

Breaking Educational Barriers: The Effectiveness of Interactive E-Publications in ALS Programs for Students in Prisons

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ABSTRACT

Access to quality education remains a challenge for persons deprived of liberty (PDL) due to so many factors including restricted internet access, noise, and limited resources. While initiatives like *Making the Connection* (Farley et al., 2015) and the *Inside-Out program* (Collica-Cox, 2022) have demonstrated the potential of offline digital learning, the effectiveness of interactive e-publications in alternative learning system (ALS) programs for inmates remains underexplored. Addressing this gap, the study investigates the impact of interactive e-publications using the Kotobee Application on ALS students at BJMP San Mateo, Rizal. Employing a quasi-experimental design, the study assessed the learning outcomes of 31 ALS students through a pre-test and post-test approach, focusing on the competencies in Mathematics which the participants were not able to master. A t-test for dependent samples were conducted to examine differences in pre and post-test scores. Results indicated a statistically significant difference, $t(30) = 24.0$, $p < .001$, with a large effect size ($d = 4.31$). Participants' posttest scores ($M=22.10$, $SD=4.03$) were significantly higher than their pretest scores ($M=6.00$, $SD=1.18$). The 95% confidence interval for the difference in scores ranged from 14.75 to 17.5. This finding highlights the potential of digital learning tools to enhance education for incarcerated individuals, despite technological limitations. The study concludes that interactive e-publications can serve as an effective medium for ALS instruction in correctional settings, providing inmates with meaningful learning opportunities. It is recommended that similar digital interventions be expanded to other subject areas and integrated into broader correctional education programs to maximize their impact on PDL learners' academic and rehabilitation outcomes.

Keywords: *Alternative Learning System, interactive e-publications, digital learning, incarcerated students, Kotobee Application*

I. Context and Rationale

Education in correctional facilities plays a vital role in promoting rehabilitation, reducing recidivism, and enabling individuals to reintegrate successfully into society. Globally, numerous initiatives have sought to address the educational needs of Persons Deprived of Liberty (PDL) despite the unique challenges of prison environments. Studies such as *Making the Connection* (Farley et al., 2015) and the Inside-Out Program (Collica-Cox, 2022) have shown that technology-supported learning, even when implemented offline, can bridge gaps in access to quality education. These programs have demonstrated the transformative potential of alternative learning modalities that accommodate the restricted internet access and security protocols in correctional institutions.

In the Philippines, the Department of Education's Alternative Learning System (ALS) provides a parallel pathway for out-of-school youth and adults, including PDLs, to complete basic education. However, teaching and learning in prison-based ALS programs often face multiple barriers: lack of adequate facilities, noisy learning environments, insufficient instructional resources, and limited access to updated educational materials. These challenges make it difficult to engage learners effectively, particularly in subjects where mastery requires sustained practice and interactive learning experiences, such as Mathematics.

The emergence of interactive e-publications offers a promising solution to these constraints. Unlike static printed modules, interactive e-publications integrate multimedia elements—videos, animations, quizzes, and instant feedback—that can enhance learner engagement and comprehension. Applications like Kotobee provide offline accessibility, allowing PDL learners to benefit from rich digital content without violating security restrictions. While the benefits of such tools have been explored in general education contexts, there remains a scarcity of empirical research on their effectiveness within prison-based ALS programs in the Philippines.

This study addresses that gap by evaluating the use of interactive e-publications in teaching Mathematics to ALS students at the BJMP San Mateo, Rizal. The focus on competencies that learners previously failed to master ensures that the intervention targets genuine learning needs. By employing a quasi-experimental pre-test–post-test design, the research aims to provide evidence of whether such digital tools can significantly improve learning outcomes in correctional settings.

The rationale behind this study lies in its potential to inform ALS educators, correctional administrators, and policymakers about innovative yet feasible strategies to overcome educational barriers in prisons. If proven effective, interactive e-publications could be scaled up and adapted for other subject areas, enriching the educational experiences of PDL learners and supporting their personal development, rehabilitation, and future reintegration into society.

