delivery is an important reason for their absence from school. One objective of education voucher is to improve the quality of education without increasing the cost. Schools can also be made accountable through rewards and punished by allocating funds according to the performance of the school. It will provide the information to parents so they can optimise their school choice. The purpose of the voucher is to provide families with maximum choice within a decentralised and competitive system of schools and directly support students or their parents rather than institutions (Weidrich, 2003).[16]

7. Discussion

The experience of the Columbia, Vermont and USA voucher scheme suggests that it would be very appropriate to implement in India. Communities with small and geographically distant could provide vouchers to their students to attend either private schools or public schools in another town. As we saw in Cleveland and the USA, voucher schemes are able to increase parental satisfaction with schools and provide a healthier environment to students of different social and economic backgrounds than the current system of public schools (Weidrich, 2003).[16] The experience of Milwaukee looks very useful for India because we are also facing the problem of high drop-out rates, disgraceful test scores and an unbearable disparity in educational opportunity between low-income and middle-income families. Several surveys and research suggest that the voucher program promotes diversity and provides opportunities, especially for poor children (Weidrich, 2003).[16] Our country can take the idea of a Swedish voucher program that provides greater freedom from school administrators and ensures greater parental involvement. The Chilean voucher example shows us that public schools will also be able to compete with private schools when the government puts extra effort into improving curriculum, teaching quality, and managing education (Weidrich, 2003).[16]

There is a need to innovate our education system which could be useful to increase maximum access to education to the people. In this way, the government should allow the PPP model (public-private partnership model) to start working with the education system, therefore the government should involve private and charity or non-profit organizations to work with the education system (Makwana, 2011).[10] The introduction of education vouchers would provide a place for charitable and non-profit organizations to work for education to all with

DOI: https://doi.org/10.30564/jiep.v6i1.5449

better quality education for the poor. CCS, a voluntary organization in New Delhi, outlined some of the benefits of the education voucher scheme and said that the education voucher scheme provides many advantages to parents, students, and academic achievement. First, students will have the power to select schools. Second, poor students will be able to get admission in private schools and the private school could not deny. Third, the government would be able to provide direct benefits to students rather than indirectly funding and managing schools (CCS, 1997).[1]

Education vouchers are entitled to an effort among many ideas, which are being done to improve school education. Numerous empirical and theoretical evidence suggests that education vouchers can be a weapon to improve the choice of the poor, able to put real pressure on state schools to perform and to create a system that will encourage to improve its quality education over time. The voucher could be used as a reward for better performance of the government schools. If government schools can be able to attract voucher students, who can choose private schools so the voucher amount could be given to the schools as an incentive. School vouchers can be consumed to confer a chance for principals/teachers to compete with the best in the industry. Through education or school vouchers, these principals/teachers can choose the option for greater managerial and financial autonomy with 100 percent funding. In this way, the government would provide an opportunity for a city or state can decide that all government schools would be funded through vouchers. The government would decide the voucher amount per student and the school would get money based on the number of students attracted and maintained (Shah, 2009).[13]

After the introduction of education vouchers, the revenue of the schools will depend on the performance of the school. Schools that have high enrollment will get high amount and schools which have lower enrollment will get low amount so schools will improve the quality of their education and try to increase enrollment and retain students. It will create a performance-based payment in the education system. Education vouchers will improve the student-teacher ratio and it will help students to achieve better learning outcomes. In the present scenario, private schools compete for rich students but after the introduction of education vouchers, government schools would also compete for both poor and rich students so education vouchers would also create healthy competition among schools (Shah, 2009).[13]

Weidrich (2003)[16] suggests that the government should authorise an independent agency to smoothly run the programme. For the purpose of a random selection of applicants in case of over-subscription, it should provide software and instructions to regional offices. For the purpose of determining the number of vouchers to be funded, the agency's regional office must work with individual municipalities, to examine school requirements for participation and monitoring program implementation. If any student fails in class must be removed from the voucher program.

