

# Digital Assessment: Empowering 21st Century Teachers in Analyzing Student's Performance in Calamba City

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## ABSTRACT

Educators utilize students' scores on standardized tests to evaluate the impact of instructional programs designed to improve student achievement. Thus, a data-driven-decision is crucial in policy formulation and the development of the interventions in addressing the gaps in education. The rationale of this study is to ensure the accuracy and validity of consolidated assessment data and to provide appropriate responses using checking and analysis software applications. The study used a descriptive quantitative design. A questionnaire was given to

the participants relative to their perception and reflection on the use of software application in assessment for the school year 2018 – 2019. The research was limited to the effectiveness of the software application in terms of checking, scoring, recording, organizing, analyzing, and reporting assessment data. The results show that assessment software application has a significant difference compared to traditional assessment procedures in terms of a) provision of accurate and valid data, b) cost-effectiveness, c) flexible features in organizing and analyzing data, and d) speed of providing feedback. The study implied the importance of how teachers should adapt to emerging technology, specifically, on software that may help them not only in assessment but also in instruction. As a recommendation, the formulation of local policy on digital evaluation should be implemented.

**Keywords** — Education, assessment, software application, descriptive quantitative design, Philippines

## INTRODUCTION

Principals and teachers are required to continually improve student learning. To plan, implement, and evaluate the appropriate programs, educational leaders must make data-driven decisions (Jacoby, 2007). Educators commonly use students' scores on standardized tests to evaluate the impact of instructional programs designed to improve student achievement (Sussman, 2016). The rubrics used for classroom assessment can have significant implications for teacher practices and student achievement. Getting an assessment right is an essential component in creating positive learning experiences and academic success. (Neumann et al., 2019). However, the data should be accurate and valid to provide efficient and effective interventions.

Public school educators need to know how to use data that support informed decision making to improve educational processes (Gentry, 2005). Analysis of standardized testing data provides a tool for educators to combat the gap in the teaching and learning process (Stephens, 2010). In the Philippine educational system, quarterly examination results and National Achievement Test are fundamental sources of educational data concerning the student's performance.

Educational leaders can make an informed decision in implementing policies and practices through acceptance and use of technology (Jacoby, 2007). Procedures

on assessment have shifted from paper-based to computer-based testing for all types of evaluations (Hensley, 2015). In line with this, technology also aids in the process of assessment evaluation, analysis, and interpretation.

## **OBJECTIVE OF THE STUDY**

Assessment plays a crucial role in the development of learner's performance. It is imperative to improve the process of evaluation to maximize the use of assessment data. Thus, this study will provide a method of upgrading the school testing mechanism. Specifically, it aims to identify: a. the teacher's perception of using technology as part of the school testing mechanism before and after the software implementation, b. the difference between convention checking procedure, checking machine, and Zipgrade application in terms of; (1) providing accurate and valid data, (2) cost-effectiveness, (3) organization of data, (4) the flexibility of features concerning to changes; and (5) timeliness of feedback; and (6) the effect of using software applications in school testing mechanisms.

## **FRAMEWORK**

This chapter takes account-related reading materials from books, journals, magazines, and abstracts, which the proponent of the study deemed helpful in attaining an in-depth discussion of the research problem and development of the research framework.

### ***Standardized Test***

Teachers agreed that the principal's initiative in analyzing standardized test data would lead to the establishment of appropriate interventions and instructional practices (Stephens, 2010). However, an evaluation of whether a particular test provides accurate and useful information about the impact of an educational intervention should also be considered (Sussman, 2016).

In educational data utilization, the standardized tests would serve as input in collecting reliable and valid results, and the process of how to manage, analyze, and interpreted data will be the output.

### ***Technology-Based Assessment***

A study comparing paper-based and computer-based testing in elementary students and mathematical fluency indicates that the two variables are not

comparable (Hensley, 2015). The idea of using the Flexilevel test supports the academic staff and students in terms of both effectiveness and acceptability (Pyper, 2016).

