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RESEARCH ARTICLE

STUDENT ATTITUDES AND BEST PRACTICES ON SCIENCE PERFORMANCE-BASED ASSESSMENT

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Abstract

Performance –based science assessments provide students with valuable experiences and opportunities to improve students' learning. Understanding the attitude of both teachers and students is an important aspect to design suitable performance-based assessment to ensure quality science education. Thus, this study was crafted to determine the teachers and students' attitude towards performance-based science assessment and best practices of teachers. This descriptive survey explored the attitude of teachers and students about performance –based assessment. While, Mann-Whitney U test was used to analyzed the significant difference between the teachers and students' attitude towards science performance – based assessment. Findings, suggest that students' viewed the test performance positively in terms of grading the students fairly in getting good marks in science. While science teachers, believe that class presentations provide opportunities for students, to demonstrate their ability and knowledge during science discussion. Mann-Whitney U test indicates a mismatched between the teachers and students' attitude on the performance-based science assessments. While, best practices of science teachers on science performance –based assessment are focused on student-centered activities such as simulation, student journals, exhibits, debates, community based project, project based learning, presentation of science investigatory project, and open-ended questions. Thus, it is necessary for the schools to strengthens the teachers' professional development especially in the development and innovations of effective science performance-based assessment tool in order to increase learners' achievement. It is also necessary to strengthens students' understanding about the role and importance of the different science performance task implored by the teacher.

Introduction:-

It is common among teachers to rate their learners according to the scores of their written test because the rates they get from it serves as the reflection of their academic achievement. However, test in a form of a multiple test questions, identification and filling the blanks serve only the rote memory of the learners. In reality, students learned based on the influence of other external factors. In designing the lesson of the teacher, the objectives were categorized based on the cognitive, affective and the psychomotor development task or goals of the lesson. Each

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lesson was deliver on this matter to each classroom, every day and in every subjects. A standardized test was made and used by the teacher to gauge the cognition level of the learners unfortunately other goals set in the lesson plan by the teachers are partially and even worse not measured. It is a sad reality that sometimes teachers use the standardized test to rate all three categories and use these measurements to determine the achievement of the students.

Nowadays, the use of performance tasked was highlighted in the grading system of the schools whereas, 50 - 40% of the total rating or grades of the students came from the tasked performed and completed by the learners. Tasked that are not limited with paper and pencil test but also included the process and final output of the learners. Performance output based on the process determines how students learn the concept and explain the steps of its development such as participation of the leaners to the activity being performed while performance based on the final output refers to the completed activity like portfolio, presentation, and electronic based output. In connection, performance tasked also supports the affective and psychomotor goals of the lessons. This assures that the total performance of the learners was measured.

Review of Related Literature:

In literature there are many definitions of performance – based assessment given by different authors. Palm (2008) stated that the definition of performance –based assessments varies greatly depending on author, disciple, publication and intended audience. According to Frechtling (1991) performance – based assessment is "anything that is not a multiple choice paper and pencil test". On the other hand, Fitzpatrick and Morrison (1971) also define it as "one in which some criterion situation is simulated to a much greater degree than is represented by the usual paper –pencil test".

Performance – based assessment is often used synonymously with other terms such as alternative assessment and authentic assessment. Authentic assessment can be define as a special kind of performance assessment conducted in an authentic context as part of normal classroom learning rather than as contrived, intrusive assessment tasks (Gipps, 1994). Alternative assessment, as characterized by Aschbacher (1991) requires problem solving and higher level thinking, involves tasks that are worthwhile as instructional activities, uses real-world context or simulations focuses on processes as well as products, and encourages disclosure of standards and criteria.

In general, a performance –based assessment measures students' ability to use the skills and concepts gained from a topic of study. Basically, the task challenges students to use their higher –order thinking skills to create a product or complete a process. (Chun, 2010). Task that is simple such as short answer questionnaire or a complex task such as science investigatory project or research proposals.

While any performance by a learner might be considered a performance task, it is useful to define its characteristics.

Hillard (2015) identifies the different characteristics of performance based assessment that "(1) the assessment accurately measures one or more specific course standards, (2) it is complex, (3) authentic, (4) process or product – oriented, (5) open –ended and (6) time-bound.

McTighe (2015) elaborated seven general characteristics of performance tasks;

1. Performance tasks call for the application of knowledge and skills, not just recall or recognition.
2. Performance tasks are open-ended and typically do not yield a single, correct answer.
3. Performance tasks establish novel and authentic contexts for performance
4. Performance tasks provide evidence of understanding via transfer.
5. Performance tasks are multi-faceted
6. Performance tasks can integrate two or more subjects as well as 21st century skills
7. Performances on open-ended tasks are evaluated with established criteria and rubrics.

With the aforementioned definitions and characteristics of performance-based assessment it is not surprising that school science has become an interesting arena for performance assessment.

Performance –based science assessments provide students with hands-on opportunities to demonstrate their knowledge and skills in science concept and not simply by recalling scientific facts but by constructing solutions (Baxter, 1991). In evaluating student performance there is an emphasis on the process by which students generate

solutions, not just on the correctness of the solution itself (Baxter et. el,1992). The idea that learners approach problem solving differently is due to varying styles and not to the different abilities of the learners (Paris et.al, 1991).

Many research shows effectivity of the science performance-based assessment in terms of its usefulness as well as its capability to improve teacher – student assessment in learning domain. However, in the light of all this effort to improve science assessment, students' attitude towards and exploration of the best practices on science performance was left behind. Thus, this study was crafted to determine the students' attitude and best practice on science performance-based assessment.

Specifically, it will answer the following questions

1. How do students feel about five different forms of performance-based assessment – test, portfolios, presentations,participation and E-based output?
2. What do teachers thinkabout students' attitudes to the five types of assessment: tests, portfolios, presentations, participation and e – based output?
3. Is there a difference between the teachers' opinion on students' attitude and the students' attitude on science performance-based assessment?
4. What are the best practices of teachers in science performance-based assessment?

