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Research Article

Utilization of the Teacher-Made Strategic Intervention Material with Google Classroom in Improving the Performance of the Challenged Learners

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ABSTRACT

This classroom-based action research aimed to improve the performance of the challenged learners in Physical Science. The combination of Strategic Intervention Material (SIM) with the aid of Google Classroom was employed as an innovation to help the respondents master the competency-based skills that they were not developed during regular classroom teaching. In a combination of qualitative and quantitative designs, this research employed observation and participation, survey, and content-based assessment as data-gathering instruments. There were 40 identified challenged learners selected purposively (10 students for each of the four sections) based on their achievement scores after the long quiz, who took part in the study. The quantitative data were processed through Statistical Package for Social Sciences (SPSS), while the obtained qualitative data were interpreted using the phenomenological methodology. Results revealed an increase in the performance level of the challenged learners based on the increase of the mean percentage score of the posttest. Additionally, it showed that SIM promotes learning retention based on their scores in the delayed-posttest, and Google classroom motivates their learning intention towards the subject, Physical Science.

Keywords: *Strategic Intervention Material, Google Classroom, challenged Learners.*

Background

Introducing new methods to help the students improve their learning and cope with the lesson is the technique an innovative teacher uses. Teachers, as the facilitators of learning, always notice who strives and not in a class. An innovative teacher gives a second chance for the students facing difficulties to understand the lesson. Pollock, Tolone & Nunnally (2021) coin innovative teachers as the creator. Thus, innovative teachers are creators of ways to help students learn the lesson before jumping into the next. This act reflects the advocacy of the Department of Social Welfare and Development (DSWD) and the Department of

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Education (DepEd) that No Child Shall Left Behind (oficialgazette.gov.ph, 2013).

In the classroom, having a learner who could not get on the discussion is expected because of individual differences and personal problems they face before going to school. Consequently, every student has a different level of understanding and participation towards the lesson and affects their performance that might cause either failure or success. Teachers innovate because learners' participation is essential for active and engaged learning (Vonderwell & Zachariah, 2005).

Keeping the students engaged in learning is a challenging task for a teacher, and that calls for an educator to have a flexible and creative mind. Flexibility is the key factor to effectively cater to diverse students' learning needs (Yorke and Thomas cited in Naz & Murad, 2017).

Innovation is finding better ways of helping the student for increasing performance. Innovation also encourages students and teachers to research, explore, and use all resources to uncover something new because innovation is both for students and teachers. DiFranza (2021) clarified that innovation could offer countless opportunities for change and evolvement that potentially impact students. Teachers innovate to identify the gaps in understanding among the students in the classroom.

The Strategic Intervention Material (SIM) has been a helpful tool utilize in classes remediation.

SIM is given to students to help them master competency-based skills that they could not develop during regular classroom teaching (Suarez & Casinillo, 2020). SIM focuses on the developing least mastered skills of the learners determine by the garnered scores. Alboruto (2017) clarifies that SIM is a learning package that comprises guide cards, hands-on activities, assessments, enrichments, and key answers. Thus, SIM is a portable learning kit that students can bring home as supplementary learning material to help them work and learn independently or with peers.

Google Classroom is a free application designed to help teachers and students. Google classroom is a digital tool that enables students to attend class online (Hussaini et al., 2020). The platform allows the teacher to upload the materials to promote paperless transactions and interact with the SIM. The respondents of this research are guaranteed to have electronic gadgets to use in joining the google classroom.

The researcher undertakes his mission to educate at San Felipe High School. The students have different approaches and ways to learn, resulting in either low or high academic achievements.

Low-performing students might lose their interest in learning if they feel that they are behind the others.

Thus, the researcher was interested in undertaking classroom-based action research to help the challenged learners promote their performance in the subject of Physical Science and test the effectiveness of the teacher-made SIM with the aid of google classroom.