Presently, there is a lack of valid and reliable instruments available to schools to adequately assess their educational needs to design better and evaluate their projects and initiatives. The School Technology Needs Assessment (STNA) provides a free, user-friendly online survey tool that meets this need for planning and formative evaluation of technology projects in educational settings (Corn, 2010).

Investigated and reported in this dissertation is a modern Web-based Distributed Mathematics Assessment System (DMAS). The interdisciplinary work involves mathematics, computer science, and education. As part of the Web-based Mathematics Education (WME) project, DMAS works well with WME for middle school mathematics education. But, like WME, DMAS is designed to work independently and at different education levels. DMAS has also begun to investigate automatic grading of student answers by using well-defined Web-based answer checking services. DMAS is an independent Web system easily interfaced to any Web page through a well-defined API. DMAS is an open system that involves Client-Side and Serve-Side programming and implemented with standard Web/Internet/Database technologies and protocols (Al-shomrani, 2008).

Based on the study of Bellini, and Dulaskaia, (2017), critical factors of a successful innovation strategy were innovation potential, the innovator capability, the accessibility of the technology as well as the social acceptance, and the chosen business. Digital flatforms widely used in business can also be integrated into an educational institution.

Technology-based testing provides a variety of ways of how to evaluate the performance of students. It helps educators to view the gaps easily in the learning process. The studies on the use of computer-based testing, flex level tests, STNA, and DMAS only show that technology can be of great help to teachers in their evaluation task.

## **Feedback**

In an educational institution, feedback is vital to learners so that they could know the development of their learning and the enhancement of their self-motivation (Agustuna et al., 2019).

Another study examined the complicated relationship between types of corrective feedback and the types of errors made by learners. As predicted, the

retention test of learners will be higher if they made fewer subtle discrimination errors. Surprisingly, the consumed feedback study time was almost twice the fine discrimination errors (Dempsey, 1989).

Also, the study that investigates the effects of learner response confidence and feedback timing on long term retention of verbal information in college students support the importance of feedback speed in education. Two levels of learner response confidence (high, low) and four levels of feedback timing (immediate item-by-item feedback, immediate end-of-session feedback, 24-hour delayed end of session feedback, and absence of feedback) were studied. Finally, error correction significantly lower for 24-hour late feedback subjects making high confidence errors on the initial test than for members of any other treatment group, making top confidence errors on the initial examination. Additionally, the role of response confidence in acquisition and retention should be studied further and integrated into a more comprehensive and prescriptive feedback model except for response confidence (Gottlieb, 1990).

In this thesis, an attempt to inform the design of adaptation and feedback components by collecting and analyzing as realistic data as possible. The focus of this research is to investigate (a) critical aspects of students' behavior and their relation to their learning, and (b) how their behavior could be employed to predict students' affective and motivational characteristics (Mavrikis, 2008).

The studies show that the effect on the provision of immediate feedback when it comes to educational data. Timeliness, as one of the characteristics of useful data, is essential for educators in providing relevant interventions.

### ***Data-Driven Decision Making***

Student data were always used in the past, but the educators continuously struggle to identify the best way to use data in improving instruction. The No Child Left Behind Act emphasizes how progression can be synthesized from student data results. Currently, the problems with the most references included (a) time, (b) too much data (c) data with conflicting information, (d) the pacing guide, and (e) changing teacher attitudes and practices. Ultimately, a data-driven culture was refined within the school that enabled instructional adjustments, promoting an increase in academic achievement (Williams, 2014).

Evidence-based research has become an essential focus in the field of education in shaping professional practice. This study emphasizes the role of organizational context in the use of data-driven decision making. Researchers and practitioners can utilize the findings produced by this study, as it facilitates the role systematic information plays in refining educational practices, and the

development of interventions to promote the use of such evidence (Grodzicki, 2014).

