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Teachers' Pedagogy In Science Integration: A Proposed Program

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A B S T R A C T

The study examined a controversial aspect of the K–12 curriculum: the supposed decongestion which resulted in integration of Science with other core subjects in the first and second grade levels. To know whether there is a disparity in the goals of the curriculum and the goal of achieving high aptitude in the science competency examination for second graders, this study conducted both quantitative analysis of the aptitude scores of the students from 2015 to 2018 and qualitative analysis of the interview statements of Grade 2 teachers and of the content of their respective lesson plans. Results showed that scaled scores of the students from 2015 to 2018 follow the same trend. Based on the interviews, there was mostly a negative perception towards the curriculum among the teachers. In terms of the actualization of the curriculum, teachers have varying strategies both in integrating and teaching science separately. However, a number of unresolved issues throughout the integration process were observed. Hence, a proposed Science Integration Program that aims to maximize the mandated integrative teaching strategies for science concepts to increase the aptitude scores of students and help teachers in resolving the issues that they face.

RESUMO

O estudo examinou um aspecto controverso do currículo do ensino fundamental e médio: o suposto descongestionamento que resultou na integração das ciências com outras disciplinas centrais nos níveis de primeira e segunda séries. Para saber se existe uma disparidade nos objetivos do currículo e no objetivo de alcançar alta aptidão no exame de competência em ciências para alunos da segunda série, este estudo conduziu tanto a análise quantitativa das notas de aptidão dos alunos de 2015 a 2018 quanto a análise qualitativa das declarações das entrevistas dos professores da 2ª série e do conteúdo de seus respectivos planos de aula. Os resultados mostraram que as pontuações escalonadas dos alunos de 2015 a 2018 seguem a mesma tendência. Com base nas entrevistas, houve principalmente uma percepção negativa em relação ao currículo entre os professores. Em termos de atualização do currículo, os professores têm estratégias variadas, tanto na integração como no ensino das ciências separadamente. No entanto, foram observadas uma série de questões não resolvidas ao longo do processo de integração. Portanto, uma proposta de Programa de Integração Científica que visa maximizar as estratégias de ensino integrativo obrigatórias para conceitos científicos para aumentar as pontuações de aptidão dos alunos e ajudar os professores a resolver os problemas que enfrentam.

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Introduction

In the 1980s, the Philippines was following the New Elementary School Curriculum until 2002 when the Basic Education Curriculum (BEC) was adapted. On its first year, DepEd monitored the change brought by BEC and immediately implemented revisions through the Revised Basic Education Curriculum (RBEC) the following year. One of the focuses of BEC and RBEC is the "decongestion of overcrowded curriculum" as stated in the DepEd Order, no. 25, s. 2002. Decongestion focuses on four core subjects: Filipino, English, Math and Science, while emphasizing integrative learning, for the other subjects such as Values Education and the likes.

In 2013, the passage of the Enhanced Basic Education Act mandated the DepEd to introduce a new curriculum for basic education. This reform is alongside the extending of basic education from 10 to 12 years. This law completed the institutionalization of the K-12 program which supplemented the passage of Kindergarten Education Act a year prior.

As cited in the K to 12 Basic Education Program (2012), it is the flagship program of DepEd in its desire to offer a curriculum that is attuned to the 21st century. This may sound promising but each subject area has its own challenges to face. One of these is the effective use of Mother Tongue Based-Multi-lingual Education (MTB-MLE) in teaching all the learning areas except in English for first and second grades (Grades 1 and 2). Meanwhile, for Science, one major source of problem and controversy is the critical revision of Science teaching in the primary elementary level, specifically for Grades 1 and 2. From being taught as a separate subject, science concepts are now integrated and taught with core subjects (i.e. English, Filipino, and Mathematics). This reform has opened a debate on Science pedagogy in the Philippines.

DepEd argued that the curriculum for science is congested. To resolve this, Science is no longer taught as a separate subject in first two grade levels, instead, incorporated with other subjects in order to focus on fundamental skills like numeracy and literacy (Sarmiento, 2013). Science would be introduced as a separate subject starting only on Grade 3. Armin Luistro, then DepEd secretary, also argued that this alteration in the science curriculum would make the classes across the Philippines more enjoyable and more child-friendly (Sarmiento, 2013; Asian Scientist Newsroom, 2012). He even furthered that this change in the science curriculum may help in catching up with the outstanding performance of our peers in Singapore, South Korea, Taiwan, Hong Kong, and Japan (Sarmiento, 2013).

However, there seems to be inconsistency in the Science integration policy considering that Science is included in the National Achievement Test (NAT) for Grade 3 along with other subjects like English, Math, and Filipino which are being taught as separate subjects in Grades 1 and 2. This results to another problem as the competency of students in Science are tested on

their 2nd grade through the Center for Educational Measurement (CEM), which is given to a number of private basic education schools in Metro Manila including the "*Red University-Manila,*" the case subject of this research.

Considering the foregoing, it is the goal of this study to determine whether there is actually a disparity in the actual teaching methods and the perceived goal of having a high Science aptitude score by the students. To answer this, a case study was conducted in "*Red University-Manila*" by performing a descriptive analysis of the CEM scores of the Grade 2 students, as provided in the report by the Guidance Counsellor's Office, which were subsequently triangulated to the result of the interview with teachers and document analysis of their respective lesson plans.

Statement of the Problem

Since 2012, "*Red University-Manila*" conducts an assessment examination provided by the CEM. Its main purpose it to measure the competency of Grade 2 students and from these results, suggest improvements on school practices. The examination for Grade 2 pupils through the CEM includes measurement for the K to 12 core subjects, specifically, English, Mathematics, and Filipino. In addition to these, the exam also measures Science competency of students focusing on four units: a) Living Things and Their Environment; b) Matter; c) Force and Motion; and d) Earth and Space. Due to science integration reform, a major challenge that teachers face is to implement this reform effectively and simultaneously achieve the goal of high aptitude score in the CEM test.

From this problem, this action research intended to know the integrative teaching strategies which would result in higher aptitude scores in the four units of Science. In answering this, the research was guided by the following supporting questions:

a) What is the pattern in the science scores of Grade 2 students from 2015 to 2018 in the CEM exams?

b) How do Grade 2 teachers perceive and actualize the integration of science with other subjects?

c) Is there a disparity in the actual teaching methods and perceived goal of having a high Science aptitude score?

Significance of the Study

First, the research and its findings can help teachers in their professional development by considering their issues, own views, and their concerns on the actualization of science integration with other subjects, and addressing them by presenting to them the proposed Science Integration Program. This can help in building teacher capacity and confidence, and help ease the teaching of science concepts along with other lessons as there is a concrete guide that they can follow.

The result of this study can be utilized, as well, in the formulation of better programs and strategies in the teaching and learning Science. Accordingly, if these efforts become successful, the students will also be expected to yield higher aptitude scores especially in Science competency.

Additionally, findings can aid policy-makers and curriculum developers to determine areas in the curriculum that need to be improved, particularly when it comes to science pedagogy for the primary level. Aside from this, the study hopes to be an eye-opener for them to recognize the issues and concerns that the teachers and educators face in implementing the changes in the curriculum. Recognizing the issues can help in creating an appropriate strategic plan in assessing and monitoring the learning outcomes of pupils. This action research can also provide a stepping stone to future researchers in further analysis and evaluation of the changes in the curriculum, specifically in the integration of science with other core subjects and in other schools across the nation.