Significance of the Study

Science education teachers are expected to provide learning activities and formative assessments which will prepare all students for performance based assessment upon completion of courses or programs. Results of this study can be used to inform the development of curricula for Science administrator and teacher preparation and professional development programs. Data from this study may also be of interest to state and local science education policy makers as they allocate funding and resources. The available literature is also sparse relative to guidelines or tools by which Science teacher competencies related to management of performance based assessment may be addressed in teacher performance evaluations. Study findings may also be useful as a basis for evaluation of current teacher and student preparation programs for science performance-based assessment content and as a guide for teacher professional development.

Methodology:-

The chapter places an emphasis on the research design used and the rationale for its use, as well as the assumptions behind the methodology and our role as researchers. Data collection and analysis procedures, along with the limitations and ethical considerations, are also detailed in this chapter.

Design of the Study

This study utilized a mixed research design. This study focused on the students' attitudes and best practices on science performance-based assessment. Survey questionnaires was used to determine the students' attitude and best practices on science performance assessment of the respondents. Content analysis within the qualitative research paradigm was used to explore the students' attitude and best practices on science performance-based assessment of the respondents.

Participants

Student Participants

As reflected in table 1, the study made use of 56 students, composed of 14 Grade 7 students (7 Male and 7 Female); 15 Grade 8 students (8 Male and 7 female); 13 Grade 10 students (3 Male and 10 Female) and 14 Grade 11 students (7 Males and 7 Female) of Pasig City Science High School enrolled during the school year 2018 – 2019 were the sources of data comprised in this study.

Table 1:- Student respondents that comprised the study.

Grade level	Male	Female	Total
Grade 7	**7**	**7**	**14**
Grade 8	**8**	**7**	**15**
Grade 10	**3**	**10**	**13**
Grade 11	**7**	**7**	**14**

Total	**25**	**31**	**56**

Teachers Participants
As reflected in table 2 atotal of fourteen teachers from public school in National Capital Region(NCR) filled out the teacher questionnaires. Five(5) of **the** teachers had over three years of teaching experience, one(1) teacher with 5 to 8 years in teaching experience, two(2) teachers had 9 to 12 years, one(1) teacher had 13 – 16 teaching experience and five(5) teachers had more than 16 years in service and al1 were currently using at least three of the assessment types under study in their classes.

Table 2:- Teacher respondents that comprised the study.

TEACHING EXPERIENCE (years)					TOTAL
1 - 4	**5 – 8**	**9 – 12**	**13 – 16**	**More than 16**	
5	**1**	**2**	**1**	**5**	**14**

Instruments Used
Studentparticipants filled out a questionnaire of 10 Likert-type scale type items in which they indicated their attitudes towards four different methods of classroom-based assessment: tests, portfolios, presentations, participation and e-based output. In effect, since the students were answering for each of the five types of assessment, they responded to 50 items in total. Students were also asked to fi11 in some background information about themselves such as age, gender and grade level. Finally, participants were asked to write what they either liked or disliked about getting marked on each of the five types of assessment. Aspace for comments wasalso included at the end of the questionnaire.

Teacher participants filled out a questionnaire of 10 Likert-type scale type items in which theyindicated their perceptions of student attitudes towards the five types of assessment: tests, portfolios, presentations, participation and e-base output. Background information on theteachers wasalso collected including such factors as length of time teaching and experience using traditional tests, portfolios, presentations, e-based output and participation for summative assessment purposes.

Data Collection and Analysis
In this study, the researcher utilized qualitative and quantitative analysis. The study used the close ended questions (Likert scale). Mean, frequency and percentage was used to report the data gathered from the survey questionnaires given to 14 science teachers and 56 students from four grade level of Pasig City Science High School. While, Mann-Whitney U test (Two-tailed Testing) a quantitative instrument was used to analyzed the significant difference between the teachersand students' attitude on science performance – based assessment. A 0.05 level of significance in Mann – Whitney U test was used in this study.

Table 3:- Mann-Whitney U interpretation of data.

Conditions	Interpretation
Ustat ≤ Ucrit at 0.05	**Significant**
Ustat > Ucrit at 0.05	**Not significant**

Ethical Considerations
In relation to the objective of the study, the researcher secured the safety and protection of the participants and the research locale. The researcher sought the approval of the concerned school before conducting the study to ensure that the study adhered to the ethical standards and guidelines in research of the said institution. The letter request to conduct the study was prepared and submitted to the principal. The researchers also made a parent consent letter before the respondents answered the questionnaires.

The data that were collected were treated with utmost anonymity and confidentiality since the researcher respects the rights of the participants for privacy and confidentiality.

In terms of providing complete information to the research participants regarding the nature of the study, the researcher included a short description of the nature and purpose of the study in the survey-questionnaire. In view of scientific honesty, the researcher made proper citations of original works that were included in this study.

Results And Discussion:-

This section contains the graphical and tabular presentations, analysis and interpretation of data based on the data gathered and simple statistical results.

Question 1:

How do students feel about five different forms of performance-based assessment – test, portfolios, presentations,participation and E-based output?

Table 4:- Students' attitude on how to be marked with the performance- based output.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. I would prefer to be mark on test.	15 (26.79%)	36 (64.29%)	2 (3.57%)	3 (5.36%)	0 (0.00%)		4.13
2. I would prefer to be mark on portfolio.	5 (8.93%)	29 (51.79%)	6 (10.70%)	13 (23.20%)	3 (5.36%)		3.36
3. I would prefer to be mark on presentation.	13 (23.21%)	33 (58.93%)	4 (7.14%)	4 (7.14%)	2 (3.57%)		3.91
4. I would prefer to be mark on participation.	18 (32.14%)	28 (50.00%)	4 (7.14%)	5 (8.93%)	1 (1.79%)		4.02
5. I would prefer to be mark on e-base output.	2 (3.57%)	35 (62.50%)	11 (19.60%)	6 (10.70%)	2 (3.57%)		3.52

Table 4 shows the students' attitude on how to be marked with the performance-based assessment. Most of the respondents believe that among the performance-based assessment tool it is necessary to be marked on test with a mean of 4.13 than other type of assessment. Next is the participation with the mean of 4.02. While the least is the portfolio with the mean of 3.36.

Respondents believe that standardized test provides them ownership with their achievement and higher scores on the test motivates them to study better thus, track their development with their scores. Presentation on the other hand promotes collaboration between learners, it is easy for the learners to interact and find effective solutions to a problem because of varied learning experiences.