After the successful implementation of the voucher scheme, we would be able to fulfill the country's basic motive that quality education to each and every one or universalization of quality education. Parents would also have the power to choose the best school for their children and it would also increase the school choice. It would help those students who are facing financial problems and leave the schools. It would uplift the education level of underprivileged children and help them to go with the mainstream. Through the education voucher, poor students would compete with rich students at the same educational level because there would be no difference between their teachings. Especially it would provide equal opportunity to girls for better schooling. Minority parents would also get an equal chance to send their children to private or public schools. Thus, education vouchers would be one of the important steps in improving the quality of education to poor students and increasing equality in provisions for rich and poor people receiving schooling. To implement this model, governments do not require to spend extra public funds on vouchers, but redepositing money previously spent directly on government schools for education vouchers given to parents. Through the education voucher scheme, when parents choose the school then an amount equal to the voucher is deposited in the school. Thus, the education voucher scheme ensures that government funds are spent only on good quality schools (Singh, 2010).[14]

So, education vouchers would be a powerful weapon thereby providing access to quality education as well as reducing segregation. Education vouchers would lead the universal education and school choice among parents and students. By successfully implementing education vouchers, the country would be able to achieve our basic motives such as "access to education for all, accountability, cost-effectiveness, equity, quality, and sustainability.

References

[1] CCS (1997). Centre for Civil Society. Retrieved from http://www.ccsindia.org

[2] Dixon et al. (2019). Experimental Results from a

 DOI: https://doi.org/10.30564/jiep.v6i1.5449

four-year targeted education voucher program in the slums of Delhi, India. *World Development, Elsevier*. Retrieved from https://doi.org/10.1016/j.worlddev.2019.104644_

[3] Friedman, M. (1955). *The Role of Government in Education in Solo R. (ed) Economics and public interest*, New Jersey: Ruters University Press

[4] Friedman, M. (1962). *Capitalism and Freedom*, Chicago: University of Chicago Press

[5] Friedman, M. (1995). Public Schools: Make Them Private. *The Washington Post.* Retrieved from *https://www.washingtonpost.com/archive/opinions/1995/02/19/public-schools-make-them-private/5d5c9c9b-675e-451b-b106-6d9ba6dad2d1/*

[6] Gomathi, S.V. and Sudhakar, V. (2014). Voucher and School Choice: Awareness of Parents in Hyderabad, India. *International Journal of Advance Research*. Retrieved from http://www.edi-foundation.org/wp-content/uploads/2017/08/VOUCHER-AND-SCHOOLCHOICE.pdf

[7] Jenks, C. (1970). *Education vouchers: a report on financing education by payments to parents*, Mass: Centre for the Study of Public Policy

[8] Levin, H. M. (2002). A comprehensive framework for evaluating educational vouchers. *Educational Evaluation and Policy Analysis*, 24(3), 159–174.

[9] Liang, X. (1996). Bangladesh: Female Secondary School Assistance. *Human Development Department, World Bank*. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.571.1165&rep=rep1&type=pdf

[10] Makwana, R. (2011). Poor Education for Poor: Can Vouchers Be the Answer in Gujarat, India. *Journal of Alternative Perspectives in the Social Sciences* 3(3), 721-742. Retrieved from http://www.thaindian.com/newsportal/business/states-siphon-off-sarva-shiksha-abhiyan-funds_10025514.html

[11] RTE (2009). Right to education. Retrieved from http://www.educationforallinindia.com/RighttoEducationBill2005.html

[12] School choice (2007). School choice. Retrieved from www.schoolchoice.in

[13] Shah, P.J. (2009). School Choice: Assuring Quality Education to All. *VIKALPA*, 34(2). Retrieved from https://parthjshah.in/sites/default/files/iim_colloquium_p70-74_jun19_vikalpa.pdf

[14] Singh, V.V. (2010). Vouchering School Education in India. Retrieved from https://cuts-ccier.org/pdf/Vouchering_School_Education_in_India.pdf

[15] SSA (2000). Sarva Shiksha Abhiyan. Retrieved from https://www.aicte-india.org/reports/overview/Sarva-Shiksha-Abhiyan

[16] Weidrich, E. (2003). Education Vouchers: Is there a Model for India? Retrieved from https://www.ccsindia.org/aboutus

[17] West, E. G. (1997). Education Vouchers in Principle and Practice: A Survey. *The World Bank Research Observer, 12*(1), 83-103.

DOI: https://doi.org/10.30564/jiep.v6i1.5449

BILINGUAL PUBLISHING GROUP

Journal of International Education and Practice

https://ojs.bilpubgroup.com/index.php/jiep

ARTICLE

Eating Patterns and Daily Dietary Recall of Primary School Pupils: An Empirical Evidence from A School Feeding Scheme

Okadigwe John Chukwujekwu*

Department of Home Economics, Nwafor Orizu College of Education Nsugbe in Affiliation with University of Nigeria Nsukka

ARTICLE INFO

Article history
Received: 21 February 2023
Accepted: 18 April 2023
Published: 19 May 2023