The conceptual framework focus on conducting the process of data-driven decision-making through collaborative leadership and data analysis for educational change. The findings from the qualitative data indicated that the central office and the schools matter equally to the use of data and building a data culture in schools. The reciprocal relationship between the central office and schools described in the discussion will strengthen the original central office initiated district data team through changes in policy, professional development, and providing time for collaboration (Heilig, 2014)

Educational leaders can incorporate appropriate educational planning through the obtainment of information and knowledge through the use of technology. The findings indicate that a principal's decision style has no bearing on his/her acceptance and use of technology. The study concluded that most principals feel comfortable using technology and attend a variety of technology training. Lastly, of the principals surveyed, the majority stated that technology was mostly used to make decisions regarding student achievement (Jacoby, 2007).

Theoretical models provide scant explanations of how public school educators apply data-driven decisions leaving educators with many unanswered questions about the practice. The study evaluates the three data-driven decision-making categories found in literature: (1) purpose of data-driven decisions, (2) processes of data-driven decision-making, and (3) contextual characteristics of data-driven decision-making (Gentry, 2005).

### ***ZipGrade Application***

ZipGrade LLC Company was founded by John Viebach. He was inspired by his wife, a teacher, in developing a cost-effective grading smartphone application. Since the development of the software, John has talked with hundreds of teachers and expanded ZipGrade with features requested by classroom teachers around the world. Teachers are sometimes surprised that the original developer answers support emails. Still, there is no better way to get insight into what is essential in different classrooms and to have a real conversation. In this study, the software used the Zipgrade application. Other applications may also be used since the research is not limited to the brand of the software.

Based on the concepts from previous studies, the diagram below represents the framework of the study.

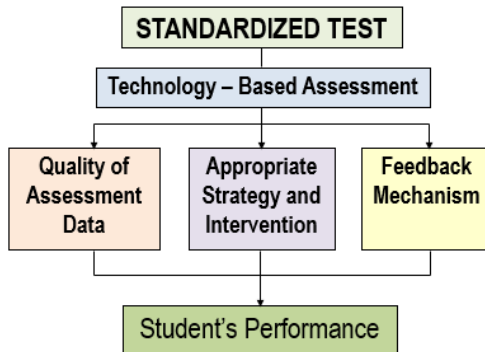


Figure 1. Conceptual Framework of the Study

The framework shows how technology-based assessment can contribute to the attainment of accurate and valid assessment data. The quality of assessment data from the standardized tests can provide an appropriate strategy and intervention in improving student's performance. Also, time is an essential element in the success of programs. Providing immediate feedback after assessment can ensure that the intervention is realistically needed.

## METHODOLOGY

This part of the paper will describe the research design, research site, participants, and procedure on collecting and analyzing information on the effect of software application on the school testing mechanism.

### Research Design

The study used one group pre-post evaluation design. The design involved one group of teachers. A pre-evaluation was administered to the teacher of their school testing mechanisms. Then, an orientation on software application was conducted to the sampled teachers in DepEd Calamba City. After utilizing the software for the third and the fourth quarter assessments, the teacher was given a post-evaluation.

### Research Site

Schools Division Office of Calamba City located within the City Hall Compound at Brgy. Real, Calamba City. The office provides education support to all public and private schools in Calamba City.

SDO Calamba City awarded as top-performing schools division office in the “2019 GawadPatnugot” hosted by the DepEd Regional Office, IV-A Calabarzon.

The research involved three (3) particular schools in Calamba City, namely; Jose Rizal Memorial School, Calamba City Science High School, and Calamba City Senior High School. The schools were selected since the location was near the division office and provided with an adequate supply of ICT equipment such as tablets, computers, and internet access.