Portfolio is the least among the assessment tools because of the issue of fairness of being marked on this type of tool.

Table 5:- Students' attitude towards the opportunity given by the performance-based output.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Getting marked on test is good because they have opportunity to show their ability.	16 (28.57%)	30 (53.57%)	2 (3.57%)	7 (12.50%)	1 (1.79%)		3.95
2. Getting marked on portfolio is good because they have opportunity to show their ability.	8 (14.29%)	19 (33.93%)	4 (7.14%)	20 (35.70%)	5 (8.93%)		3.09
3. Getting marked on presentation is good because they have opportunity to show their ability.	28 (50.00%)	21 (37.50%)	3 (5.36%)	2 (3.57%)	2 (3.57%)		4.27
4. Getting marked on participation is good because they have opportunity to show their ability..	24 (42.8	23 (41.0	1 (1.79%)	6 (10.7	2 (3.57		4.09

	6%)	7%)		0%)	%)		
5. Getting marked on e-base output is good because they have opportunity to show their ability.	6 (10.71%)	34 (60.71%)	8 (14.30%)	7 (12.50%)	1 (1.79%)		3.66

Table 5 shows the students' attitude towards the opportunity given by the performance-based assessment. Participants believe that presentation assessment provides them more opportunity with a mean of 4.27, followed by participation with the mean of 4.09 while the least is the portfolio assessment with a mean of 3.09.

Exploration and displays of learners' talents and skills defines the presentation and participation assessment. Participants view this as an opportunity to display their hidden talents especially in language and body kinesthetic. This proves that aside from laboratory activities it is also necessary for teachers to consider and utilized an assessment that includes activities that enhances the different talents of the students

However, portfolio assessment provides an opportunity for the researcher to look into for possible intervention to strengthen this type of assessment.

Table 6:- Students attitudes on how performance based assessment helps them learn.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Getting marked on test helps me learn.	22 (39.29%)	26 (46.43%)	2 (3.57%)	4 (7.14%)	2 (3.57%)		4.11
2. Getting marked on portfolio helps me learn.	5 (8.93%)	23 (41.07%)	5 (8.93%)	15 (26.80%)	8 (14.30%)		3.04
3. Getting marked on presentation helps me learn..	25 (44.64%)	23 (41.07%)	2 (3.57%)	4 (7.14%)	2 (3.57%)		3.16
4. Getting marked on participation helps me learn.	25 (44.64%)	27 (48.21%)	1 (1.79%)	2 (3.57%)	1 (1.79%)		4.30
5. Getting marked on e-based output helps me learn.	6 (10.71%)	30 (53.57%)	7 (12.50%)	12 (21.4%)	1 (1.79%)		3.50

Table 6 shows students' attitudes on how performance-based assessment helps them learn. The respondents believe that participation assessment helps them learn at 4.30 mean, followed by a test assessment with a mean of 4.11, electronic based output (e-based output) with a mean of 3.50, presentation with a mean 3.16 and lastly with portfolio assessment with a mean of 3.04.

Participation assessment makes the learners interact with their co-learners, thus, culture of collaboration is being intensify with this type of assessment. Learners assumes that learning new concepts is easy if exchange of ideas exist within their group.

On the other hand, portfolio assessment is more on individual effort and requires personal input on this task.

Table 7:- Students' attitude on fairness of performance-based assessment.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. I think getting marked on test is fair to me.	16 (28.57%)	34 (60.71%)	1 (1.79%)	5 (8.93%)	0 (0.00%)		4.09

2. I think getting marked on portfolio is fair to me.	11 (19.64%)	26 (46.43%)	3 (5.36%)	12 (21.40%)	4 (7.14%)		3.50
3. I think getting marked on presentation is fair to me.	16 (28.57%)	33 (58.93%)	1 (1.79%)	5 (8.93%)	1 (1.79%)		4.04
4. I think getting marked on participation is fair to me.	14 (25.00%)	32 (57.14%)	2 (3.57%)	6 (10.70%)	2 (3.57%)		3.89
5. I think getting marked on e-based output is fair to me	10 (17.86%)	32 (57.14%)	6 (10.70%)	4 (7.14%)	4 (7.14%)		3.71

Table 7. shows students' attitude on how performance – based assessment cultured fairness among the learners. Respondents believe that taking a test displays fairness with a mean of 4.09 as well as presentation assessment with a mean of 4.04, followed by participation assessment with a mean of 3.89, e-based output of 3.71 and lastly with portfolio assessment with a mean of 3.50.

Since that scores in the standardized test is exact and measured, it is normally viewed that it displays fairness. However, a majority of respondents also believe that presentation assessment displays fairness despite of its exposure to personal biases of the teacher. This response might be an indication that the use of rubrics in classroom presentation reinforce the beliefs of the learners of fairness in presentation assessment.

However, respondent views portfolio assessments are more prone from personal biases of the rater.

Table 8:- Students' attitude on getting a good mark on performance-based assessment.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. I know what I must do to get a good mark on test.	30 (53.57%)	22 (39.29%)	1 (1.79%)	2 (3.57%)	1 (1.79%)		4.39
2. I know what I must do to get a good mark on portfolio.	12 (21.43%)	34 (60.71%)	2 (3.57%)	5 (8.93%)	3 (5.36%)		3.84
3. I know what I must do to get a good mark on presentation.	23 (41.07%)	21 (37.50%)	7 (12.50%)	4 (7.14%)	1 (1.79%)		4.09
4. I know what I must do to get a good mark on participation.	21 (37.50%)	26 (46.43%)	4 (7.14%)	4 (7.14%)	1 (1.79%)		4.11
5. I know what I must do to get a good mark on e-base output.	13 (23.21%)	24 (42.86%)	10 (17.90%)	5 (8.93%)	4 (7.14%)		3.66

Table 8 shows students' attitude on getting a good grade on performance-based assessment. Respondents believe that their score on tests provides them with good marks (4.39), followed by participation (4.11), presentation (4.09), portfolio (3.84) and e-based output (3.66).

Respondents believe that test assessment provides them clear idea of how they are able to increase their scores in test. An exact and simple formula that will allow them to adjust and modify their approach.