Keywords:
Eating patterns
Daily dietary recall
Nutritional status
Pupil
School
Feeding scheme

ABSTRACT

The objective of this study was to experimentally evaluate children's daily food memory and eating habits. The study found that the gender and school location had an impact on the nutritional condition of primary school students as well as the school food scheme. The investigations were based on three hypotheses and three research questions. In this study, the Eating Habits and Daily Dietary Recall Scale was the tool utilized to gather data (EPDDRS). Four experts—three from the department of vocational education and one lecturer in test and measurement evaluation—validated the instrument's face. The dependability indices of EPDDRS were calculated using Cronbach's Alpha. While delivering the instruments, the researcher used the direct administration and retrieval approach. 58 instructors and a sample size of 1240 students were selected using a systematic random selection approach. The obtained data was examined using mean and standard deviation to address the research objectives, and the null hypotheses were tested using t-test statistics and Analysis of variance (ANOVA) at the 0.05 level of significance. The main conclusions of this study were that the school meal program had a favorable impact on the students' nutritional status. Also, a balanced ration of nutrient-dense meals that were suitably varied was supplied for the students via the school food program. Also, the findings revealed a substantial difference in the mean assessments of male and female students about their eating patterns. On the school meal program's dietary recall list, students from high, middle, and low socioeconomic status differ significantly. Recommendations were given to the government, schools, and parents based on the study's findings. The study's shortcomings were discussed, and recommendations for more research were made.

1. Introduction

Over the years, both rich and poor nations have introduced School feeding schemes at one point or the other in their national history. Large organizations frequently carry out these programs in conjunction with the national government and non-governmental groups. School feeding schemes have a long history of more than a century of development, testing, and evaluation as well as ongoing research to provide the best in nutrition, nutrition education, and food services for the country's millions of school-aged children (Okolo-Obasi & Uduji, 2022).[12] School feeding schemes did not emerge overnight or

**Corresponding Author:*
Okadigwe John Chukwujekwu, Department of Home Economics, Nwafor Orizu College of Education Nsugbe in Affiliation with University of Nigeria Nsukka; Email: jekwuokad@gmail.com.

 DOI: https://doi.org/10.30564/jiep.v6i1.5487

even during the previous decades. The School feeding scheme in Nigeria is a significant national initiative with the goal of giving all students between the ages of 5 and 13 one meal each day while they are in class. The primary school students' nutritional state, enrollment, attendance, academic performance, and completion rate are all predicted to improve as a result of this initiative (Aurino, Gelli, Adamba, Osei-Akoto, & Alderman, 2023).[4]

The school feeding scheme is divided into two categories: take-home rations and on-site meals or snacks. Historically, on-site meals have been the most common type of school food intervention. They are primarily introduced to encourage access to education and improve learning. The major on-site meal options are breakfast, mid-morning snacks, lunch, and supper, which is exclusively available to boarding school students. The on-site feeding program offers hot meals in the morning or at lunch to provide students energy for the day. The meals are either made nearby or on the school's grounds (Nhlapo, Lues, Kativu & Groenewald, 2015).[11] The snacks are often ready-made, high-energy, fortified snack biscuits in regions where they are utilized in place of prepared meals. The take-home ration is a perk that promotes educational access. This approach is providing the kids with food to take home. This take-home ration is typically delivered at specific points during the school year, such as the conclusion of the school day, the end of the term, or even the end of the year, depending on the school or the authorities running the program (Cohen, Hecht, McLoughlin, Turner & Schwartz, 2021).[7] Take home meals are designed for the whole family and act as a significant incentive for regular attendance at school and involvement in all educational activities to help students achieve better academically.

The School feeding scheme is often targeted at rural children in underdeveloped nations, although most governments have made it mandatory for all students enrolled in public primary schools from low- to high-socioeconomic status households. Insuring that students have access to meals at school can be essential to ensuring that kids study effectively (Chakrabarti, Scott, Alderman, Menon & Gilligan, 2021).[5] The Nigerian stakeholders applauded the school feeding initiative because it would help millions of Nigerian children who leave their homes for school without food and don't get back until late in the afternoon eat. Through this program, the children would be able to eat a meal that would meet at least one-third (1/3) of their daily nutritional needs, which would enhance their academic performance. Many school food programs have a greater influence on students' nutritional health, according to several research. Kids who have access to a school breakfast program eat a better diet overall. The existence of school breakfast programs either promotes better results for every outcome investigated or, at the very least, does not promote poorer outcomes (Adekunle & Christiana, 2016).[1] A society's health and the eating habits of its children depend on its population receiving a healthy diet.

