
Pre- and Mid-Pandemic Analysis on Student's Science Grades: a Key for Future Action Research

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ABSTRACT - The curse of the COVID-19 pandemic has greatly impacted the assessment of learning for the past two years. One of the disciplines that was greatly affected is Science. Science education is vital in human development. Most recently, numerous research articles have been published to assess assessment strategies, their effectivity and instrumentations across the globe. However, among these numerous research articles in the local and international scale, it can be observed that there is dearth in the assessment of student's performance in Science. Thus, this study is conducted to assess the trend in student's science grades before and during the pandemic in the Philippine Junior High School K to 12 curricula. This study employed a descriptive quantitative research design to attain the pre and mid pandemic analysis. The respondents of this study were the Junior High School SY 2018-2019 and SY 2020-2021 completers. The acquired data shall be treated using T-Test of Independence. The results revealed that students' grades in Science significantly increased during the pandemic era and become less varied which is evident in their lesser extent of its variability. This result runs counter to other researches on students' output in time of pandemic and several areas need to be reassessed for its validity and reliability with students' actual application of science skills which are lifelong vital tools. Thus, it is recommended that for future school-based action researches, educators should focus on themes like; Science skills and grades parallelism, modular and face to face modality comparisons, pandemic assessment lapses, and school problem management.

Keywords: Science Assessment, K to 12 curriculum, students' grades, pandemic

Introduction

The curse of the COVID-19 pandemic has greatly impacted the assessment of learning for the past two years. It reshaped the educational landscape in the Philippines and in the globe as a whole, bringing us the new face of education focusing on alternative distance learning modalities. This shift in curriculum implementation calls the need to assess the pre- and mid-pandemic grades of junior high school students and draw conclusions from its findings.

One of the disciplines that was greatly affected is Science. Science education is vital in human development. It is denoted by experts as an essential tool in uplifting economic progress. Several methods and strategies have been innovated to cope up with the scenario. However, in the impoverished communities where internet connectivity is a problem, virtual distance education is an impossibility thus looking at a vaguer solution, modular learning. Amidst all these problems, assessment is the key aspect that suffered putting in place the question of validity and reliability of student's grades. In a more rational perspective, grades are defined as the tangible descriptors of learning. Deriving the trends in student's science grades before and during pandemic could shed light in response to the controversies that entail validity and reliability of assessment.

Most recently, numerous research articles have been published to assess assessment strategies, their effectivity and instrumentations across the globe. In research conducted in Arizona on students' writing ability, it

was found out that students who took the exam before the pandemic have higher grades compared to those who took the exam most recently (Skar et al, 2021). Similar result was derived by Engzell, 2020 in which findings reveal learning loss of 3 percentile point (or 0.08 standard deviation) learning loss. These losses continue to rise up to 55 percent higher for pupils from lower-income families. In contrary, Jacques, 2020 found a contrasting result among students in France which revealed that distant learning has no effect on engineering students' performance.

In the neighboring countries of Indonesia and Thailand, Robiasih and Lestari (2020) found out that most teachers conduct assessment via Google Classroom and WhatsApp using multiple choice type of tests and essay questions while Haiyudi and Art-In (2021) suggests new ways in assessing learning at home with the aid of parents. Parent and teacher engagement should be maintained to effectively foster effective student learning development.

In the Philippines, the Department of Education has released its interim guidelines on assessment and grading in the time of pandemic on October 2, 2020. It encouraged teachers to apply varied authentic assessments, holistic development of students and that grading should imply positive feedback of learning. The said order modified the grade computation in the basic education sector. For instance, in the Science discipline, grade computation is divided in two components; written works and performance task, deleting quarterly assessment in the picture.