However, e-based is the least among the assessment types because this is quite new to the learners as well as to their teachers.

Table 9:- Students' attitude on how performance-based assessment helps in improving cognition of science concepts.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Getting marked on test helps me improve my cognition of science concepts.	22 (39.29 %)	26 (46.43 %)	1 (1.79%)	5 (8.93 %)	2 (3.57 %)		4.09
2. Getting marked on portfolio helps me improve my cognition of science concepts.	7 (12.50 %)	27 (48.21 %)	3 (5.36%)	13 (23.20 %)	6 (10.70 %)		3.29
3. Getting marked on presentation helps me improve my cognition of science concepts	26 (46.43 %)	22 (39.29 %)	3 (5.36%)	4 (7.14 %)	1 (1.79 %)		4.21
4. Getting marked on participation helps me improve my cognition of science concepts	21 (37.50 %)	27 (48.21 %)	1 (1.79%)	5 (8.93 %)	2 (3.57 %)		4.07
5. Getting marked on e-based output helps me improve my cognition of science concepts	8 (14.29 %)	29 (51.79 %)	6 (10.70%)	12 (21.4 %)	1 (1.79 %)		3.55

Table 9 shows the students' attitude on how performance-based assessment helps in improving cognition of science concepts. Presentation marks the highest with a mean of 4.21, test with a mean of 4.09, participation with a mean of 4.07, e-based concepts with a mean of 3.55 and portfolio with a mean of 3.29.

It is surprising that presentation assessment has the highest mean among other assessment type since that cognition or concepts accumulation requires rigid and exact manner of development. This indicates that presentation activities fits the learning process of the students.

While, portfolio assessment sets in the bottom as it scores the least among the mean score.

Table 10:- Students' attitude on how performance – based assessment consumes time.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Test take(s) too much time.	9 (16.07%)	25 (44.64%)	1 (1.79%)	18 (32.1%)	3 (5.36%)		3.34
2. Portfolio take(s) too much time. .	27 (48.21%)	19 (33.93%)	1 (1.79%)	6 (10.70%)	3 (5.36%)		4.09
3. Presentation take(s) too much time..	17 (30.36%)	23 (41.07%)	2 (3.57%)	12 (21.40%)	2 (3.57%)		3.73
4. Participation take(s) too much time..	4 (7.14%)	20 (35.71%)	3 (5.36%)	19 (33.90%)	10 (17.90%)		2.80
5. E-base output take(s) too much time.	16 (28.57%)	19 (33.93%)	5 (8.93%)	13 (23.20%)	3 (5.36%)		3.57

Table 10 shows the students' attitude on how performance – based assessment consumes time. Mean shows that participation (2.80) assessment requires least amount of time, followed by test assessment (3.34), e-based output (3.57), presentation (3.73) and the most time is portfolio assessment (4.09).

Different science performance-based assessment requires time to accomplish by the students to gain an effective tool for assessment. Participation assessment requires least time because this type of assessment may occur within the period of one hour, just enough for a class discussion. Similarly, test assessment consumes also less amount of time for the preparation and accomplishments. It is also fitted within one hour of class meetings.

On the other hand, portfolio assessment requires more time of preparation and accomplishments, since it contains a collections of learners output and accomplishment, it requires them more time to accumulate and reflect on what the students learn within the entire period of study.

Table 11:- Students' attitude on how performance –based assessment shows ability in science.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Test are(is) good for showing my ability in science.	21 (37.50 %)	26 (46.43 %)	0 (0.00%)	7 (12.50 %)	2 (3.57%)		4.02
2. Portfolio are(is) good for showing my ability in science..	9 (16.07 %)	19 (33.93 %)	4 (7.14%)	16 (28.60 %)	8 (14.30 %)		3.09
3. Presentation are(is) good for showing my ability in science.	24 (42.86 %)	23 (41.07 %)	0 (0.00%)	7 (12.50 %)	2 (3.57%)		4.07
4. Participation are(is) good for showing my ability in science.	18 (32.14 %)	28 (50.00 %)	2 (3.57%)	7 (12.50 %)	1 (1.79%)		3.98
5. E-base output are(is) good for showing my ability in science.	10 (17.86 %)	23 (41.07 %)	6 (10.70%)	14 (25.00 %)	3 (5.36%)		3.41

Table 11 shows students' attitude on how performance – based assessment shows ability in science. Presentation assessment has the highest mean of 4.07, Test assessment with 4.02, participation assessment with a mean scores of 3.98, e-based output with a mean of 3.41 and lastly portfolio assessment with a mean of 3.09.

Presentation assessment highlights the ability of students in science in terms of concept presentation, problem solving and critical thinking. It is also utilized by the teacher to enhance strong networks with other agencies to help the learners gather information about their presentation.

However, students perceived portfolio as the least type of assessment that shows ability in science. This type of negative perception towards portfolio is a contradiction to its main goal of the assessment material because portfolio contains a collection of all the works of the students thus, showing the ability in science of the respondents.

Table 12:- Students' attitude on how performance –based assessment should be used for marks.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Test should be used for marks	19 (33.93%)	31 (55.36%)	1 (1.79%)	4 (7.14%)	1 (1.79%)		4.13
2. Portfolio should be used for marks	8 (14.29%)	23 (41.07%)	4 (7.14%)	16 (28.60%)	5 (8.93%)		3.23
3. Presentation should be used for marks.	22 (39.29%)	18 (32.14%)	4 (7.14%)	11 (19.60%)	1 (1.79%)		3.88
4. Participation should be used for marks.	16 (28.57%)	29 (51.79%)	2 (3.57%)	6 (10.70%)	3 (5.36%)		3.88
5. E-base output should be used for marks	8 (14.29%)	29 (51.79%)	6 (10.70%)	9 (16.10%)	4 (7.14%)		3.50

Table 12 shows students' attitude on how performance – based assessment should be used for marks. Respondents viewed test assessment (4.13) as the most reliable way of being mark or graded in science subject. Followed by presentation and participation with similar mean of 3.88. E-based output with a mean of 3.50 and lastly portfolio assessment as 3.23.