This study aims to improve the challenge students' performance in Science using the teacher-made strategic intervention material with the aid of google classroom. Specifically, the following questions will guide this study:

1. did the teacher-made science strategic intervention material with google classroom increase the performance level of the challenge learners of grade 12 ;
2. does the teacher-made SIM with google classroom promote retention to the challenged learners;
3. how do the challenge learners perceive the effectiveness of the teacher-made SIM with the use of google classroom;
4. what problems encountered by the challenged learners in using Google Classroom;
5. is there a significant difference in the performance of the challenge learners before and after the use of the teacher-made SIM with google classroom; and,
6. is there a significant relationship between the students' perception of teacher-made SIM with the help of google classroom and their performance?

Methods

Type of research

This study employs a mixed method as the researcher concerns interpreting the scores of the challenge learners (quantitative) and the respondents' perception towards the

effectiveness of the said teaching innovation (qualitative).

The one-shot case study was used to test the effectiveness of the teacher-made SIM with google classroom in helping the challenge learners to succeed.

Respondents

The subject is the ten least learners of each of the four sections handled by the researcher for the school year 2019-2020. Thus, 40 challenged learners display low performance in the topic *the historical development of the atom* in the subject, physical Science.

Sampling method

Purposive sampling is non-probability sampling in which the decision concerning the individuals to be included in the sample is taken by the researcher, based upon a variety of criteria might consist of knowledge of the research issue and willingness to participate in the study (Oliver, 2006). The main goal of the teachers is to educate the students and address the difficulties of the challenged students who cannot cope with the objectivity of the lesson. One cannot deny that intervention materials are needed to provide for the poor performing students to achieve the learning goal. The Strategic Intervention Material or SIM is a teaching aid introduced into the teaching methods to lighten the students' activity and increase their understanding level (Dy, 2011).

Strategy

The SIM is strategically prepared and designed for teaching remediation based on the learning style of the learners. The said device religiously followed the five cards, namely, guide card, activity card, assessment card, enrichment card, and reference card, and was given after the regular classroom instruction to the students who could not appreciate the concept of the subject matter (Salviejo et al., 2014).

Google Classroom is an application that teachers can use (to mentor and monitor the students) and the students (interact with the teacher) for free, and that can be compatible with any smartphone or version of operating systems in computer desktop as long as the device is online.

The teacher served as the administrator of the platform and can give supplemental support for the SIM activities. While the subjects can view the soft copy of their SIM, they can provide their comments, ask questions on how to accomplish the activities in each card, and access their google drive and store their accomplished activities or the SIM as a whole. Moreover, students were encouraged to communicate with other students on the platform.

Upon accomplishing the activities on SIM, the administrator sent to the challenge students a follow-up perception survey. The features include the respondents' experience in accomplishing the SIM and how the Google Classroom helps them achieve the SIM activities that conclude the effectiveness of the intervention material and the strategy.

Instruments

The primary tool for this research is the teacher-made strategic intervention material, which is associated with the challenge learners displayed poor performance. This research includes the 25-point posttest and delayed posttest with almost the same content as the long quiz administered before the intervention and the 7-point perception survey for the student's perception on the effectiveness of SIM with google classroom in improving their learning in the particular subject. The given tests have undergone reliability tests using KR20. The KR-20 garnered-value for the posttest is 0.89; the test also has a 90.1% discrimination index and a -0.10 discrimination index.

Additionally, the researcher utilized Cronbach's Alpha to determine the internal consistency of the perception survey, and the said survey has 0.76 as the reliability coefficient. Accordingly, a reliability coefficient of .70 or higher is considered "acceptable" in most social science research situations (ucla.edu).

The three experts evaluated the validation of the posttests and the perception surveys. The average computed mean of the validators was 4.10.

Data Collection Procedure

The teacher discussed the topic historical development of the atom in the regular

schedule of the teacher in each section. The teacher administered a formative assessment as a long quiz composed of 25 multiple-choice items. Each student's score was recorded and analyzed. If the score they obtain is higher than 75%; otherwise, those students who did not meet the 75% rate are the subject of this research. The challenged learners received an additional activity as teacher-made strategic intervention material. All activities in the SIM are related to the learning competency, where they displayed poor performance.

The teacher made the quizzes using the Google form available in the Google Classroom as one of the valuable components of the said learning platform. The teacher recorded the garnered scores of the challenged learners using the class record to save the students' effort in answering the practice quiz. The content of the practice quiz was related to the posttest and the long quiz item.