In other words, students who are raised in such circumstances show signs of lifestyle influences on their eating habits. A child's academic performance is strongly influenced by their nutritional and physical health state, Children who lack specific nutrients in their meals, especially iron and iodine, or who have protein-energy malnutrition hunger, parasite infection, or other disorders may not have the same capacity for learning as healthy, well-nourished children, claim. Studies have shown that children of school age who are in poor health and who eat poorly have lessened cognitive development, either through physiological changes or by limiting their capacity to engage in learning experiences, or both (Chakraborty & Jayaraman, 2019;[6] Atta, & Manu, 2015).[3] Hence, it is crucial to experimentally assess the daily dietary memory and eating habits of primary school students as they relate to a typical school food program. The study will assist identify youngsters from the streets, which will be helpful to the students. Knowing that a healthy supper must be had at school will encourage frequent attendance. The availability of meals, which would lessen health issues and also boost academic performance of students, has encouraged the students' regularity. Given the outcomes of the School feeding scheme and how crucial a lunch supplied to children while they are in school has been in improving the children's health and academic performance, the study would also be significant to the broader public.

2. Statement of the Problem

Children are among the most susceptible people in any society, and they would be disproportionately affected by poverty and inequality. Eating patterns or behaviors are known as feeding habits. One to three meals each day are possible. The proper approach makes reference to a diet that is well-balanced. A balanced diet includes all six necessary elements in the proper quantities as needed by the body. The six nutrients are necessary because they include the different nutritious components intended to maintain and advance overall health. In terms of eating habits, primary school students face a variety of influences and difficulties, including their appetites, peer pressure, parental influence, and early-learned eating habits. There are indications that economic considerations, particularly the price of food in relation to income, have a significant

DOI: https://doi.org/10.30564/jiep.v6i1.5487

role in determining the kind and quantity of food that individuals eat. The majority of people are shown to have switched from consuming more carbs like rice and corn to more protein-rich foods like dairy and meat as the level of life keeps rising.

When it comes to a child's academic achievement in school, nutrition and health have a significant role. Children who are malnourished in terms of protein, energy, or other nutrients—particularly iron and iodine—or who have other illnesses such hunger parasite infections or other diseases are unlikely to have the same capacity for learning as children who are healthy and well-fed. Children who are in poor physical and nutritional health are less able to participate in learning experiences, which has an impact on their cognitive development. One in ten children in Nigeria do not attend school, making it one of the countries with the lowest rates of school enrollment in the world. The reasons for this include poverty, socio-religious prejudice, geographic location, apathy, and neglect of the need for adequate educational opportunities and a welcoming environment. These young people are typically seen peddling various things on crowded city streets in exchange for cash. In rural locations, you can find others working on farms or assisting their parents with their varied jobs. As a result, the focus of this study is on examining the daily food memory and eating habits of primary school students as determined by a School feeding scheme.

3. Research Questions

This study answered the following research questions:

1. What are the eating patterns of primary school pupils?
2. What is a day dietary recall list of primary school pupils in low, middle and high social economic status?
3. What influence has School feeding scheme on the nutritional status of the primary school pupils?

4. Research hypotheses

The research hypotheses for this study were tested at the 0.05 level of significance. They are as follows:-

- HO_1 There is no significant difference between the eating pattern of male and female primary school pupils.
- HO_2 There is no significant difference in dietary recall list among primary school pupils of low, middle, and high social economic status
- HO_3 There is no significant difference between the influence of School feeding scheme on the nutritional status of pupils in urban and rural area.

5 Method

This study employed a descriptive ex-post facto research design. When the dependent variable has already been impacted by the independent variable, this research design is used. As a result, no variable was altered. The population of this study consisted of teachers and pupils from primary one to three in public primary schools. There were twelve thousand four hundred (12,400) pupils and five hundred and seventy-eight (578) teachers present.

A sample of 1240 kids and 58 teachers, representing 10% of the entire student and teacher population participating in the school meal program in the research region, were chosen using Primary 1, 2, and 3. A method of systematic random sampling was used in the investigation. Five schools from urban regions and five from rural areas were randomly selected. Local government offices were located in metropolitan regions, while other locations were in rural ones. The items on the instruments for the Faculty of Education at Delta State University Abraka were validated by four experts—three from the Vocational Education Department and one lecturer in test and measurement assessment. They provided input, and the instrument was improved.