Respondents perception about test assessment might be due to its accuracy and definite nature of gathered test scores. This tool also acts as a feedback mechanism to the learner to easily interpret and analyzed their performance in science subjects.

On the other hand, portfolio assessment was viewed by the respondents as the least because of its complexities and difficulty to predict their possible scores.

Table 13:- Students' attitude on how performance –based assessment makes me put in more effort in class.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Getting marked on test makes me put in more effort in class	24 (42.86 %)	23 (41.07 %)	1 (1.79%)	7 (12.50 %)	1 (1.79 %)		4.11
2. Getting marked on portfolio makes me put in more effort in class	18 (32.14 %)	22 (39.29 %)	4 (7.14%)	8 (14.30 %)	4 (7.14 %)		3.75
3. Getting marked on presentation makes me put in more effort in class	29 (51.79 %)	21 (37.50 %)	3 (5.36%)	2 (3.57%)	1 (1.79 %)		4.34
4. Getting marked on participation makes me put in more effort in class	26 (46.43 %)	21 (37.50 %)	5 (8.93%)	2 (3.57%)	2 (3.57 %)		4.20
5. Getting marked on e-based output makes me put in more effort in class	11 (19.64 %)	29 (51.79 %)	7 (12.50%)	6 (10.70 %)	3 (5.36 %)		3.70

Table 13 shows the students' attitude on how performance –based assessment makes learners put more effort in class. Among the different types of assessment tools in science, Presentation assessment was viewed by the respondents as a form of assessment that requires more effort to be given in class with a mean of 4.34, followed by participation assessment (4.20), Test assessment (4.11), portfolio assessment (3.75) and the least is e-based output (3.70).

These findings suggest that students tend to provide more effort in presentation assessment. In this form of assessment, students were required to conduct an in-depth study on the topic of the presentation, in order to present a good report. Similarly, participation assessment requires the student to make a collaboration within the group.

E-based output assessment is the least among the science performance-based assessment, since students are aware on the use of computer and its other applications, it is easy for the students to create simple and complex tasks assigned as electronic-based output.

Question 2.
What do teachers think about students' attitudes to the five types of assessment: tests, portfolios, presentations, participation and e – based output?

Table 14:- Teachers opinion about student attitudes towards how to be marked by science performance-based assessment.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. I think student prefer to be mark on test.	5 (35.70%)	8 (57.10%)	0 (0.00%)	1 (7.14%)	0 (0.00%)		4.21

2 I think student prefer to be mark on portfolio.	4 (28.6%)	10 (71.40%)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.29
3. I think student prefer to be mark on presentation.	10 (71.40%)	4 28.60%)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.71
4. I think student prefer to be mark on participation.	8 (57.10%)	5 (35.70%)	0 (0.00%)	1 (7.14%)	0 (0.00%)		4.43
5. I think student prefer to be mark on e-base output.	3 (21.40%)	9 (64.30%)	0 (0.00%)	2 (14.30%)	0 (0.00%)		3.93

Table 14 shows the teachers opinion about student attitudes towards how to be marked by science performance – based assessment. Teachers believe that most student had a positive inclination with the presentation assessment (4.71) that students want to be mark in this type of assessment, followed by participation with 4.43 mean, portfolio assessment with 4.29, test with 4.21 and last with electronic-based output assessment.

This idea may be influence with the experience of the teacher on how student responds with different form of science performance – based assessment.

Table 15:- Teachers opinion about students' attitude towards the opportunity given by the performance-based output.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Students think getting marked on test is good because they have opportunity to show their ability.	4 (28.60%)	7 (50.00%)	0 (0.00%)	3 (21.40%)	0 (0.00%)		3.86
2. Students think getting marked on portfolio is good because they have opportunity to show their ability.	6 (42.90%)	8 (57.10%)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.43
3. Students think getting marked on presentation is good because they have opportunity to show their ability.	11 (78.60%)	3 (21.40%)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.79
4. Students think getting marked on participation is good because they have opportunity to show their ability..	10 (71.40%)	4 (28.60%)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.71
5. Students think getting marked on e-base output is good because they have opportunity to show their ability.	7 (50.00%)	6 (42.90%)	0 (0.00%)	1 (7.14%)	0 (0.00%)		4,36

Table 15 shows the teachers opinion about students' attitude towards the opportunity given by the performance-based output. Most of the teachers believe that presentation assessment gives an opportunity for a child to display their potentials. Next is participation assessment (4.71), portfolio (4.43), e-based output (4.36 and last is test assessment (3.86)

Teachers perception might be from their observation on how students behaves or reacts on a particular activities given by the teachers.

Table 16:- Teachers opinion about students' attitude on how performance-based assessment will help the students learn.

	Strongly agree	Agree	Don't Know	Disagree	Strongly		Mean

					Disagree		
1. Students think getting marked on test belps them learn.	7 (50.00 %)	5 (35.70 %)	0 (0.00%)	2 (14.30 %)	0 (0.00%)		4.21
2. Students think getting marked on portfolio belps them learn	5 (35.70 %)	8 (57.10 %)	0 (0.00%)	1 (7.14%)	0 (0.00%)		4.21
3. Students think getting marked on presentation belps them learn.	8 (57.10 %)	6 (42.90 %)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.57
4. Students think getting marked on participation belps them learn..	8 (57.10 %)	6 (42.90 %)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.57
5. Students think getting marked on e-based output belps them learn.	3 (21.40 %)	10 (71.40 %)	0 (0.00%)	1 (7.14%)	0 (0.00%)		4,07

Table 16 shows teachers' opinion about students' attitude on how performance-based assessment will help the students to learn. Presentation and participation assessment were perceived by the teachers as a form of assessment that aide in the learning process of the students, followed by test and portfolio assessment with similar mean of 4.21 and last by e-based output assessment (4.07)

This opinion of the teachers on the students' attitude may influence the type of assessment they will use in their classes, especially if the objective of the teacher is to help the students learn a lesson.

Table 17:- Teachers opinion on how student think on issues of fairness in getting marked using science performance – based assessment .