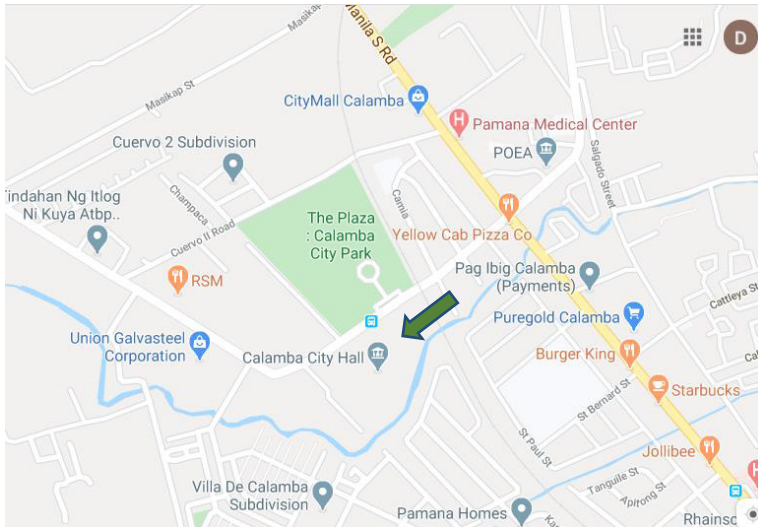


Figure 2. Map of DepEd Calamba City

## Participants

The respondents of this research were teachers from sample schools in Calamba City. The study was administered from the third to the fourth quarter of the school year 2018 – 2019. The sample teachers comprise of elementary school, junior high school, and senior high school.

The participants were selected using purposive sampling. The sampling method was used due to the limited number of the device as part of the software simulation. A total of thirty-five (35) teachers were recognized and participated in the study. Participants were mostly advisers of Grade 6, Grade 10, and Grade 12.



## **Instrumentation**

A questionnaire was administered to all the sample teachers regarding their perception and reflection on the utilization of the checking and analysis software application—the survey composed of multiple-choice and 5 – point Likert Scale.

A simulation of the use of software applications was administered. The effectiveness and efficiency of the process were analyzed. The data was validated based on the quality of item analysis for the fourth quarterly examination result.

The researchers also constructed a monitoring and evaluation tool. The tool was validated by the School Governance and Operations Division Chief and Monitoring and Evaluation (M&E) Section Specialist.

A monitoring and evaluation tool concerning the school testing mechanism was crafted and validated by SGOD Chief and Monitoring and Evaluation (M&E) Senior education Program Specialist. The tool was reliable and valid since it was aligned to the National Educators Academy of the Philippines (NEAP) standards, and the validators were trained for crafting monitoring and evaluation tools. The validated monitoring and evaluation tool was used as an instrument in collecting on-sight responses.

## **Research Ethical Protocol**

The schools subjected to the study were provided with consent, together with the teachers that participated in the orientation, simulation, and evaluation. The information collected from the participants remained confidential and used only according to the purpose, as indicated in the research.

## **Data Gathering**

Three sets of data were collected. The first data was collected from the teachers involved in the study. The perception of teachers with regards to the use of technology in the assessment were summarized. The second set of data was based on the simulation conducted by the teachers on the use of software applications. In this data, the actual effect of software on the tfrom computer-based testing were highly evident compared to paper-based testing. Still, it is necessary to determine if results are comparable aneacher was identified. The last data was consolidated from the monitoring and evaluation results.

## **Statistical Techniques**

The difference between pre and post evaluation of teacher's perception of the users of software as school testing mechanism was analyzed through a t-test of dependent means.

## RESULTS AND DISCUSSION

This chapter details the results of data collection and analysis and report findings concerning the research questions for this study. The results show the teachers' perception of using the software application and comparative analysis of various testing procedures. The chapter ends with a discussion on the efficiency of using the software in assessment base on different key areas.

### *Teacher's Perception*

The participants were provided with a questionnaire relative to their school testing mechanism before and after the implementation of the software program. The results were compared and identify if there is a difference in the teacher's perception.