Scope and Limitation

This action research does not aim to evaluate whether the K-12 curriculum is successful nor does this intend to propose an over-all new curriculum. This action research rather aims to know how to maximize the newly implemented curriculum by knowing the appropriate integrative teaching strategies for Science concepts and to propose a program that will serve as a guide for policy makers and curriculum developers and educators.

This action research employed a mixed methodology which presents a deeper analysis on the discussed research problem. However, it shall be noted that K-12 curriculum and the revision in the teaching of science at the primary level have only been implemented in 2012. Consequently, it means that the examination for this change is fairly new. Due to this, the data for the exam scores of the grade 2 students will be limited and also limited to University of the East-Manila. Descriptive method for the quantitative analysis was done where pattern was identified through visual aids such as charts and graphs. The qualitative analysis focused on the interview with the Grade 2 teachers and on the content analysis of their lesson plans to determine their perceived views and actual works on integrating science with other subjects. However, it shall be noted that the researcher used a retrospective method. This posed limitations as it can be expected that not everything will be remembered by the teachers interviewed. After the analysis, this research formulated and presented a program that can be utilized by the Grade 2 teachers as a guide as to where the four units in the science competency assessment in the CEM examination can be integrated to yield higher scores.

However, the research was bounded within the scope of UE-Manila, which means that the result of the research is not generalizable. Any result shall not be interpreted to be the same

with other schools as "*Red niversity-Manila"* is not representative of all schools. Instead, the result shall serve as a support, guide, and assistance to not just the schools but also to teachers and educators, and to policy-makers and curriculum developers.

Review of Related Literature

Advantages of Integrating Science

The process of integrating science concept is not unique in the Philippines. In Indonesia, in an almost similar time as in the Philippines, their government decided to do the same reform except that the integrated teaching of science is not just for the first two grade levels but for all elementary levels (Sarmiento, 2013). Indonesia pushed through with this change due to public opinion wherein the curriculum for the subject has been excessively difficult for students to learn (Rochmyaningsih, 2012). This is similar to that of the Philippines where science concepts were integrated in other learning area due to DepEd's move to focus more on numeracy and literacy skills.

Pegg (2010) examined the initial and on-process concerns of teachers when it comes to incorporating a new approach in integrating science and literacy and how they were resolved through the teachers' involvement in professional development. It was found that teachers have issues in terms of time constraints, assessment, and effects on student outcomes of teaching science as integrated with literacy. In resolving these issues, it was observed that teachers produced an innovation unique to their context – teachers extended the level of curriculum integration that was occurring in their classroom. Teachers began to integrate science into their language arts instruction as well as integrating language arts into their science instruction, which resulted to more successful and efficient learning of science. Losty (2012), on the other hand, saw the challenge of time as an opportunity to maximize topics that can be integrated. Losty also argued that through careful integration, the time table would rather be more flexible, thus, achieving progress in science.

Further, Pegg (2010) stated that the professional development workshops facilitated the sharing of teachers' concerns in a safe environment where professional development staff and other teachers could share possible solutions and stories of related successes. By examining the nature of teachers' concerns and their resolutions in specific cases, guidance was provided to others pursuing similar types of change. While his research has demonstrated the benefits of integration, Pegg admitted that little research has been conducted on the issues that teachers encounter as they incorporate the new practices into their instruction such as integrating science to literacy instruction. The study hoped to provide important insight into the adoption of an integrated science and literacy approach, the nature of change that occurred as teachers proceeded through this process, and ways in which teachers moved from questions and challenges to solutions and successes.

Meanwhile, Furner and Kumar (2007) explored the question as to whether mathematics and science should be integrated in order to reform science education. In an era dominated by mathematics, science, and technology, it is essential that science and mathematics be taught in K to 12 and that teachers are equipped with the knowledge and skills to teach both science and mathematics meaningfully to students. However, in a test driven curriculum where students and teachers are evaluated based on students standardized test scores for mathematics and reading, they posited that teaching science meaningfully remains a challenge. Research indicates that using interdisciplinary or integrated curriculum provides opportunities for more relevant, less fragmented, and more stimulating experiences for learners, as cited from the study of Furner and Kumar (2007), planning and teaching interdisciplinary lessons involve two or more teachers, common planning time, the same students, teachers skilled in professional collaboration, consensus building, and curriculum development. For their end note the researchers stated that there is optimism for improving science teaching through integration with mathematics. Problem based learning is an area where successful integration of mathematics and science could be achieved. The critical role of mathematics in understanding the relationships between scientific concepts especially in the physical sciences cannot be underestimated. In this context, student success depends on the degree to which math and science are integrated in order to motivate and engage students in meaningful learning.

The success of integrative teaching for primary science has also been observed in Japan (Pawilen and Sumida, 2005). Japan integrates science with other core subjects in the first and second grade. However, it was found that what made Japan successful is its unique approach of letting the students choose a science topic that they want to discuss. This entails the emphasis given to practical and participatory learning among the pupils.

Disadvantages of Integrating Science

Despite the discussed advantages, some educators and scholars still disagree on the changes done on the curriculum. They argue for teaching Science at an early stage in order to catch up in the global science competency examinations (Sarmiento, 2013). Cristobal (cited in Sarmiento, 2013) echoes this argument noting that pupils must be exposed to values of science during their formative stage in order for them to imbibe the subject. De Dios (cited in Sarmiento, 2013) furthers that, at a young age, children have the capacity to grasp scientific concepts and methods as they possess natural curiosity (Sarmiento, 2013). These claims are supported by Akerson, et.al (2011) as they found out that students across grade levels (beginning from kindergarten) have the capability to comprehend concepts of natural science when it is explicitly taught to them. With the capability of the students to “compare and contrast, make observations and measurements, and appreciate nature”, De Dios argued that

these skills which are necessary for learning science would be futile as there will be no allotted time to practice them (cited in Sarmiento, 2013).

Findings of Akerson, et. al. (2011) and the arguments of De Dios (cited in Sarmiento, 2013) are analogous to the arguments of Dulay (1998). The latter recognized the growing concern on science curriculum at the elementary level but remained grounded on the argument that children should acquire experience on things that touch their lives, so they may understand the world in which they have come to know. For this reason, they must be provided with opportunities to have first-hand experience to feel, to see, and to use all the senses to make learning meaningful. Dulay also suggested an interactive learning for science starting at an early age where they will feel involved, rather than removing science as a subject at this level. He also stated that science is significant and there is a need to touch the subject effectively. It must be meaningful, practical, and should provide vicarious experience so that the natural interest that the child has shown in his efforts to know, to understand, and to adapt to his environment will be developed. For the child, the world he lives in is full of exciting things to discover and learn. The teacher therefore must know and understand children and their interests so that the educational system can adopt methods which, together with the necessary materials and teaching aids, will result to the effective science teaching–learning process (Dulay, 1998).

Surya and Kasali (cited in Rochmyaningsih, 2012) forwards a similar observation. Both argued that Science being included in the curriculum for primary level is not the problem per se, rather, the teaching style and method. They observed that in Indonesia, science teachers were non-interactive, thus, making the subject difficult and dull for the young learners. In a way, it becomes similar to not exercising the natural capabilities and skills of students for scientific learning which are meant to be practiced through first-hand experience (Rochmyaningsih, 2012).