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Students think getting marked on test is fair to them.	8 (57.10 %)	6 (42.90 %)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.57
2. Students think getting marked on portfolio is fair to them.	4 (28.60 %)	9 (64.30 %)	0 (0.00%)	1 (7.14%)	0 (0.00%)		4.14
3. Students think getting marked on presentation is fair to them.	6 (42.90 %)	8 (57.10 %)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.43
4. Students think getting marked on participation is fair to them..	8 (57.10 %)	6 (42.90 %)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.57
5. Students think getting marked on e-based output is fair to them.	3 (21.40 %)	9 (64.30 %)	0 (0.00%)	2 (14.30 %)	0 (0.00%)		3.93

Table 17 shows teachers' opinion on how student think on issues of fairness in getting marked using science performance – based assessment. Teachers believe that students look at test (4.57) and participation (4.57) as a form of assessment that displays fairness in terms of how they are being mark in the class. This is followed by presentation (4.43), portfolio (4.14) and last e-based output assessment (3.39).

These findings offer opportunity to educate other teachers on the standards and proper used of different science performance-based assessment instrument to manage the class as well as motivate our learners.

Table 18:- Teachers opinion on how students think on what they must do to get a good mark.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Students know what they must do to get a good mark on test.	9 (64.30 %)	4 (28.60 %)	0 (0.00%)	1 (7.14 %)	0 (0.00 %)		4.50
2. Students know what they must do to get a good mark on portfolio.	6 (42.90 %)	8 (57.10 %)	0 (0.00%)	0 (0.00 %)	0 (0.00 %)		4.43
3. Students know what they must do to get a good mark on performance	8 (57.10 %)	6 (42.90 %)	0 (0.00%)	0 (0.00 %)	0 (0.00 %)		4.57
4. Students know what they must do to get a good mark on participation.	6 (42.90 %)	8 (57.10 %)	0 (0.00%)	0 (0.00 %)	0 (0.00 %)		4.43
5. Students know what they must do to get a good mark on e-based output.	4 (28.60 %)	9 (64.30 %)	0 (0.00%)	1 (7.14 %)	0 (0.00 %)		4.14

Table 18 offers a results that displays teachers' opinion on how students think on what they must do to get a good mark. Teachers think that students focus more on the performance assessment (4.57), followed by test (4.50), then by portfolio and participation (4.43) and last with e-based output performance assessment.

These findings show the teachers idea on what type of assessment needs more consideration and time, thus teachers may give more leeway in terms of time and preparation.

However, e-based output requires less effort since the learner is more oriented in computers and gadgets which is the primary material in building –up electronic based output.

Table 19:- Teachers opinion on how students think on how performance-based assessment helps them improve science concepts.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Students think getting marked on test helps them improve their cognition of science concepts.	12 (85.70%)	1 (7.14 %)	0 (0.00%)	1 (7.14 %)	0 (0.00 %)		4.71
2. Students think getting marked on portfolio helps them improve their cognition of science concepts.	5 (35.70%)	8 (57.10%)	0 (0.00%)	1 (7.14 %)	0 (0.00 %)		4.21
3. Students think getting marked on performance helps them improve their cognition of science concepts	6 (42.90%)	8 (57.10%)	0 (0.00%)	0 (0.00 %)	0 (0.00 %)		4.43
4. Students think getting marked on participation helps them improve their cognition of science concepts.	9 (64.30%)	5 (35.70%)	0 (0.00%)	0 (0.00 %)	0 (0.00 %)		4.64
5. Students think getting marked on e-based output helps them improve their cognition of science concepts	6 (42.90%)	7 (50.00%)	0 (0.00%)	1 (7.14 %)	0 (0.00 %)		4.29

Table 19 shows teachers' opinion on how students think on how performance-based assessment helps them improve science concepts. Among the performance-based assessment that improves science concept, test assessment (4.71)

was regards as the most favorable process that improves science concepts in the classroom, followed by participation (4.64), performance (4.43), e-based output (4.29) and portfolio (4.21).

Although the aforementioned type of performance-based assessment was ranked according to its mean, results reflects high means, thus science teachers perceived positive impact of science performance-based assessment in terms of improving the science concepts of the learners.

Table 20:- Teachers opinion on how students think on how performance-based assessment are good for showing their ability in science .

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Students think test are(is) good for showing their ability in science.	5 (35.70 %)	8 (57.10 %)	0 (0.00%)	1 (7.14 %)	0 (0.00 %)		4.21
2. Students think portfolio are(is) good for showing their ability in science.	4 (28.60 %)	9 (64.30 %)	0 (0.00%)	1 (7.14 %)	0 (0.00 %)		4.14
3. Students think presentation are(is) good for showing their ability in science	11 (78.60 %)	3 (21.40 %)	0 (0.00%)	0 (0.00 %)	0 (0.00 %)		4.79
4. Students think participation are(is) good for showing their ability in science.	10 (71.40 %)	4 (28.60 %)	0 (0.00%)	0 (0.00 %)	0 (0.00 %)		4.71
5. Students think e-based output are(is) good for showing their ability in science	6 (42.90 %)	7 (50.00 %)	0 (0.00%)	1 (7.14 %)	0 (0.00 %)		4.29

Table 20 shows teachers' opinion about how performance-based assessment are good for showing the ability of the students in science. Teachers think that presentation assessment (4.79) promotes enhancement of the students' abilities in science, followed by participation (4.71), e-based output (4.29), test (4.21) and portfolio assessment (4.14).

The mean scores suggest the effectiveness of this assessment from the teachers' point of view – including experiences, preferences as well as acceptance of the learners, hence teachers perceived this effective.

Table 21:- Teachers opinion on how students think on how performance-based assessment should be used for mark.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Students think test should be used for marks.	11 (78.60%)	3 (21.40%)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.79
2. Students think portfolio should be used for marks	6 (42.90%)	8 (57.10%)	0 (0.00%)	1 (7.14%)	0 (0.00%)		4.43
3. Students think presentation should be used for marks	10 (71.40%)	4 (28.60%)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.71
4. Students think participation should be used for marks	9 (64.30%)	5 (35.70%)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.64
5. Students think e-based output should be	4	8	0	0	0		4.00

used for marks	(28.60%)	(57.10%)	(0.00%)	(0.00%)	(0.00%)		

Table 21 depicts the teachers' opinion on how students think on the use of performance-based assessment for students' mark. Teachers believe that their student wants to be mark using the test(4.79), followed by the presentation (4.71), participation (4.64), portfolio(4.43) and e-based output(4.00).