To evaluate the trustworthiness of the device, a pilot study was carried out. In this approach, students and instructors received sixty copies of the tests. The pilot exam was taken by sixty respondents, comprising thirty (30) teachers and students from urban regions and thirty (30) from rural areas. The pilot test was divided into two equal halves, and the correlation between the two halves' findings was used to establish the internal dependability. The internal consistency of the tool was assessed using Cronbach's alpha statistics. The results of the pilot research showed that the r value coefficient was 0.74. The instrument is believed to be appropriate for the inquiry as evidenced by the high coefficient.

The structured questionnaire that comprised the major component of the study was called the Eating Patterns and Daily Dietary Recall Scale (EPDDRS). Section A of the questionnaire, which was broken up into sections, included questions on the demographics of the students, including their sex and the location of their school. Although Part B collected data on Daily Dietary Recall, Section C collected information on Eating Habits. Each of the selected schools received a total of 1298 copies of the questionnaire, which were hand distributed with the help of research assistants and classroom teachers.

Frequency counts, percentages, means, and standard deviation were used to address the study's topical issues. On the scale in use, the cutoff was 2.50. Hence,

 DOI: https://doi.org/10.30564/jiep.v6i1.5487

mean scores of 2.50 and above were considered to be in agreement, whilst scores of 2.50 or lower were considered to be in disagreement. T-tests with a 0.05 threshold of significance were employed to evaluate hypotheses. Analysis of Variance (ANOVA) was used to assess Hypothesis 2 at the 0.05 level of significance.

The goal of the School feeding scheme was to guarantee that students ate at least one square, balanced meal each day that provided at least 33% of the daily required intake of important vitamins and minerals. The program requires a meal that is based on the national recommendations but modified to take seasonality and local availability into account, as indicated in table 1.

Table1: Weekly Standard Menu As Originally Planned And As Currently Implemented

Day	
Monday	Maize, beans, fish stew
Tuesday	Yam and beans with fish vegetable stew
Wednesday	Rice beans, vegetable with egusi + fish + coco drink
Thursday	Maize, beans egg stew
Friday	Rice, beans, fish vegetable stew

6. Results

Research Question 1

What are the eating patterns of primary school pupils?

According to the outcome shown in Table 2, the statement items' mean range was between 1.56 and 3.00. Four items had means that were higher than the 2.50 cutoff criterion. The means for items 1, 2, 5, and 6 were under 2.50. This showed that while some of the statement items were accepted by the responders, some were not. The items' standard deviations varied from 0.55 to 0.94. This demonstrated that respondents' replies were similar to one another since they were near to the mean.

Research Question 2

What is the daily dietary recall list given to primary school pupils in schools?

Table 3's results revealed a mean range of 1.56 to 4.56. Due to their means being more than 2.50, 31 of the 36 items were agreed upon. Whereas the mean scores for items 12, 15, 18, 20, 34, 36, and 42 were below the 2.50 cutoff. They didn't agree on this, thus. The items' standard deviations varied from 0.55 to 1.04. This revealed that the replies of respondents were similar to one another.

Research Question 3

What influence has School feeding scheme on the nutritional status of the primary school pupils?

According to Table 4, all of the components had mean ranges that were higher than the 2.50 cutoff mark, ranging from 2.93 to 3.03. Furthermore, it showed that the instructors were in agreement that the school meal program had a favorable impact on the students' nutritional health. The items' standard deviations varied from 0.69 to 0.88. This revealed that the replies of respondents were similar to one another..

Hypothesis 1

$HO_{1:}$ There is no significant difference between the eating pattern of male and female pupils.

The results of the t-test analysis on the average replies of the eating habits of male and female students were displayed in Table 5. The null hypothesis is rejected since the t-cal (3.32) is higher than the table value of 1.96. This demonstrates that male and female primary school students' eating habits differ significantly.

Table 2: Mean responses of pupilson the eating patterns of male and female pupils(N=1240)

S/N	Statement item	Mean	SD	Remark
	Eating Pattern at Home			
1	You eat three meals a day	2.83	0.63	Agreed
2	You eat breakfast before coming to school	2.51	0.55	Agreed
3	Your parents pack lunch for you to the school	2.05	0.64	Disagreed
4	Breakfast is not eaten at all in your house	2.13	0.89	Disagreed
	Food Eaten at School			
5	Your school gives you breakfast every school day	3.00	0.89	Agreed
6	Your school gives you lunch every school day	2.72	0.94	Disagreed
7	Food is given to you in school before classes begin	2.01	0.78	Disagreed
8	Your school gives you snacks every school day	1.56	0.64	Disagreed