Additionally, the activities and the soft copy of the SIM were also available in the social learning platform called, google classroom, uploaded by the administrator, and the students can access it and ask questions. They can give their suggestions to co-learners anytime, anywhere, as long as they are online.

After accomplishing the activities, a posttest was provided, then compare, and the increase of means determined the effectiveness of the SIM to the challenged learners in the subject of Physical Science. A week after, the delayed posttest was administered to analyze if retention among the respondents was successful. Again, the mean was used as the basis for concluding the retention of learning. Finally, the perception survey on the effectiveness of the teacher-made SIM with the aid of google classroom was administered after the delayed posttest and find if there is a significant relationship between them to determine the challenged learners' performance.

Data analysis

The researcher present and summarize the quantitative data and the qualitative interpretation following the objective set in this study.

The mean percentage score (MPS) was considered describing the scores of the students on their long quiz. The mean and the MPS were used to determine and compare their posttest and the delayed posttest scores.

For the perception survey, frequency and ranks were considered. The paired sample t-test was used to determine the significant difference between the performance of the challenge learners before and after the use of the teacher-made SIM with google classroom. The Spearman's rho was utilized to establish the relationship between the students' perception of teacher-made SIM with the use of google classroom and their performance.

The researcher analyzed the qualitative data reflectively on the problems encountered in using google classroom in teaching the challenged learners and their perception of the effectiveness of the teacher-made SIM with the use of google classroom.

Result and Discussion

The researcher expected that the teacher-made strategic intervention material to improve the level of performance of the challenged students (n=40) in the topic, Historical Development of Atom, of the subject Physical Science. The utilization of Google classroom was to streamline sharing files and taking the posttest and delayed posttest online using the google form.

Table 1. Scores of the Challenged Learners before and after the implementation of innovation

Quiz/Test	Lowest Score Obtained	Highest Score Obtained	Mean	Standard Deviation	Coefficient of Variation	MPS
Long Quiz	6	15	11.95	2.11	0.17 or 17%	46.60
Post-test	12	25	23.10	3.84	0.16 or 16%	90.12

Table 1 perceptibly shows the respondents' highest and lowest scores obtained. Most of the scores obtained in their posttest are high compared to their scores in the long quiz. The MPS of the long quiz (46.60) and the Post-test (90.12) have a significant difference that expresses the improvement of the challenged learners who used the teacher-made SIM. With the Google classroom, since it was observed and monitored by the teacher, most of the challenged learners are active online after the class. Moreover, the respondents' interaction towards the topic was noticed by the teacher. The engagement of the students to learn more increases as they use the said online platform for learning. The teacher-made SIM is helpful to the students as the standard deviation signifies that the scores of most of the respondents tend to group with the mean. Based on the study of the IDRE (2016), the coefficient variation is the ratio between the standard deviation and the mean should be less than one to indicate less variance. Thus, through the help of Google classroom, the impact of the teacher-made SIM was practically equal between them as the mean scores are exceeded the average, which is 12-points.

Moreover, the lowest and highest scores of both the long quiz and the posttest had a huge difference. This shows the improvement of the challenged learners in using the strategic intervention material with the aid of Google classroom was indeed helpful in active learning. Positively, this is because the students can reach help to their peers or the administrator (teacher) of the Google classroom anytime they participate.

Furthermore, the utilization of Google classroom created a safe learning avenue for the students in learning. The interaction between the teacher and the learners is private. The SIM was used as the instructional material of the teacher online. Membrebe (2015) suggested that the Strategic Intervention Material can be adopted as instructional material for the improvement in teaching Science, to facilitate and carry out the process of learning, and, most importantly, to improve the students' achievement.

Using Google classroom provides the challenged learners a meaningful online learning to which all the queries are organized, and the online feature of it made them have access right at their fingertips. With this online learning platform, the used software materials such as the teacher-made SIM and the practice quizzes are safe and retrievable through download. Google classroom eliminates the risk of losing worksheets or the soft copy version of the assignments. Google classroom can work in unidirectional development as it can serve the teachers' approaches and styles on one hand and students' awareness, understanding, and active involvement in different classroom skills on the other side (Al-Maroof and Al-Emran, 2018).