Moreover, it can be argued that through an interactive learning of science, as per the Psychosocial Theory of Erik Erikson (Psychology Notes, 2012), students as young as 5 years old can develop self-awareness and confidence, industriousness, diligence, perseverance, and the ability to put work before pleasure when given the appropriate opportunity and support, and recognition for accomplishments and completed tasks. If to be analysed, all of the characteristics which are thought to be developed in this theory are what the new implementing K-12 curriculum aims to attain for students.

It is at this point that the teacher and the methods of teaching play major roles. These are magnified for they raise and intensify the concern for integrative learning in science. This would mean that the implementation of the integration of science concepts with various subjects is on the hands of individual teachers of Grades 1 and 2. However, problems with familiarity with subject matter content and ease in teaching science increases as teachers may have only a little background with the subject (Tan-Fabian, 2012). Consequently, integrating

it with other subjects becomes difficult, in addition to other informal workloads that elementary teachers face (Tan-Fabian, 2012). Because of this, there is a great possibility that science concepts may not be introduced and integrated with other subjects all together (Tan-Fabian, 2012).

Teaching Science according to Cristobal, chief research specialist at the Philippine Science Department, as cited by Sarmiento (2013) should be done early on so that the values of science during the formative stage of children would be imbued among the pupils. Cristobal believes that the key is to train teachers in Grades 1 and 2 on basic science competencies which would be needed to successfully implement the current curriculum. Otherwise, she pointed out that it might be difficult for students to get into science careers which will be detrimental to a country's science and technology department.

Sarmiento (2013) further stated in his article that the decision of DepEd to remove science in Grades 1 and 2 does not help Filipino students especially that there are already difficulties in coping against the outstanding performance of Singapore, South Korea, Taiwan, Hong Kong, and Japan. In the recent study conducted by Trends in International Mathematics and Science Study (TIMMS), an international assessment of math and science skills among primary and secondary school students conducted every four years, the Philippines ranked 41st in science among 45 countries in the 2003 TIMSS – the same as in 1999. It did not participate in the 2007 and 2011 TIMSS. Indonesia ranked 40th for science in the 2011 TIMSS, trailing behind neighbours Malaysia and Thailand. The 2011 scores for both science and math are also down from the previous TIMSS in 2007. In line with this, education experts predict such performance will worsen if science is not introduced as early as possible.

Development

Research Design

This action research followed the cyclical format wherein the researcher identified whether there is a problem of disparity in the current curriculum and with the following: a) expected, and actual teaching methods for science, and b) expected integration of science as a teaching method measured, partially, by the goal of having a high score in science competency. With this, the research conducted a case study on *"Red University-Manila,"* in examining whether there is disparity on how the Grade 2 teachers implement the science integration in their classes as mandated by the K to 12 program for primary pupils, whether their lesson plans can show proof of integration in the process of teaching science concepts and competencies, and the learning outcomes in science as shown in the students' scores in science competency. In analyzing these, this action research conducted a mixed methodology. This fits the intention

of the research as it aimed to know the proper integration strategies in teaching science to primary students particularly for those in Grade 2.

The quantitative analysis presented the pattern or trend of the scores in the science competency of Grade 2 students in CEM exam. In order to know what drives the highest scores, the perception and actualization of the teachers of the curriculum were examined. These were done through qualitative analysis. The researcher interviewed Grade 2 teachers and examined documents specifically the teachers' lesson plans from 2015 to 2018.

This shall be further discussed in the succeeding sections.

Research Participants

Grade 2 teachers and students from 2012-2018 of the "*Red University-Manila*" were the participants in this study.

Grade 2 students of were purposively chosen as the participants of the quantitative phase of the study for the following reasons:

1. *"Red University -Manila"* was one of the schools that consistently conducted CEM examinations yearly.
2. Grade 2 students were the ones who took the CEM from 2012-2018, despite having no Science subject in their curriculum.

Corrolary to this, Grade 2 teachers of "*Red University- Manila*" from 2012-2018 were purposively selected as participants of the qualitative phase of the study to explore their teaching strategies in terms of integrating Science with other core subjects with the goal of maintaining the high aptitude CEM scores of the grade 2 students in Science.

Table 1.

Demographic Information of Participants

Name	Gender	Grade level	Years of teaching	Field of specialization
T1	F	Grade 1 (handled Grade 2 for 3 years)	11 years	Early Childhood
T2	F	Grade 2	13 years	BEED Mathematics
T3	F	Grade 2	2 years	General Education (Generalist)
T4	F	Grade 3 (handled Grade 2 for 9 years)	11 years	BEED Mathematics

All the teachers interviewed were female. They taught different grade levels and had varying years of teaching experience in their respective grade levels. T2 and T3 had been teaching Grade 2 for 13 years and two years, respectively. Teacher 1 had been teaching Grade 1 for 8 years during the conduct of the study but had taught grade 2 students for 3 years. Siilarly, T4 wasteaching Grade 3 for two years, but before that, she handled and taught Grade

2 for nine years. The interviewees also had varying field of specialization: T2 and T4 both had specialized in BEED Mathematics. T1, on the other hand, had specialized in Early Childhood, while T3 had specialized on General Education.

Data Gathering Procedures and Instruments

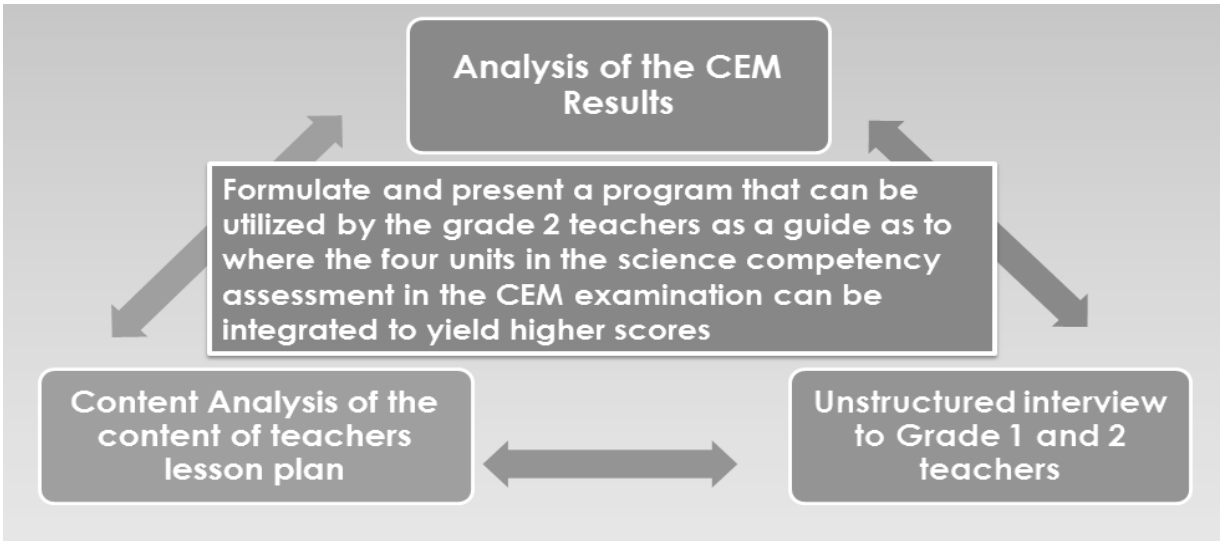
First, the researcher had secured a copy of the CEM examination results of Grade 2 students covering the period 2015 – 2018. Second, unstructured interviews were conducted with the selected participants. The interviews with teachers were unstructured to give ample space for the interviewees to express their views freely and let the interviewer explore areas that were unforeseen but necessary in answering the research questions. These interviews were composed of three main parts: 1) the perception of the teacher towards the curriculum; 2) the actualization of the curriculum by the teacher; and 3) issues that the teachers had faced before and along the process of integrating science concepts with other subjects. Each interview lasted for at least an hour or so and was also audio recorded (with the consent of the interviewees). Consequently, unobtrusive method was also employed wherein the researcher had observed and collected data in times when the interviewers were having their usual conversations with other teachers, without the researcher interacting and interfering with them.