II. Action Research Questions

This research investigated the effect of Interactive E-Publications using Kotobee for the ALS students of BJMP San Mateo, Rizal for the school year 2024-2025.

Specifically, this research will answer the following questions:

1. What are the pre-test and post-test scores of the students in LS2: Mathematics?
2. Is there a significant difference between the level of mastery of the students before and after the implementation of the Interactive E-Publications?

III. Proposed Innovation, Intervention, and Strategy

The proposed innovation is the self-directed use of interactive e-publications to help ALS learners in the BJMP San Mateo master essential fraction skills: adding, subtracting, multiplying, and dividing fractions; finding the least common denominator (LCD); and simplifying fractions to their lowest terms. These topics have already been taught in previous lessons, but the learners have not yet achieved mastery.

The interactive e-publications, developed using the Kotobee Application, are designed for offline, independent use within the secure correctional facility. Each module includes:

- Concise concept reviews to refresh learners' understanding.
- Step-by-step animated solutions for sample problems.
- Interactive practice items that give instant feedback and explanations.
- Self-check quizzes for monitoring progress.

Intervention

Learners independently work through the interactive e-publications at their own pace during designated ALS learning sessions. The materials are sequenced from simpler skills (LCD and simplification) to more complex operations (addition, subtraction, multiplication, and division

of fractions). The activities are designed so learners can revisit and repeat sections until they achieve full understanding.

Strategy

1. Orientation – The teacher explains the purpose of the interactive e-publications, how to navigate them, and the expected learning outcomes.
2. Independent Digital Engagement – Learners work on the modules on their own, engaging with multimedia examples, solving practice problems, and receiving immediate feedback.
3. Self-Monitoring – Learners check their own progress through built-in quizzes and activity scores.
4. Teacher Assessment – At the end of the intervention period, the teacher administers a structured post-test (the same assessment used for pre-test) to measure learning gains and mastery of competencies.

This approach places the responsibility for learning primarily in the hands of the students, encouraging self-reliance, persistence, and metacognitive skills. The teacher's role is focused on facilitation, ensuring that learners have access to the digital materials, and conducting pre- and post-tests to measure the effectiveness of the intervention.

IV. Action Research Methods

The quantitative quasi-experimental research design was used to investigate the effectiveness of the innovation. After the first semester, competencies that were not mastered by the students were identified. Dong et al. (2021) defined this design as type of empirical study used in estimating the causal relationship between an intervention and its outcome. Since it does not involve random assignment of participants to groups, it is not considered full experimental design.

Participants or Other Source of Data and Information

In the conduct of this research, 31 ALS students at BJMP, San Mateo participated in the use of the Interactive E-Publications. The students took the pre-test for the targeted competencies to be tested in the study. The researcher then implemented the project before the administration of the post-test. The innovation was tried on three learning competencies under ALS Learning Strand 2: Mathematics namely (1) Addition and Subtraction of Fractions, (2) Multiplication and Division of Fractions, and (3) Reducing fractions to lowest terms.

Data Gathering Methods

The instrument for the pretest and posttest was drafted by the researcher and was checked for validity and reliability. The material was validated by two English teachers for grammar and construction, then later validated by two ALS Teachers. The material was pilot tested to regular ALS students who did not participate in the study to check its readability and comprehensibility.

The results of the pretest and posttest were tested using T-test (since the data satisfy the normality assumptions) to check whether the project scale effectively helped the students acquire the competencies (Gopalan et al., 2020).

V. Discussion of results and reflections

Table 1 shows that there is an improvement in student performance after the intervention. In the pretest, 25 students (81%) were in the Did Not Meet Expectations (Failed) category and 6 (19%) were in the fairly satisfactory category, indicating a lack of proficiency. However, in the post-test, none remained in the failing category, with 15 (48%) achieving Outstanding, 5 (16%) reaching Very Satisfactory, 10 (32%) attaining Satisfactory, and 1 (16%) moving up to Fairly Satisfactory. This result indicates that after the intervention, the students' competency improved and the failure rate was eliminated.