DOI: https://doi.org/10.30564/jiep.v6i1.5487

Table 3: Mean responses of pupils on the daily dietary recall list given to pupils in schools (N=1240)

S/N	Statement item	Mean	SD	Remark
	Breakfast			
9	Tea and bread	3.09	0.89	Accepted
10	Quaker oat and bread	2.65	0.57	Accepted
11	Custard or pap with beans pudding (akara)	2.71	0.63	Accepted
12	Noodles and egg (indomie)	2.11	0.76	Rejected
13	Rice and with fish or beef stew	3.09	0.55	Accepted
14	Fried plantain or yam with egg sauce	2.52	0.64	Accepted
15	Beans pottage	1.72	0.79	Rejected
16	Water	4.10	0.93	Accepted
17	Orange	2.76	0.83	Accepted
18	Apple	2.01	0.67	Rejected
19	Watermelon	2.56	0.81	Accepted
20	Others	1.56	0.93	Rejected
	Lunch			
21	Beef or fish Egusi soup with Eba	4.01	0.77	Accepted
22	Meat/fish Jollof rice with spaghetti	3.42	0.56	Accepted
23	Fish vegetable soup and Eba	2.50	0.75	Accepted
24	Yam pottage	3.77	0.66	Accepted
25	Beans pottage	4.03	0.82	Accepted
26	Beef or fish stew with rice	3.33	0.95	Accepted
27	Ewedu soup with Amala	2.56	1.04	Accepted
28	Oranges	4.51	1.00	Accepted
29	Pineapple	3.32	0.69	Accepted
30	Apple	1.67	0.69	Rejected
31	Others	2.78	0.56	Accepted
	Dinner			
32	Beef or fish jollof rice	3.53	0.78	Accepted
33	Beef or fish Egusi soup with Eba	3.67	0.65	Accepted
34	Spaghetti	2.22	0.54	Rejected
35	Plantain pottage	3.10	0.71	Accepted
36	Bean pottage	1.93	0.92	Rejected
37	Oranges	4.05	0.66	Accepted
38	Apple	2.33	0.57	Rejected
39	Pineapple	3.89	0.91	Accepted
40	Water melon	3.73	0.68	Accepted
41	Water	4.56	0.78	Accepted
42	Others	1.65	0.63	Rejected

Table 4: Mean responses of teachers on the influence of school feeding programme on the nutritional status of the pupils (N=58)

S/N	Statement item	Mean	SD	Remark
43	Meals prepared for the children are nutritionally adequate	3.17	0.78	Agreed
44	School feeding scheme has improved the nutritional status of pupils	2.93	0.69	Agreed
45	School feeding scheme has helped to improve the health status of the pupils and so they are more alert and attentive	3.03	0.81	Agreed
46	Good nutrition has been met due to School feeding scheme	4.10	0.84	Agreed
47	Pupils are regular to school because of good health	3.45	0.88	Agreed

 DOI: https://doi.org/10.30564/jiep.v6i1.5487

Table 5: t-test analysis of the mean responses of male and female pupils on eating pattern

Gender	N	Mean	SD	t-value	t-tab	Decision
Males	578	2.56	0.78			
				3.32	1.96	Rejected
Females	662	2.61	0.56			
Total	1240					

Hypothesis 2

$Ho_{2:}$ There is no significant difference in dietary recall list among primary school pupils of low, middle, and high social economic status

The finding in Table 6 indicated that, at the 0.05 level of significance, the F-cal value (4.85) is higher than the F-tab value (3.28). The null hypothesis is therefore disproved. This suggests that the mean assessments of students whose parents had low, middle, and high socioeconomic level varied significantly from one another.

Hypothesis 3

$HO_{3:}$ There is no significant difference between teachers from rural and urban schools on the influence of School feeding scheme on the nutritional status of primary school pupils.

The t-test analysis of the mean answer from teachers in rural and urban schools was displayed in Table 7 as a result. At the 0.05 threshold of significance, the t-value (3.77) was higher than the crucial t-tab (1.98). The stated null hypothesis (Ho) was disproved as a consequence. This demonstrates that the impact of the school food program on the nutritional condition of male and female students from urban and rural schools varied significantly on a mean basis.