The Teacher-Made Sim with Google Classroom Promotes Retention to the Challenge Learners

The delayed posttest was conducted a week after the posttest. The same content was utilized, and with the use of Google classroom as the platform of the posttest using the google form, the score obtained of the challenged learners was gathered instantly. The online process of taking the delayed posttest also promotes paperless education and instant information about the students.

Table 2. Scores of delayed posttest after a week of taking the posttest

Quiz/Test	Lowest Score Obtained	Highest Score Obtained	Mean	Standard Deviation	Coefficient of Variation	MPS
Post-test	12	25	23.10	3.84	0.16 or 16%	90.12
Delayed Post-test	19	25	23.03	2.28	0.09 or 9%	92.12

Using Google classroom and the SIM, it is shown that the scores alone obtained by the challenged learners that are presented in table 6 was indeed promoted retention among the

students. The mean (23.10) and the MPS (90.12) garnered on the posttest and the delayed posttest (23.03, 92.12 respectively) are close to each other. Retention of information, knowledge, and learning is evident. Even a week after taking the posttest, the performance of the students still improved. The challenged learners remarkably improved their performance because the uploaded items and queries on google classroom before are always available to them to review. Based on the researcher's observation, even the teacher-made SIM has been done, most of the challenged learners are still visiting the platform and actively asking about the other topics discussed after the Historical Development of the Atom. Retention of learned information can be distinguished as having the data stored in long-term recall so that it can be readily regained (Bennett and Rebello, 2012). The improvement of the learners to the subject has changed and improved as essential information can be retrieved on the online platform for review anytime.

The Challenge Learners Perceive the Effectiveness of The Teacher-Made SIM with the Use of Google Classroom

This section provides the analyzed answers from the open-ended survey of the challenged learners concerning the problems they considered and experienced. The internal consistency of the perception survey is 0.76 using the Cronbach's Alpha. According to Griethuijsen et al. (2014), alpha has a threshold or cut-off as acceptable, sufficient, or satisfactory. This was generally seen as ≥0.70 or >0.70, although one article more vaguely referred to "the acceptable values of 0.7 or 0.6. Qualitative descriptors understanding alpha values adopt a different and seemingly subjective terminology.

The average computed mean of the validators was 4.10 or valid. The validity was done to prove further that the result of the high performance of the students can be accounted for from the SIM with the help of Google Classroom.

Table 3. Students' Perception of the Effectiveness of the teacher-made SIM with the aid of Google classroom (n=40)

No.	Effectiveness	Frequency	Rank
1	My motivation toward strategic intervention materials has increased whenever I use Google Classroom. *(nadadagdagan and aking motibasyon sa pagtapos ng mga Gawain kapag ako ay gumagamit ng google classroom*)	10	1
2	It was easy to get immediate feedback in Google classroom (*napakadaling makakuha ng agarang sagot mula sa mga ka-klase sa pamamagitan ng google classroom.)*	4	4
3	Learning Science made easy by the strategic intervention material with google classroom. (*sa aking pag-gamit ng google classroom at strategic intervention material ay napadali ang pag-aaral ko sa pagsa*)	8	2
4	Using Google classroom enables me to share my ideas about each activity card in the SIM. (*sa aking paggamit ng google classroom ay naibahagi ko ang aking kaalaman patungkol sa mga gawain na nasa SIM*)	4	4
5	Google classroom helped us to be more cooperative in learning and accomplishing the activity cards in SIM. (*nakatulong ang google classroom sa pagtapos ng mga gawain sa SIM dahil kaming mga studyante ay nag tulong tulong sa pag-bigay ng kanya-kanyang konsepto*)	5	3

No.	Effectiveness	Frequency	Rank
6	The SIM helped me connect to the topic, and the Google classroom allowed me to connect more often to my classmates after class. (*ang paggamit ng SIM ay natakulong na maintindihan ko ang mga paksang nakapaloob at ang google classroom ay mas nakatulong na mapalapit pa ako sa mga ka-klase ko pagkatapos ng klase.)*	5	3
7	Learning Science with the help of SIM and Google classroom retain more information on the topic. (*ang paksa ay nanatili sa aking pag-iisip sa pamamagitan ng SIM at paggamit na rin ng google classroom.)*	4	4

The above table presents the students' perception of the effectiveness of the teacher-made SIM and the utilization of Google classroom as an innovation to the challenged students.