Before pandemic, numerous researches has been conducted on Science education. Orleans (2007) debates that the Philippines' present standard of scientific education lags behind other countries throughout the world. Cited contributing factors to this finding are; Academic qualification deficiencies, low ongoing professional involvements, extensive science teaching experience, and good license status. Bernardo added some notable trends in the country's science education with reference on students' perceptions. These includes a decline in science inquiry activities and the use of grades as feedback especially in the higher years, but an increase in support for self-learning and effort, as well as positive attitudes. These patterns were explored in light of potential issues with teacher practices that may lead to poor scientific success levels among students (2008). Furthermore, Orleans added that there is a scarcity of instructional materials and technology, the unpopularity of professional mentorship, and easy access to libraries and the internet (2007).

This pre-pandemic findings lead some researchers to assess the different aspects of science education status in the country. Landicho, 2020 said that educators, students, parents, and other stakeholders are required to respond proactively to the requirements of the moment in the face of the COVID-19 epidemic. Changes and difficulties can be converted into opportunities for high-quality education at this moment of uncertainty. Several modality assessments also reveal that the introduction of hybrid learning, educational institutions implemented a variety of assessment procedures, including how grades are computed, attendance, modalities available, and feedback (Cahapay, 2020). Good evaluations, according to Aguilar et al., (2021), are ones that can assist students prepare for future disruptions and uncertainties thus schools may be proactive in applying a more lenient approach in generating students' evaluations during the pandemic, according to Cahapay (2020), whereas Tria (2020) indicated that assessment would be continually redefined as part of the post-pandemic adjustments.

In the local scale a number of teachers would argue that students' grades in the time of pandemic are not valid and reliable for the learning experience is not authentic specifically in communities where only modular approach of instruction can be made possible and equal to all learners, it is difficult assess the truest sense of learning. Thus, students' grades should be reassessed on the extent of their reliability and validity in the time of pandemic.

Among these numerous research articles in the local and international scale, it can be observed that there is dearth in the assessment of student's performance in Science. Thus, this study is conducted to assess the trend in student's science grades before and during the pandemic in the Philippine Junior High School K to 12 curricula. The results of this study will be beneficial for teachers to reflect on their practices, to the education sector executives in promulgating new revised guidelines in assessment and to develop innovative ways in effectively assessing student learning.

Methods and Materials

This study employed a descriptive quantitative research design to attain the pre and mid pandemic analysis of students Science grades. It used purposive random sampling in selecting potential respondents. The respondents of this study were the Junior High School SY 2018-2019 and SY 2020-2021 completers of Madridejos National High School, Madridejos District, Schools Division of Cebu Province. Data mining procedures shall be employed using the readily available information in the school records. The acquired data shall be treated using T-Test of Independence. Given that the data are two independent groups with commonality in which all of them are junior high school completers and with differences, the other group graduated before pandemic and the other one graduated during pandemic.

Ethical Consideration

The ethical considerations endorsed by the Belmont Report in 1974, which covers three core ethical concepts important to research involving people as subjects: respect, beneficence, and justice, enrich this research investigation. The study's participants are viewed as autonomous agents, and the notion that people should be respected is based on two moral conditions: the need to grant autonomy and the need to protect those with impaired autonomy. The researcher assures that study participants volunteered to participate, that they were given appropriate information in easy-to-understand languages, and that they were not in danger. Respect for individuals also entails respecting their privacy and maintaining their confidentiality. The participating schools were given the option of declining or waiving their participation in the study. They are allowed complete autonomy in dealing with the information requested. Furthermore, because only their grades were acquired through available records, there was no direct contact with the kids or youngsters involved.

The second principle, Beneficence, states that the researcher must maximize potential benefits while minimizing potential harms. This entails safeguarding human welfare. The investigator should consider whether the benefits are to the full benefit of the participants before proceeding. That the hazards mentioned should be avoided or reduced. The recent analysis has ruled out any potential threat to the environment. The respondents are assured that the data will be obtained at their preferred time and location, and that they will not be asked questions that are beyond their control.