Table 1. Pretest and Posttest Scores of the Respondents

Scores Verbal Interpretation	Pretest (N)	Post-test (N)
Outstanding	0	15
Very Satisfactory	0	5
Satisfactory	0	10
Fairly Satisfactory	6	1
Did Not Meet Expectations (Failed	25	0
Total	31	31

Legend: 0-17 Did not Meet Expectations (failed), 18-21 Fairly Satisfactory, 22-24 Satisfactory, 25-26 Very Satisfactory, 27-30 Outstanding (DepEd Order No. 8, s. 2015)

Since the pre-test and post-test scores satisfy the normality assumption, t-test was used to statistically treat the data. A t-test for dependent samples were conducted to examine differences in pre and post-test scores. Results indicated a statistically significant difference, $t(30) = 24.0$, $p < .001$, with a large effect size ($d = 4.31$). Participants' posttest scores ($M=22.10$, $SD=4.03$) were significantly higher than their pretest scores ($M=6.00$, $SD=1.18$). The 95% confidence interval for the difference in scores ranged from 14.75 to 17.5.

Descriptives

	N	Mean	Median	SD	SE
posttest	31	22.10	22	4.03	0.723
pretest	31	6.00	6	1.18	0.213

Paired Samples T-Test

								95% Confidence Interval			
		statistic	df	p	Mean difference	SE difference	Lower	Upper		Effect Size	
posttest	pretest	Student's t	24.0	30.0	<.001	16.1	0.671	14.7	17.5	Cohen's d	4.31

Note. $H_a: \mu_{\text{Measure 1}} - \mu_{\text{Measure 2}} \neq 0$

The findings reveal a significant improvement in student performance following the intervention. Before the intervention, all students were in the Did Not Meet Expectations category, highlighting a lack of proficiency. However, after the intervention, none remained in this category, with a substantial number achieving higher proficiency levels, including Outstanding, Very Satisfactory, Satisfactory, and Fairly Satisfactory. The post-test scores are significantly higher than the pre-test scores, suggesting that the intervention was effective in enhancing student competency and eliminating failure rates.

VI. Recommendations

Given the success of the intervention, it is recommended that the project be widely adopted and its concept applied to other Alternative Learning System (ALS) subjects to further support

student learning. Teachers should integrate the intervention into regular instructional strategies and identify the key components that contributed most to student success.

This intervention will also fit the needs of students in regular program who lack proficiency in mathematics. It would be best if the researcher will find a way to present and demonstrate how this intervention is done so that more teachers and students will be able to benefit from it.

Future research may examine how the intervention can be optimized for different learning contexts and explore additional instructional strategies that can further enhance student performance and engagement.

VII. Action Plan

DISSEMINATION ACTIVITIES	Month 1	Month 2	Month 3	Month 4
1. Presentation of the study to GNHS Research Committee and the faculties interested with the study.				
2. Presentation of the study to the ALS Teachers of San Mateo Suboffice.				
3. Presentation of the study to the district of San Mateo in preparation for the 12 th DRC.				
4. Presentation of the study to the 12 th Division Research Conference.				
5. Presentation of the study to the SEPS for ALS of the Division of Rizal and international conferences				

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Financial Report

Activity	Eligible Expenditures	Quantity	Cost in PHP	Source
	Bond Papers	3 rims	900.00	MOOE

For the printing of manuscripts	Printer's Ink	2 sets	2,000.00	MOOE
Research dissemination expenses	Food	For ALS Teachers plus Research Committee members/ other faculty members	1,000.00	MOOE
Research presentation in the district and international conferences	Registration	1 researcher	2,000.00	MOOE
Total			5,900.00	