Aside from the interview, selected participants were asked to provide their lesson plan on the core subjects wherein they integrate science concepts. The results of the interview with the teachers were triangulated with an analysis of the content of their lesson plans in order to formulate and proposed a science integration program for Grade 1 and 2 pupils.

Data Analysis

Figure 1.

Conceptual Framework on the data analysis



The top most box shows the analysis of CEM exam results from 2015-2018. The CEM exam results and the report in the scores were provided by the Guidance Counsellor's Office of *"Red- University- Manila*." From this report, descriptive statistics were utilized to identify the 1) raw overall score; 2) scaled scores 3) highest and lowest scores; 4) scores per content area in the Science componente. After identification of these information, the pattern on the score of the students were analyzed and triangulated to the result of the interview with teachers and document analysis of their respective lesson plans.

In analyzing the interview responses, the researcher followed the steps of thematic coding. With this, transcribed materials, including noted non-verbal data, were examined one by one. Topics and concepts that go with a respective theme were identified for the final step of interpretation. Analysis was done in a circular manner wherein the researcher can go back and forth. A researcher-made matrix (see Table 2) was formulated as a guide in coding and analyzing the interview with the teachers and the contents of their respective lesson plans.

Table 2:

Researcher-made matrix as guide in coding and analyzing interview

Perception towards the curriculum	**Positive**	**Negative**
Actualization of curriculum	Integrative teaching of science	Science as a separate subject
Issues Faced	Issues that were resolved	Issues that were not resolved

As presented in Table 2, the first column presents the three parts of the interview for teachers. The first part answered queries on how they view the non-separation of science subject with the other identified core subjects were asked. As it was assumed that views and perceptions change, the teachers were asked regarding their views the first time they knew that science concepts shall be taught with other core subjects and how they view this integration at present. The teacher's perception can influence how they will actualize the prescribed curriculum. For the second part, their strategies on how they integrate science concepts with other subjects were asked. This part also included a discussion of teaching styles and activities that they did to execute the integration. Additionally, they were asked how they manage questions regarding science concepts. From their individual strategies, they were asked to evaluate their own strategies and whether they change and develop them based on their own evaluation. This can show the progress on teaching strategies from 2012 – 2018. For the last part, the interviewees were able to freely discuss the issues and concerns they have faced from the first time they heard of this critical change in the teaching of Science to their preparation of lessons to the actual teaching of science concepts to the students. To analyze the responses of each key informant, the ideas were grouped into positive and negative in order to merge the recognized categories.

The result of the interview was triangulated to the content analysis of the lesson plan of the teachers from 2012 to 2018. This provided concrete evidence of the teachers' actualization of the curriculum and could also reflect how their perceptions and issues they faced are reflected to the actual teaching process.

Results and discussion

This chapter presents results obtained and was organized into two sections:1) quantitative data containing raw and processed science aptitude test scores from the CEM and 2) responses from key informant interviews and analysis of lesson plans of the teachers.

Problem 1. What is the pattern in the science scores of Grade 2 students from 2015 to 2018 in the CEM examinations?

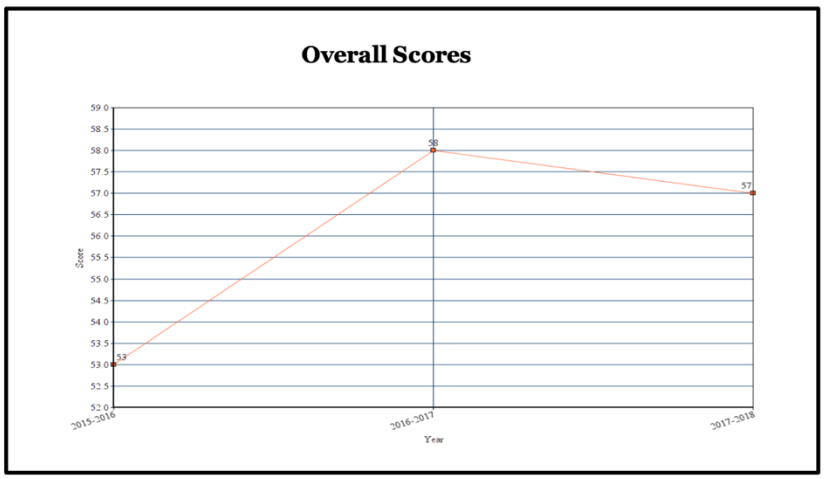
Data on the Science Aptitude Scores of Grade 2 students from *"Red University- Manila"* was sourced from CEM, wherein two types of scores were given: the raw score, which came in as a percentage of the total correctly answered items to the total items asked in the test, and a scaled score, wherein points were assigned to each item based on level of difficulty and scores were recalculated. Scaled scores were also used to compare them to the parameters of the total population scores; the scaled score of the school was compared to the average scaled score of all the schools that CEM subjected the metric to. Scores were also recorded per content area, namely, 1) Living Things and Their Environment, 2) Matter, 3) Force and Motion, and 4) Earth and Space, and per Cognitive Skill, namely, 1) Remembering, 2) Understanding, 3) Applying, and 4) Analyzing. A distribution of examinees by test performance was also present.

For the purpose of analysis, only included are the overall raw scores and scaled scores, scores per content area, and the distribution of Examinees by Test Performance. The data presented in Figure 2 from S.Y. 2015-2016 to S.Y. 2017-2018 show any relevant changes and variations through time during the K-12 implementation.

Overall Scores

Figure 2.

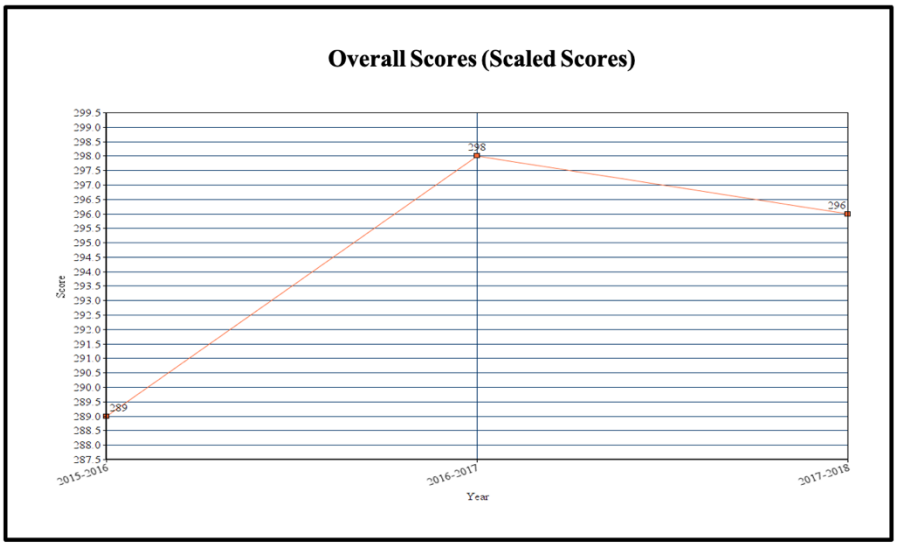
Raw overall scores in SY 2015-2016, 2016-2017, and 2017- 2018



The raw overall scores, across time, ranged from 53 in SY 15-16, to 58 in SY 16-17, and 57 in SY 17-18 (Figure 3). CEM lists all these scores as Average, as per its Test Performance Description standards.