7. Discussion of Results

The results of the study were discussed based on the research questions and hypotheses formulated for the study. The findings in Table 5 showed that elementary school students' eating habits varied significantly. Children's mental and physical development, as well as growth and various hazards connected with both short-term and long-term health issues, are significantly influenced by their eating habits. Eating breakfast is crucial for humans since it improves one's ability to focus throughout the day. In the short term, it boosts the energy and concentration, while in the long run, it can help to better control the weight and lower chances of developing heart disease (Lesani, Mohammadpoorasl, Javadi, Esfeh, & Fakhari, 2016).[10] Although though breakfast has numerous advantages for your health and wellness, many individuals frequently miss it for a number of reasons. Individuals who miss breakfast are more likely to struggle with concentration by midday and to perform worse intellectually. Moreover eating habits are formed early in infancy and are retained into adulthood. Healthy eating has many benefits, such as reducing the risk of heart disease, it helps the body and brain get the energy needed to think and be physically active (El-Ansari, Suominen & Samara, 2015).[8]

Table 6: Analysis of variance of the mean responses of pupils on dietary recall list among pupils of low, middle, and high social economic status

Source of variance	Df	SS	MS	F-cal	F-table	Decision
Between	2	5.55	2.77			
				4.85	3.28	Rejected
Within	34	19.63	0.57			
Total	36	25.18				

Table 7: t-test analysis of the mean responses of teachers from rural and urban schools on the influence of School feeding scheme on the nutritional status of pupils

Location	N	Mean	SD	t-value	t-tab	Decision
Rural	24	3.44	0.69			
				3.77	1.98	Rejected
Urban	34	4.01	0.65			
Total	**58**					

DOI: https://doi.org/10.30564/jiep.v6i1.5487

The outcome in Table 3 showed that a variety of meals were served to the students at breakfast or lunch as part of the School feeding scheme. According to the meal plan's recipe, each meal—breakfast or lunch—provided the necessary nutrients and balanced diet required by humans for development and survival (Penagini, Dilillo, Meneghin, Mameli, Fabiano, & Zuccotti, 2013).[13] The major goal of the school feeding scheme in primary schools is to improve the health and nutritional status of all schoolchildren. The under-nutrition of children is one of issue that plague the nation. Malnutrition, a disorder brought on by poor nutrition, impairs the immune system, stunts growth, and impairs cognitive development (Adeyeye, Ashaolu, Bolaji, Abegunde & Omoyajowo, 2023).[2] Also, school nutrition programs are essential to helping kids achieve and maintain a level of health that is best for their academic success. Proteins, carbs, lipids, vitamins, water, and roughages must all be consumed in suitable quantities and proportions to the body. Consistently demonstrated that milk, leafy green and bright yellow vegetables, whole grain or enriched breads, and cereals and toast should all be consumed in greater quantities for diet improvement.

According to Table 4, the instructors were in agreement that the school meal program improved the students' nutritional status. The results are consistent with Fontenelle, de-Araújo, da-Cunha-Soares, Cruz, Henriques & do-Nascimento-Marreiro, (2022)[9] argument that weak health and poor nutrition among school-age children hindered their cognitive development, either through physiological changes or by reducing their ability to participate in learning experiences, or both. Also, proper nutrition is essential for the welfare of any community and of each individual within the society. School breakfast programs readily available either promoted better results or, at the very least, did not encourage the worst outcomes for every outcome assessed.

Hypotheses

The finding from tables 5, 6, and 7 showed that there were substantial differences in respondents' mean ratings of the School feeding scheme's impact on students' academic performance in terms of eating habits, dietary memory, nutritional status, and academic performance. The findings also showed that there was no statistically significant difference in the respondents' mean ratings of the School feeding scheme's impact on students' academic performance in terms of food diversity, students' attitudes about the program, and factors influencing it.

8. Conclusion

This study's primary goal was to assess how the School feeding scheme affected students' academic performance. The School feeding scheme gave the students a healthy eating schedule. They are able to concentrate throughout the educational activities because to this healthy eating routine. The School feeding scheme gave students a useful daily memory list of foods that satisfy the essential nutrients required for their continued physical and intellectual or cognitive development. Also, the School feeding scheme offered nutritious lunches. Based on the analysis of data collected, the researcher found out that pupils were provided with either breakfast or lunch daily especially breakfast which was important for them to concentrate in the class throughout the day; the meal pattern (breakfast, or lunch) provided by the School feeding scheme, provided foods that will supply the basic nutrients (balance diet) needed by human for growth and survival; the School feeding scheme had a positive influence on the nutritional status of the pupils; the School feeding scheme provided rich meals for the pupils, meals that were properly diversified to provide a balance ration; there is significant difference between the mean ratings of male and female pupils on eating pattern; there is significant difference among pupils from high, middle and low on dietary recall list of the School feeding scheme.