The idea of being mark in a particular type of assessment motivates the learners and most of the common type of assessment that is popular to both teachers and students is the use of test assessment. Most probably because of the definite and concrete scores that teachers can get.

On the other hand, e-based output is less popular among teachers as suggested by their mean scores, most probably because of their limited knowledge about materials develop by the learners with the aid of computer hence teachers should be oriented with this type of assessment as the educational system are promoting the 21st century skills to the students. Information and communication technology is a major component of this 21st century skills and learners should be equipped in this type of domain.

Table 22 shows teachers' opinion on how students think on the performance-based assessment in terms of putting in more effort to accomplish the task. Based on the results of the means, teachers perceived that students put more effort in making presentation (4.93), followed by participation (4.71), portfolio (4.64), test (4.50) and e-based output assessment (4.29).

Table 22:- Teachers opinion on how students think on how performance-based assessment make them put in more effort in class.

	Strongly agree	Agree	Don't Know	Disagree	Strongly Disagree		Mean
1. Students think getting marked on test makes them put in more effort in class.	7 (50.00%)	7 (50.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.50
2. Students think getting marked on portfolio makes them put in more effort in class	9 (42.90%)	5 (57.10%)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.64
3. Students think getting marked on presentations makes them put in more effort in class	13 (71.40%)	1 (28.60%)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.93
4. Students think getting marked on participation makes them put in more effort in class	10 (64.30%)	4 (35.70%)	0 (0.00%)	0 (0.00%)	0 (0.00%)		4.71
5. Students think getting marked on e-based output makes them put in more effort in class	6 (42.90%)	7 (50.00%)	0 (0.00%)	1 (7.14%)	0 (0.00%)		4.29

Each science performance – based assessment is unique in terms of their requirements, time and resources, thus science teachers should get an in-depth understanding about its nature in order to utilized the main purposed of the assessment.

Question 3

Is there a difference between the teachers' opinion on students' attitude and the students' attitude on science performance-based assessment?

Table 23:- Teachers opinion on students' attitude vs students' attitude on scienceperformance –based assessment

	Rank Sum	U_{stat}	U_{crit}	Remarks
Question 1				

Student	17.00	2.00	2.00	Significant
Teacher	38.00	23.00		
Question 2				
Student	18.00	3.00	2.00	Not significant
Teacher	37.00	22.00		
Question 3				
Student	20.00	5.00	5.00	Not Significant
Teacher	35.00	20.00		
Question 4				
Student	17.00	2.00	2.00	Significant
Teacher	38.00	23.00		
Question 5				
Student	16.00	1.00	2.00	significant
Teacher	39.00	24.00		
Question 6				
Student	15.50	0.50	2.00	Significant
Teacher	39.50	24.50		
Question 7				
Student	21.00	6.00	2.00	Not significant
Teacher	34.00	19.00		
Question 8				
Student	15.00	0.00	2.00	Significant
Teacher	40.00	25.00		
Question 9				
Student	16.00	1.00	2.00	Significant
Teacher	39.00	24.00		
Question 10				
Student	16.00	1.00	2.00	Significant
Teacher	39.00	24.00		

Table 23 shows the results of the Mann-Whitney U (Two – Tailed Testing) of teachers' opinion on students' attitude versus students' attitude on science performance – based assessment. Determination of significant difference was made for the ten sets of questions to find its significant difference between teachers' opinion on students' attitude and students' attitude on five types of science performance-based assessment namely; test, portfolio, performance, participation and e-based output.

For question 1, it identifies the preference of the students versus the teachers' opinion to be marked on different science performance-based assessment tool. Since the Ustat = Ucrit at $\alpha = 0.05$ level of significance, the results suggest a significant difference between the preference of the teachers' opinion on students' attitude versus the students' attitude. For example, most teachers believe that the use of portfolio in giving assessment is favorable with the students' attitude however this is in contrary with their attitudes. Students don't want to be graded base on portfolio assessment because it is prone to biases.

For question 2 comparison, results suggest that (Ustat > Ucrit at alpha 0.05) no significant difference between the teachers' opinion on student attitudes versus the student attitudes. Teachers and student both agreed that presentation and participation provides them opportunity to show their ability in class.

For question 3 comparison, results suggest the (Ustat > Ucrit at alpha 0.05) no significant difference between Teachers' opinion on students' attitude against students' attitude. Both groups agreed that participation assessment helps them lean.

For question 4 comparison, results show that Ustat = Ucrit at $\alpha = 0.05$ level of significance. It suggests significant difference between the two groups. Both groups provide different idea on what type of assessment will demonstrate fairness among students.

For question 5 comparison, results show that Ustat < Ucrit at alpha 0.05, it suggests a significant difference between the two groups. Based from the observe value of the means of student attitude towards students' understanding on how to get a good mark with different performance-based assessment. Students felt confusion and doubt on how different performance – based assessment was graded by their teachers.

For question 6 comparison, results show that Ustat < Ucrit at alpha 0.05, it suggests significant difference on how performance –based assessment improve students' level of cognition of science concepts.

For question 7 comparison, results suggest that Ustat > Ucrit at alpha 0.05, it suggest no significant difference between the two groups. Both of them believe that all types of assess requires time to accomplish.

For question 8 comparison, results show that Ustat < Ucrit at alpha 0.05, this means the significant difference between the two groups. Both groups had different perception on what particular performance task will display the students' ability.

For question 9 comparison, results show that Ustat < Ucrit at alpha 0.05, this shows significant difference between the two groups in terms of identifying what particular science performance task should be used for marking.

For question 10 comparison, results show that Ustat < Ucrit at alpha 0.05, this shows significant difference between the two groups in terms of what particular performance –based assessment will make students put in more effort in class. Most students have a positive attitude towards presentation and participation while teachers want to deal with portfolio assessment.

In general, there is a mismatched between the students' attitude and teachers' opinion on students' attitude on the use of science performance-based assessment. This might cause a problem on giving marks to the students by the teachers since they have a different beliefs and ideas.