Figure 3.

Raw overall scaled scores in SY 2015-2016, 2016-2017, and 2017- 2018



As shown in Table 3, it can be inferred from the results of the scaled scores that it follows a similar pattern as with the raw scores: 289 in SY 15-16, 298 in SY 16-17, and 296 in SY 17-18; since scaled scores are just transformed versions of the raw scores. By inspecting how these scaled scores fared as compared to population averages, the scaled scores of UE-Manila were consistently lower than the population averages, even after a 9-point increase in SY 16-17.

Table 3.

Overall UE-Manila scaled scores vs. population averages

Year	Scaled Score	Population Average
2015 – 2016	289	310
2016 – 2017	298	305
2017- 2018	296	304

Scores per Content Area

Upon analysis of the scores per content area, not much change was observed. Scores remained relatively stable, increasing only in increments of less than 5 points for the most part. The only outlier is the score jump in the content area Living Things and the Environment,

which showed a 9-point increase and Earth and Space which showed a 7-point increase from SY 15-16 to SY 16-17 as shown in Table 4.

Table 4.

UE-Manila scores per content area

Year	Living Things & Environment	Matter	Force & Motion	Earth & Space
2015-2016	54	48	60	50
2016-2017	63	48	64	57
2017-2018	60	53	63	52

Table 5 shows the comparison of scaled scores with population averages turns the same results with the overall scores, consistently below average. However, latest scores are significantly closer to the average than it was in SY 16-17.

Table 5.

Comparison of UE-Manila scaled scores with population averages

Year	Living Things & Environment		Matter		Force and Motion		Earth and Space	
	Scaled Score	Population Average	Scaled Score	Population Average	Scaled Score	Population Average	Scaled Score	Population Average
2015-2016	302	336	285	316	328	359	272	304
2016-2017	326	329	289	306	341	350	288	298
2017-2018	319	328	296	306	339	348	281	298

Analysis

CEM's Test Performance Description marks the overall performance of the Grade 2 students in Science as Average throughout the three-year time span. However, it can be inferred that the scaled scores are consistently lower than the population averages, which might imply difficulties for the students in learning Science concepts relative to students in other schools. Lower score than the population average means that students found the Science aptitude test harder relative to students from other schools. However, even though it is consistently lower, recent years have shown increases that have brought it significantly closer to the average within a 5-point post.

Problem 2. How do Grade 2 teachers perceive and actualize the integration of science with other subjects?

Key Informant Interviews

Earlier section had provided the research framework (See Table 2) to be utilized to code the data from the key informant interviews. Key informant interviews were guided through the framework. This section outlined the process which aimed to go through each category and find themes, either included or previously not included in the framework, and look at how Grade 2 teachers from *"Red University-Manila"* had perceived and actualized the integration aspect introduced in the new K-12 curriculum.

a. Perception of the Curriculum

Initially, perceptions of the curriculum were unanimously negative, with little or negligible change after years of implementing the curriculum. Statements from the interviews in support of this view include:

> *"I am sad, shocked, and a bit disappointed"* (Teacher 4).
>
> *"I am disappointed because when I was in Grade 1, Science was a separate subject and I enjoyed every topic we had. Tough it is less preparation for me as a teacher now; I still would want it as a separate subject*" (Teacher 1).
>
> *"I am unhappy because Science is one of the most favorite subjects of many students"* (Teacher 3).
>
> *"I was shocked, may bago nanaman kasi" [I was shocked that there would be a new (adjustment) again.]* (Teacher 2).

The views were mostly pessimistic with expressions of doubt for the success of the curriculum change.

> *"I actually ask myself if the integration of science concepts can help the students in acquiring knowledge in science. I even ask how the curriculum planners come up with this decision. Is there any proof of success in science integration?"* (Teacher 1).
>
> *"Integrative teaching of science concepts was not a good decision to better the learning experience and increase the knowledge of the students because not all topics will be covered due to time insufficiency"* (Teacher 3).

There was a general sentiment that integration will not be enough to introduce science concepts to the students.

> *"I can only teach touch far a part of science. Unlike if it's a major subject you can cover all the objectives"* (Teacher 1).
>
> *".....because of the fact that science is one of the core subjects that will be included in the Center for Educational Measurement in Grade 2. This measures the*

learning in school under the K to 12 curriculum. Paano maiintiigrate lahat ng competencies in Science under the K to 12, hindi mamamaster ng mga bata ang mga science competencies. Pag integration ang paraan ng pag introduce ng science concept baka di nila masyado ma grasp at baka mababa ang makuha sa CEM" [...because of the fact that Science is one of the subjects that will be included in the Center for Education Measurement in Grade 2. This measures the learning in school under the K to 12 curriculum. How would all competencies in Science under the K to 12 be integrated, the student will not be able to master the science competencies. If integration will be the way to teach them science concepts, they may not fully grasp those, consequently, garnering low scores on the CEM examinations.] (Teacher 2).

Additionally, the respondents expected that students will have more difficulty in focusing to learn the main subject at hand because of the extra workload of learning science concepts on the side.

"It increases the knowledge of students but with limitation since it's just integration to a major subject. For me, it's just an addition to their knowledge" (Teacher 3).

"...because the students did not yet master the topic in that particular subject tapos papasukan pa ng ibang concept, with that lalong walang mastery at lalong nagiging kumplikado sa mga bata" [...because the students did not master, yet, the topics in that particular subject and then other concepts will be injected, no mastery of concepts will be achieved and it would be more complicated for students.] (Teacher 2).

"Yung additional burden ng pag-iisip kung paano at saan iiintegrate ang particular topic in science lalo pa bumigat nung nagkaroon ng CEM ng 2015. May pressure kasi pag mababa ang result ng exam kaya pagmalapit na ang CEM nagbibigay kami ng additional time to teach science as part na rin ng review for the upcoming exam" [The addition burden of thinking how and where to integrate particular topic in science became more challenging when CEM examinations were introduced in 2015.] (Teacher 4).

These results are similar with the findings of Pegg (2010) where he examined the concerns of the elementary teachers as they engage in the process of incorporating a new approach in integrating science. The study found that teachers expressed concerns related to time constraints, assessment, and effects on student outcomes. These results are also supported by Tan-Fabian (2012) stating that integrating science with other subjects becomes difficult, in addition to other informal workloads that elementary teachers face and because of this, there is a great possibility that science concepts may not be introduced and integrated with other subjects all together. However, according to Cristobal (cited by Sarmiento, 2013), the solution to this problem is to train teachers in Grades 1 and 2 on basic science competencies

which would be needed to successfully implement the current curriculum. Otherwise, she pointed out that it might be difficult for students to get into science careers which will be detrimental to a country's science and technology education.