The results of this study have important ramifications for all parties engaged in the management of public primary schools in Kaduna state, including parents, teachers, students, the government, researchers, and researchers. The School feeding scheme has to be sustained and the kids' regular attendance at school needs to be encouraged more by parents and instructors. The government and all parties involved may need to find ways to guarantee that the School feeding scheme is maintained and effectively run. The study has advanced knowledge by showing that a healthy eating pattern helps students stay alert during the day's educational activities and that effective School feeding schemes offer students a daily recall list of foods that satisfy the essential nutrients required for a child's physical and intellectual development.

Based on the study's findings, it is advised that the government fund the School feeding scheme adequately, that each school establish a management committee for the program's efficient and effective administration, that non-governmental organizations and wealthy individuals be permitted to contribute financially to the initiative, and that a committee for the School feeding scheme be

 DOI: https://doi.org/10.30564/jiep.v6i1.5487

formed. Also, physical facilities that make it simple to travel to the intended beneficiary schools can help ease some of the problems.

References

[1] Adekunle, D. T., & Christiana, O. O. (2016). The Effects of School Feeding scheme on Enrolment and Performance of Public Elementary School Pupils in Osun State, Nigeria. *World Journal of Education*, *6*(3), 39-47.

[2] Adeyeye, S. A. O., Ashaolu, T. J., Bolaji, O. T., Abegunde, T. A., & Omoyajowo, A. O. (2023). Africa and the Nexus of poverty, malnutrition and diseases. *Critical Reviews in Food Science and Nutrition*, *63*(5), 641-656.

[3] Atta, G. P., & Manu, J. (2015). Ghana school feeding program: a retrospective review. *International Journal of Innovative Research and Development*, *4*(8), 402-410.

[4] Aurino, E., Gelli, A., Adamba, C., Osei-Akoto, I., & Alderman, H. (2023). Food for thought? Experimental evidence on the learning impacts of a large-scale school feeding program. *Journal of Human Resources*, *58*(1), 74-111.

[5] Chakrabarti, S., Scott, S. P., Alderman, H., Menon, P., & Gilligan, D. O. (2021). Intergenerational nutrition benefits of India's national school feeding program. *Nature Communications*, *12*(1), 4248.

[6] Chakraborty, T., & Jayaraman, R. (2019). School feeding and learning achievement: evidence from India's midday meal program. *Journal of Development Economics*, *139*, 249-265.

[7] Cohen, J. F., Hecht, A. A., McLoughlin, G. M., Turner, L., & Schwartz, M. B. (2021). Universal school meals and associations with student participation, attendance, academic performance, diet quality, food security, and body mass index: A systematic review. *Nutrients*, *13*(3), 911.

[8] El-Ansari, W., Suominen, S., & Samara, A. (2015). Eating habits and dietary intake: is adherence to dietary guidelines associated with importance of healthy eating among undergraduate university students in Finland?. *Central European journal of public health*, *23*(4), 306-313.

[9] Fontenelle, L. C., de Araújo, D. S. C., da Cunha Soares, T., Cruz, K. J. C., Henriques, G. S., & do Nascimento Marreiro, D. (2022). Nutritional status of selenium in overweight and obesity: A systematic review and meta-analysis. *Clinical Nutrition*.

[10] Lesani, A., Mohammadpoorasl, A., Javadi, M., Esfeh, J. M., & Fakhari, A. (2016). Eating breakfast, fruit and vegetable intake and their relation with happiness in college students. *Eating and weight disorders-studies on anorexia, bulimia and obesity*, *21*, 645-651.

[11] Nhlapo, N., Lues, R. J., Kativu, E., & Groenewald, W. H. (2015). Assessing the quality of food served under a South African school feeding scheme: A nutritional analysis. *South African Journal of Science*, *111*(1-2), 01-09.

[12] Okolo-Obasi, N.E. and Uduji, J.I. (2022), "The impact of National Home Grown School Feeding scheme (NHGSFP) on rural communities in Nigeria", Journal of Economic and Administrative Sciences, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/JEAS-10-2021-0211

[13] Penagini, F., Dilillo, D., Meneghin, F., Mameli, C., Fabiano, V., & Zuccotti, G. V. (2013). Gluten-free diet in children: an approach to a nutritionally adequate and balanced diet. *Nutrients*, *5*(11), 4553-4565.

DOI: https://doi.org/10.30564/jiep.v6i1.5487

BILINGUAL PUBLISHING GROUP
Tel:+65 65881289
E-mail: contact@bilpublishing.com
Website:https://ojs.bilpubgroup.com