Question 4
What are the best practices of teachers in science performance-based assessment?

Fourteen science teachers from different public schools in National Capital Region (NCR) were asked to answer the survey questionnaires about the best practices they adhere in science performance – based assessment and this are their responses.

Table 24:- Best practices of science teachers on science-based performance assessment.

Best Practices	Short Description	Logical framework
Simulation	The aim is for the student to showcase their learning through the use of models. The class will be divided into smaller groups usually composed of 5 members.	Learning by doing. Students learn/remember the concept if they do.
Student Journals, Exhibits, Project (SIP) Debates	Performance based assessment requires student to perform a task using skills learned in the class. It allows them to demonstrate their learning in unique way using their skills and talents.	Learners draw his own fast experience and existing knowledge to discover facts and relationships and new truths to be learned. Students will interact with the world by exploring and manipulating objects on performing experiments.
Community-based project	It was employed as a performance tasks for the students to apply what they have learned in ecosystem. Students were asked to identify an environmental problem in their community. Write a plan of action on how they can help solve it, and then implement their plan. They were graded based on the rubrics given to them. The purpose of the project is to apply what they have learned in ecosystem and develop students' awareness on the	Based on past experiences, students find it interesting to come up with an output involving problem-solving and integrating or applying their knowledge and skills in real life situations.

	present condition of the environment.	
Test, presentation and participation	The aim of the performance based assessment is to measure how much they learn in the topic discussed in the classroom. The assessment should vary in order to measure all aspects of learning. It should be designed for all types of learners (ex. In the class)	---
Project-based Learning (PBL)	Objective: To create a investigation of a certain concepts or To present a science concepts given rubrics. Target Group: Grade 7 Method: At the start of the quarter, present the theme to the students as well as the objectives/competencies. From the listed competencies, students create or design a plan of a project showing/explaining a science concept. This can be integrated with other learning areas. Provide a rubric for rating.	INPUT Present the theme PROCESS Provide activities that will help the students understand the concepts. Students are presented the rubrics. Students plan for their project. OUTPUT Students present their project/work based on the rubrics.
Presentation of science investigation output	If target not only the cognition domain but also the psychomotor and the affective.	From the concept/science concept, conceptual understanding ↓ Inquiry – based ↓ Perform the activity ↓ Misconceptions Motivation of prior knowledge
MCO's, Open – Ended Questions performance – based assessment	For classes with multiple intelligences For holistic development	Effective in chemistry teaching.

The best practices science teachers adhere are the following, simulation, Student journals, exhibits, SIP projects, debates, community – based project, test, presentation and participation, project – based Learning (PBL) presentation of science investigation output, MCO's Open – Ended questions performance – based assessment.

In general, best practices of science teachers implore student –centered principles whereas students act as independent learner to understand concepts in science and conducts researches that commands community involvement, to craft solutions to environmental problems.

By performing the abovementioned best practices of science teachers from different public schools in national capital region, it depicts a tried and tested methods that produce or gains positive results to their student as well as to their schools. Improving the student achievements and developing the 21st century skills to the students.

Summary Of Findings, Conclusion And Recommendation:-

This chapter provides the summary of findings, conclusions and the recommendation from the study conducted by the researcher.

Summary Of Findings

From the study conducted the following results were documented and identified by the researcher below;

1. Based on the survey of the students' attitude on science performance-based assessment, learners viewed the test performance positively in terms of grading the students fairlyin getting good marks in science. On the other hand, class presentation as a science performance – based assessment, shows positive response to the students in terms of providing opportunities in learning science concept, help the learner improves understanding science

concept, and maximizing the students' ability in science. Participation assessment scored high in helping the students learn, while portfolio was viewed by the learners as a type of assessment that requires more time to complete and accomplish.

2. The teachers' opinion on students' attitude indicate positive response towards class presentation as a science performance – based assessment in terms of students' preference for marking in science, it provides an opportunity for learners, to shows students' ability and active participation during science class. While test and participation was perceived by the teacher of being fair, and help improve science ability.
3. Upon analysis of the students and teachers' attitude, it is identified that out of ten sets of questions only three (3) topics suggest a no significant difference and seven (7) statement with significant difference.
4. The science teachers suggest different best practices on science performance –based assessment namely; simulation, student journals, exhibits, projects, debates, community based project, test, presentation, participation, project based learning, presentation of science investigatory project, and open-ended questions.

Conclusions:-

Based from the foregoing findings the following conclusions were drawn;

1. Students should have an orientation on the different types of assessment that they will perform in the classroom. A rubric will help them understand the goals or purpose of each type of science performance-based assessment and to know how they are being marked by their teachers.
2. Teachers should study gauge and study their leaners to create an effective science performance –based assessment. If the teachers know his students he can implement the best plan to gauge the learners on the topics of science. It is good to know that a teacher has a mastery of one form of science performance-based assessment but it will be helpful if teachers are equipped to administer different types of assessment to measure different preference, ability, and intelligences of the learners.
3. There is a clear mismatched of students' attitude against teachers' opinion on the student attitudes, thus teachers cannot make a comprehensive analysis of the learners' achievement. Teachers should analyze the results of the science performance –based assessment of the students to help them develop holistically.
4. Teachers creates their own best practices in science performance-based assessment, with the idea that they want to help their learners, Base on the list of best practices in science performance – based assessment, it is all created with one philosophical truth, that education should employ learner-centered approach to help the learners to develop their knowledge and skills.

Recommendation:-

Based from the abovementioned conclusion, the following recommendations was formulated by the researcher.

1. There should be a standardized rubrics given to the teachers that they can follow or modify according to the needs and orientation of the students' culture and local. A prepared rubric should be the results of the collaborative effort of the teachers, to gain supports and implementation of the science performance –based assessment.
2. There should be a comprehensive professional meetings conducted weekly to address immediate issues or opportunities to improve the existing performance –based assessment of the schools.
3. Schools should administer yearly, professional visits to different institution that garnered best practices of other schools.
4. Research study should be conducted to test the effectiveness of the science performance-based assessment, especially in the use of new technology to assess the learner in science curriculum.
5. Evaluation and adaptation of the best practices in science performance –based assessment should be made by the teachers of the school.

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