Table 1. Comparison between Teacher's Perception in using Technology as part of the School Testing Mechanism before and after the software implementation.

Group	Conventional	Software
Mean	4.209	4.635
SD	0.539	0.311
SEM	0.091	0.053
N	35	35

The intermediate values are  $t = 4.0500$ ,  $df = 68$  and standard error of difference = 0.105. The two-tailed P value equals 0.0001 at 95% confidence. By conventional criteria, this difference was extremely statistically significant. The benefits of computer-based testing were highly evident compared to paper-based testing. Still, it is necessary to determine if results are comparable and are used interchangeably (Hensley, 2015).

### *Comparative Analysis*

The software application compared with conventional, machine, and software checking and analysis procedure base on the following areas below.

Table 2. Comparison between Conventional, Machine, and Software Checking and Analysis Procedure.

Areas of Concern	Convention Checking	Checking Machine	Software Application
Data Accuracy and Validity	Low	High	High
Cost-Effectiveness	High	Low	High
Organization of data	Low	Medium	High
Flexibility of Features	Low	Medium	High
Timeliness of Feedback	Slow	Fast	Fast

The table shows that conventional procedures and software applications would provide high cost-effectiveness. At the same time, the provision of accurate data and speed of feedback can be efficiently gain in using checking machine and software applications. According to Viebach (2018), founder of ZipGrade, a cost-effective grading application provides a reliable and accurate assessment data.

### ***Test of Accuracy and Validity***

The data based on the simulation conducted in checking test materials. Procedure A – the test was reviewed and analyzed by a teacher while Procedure B – the test was reviewed and analyzed using a software application.

Table 3. Comparison of Convention and Software Checking Procedure

Areas of Concern	Conventional Checking	Software Application
No. of Test Paper	35	35
Checking Speed	28 mins	2.5 mins
Percent Accuracy	94 %	100 %
Item Analysis Speed	25 mins	0.1 min
Correction Speed	5 mins	0.1 min

The table shows that the conventional procedure in checking and analyzing test accumulated fifty-eight (58) minutes while in software application, it only required three (3) minutes. The timing of feedback affects greatly the retention rate of learners (Gottlieb, 1990).

### ***On-sight Monitoring Result***

Based on the on-sight monitoring conducted, the reasons for the schools failed to utilized technology in testing were as follows: a. the school tends to follow the Division Standard; b. teachers don't want to use other procedures since they might encounter digital error; and c. administrators want the conventional process.

As per the current status of the school testing mechanism, the accuracy and validity of the test result were at stake. The practices of most teachers on asking students to help them in checking test papers may lead to human errors. While, the teachers who reviewed the paper by themselves, especially Grade 1 – 3 teachers, tend to use more time in reviewing instead of interpreting the test results and providing appropriate intervention. Schools currently embrace data analysis as a vital part of the instructional decision-making process. The study assessed the influence of the campus data coach on a middle school mathematics teachers' use of analyzed data to make instructional decisions (Hill, 2010).

## **CONCLUSIONS**

The study revealed that there was a significant difference in the teacher's perception of using technology as a tool in school testing mechanism. Its result shows that the software application provided them more accurate and valid assessment data, efficiency in organizing, analyzing, and interpreting test results and provide them enough time to identify appropriate intervention based on the analysis.

Also, the checking software application would help school administration since this procedure provides lower financial consumption and a more natural method in collecting and submitting consolidated test results.

The result of the study implied the importance of how teachers should adapt to emerging technology, specifically, on software that may help them not only in assessment but also in instruction. As a recommendation, the formulation of local policy on digital evaluation should be implemented.

## **TRANSLATIONAL RESEARCH**

The findings of the study were translated through the development of a localized version of the tested software. Integrating this software on the testing mechanism for the entire Schools Division will provide more accurate and valid

assessment data, which will subsequently increase the success rate of all the educational programs aligned with it.

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