Indicator 1 has the highest frequency counts or rank 1. The indicator stated as *my motivation toward strategic intervention materials has increased whenever I use Google classroom*. This means that challenged learners enjoy using the electronic learning platform to comprehend the teacher-made SIM. This also could mean that for the students, google classroom elevates their motivation to accomplish the activities in the SIM. Students were always interested in getting logged in based on their comments in the platform's comment section, "*my understanding widened in this platform..*" This could affirm how the students get interested in accomplishing the activities in SIM even after class. Some of them are logged in to google classroom. The Google classroom is new for the students, especially for the challenged learners. That is why it interests them to engage on the platform, and they significantly found it to increase their intrinsic motivation that could affirm the increase in their score and MPS. Motivation explains why the students decided to accomplish something, how hard they pursue it, and how long they can sustain the activity (Gbolie and Keamu, 2017).

Furthermore, the second highest-ranking indicator on the above table is indicator number three. Which is stated, *Learning Science made easy by the strategic intervention material with google classroom*, with the frequency of 8. This could mean that some of the challenged students who find it hard to perform the learning the topic was suddenly improved and made their way to accomplish the activities on the teacher-made SIM anytime, even after the class hours. This is because they were intrinsically motivated with the help of Google classroom. The teacher used Google classroom to upload and download learning files and a platform where most of the students were conversing on "*how to accomplish the task*" and *"what to do to determine the correct answer"* in the activities under the teacher's surveillance. One student commented that "*Fortunately, I'm not ashamed to ask..."* This could mean that the students felt safe on the platform, and nobody would judge them if they were making a mistake. Students could hold a positive perception regarding the use of Google Classroom. This further means that when the challenged learners' privacy was observed, they do not feel embarrassed to share ideas with the administrator's supervision.

Problems Encountered in Using Google Classroom in Teaching the Challenge Learners

One cannot deny that students love technology, and technology takes most of their time. The researcher included in this study the utilization of Google classroom in teaching the challenged learners. Luckily, all the challenged learners had their smartphones, tablets, and laptop to use. The researcher observed that most of the respondents were logged in. This observation could be a good indicator but staying online until 11:30 pm is bad for their health.

Another observation was that few students could not log in because their sim cards have no load. The researcher sometimes brought his internet modem to the school and made these students participate in the online platform with the teacher-made SIM.

Significant Difference in the Performance of the Challenge Learners Before and After the Use of the Teacher-Made SIM with Google Classroom

To further verify the results on the performance of the challenged learners, the table below presents the significant difference in the respondents' performance with the use of the teaching innovation.

To statistically analyzed the students' performance, a comparison between tests was undertaken. The table below reveals the findings:

Table 4. Differences in the Students' Performance

Tests	Mean	t	Significance
Posttest- Delayed posttest	1.58	2.12	.040*

It can be gleaned on the above table that the posttest and delayed posttest administered to the challenged learners was below the set value of 0.05 alpha level of significance. This means that the null hypothesis states that there is no significant difference in the performance of the challenge learners before and after using the teacher-made SIM with google classroom is rejected.

This result explains statistically that the teacher-made SIM was indeed improved the level of performance of the challenged learners on the topic of the historical development of atom in the subject Physical Science. SIM is an instructional material for remediation and the solutions employed by the Department of Education to improve academic achievements of the challenge learners in Science and Technology (Salviejo, Aranes, and Espinosa, 2014).

The results further mean that with the Google classroom as a teaching innovation, the learning of the challenged learners was continuous, enhancing the students' retention ability since they can log in anytime they wanted. It can also be observed that the significant level of 0.04 tells that even the delayed posttest was administered many days after the posttest, their performance is still fascinating. The student's motivation to finish the activities is observable. Good teaching is the encouragement of an in-depth approach to learning (Biggs, 2003).