Moreover, the result proves that pupils must be exposed to values of science during their formative stage in order for the pupils to imbibe them, as stated by Cristobal (cited in Sarmiento, 2013). This was also supported by Dulay (1998) where he recognized the growing concern on science curriculum at the elementary level but argued that children must be provided with opportunities to have first-hand experience to feel, to see, and to use all the senses to make learning meaningful. He then, suggested an interactive learning for science starting at an early age where they will feel involved, rather than removing science as a subject at this level.

b. Actualization of the Curriculum

In terms of actualizing the integration of the curriculum, the most common subjects that science concepts are integrated in are Edukasyon sa Pagpapakatao (Values Education) (ESP), Araling Panlipunan (Social Studies) (AP), and English, mostly due to the broad range of topics that these subjects cover.

> *"Some competencies in Science can easily be integrated to different topics in AP and ESP particularly in topic in Living things and care for body ad environment"* (Teacher 1).
>
> *"The book that we use in English has integrated some science concepts, that is why some topics are easily be taught to the pupils"* (Teacher 2).

It is also be due to the techniques usually used in integration, specifically storytelling, video showings, and drawing, which are more commonly utilized in such subject areas. English textbooks, which include stories, make it easier to insert discussions on science concepts like Earth and Space while discussions on the surroundings can also be integrated easily in Araling Panlipunan (Social Studies) since part of the subject area focuses on bodies of water and land.

> *"…in my class, I often use video clips, storytelling, drawing as my spring board to introduce science concepts. Sometimes examples are used in sentences in order for the students to read and acquire the different concepts"* (Teacher 3).

In the process of teaching, if students ask questions regarding science concepts, and teachers deal with it on a case-to-case basis; they report that some questions take more time to discuss and some can be answered directly.

> *"Sometimes I integrate it with other subject but most of the time I answer them directly"* (Teacher 4).

The issue presented by Tan-Fabian (2012) stating that problems with familiarity with subject matter content and ease in teaching science increases as teachers have little background with the subject. This is in contrast to the response of the primary teachers where they expressed their sentiments that since they are all graduates of Bachelor of Science in

Elementary Education, they are well versed with all elementary basic subjects and there will be no problem in teaching science concepts. Their years of teaching in their respective grade levels, especially Teachers 1, 2, and 4 with 11, 13 and 11 years of teaching, respectively, shows as well the amount of years in teaching making them more experienced and ease in executing subjects in primary level.

> "*Hindi naman issue sa mga BEEd gaya namin ang specialization dahil experts kami sa lahat ng elementary subjects. Kaya naming ituro ang Science concepts kulang lang talaga sa oras kaya mas mainam na bigyan ng sariling oras sa pagtuturo lalo pa at ito ay kasama sa examination sa CEM. Mas magiging maganda ang resulta ng mga examinasyon sa Science kung bibigyaan ng tamang pansin na ito ay maituro at maging separate subject" [Specialization is not an issue for us who were BEEd graduates because we are experts in all elementary level subjects. We can teach Science concepts, it's just that we lack time, hence, it is better that a separate time period would be given to teach Science concepts especially it is included in the CEM examinations. The results in the CEM examination for Science would be better if Science would be taught as a separate subject.]* (Teacher 1).

Problem 3. Is there a disparity in the actual teaching methods and perceived goal of having a high science aptitude score?

Issues and Concerns

Issues that teachers raised regarding the introduction of integration into the curriculum instead of teaching science as a separate subject were mainly unresolved. The most common problem raised was the lack of time allocated to teaching science concepts. Some even say that science should be allocated its own time as a separate subject.

> *There must really be a separate time for introducing science concepts. Since lack of time is one of the issue, the tendency will be the students are behind/ or their knowledge about science concepts is very limited. Confusion issue can lead to students' incompetence towards both science and other core subjects* (Teacher 3).
>
> *"Hindi ko sya lubusang nagagawa sapagkat kulang sa oras at inaalala ko yung mastery ng mga bata sa subject na pinag-iintegratan ng science concept. Sana ay magkaroon na lang ng separate time para sa subject na science para ang mga bata ay lubusang matutunan ang mga konsepto sa science at sa ganun ay lubusang mamaster ang mga competencies at di na din kakabahan sa resulta ng CEM" [I cannot fully accomplish the integration due to time constraint and I worry about the mastery of students to the subject wherein Science concepts are integrated. I hope that there would be a separate subject for Science so that students can fully learn these concepts, master the competencies. With that, we would not worry regarding the results of the CEM examinations.]* (Teacher 2).

Another issue is that there was lack of training and directives from DepEd for most private schools (including *"Red University-Manila*) on how to integrate and where to integrate science concepts.

> *"The issue of how to do it. Alam naman ng mga teachers somehow to integrate pero yung issue na meron bang pinalabas ang DepEd on how to integrate it, or ikaw na bahala as a teacher. Sana nagkaroon muna ng trainings para sa mga private school teachers kasi karaniwan na sa public schools nagkaroon ng mga seminars and trainings" [The issue of how to do it. Somehow, we know how integrate but the issue is, does DepEd release guidelines on how to integrate or it is up to the discretion of teachers? I hope that there would be trainings for private school teachers same as with those conducted in public schools.]* (Teacher 2).

These issues raised by the teachers were supported by the claim of Cristobal (cited in Sarmiento, 2013) that the key is to train teachers in grades one and two on the basic science competencies which would be needed to successfully implement the current curriculum.

Another noticeable theme is that science integration relegates science to the backburners of teaching in these lower grade levels, thus putting it at odds with the goal of getting a higher science proficiency in the CEM science aptitude test. Consequently, every time the schedule for the CEM diagnostic test is near, teachers are forced to cram the teaching of science concepts through reviews

> *"Yes, pag palapit na ang CEM nagdadagdag na lang kami sa grade 2 ng extra time para mareview ang mga competencies sa science na kasama sa CEM Science competencies para matutukan ang mga bata at mareview na din" [Yes, when the CEM examinations gets near, we just add more time to review Grade 2 students on the competencies included in the examination.]* (Teacher 4).
>
> *"Science integration to other learning areas is not enough for the pupils to master the competencies for the CEM, and so teachers give extra time not included in the class program to review science competencies*" (Teacher 3).

These issues raised by the teachers were strengthen by the argument stated by De Dios (Sarmiento, 2013) that if there will be no allotted time to practice the skills which are necessary for learning science would be futile. Cristobal as (cited in Sarmiento, 2013) stated a similar argument expressing that teaching Science should be done early on so that the values of science during the formative stage of children would be imbued among the pupils. In addition, Sarmiento (2013) further stated that the decision of DepEd to remove science in grades one and two does not help Filipino students especially that there are already difficulties in coping against the outstanding performance of their peers in Singapore, South Korea, Taiwan, Hong Kong and Japan. In the study by TIMMS in 2003, the Philippines ranked 41 in science among 45 countries. Therefore, education experts predict such performance will worsen if science is not introduced as early as possible.

Summary of the Analysis of Interview

Table 6.