The third concept is justice, which refers to the fair distribution of research rewards and burdens to participants. This can be interrupted when a person's privileged benefit is not provided without explanation or when a hardship is unfairly imposed. This is about the method of selecting participants without prejudice, with all segments of the population given the opportunity to participate in the study. There are no substantial risks found in this study because participants were chosen at random and the context is of positive value to the advancement of the educational system. There are also no potential negative consequences of the study, such as psychological, physical, legal, societal, or economic.

Results



The average Science grades of different sets of Grade 10 students before and during pandemic were assessed and was analyzed using t-test of independence. The results are as follows:

Table 1. The Acquired Data Statistics and the t-value

SCHOOL YEAR	POPULATION	SAMPLE SIZE	MEAN	VARIANCE	T _{cv}
2018-2019	790	259	85.46	51.12	- 4.74
2020-2021	710	250	88.06	25.11	

Two sets of independent data were analyzed in this study. The Science average grades of 259 students acquired in S.Y. 2018-2019 is the pre-pandemic data. While the SY 2020-2021 with a sample size of 250 is the mid-pandemic data. Results revealed that the mid-pandemic data has a greater mean which is an indicator that it is a better performing group. The mid pandemic data also acquired smaller variance among scores which justifies that it is less dispersed, more homogeneous data set. Lastly having a smaller computed t value (-4.74), than the threshold of rejection zone of the conducted t-test (± 1.960), it can be concluded that there is a significant positive difference between data sets. Students grades significantly increased during the mid-pandemic era compared to its pre-pandemic counterpart.

Discussion

The results revealed that students' grades in Science significantly increased during the pandemic era and that the grades become less varied which is evident in their lesser extent of variability. These results were not evident in any research findings relative to students performance in the time of pandemic for most results report a decline in performance. Skar et al, 2021 and Engzell, 2020 reported linguistic learning losses in Arizona during the pandemic. UNESCO's report declare that learning losses are unacceptable thus schools must re-open (UNESCO, 2021).

On a positive note, however, these results reflect the Department of Education's efforts to maintain educational stability which includes revised guidelines on student assessment. On the onset of pandemic classes on October, 2020 the Department of Education revised grading components where for Science subject, performance tasks and written works were given equal emphasis of 50% respectively, it also stressed on finding new contextualized schemes to effectively assess student learning (DepEd, 2020). DepEd Order 18 series of 2020 highlights the importance of self-pacing mechanism among students during the pandemic period (DepEd, 2020). This gives more time to students to actively comprehend the lessons at their own pace. Students, teachers and parents' collaboration is emphasized as according to Landicho (2020) said, stakeholders' participation is important in students' education in the time of pandemic. During this period, teachers became more active in monitoring their learners by the acts of frequent home visitation and mentoring. Remedial classes were also observed nationwide (DepEd, 2021). Furthermore, local reports on discussed competencies in the Department of Education revealed that more competencies are taken up this pandemic compared to the previous years. In contrary, reports that require teachers to not give grades below 80 is circulating among regions together with the use of contextualized transmutation tables which are somehow teachers' way of meeting deadlines due to students lack of submissions regardless of countless home visitations.

The Philippines is one of the few remaining countries that are last in re-opening schools. Contrasting ideas and results were discovered related to education during pandemic. However, the principle of quality education should be emphasized that good evaluation are the ones that can measure and predict the future of every student



(Aguilar, 2021). Building on the investments made and lessons acquired during the crisis, countries have the chance to speed learning recovery and make schools more efficient, equitable, and resilient (UNESCO, 2021).

Conclusion

The study yielded that there is a highly positive significant increase among students' grades in the time of pandemic compared to the students' performance before that era. However, contrasting studies have challenged this result and several areas in the Philippine education sector need to be revisited for its validity and reliability with students' actual application of science skills which are lifelong vital tools. Thus, it is recommended that for future school-based action researches, educators should focus on themes like; Science skills and grades parallelism, modular and face to face modality comparisons, pandemic assessment lapses, post-pandemic mitigation plans and school problem management.

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