Significant Relationship between the Students' Perception of Teacher-Made SIM with the Use of Google Classroom and their Performance

Table 5 presents the values obtained using Spearman's rho. This is to measure statistically the significant relationship between the students' perception of the SIM devised by the researcher with Google classroom. The Spearman rank correlation is used to test the association between two ranked variables, or one ranked variable and one measurement variable (McDonald, 2014).

Table 5. Correlation Between Students' Perception of the Teacher-made SIM with Google classroom and their performance

Tests	Correlation Coefficient	n	Significance
Students' Perception	.254	40	0.034*

It can observe in the above table that the significant value of 0.034 is lower than the set alpha level of 0.05. The alpha level warrants the rejection of the formulated null hypothesis. There is no significant relationship between the students' perception of teacher-made SIM with the use of google classroom and their performance. Thus, the correlation entails statistically the positive relationship between the two variables involved in the test. The result further indicates that the students who perceived that the teacher-made strategic intervention material with the utilization of Google classroom is active and improved the performance of the

challenged learners toward the topic. This further implies that the student's perception of the effectiveness of the intervention and the possibility they exhibit valuable performance in Physical Science is direct.

Table 5 further indicates that since Google classroom is new to the respondents, their curiosity to utilize the application is high, resulting from being in the learning portal even after class.

The google classroom also arouses the students' motivation, resulting in a positive perception of the SIM and the online learning platform. Since the students are constantly exposed to technology, that fact turned into a significantly positive effect on the challenged learners to utilize their gadgets in the right way by improving their learning and performance in using technology.

Furthermore, the statistical result revealed the self-encouragement of the challenged learners as well towards the Google classroom. The said learning platform provided is, therefore, an open opportunity for the respondents to participate, communicate, and share their ideas without being judge by their peers. Improving their weakness online with the activities formulated in the SIM elevates their performance that could be observed in the above findings. The utilization of such an online learning platform involves the learners in different activities and helps their learning beyond the information (Gil-Garcia & Clinton, cited in DiCicco, 2016).

Conclusion

Changing the challenged learners holistically to Science, particularly in Physical Science, is not easy to find a simple yet unique intervention. However, Google classroom and the teacher-made SIM can provide an appreciated way to facilitate and create a no online judgment facility in learning Science.

Based on the garnered data and analyses on the students' perception survey, the teacher-made strategic intervention material was overall helpful in improving their learning, specifically;

1. There is an increase in the performance level of the challenged learners of grade 12 based on the increase of the mean percentage score of posttests.
2. The teacher-made SIM promotes retention to the students as the delayed-posttest obtained a slight increase of mean percentage from the posttest.
3. The learners mostly perceived that the teacher-made SIM with Google classroom aroused their learning intention towards the subject, and learning science made it easy for them to understand.
4. The Google classroom requires an internet connection, a common problem for some students. The google classroom makes them awake until late at night to finish the activities in the SIM since they can log in anytime they wish, which might cause health complications.
5. There is a significant difference in the performance of the challenged learners before and after using the teacher-made SIM with Google classroom.
6. There is a positive correlation between the students' perception of the effectiveness of teacher-made SIM with the use of google classroom and their performance.

Recommendations

In line with the conclusion above, it is recommended that;

1. Devising a teacher-made SIM should maintain to cater to the challenged learners' needs and encourage them to strive more in learning the topics in Physical Science.
2. Related activities must be secure in the Google classroom to exercise the art of learning to promote learning retention.
3. The teacher and parents must secure an internet connection for the challenged learners to keep in touch with the activities. The teacher-involved should talk to the parents of the challenged learners to monitor their online activities.
4. Continuous monitoring of the students is needed to immediately address their needs and improve their weaknesses in the learning competency they failed to achieve.
5. Proper orientation towards the use of Google classroom in any teaching-learning activity should elaborate deeply by the

teacher-involve to the students and be oriented on the problems they might encounter.

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