Summary of Interview Responses

Perception towards the curriculum	**Positive**	**Negative** • Initially negative • Doubt of success for integration • Integration as a poor mismatch for CEM competencies • Science integration is not enough • Limits the teaching of science • Limits the learning of science • Students find it hard to focus on science concepts being integrated since they are already studying a main topic • Insufficient time
Actualization of curriculum	**Integrative teaching of science** • Integrates concepts in AP, Edukasyon sa Pagpapakatao, English, Music • Use of video clips, storytelling and drawing • Answers questions directly • English worktexts sometimes use concepts • English worktexts sometimes use concepts • Teaching style varies from child to child • Evaluation happens	**Science as a separate subject** • Reviews children on the competencies • Teaching strategies change when CEM approaches • CEM test influences changes in strategies, forces teacher to cram integration of concepts • Extra time to review for science • Science questions - depends • Includes more participative activities • Answers questions directly
Issues Faced	Issues that were resolved	Issues that were not resolved • How to integrate • No directives from DepEd on how to integrate • No trainings • Mastering competencies in other subject + integration renders it ineffective • Not yet resolved • Lack of time to integrate/teach Science concepts • Don't Integrate, Science should be taught as a different subject • Focus on the competency on the major subject • Lack of time • Student might be confused due to additional concepts • Students tend to be behind on science due to these issues

From this summary, noticeable that teachers have mostly negative perception on integrating science with other subjects. The initial negative perception was strengthened due to several issues that were not resolved along the process including insufficient time and inability of children to focus on the integrated concepts. Despite the positive aspect of the actual teaching style of integrating science concepts, it was seen that teachers still need to review science concepts separately to ensure competency when students take the CEM examination.

Lesson Plan Content Analysis

After the data gathering, the researcher conducted an analysis on the lesson plan of the teachers on different subjects that they incorporated science concepts, covering the period from 2012 to 2018. This material provided a concrete evidence of the teachers' actualization of the curriculum and can also reflect their perceptions and the issues they faced in the actual process of integration.

When put alongside teachers' perceptions on science integration, the contents of the lesson plans showed efforts to integrate, given that teachers find the opportunities to integrate science in subjects like AP, ESP, and English. However, a key finding tells that the process of what and how to integrate were not thoroughly discussed in their semi-detailed lesson plans. One limitation, however, that hampers efforts to integrate is the implementation of standard format in formulation lesson plan for the basic education level in *"Red University-Manila*." It places technical barriers making it more difficult for teachers to include the integration of science concepts. One reason justifying this is that the current format prioritizes values integration, rather than the integration of science concepts. Meanwhile, it can also be due to the concerned individuals (i.e., subject coordinator or administrator) checking the lesson plans whether they adhere with the mandate of science integration to other learning areas.

Final considerations/ Conclusions (lowercase, bold, Georgia 11 font, left-aligned, unnumbered)

Conclusion

This research aimed to know what integrative teaching strategies can be implemented in order to increase scores in the four areas of science competency. Data from the key informant interviews show that teachers employ varying strategies in integrating science concepts: 1) through different subjects (ESP, AP, English, and Health Education), 2) through differing interactive methods (video showing, storytelling, and drawing), and 3) through addressing inquiries by students either in class or through further discussions beyond class.

However, certain issues arising from the actual implementation of the integration curriculum have hampered its effectiveness. These include lack of time for teaching the science concepts since the teaching coincides with the teaching of another major subject; difficulty for students mastering another major competence; and, the lack of teacher training and directives

from DepEd regarding integration. Despite the educational background of the informants, they were not trained to integrate subjects to other subjects as this reform is new in the pedagogical system of the Philippines.

Meanwhile, as their lesson plan follows a standard format, rigidity renders them to be unable to easily accommodate changes such as the integration of science concepts. However, it does already allow for integration of values education, and it is loose enough to allow the teachers to integrate it sparingly with subjects like AP, ESP, and English. The problem, however, is this is not enough to master the competencies in science, with these limitations only allowing the teachers very little time to spare for integration.

From the interview, a resolution to these problems arises: to discontinue the integration program and teaching science as a separate subject since private school have the option of having additional subjects. This solution, while not being an integration strategy itself, proves to be the more popular choice among the key informants, since provide them more time to teach science concepts while also not being hampered by the lack of emphasis suffered in integration. This implies that the integration system, as perceived by the respondents, has not worked in improving the knowledge of students in science, worse, even sacrificing mastery for other core subjects.

Integration downplays the complexity in teaching science concepts since implementing a policy which lowers the emphasis of science subjects implies that the concepts can be taught easily, in only a very limited time. While the integration lacks in certain aspects, science concepts can still be taught through integration but necessitates an increase in the total teaching times of all the subjects in which science concepts can be easily integrated (Music, English, ESP, AP, and Health Education).

Recommendations

The scope and limitations necessarily limit the study to *"Red Unversity-Manila"* teachers and students. It would be beneficial to the robustness of the data and for more broad generalizations to be made to include a larger population's size. Data can also be analyzed according to science competency per student, rather than per school. This would give a more detailed view on the status of science competencies operating under the integration program. More so, in the scaled scores versus population average analysis, it is a weakness in the data that integration covers all of the schools mentioned (assuming all the schools follow the K-12 curriculum). It would be better to examine, as well, the performance and practices of other educational systems in other countries that practice the same policy of integration.

Another metric would be to not focus on competency, but rather on whether or not science integration affects the outlook of the student on learning science: does the student's interest in learning science increase due to integration? Or does teaching science as a different subject apart from the other major subjects keep interest in learning science better than integration?

In order to adhere with the implementation of the K to 12 curriculum, a Science Integration Program is being proposed to help teachers in the integration process of the science concepts in order to prepare the students to the CEM examination towards increasing science competence of Grade 2 students. It is aimed that this framework can remedy the issue on time constraints and other concerns leading to the lower score of the chosen case as compared to population average.

The program is held from the first quarter to prepare the Grade 2 students in the CEM science aptitude test. This process is believed to foster retention of science concepts for long-term learning as compared to the review sessions conducted by the teachers prior to CEM which encourages retaining the concepts for the duration of the exam. The best route seems to be to re-allocate more time into actual teaching of science concepts by following the proposed science integration program.

Science Integration Program for Grade 1 and 2

Rationale:

It has been six (6) years when the Enhanced Basic Education Act of 2013 was enacted. Throughout its implementation, the exclusion of Science as a subject for Grades 1 and 2 has been controversial with regards to Science learning and pedagogy.

In order to adhere with the implemented law, the findings of this action research were considered in the conceptualization of the Proposed Science Integration Program in order to enhance the teaching and learning process to be able to achieve the Science competencies in the K to 12 curriculum. The proposed framework represents the prescribed competencies and concepts needed to be acquired and mastered by the pupils to be integrated with other subjects particularly English (Reading and Language), Health under MAPEH (Music, Arts, PE and Health), and Mathematics, as stated in an interview with former Education Secretary Bro. Armin Luistro (PDI, 2012).

Moreover, other concepts were suggested to be integrated to Araling Panlipunan (Social Studies) and Edukasyon sa Pagpapakatao (Values Education) for the valuing processes. The framework is divided into four units, 1) Matter, 2) Living Things and Their Environment, 3) Force and Motion, and 4) Earth and Space, which are also subdivided into different contents. The learning competencies for each unit are presented together with its goal on what the pupils are expected to perform and acquire during the integration process. Subjects from where the different topics will be integrated were also specifically mentioned in order to serve as guide and reference in developing teaching and learning plan. However, the success of the implementation of the proposed integration of science to other learning areas will ultimately depend on the teacher's strategy, classroom style, methods, and innovation, among other factors.

<table>
<tr><th colspan="4">Proposed Program for Integration of Primary Science Competencies
to different Learning Areas for Grade 1 and 2</th></tr>
<tr><td colspan="2">UNIT 1 MATTER</td><td colspan="2">Integrated to:</td></tr>
<tr><td>Content</td><td>Learning Competencies</td><td>Subject/s</td><td>Topic</td></tr>
<tr><td>Properties
• Characteristics of solids, liquids, and gases</td><td>The learner…
• classifies objects and materials as solids, liquids and gases based on their characteristic</td><td>ENGLISH
• Proper and common nouns</td><td>• Proper and Common Nouns
• Using big and small letters
- classifies matters into common nouns and identifies proper nouns for solid, liquid and gas
<table><tr><th>Common Nouns</th><th>Proper Nouns</th></tr><tr><td>Solid
- pencil
- soap
- shoes</td><td>
-Monggol
- Safeguard
- Adidas</td></tr><tr><td>Liquid
- milk
- soda
- shampoo</td><td>
- Nido
- Coke
- Pantene</td></tr><tr><td>Gas
- gases on Earth’s atmosphere</td><td>
- Nitrogen
- Oxygen
- Argon
- Carbon Dioxide</td></tr><tr><td></td><td></td></tr></table></td></tr>
<tr><td>Changes in materials</td><td>• investigates changes in solids and liquids when temperature changes</td><td>ENGLISH
• Predicting Outcomes</td><td>• Give possible endings in solids and liquids when temperature
• changes
Investigatory project::
• - use a chocolate bar to show melting, freezing and evaporating</td></tr>
<tr><td></td><td></td><td>ENGLISH
• Simple Future Tense</td><td>• Constructing a sentence in simple future tense form
-. The ice cube will melt when heated or there is an increase in temperature. (Physical changes in matter took place)
- The gas will turn to liquid form again when exposed to cooler objects/ temperature. (Process of Condensation)
• - the liquid will become solid or ice by cooling (Process of Freezing)</td></tr>
</table>

Proposed Program for Integration of Primary Science Competencies to different Learning Areas for Grade 1 and 2			
UNIT 2 LIVING THINGS AND THEIR ENVIRONMENT		**Integrated to:**	
Content	**Learning Competencies**	**Subject/s**	**Topic**
Parts and Functions of Living Things • **Humans**	*The learner…* • identifies the sense organs of the body • describes the parts and functions of the sense organs of the human body • communicates healthful practices to protect the sense organs using multimedia/ non-multimedia resources	**HEALTH EDUCATION** • **Our Sense Organs**	• How do sense organs help us everyday EYES – sense of sight NOSE - sense of smell EARS – sense of hearing TONGUE – sense of taste SKIN – sense of touch • Care of the eyes, ears, nose, tongue, and skin • Manage oneself in taking care of one's health
• **Animals**	• identifies and describes animals in the environment	**ENGLISH** • **Describing words**	• Describing and classifying animals according to size, shape, color or texture
	• identifies the parts and functions of animals	**ENGLISH** • **Verb**	• Introduce that verbs are words that express actions • After learning one's own body part, introduce that animals have. • different body parts and functions also.
• **Animals**			*Use a game " TRY TO BE LIKE (imitating movements of animals that can be done easily by the pupils)
	• groups or classifies animals according to body parts and use	**ENGLISH** • **Grouping pictures based on similar ideas** • **Associating words with printed symbol** **OR** • **Antonyms**	• How do animals use their body parts to help them survive? - Animals are grouped according to the functions of the body they perform ✓ Movement ✓ Protection ✓ Food getting ✓ Survival • Arranging animals according to their opposite movements or characteristics like slow – fast, heavy – light, big – small, etc.

	• states the importance of animals to humans	**HEALTH EDUCATION** • **Healthful foods from animals**	• Do you know the Healthful foods? • How important are the animal sources of food to us? • Protein foods are good to : humans - beef - poultry – chicken, duck - eggs - nuts, seeds - beans - tofu • Discuss in valuing other things that animals can do to humans
• **Plants**	• identifies the parts of plants and their functions • describes the parts of different kinds of plants	**ENGLISH** • **Arranging words in alphabetical order**	• Arranging the parts of plants in alphabetical order ____ roots ____ stem ____ leaf ____ seeds ____ flower ____ fruits * can be used as a springboard in describing the parts of different plants and its functions.
	• states the importance of plants to humans.	**EDUKASYON SA PAGPAPAKATAO** • naipamamalas ang pang-unawa sa kahalagahan ng pangangalaga sa kalusugan • pagkalinga sa kapaligiran	• maipatutukoy ang mga pagkaing mainam sa kalusugan mula sa mga halaman • maipasagawa ng palagian ang pagtulong sa pananatili ng kalinisan at kaayusan ng tahanan at paligid para sa mabuting kalusugan * maari ring tukuyin ang iba pang kahalagahang dulot ng mga halaman sa kapaligiran bukod sa pagkain tulad ng: - pagkakaroon ng malinis na hangin - pagkakaroon ng tulong laban sa baha - mga kagamitang maaaring gamitin sa tahanan at paggawa ng tirahan - mga damit - atbp

• **Characteristics of Living Things**	• compares with living and non-living things	**EDUKASYON SA PAGPAPAKATAO** • **Paglikha ng mga may buhay sa mundo**	• Ipaalam sa mga bata ang aralin ukol sa nilikha na Maykapal na may buhay sa mundo tulad ng mga halaman, hayop at mga tao. • Ipaunawa ang iba't ibang katangian ang mga nilikhang may buhay. • Maaring gumawa ng isang "chart" upang ipakita ang pagkakaiba ng katangiang taglay ng mga nilikhang may buhay sa mundo tulad ng mga halaman, hayop at mga tao.
Heredity: Inheritance and Variation • **Characteristics passed on from parents** **- humans** **- animals** • **- plants**	• infers that living things reproduce • identifies characteristics passed on to offspring from parents (e.g., humans, animals, plants)	**ENGLISH** **Adjectives**	• Use adjectives or describing words to identify different characteristics passed on to offspring from parents of humans, plants or animals. • These words can describe the size, shape, color, numbers, taste, and texture. • For vocabulary development, use description words for people, objects, things and places.
Ecosystem **Basic needs**	• identifies the basic needs of humans, plants and animals such as air, food, water, and shelter • explains how living things depend on the environment to meet their basic needs • recognizes that there is a need to protect and conserve the environment	**ARALING PANLIPUNAN** • Pagkilala sa Sarili/ Ang Aking mga Pangangailangan Pangangalaga sa Kapaligiran	• Nailalarawan ang mga pansariling pangangailangan: pagkain, tirahan, kasuotan at tubig, bukod 337itto ay mayroon din iba pang mga pangangailangan ang tao upang mabuhay sa panahon ngayon told ng edukasyon, gamut at kuryente. • Talakayin din ang kahalagahan ng pagtitipid ng mga likas na yaman at mga bagay sa kapaligiran na pinagmumulan

			ng ating ikinabubuhay. *Maaaring ipaunawa na ang mga pangangailangan natin ay nagmula sa kapaligiran kaya dapat pahalagahan at pangalagaan. (for Valuing)

Proposed Program for Integration of Primary Science Competencies to different Learning Areas for Grade 1 and 2			
UNIT 3 FORCE AND MOTION		**Integrated to:**	
Content	**Learning Competencies**	**Subject/s**	**Topic**
Moving Objects • **Reference Point** • **Indicators of motion**	*The learner…* • describes the position of a person or an object in relation to reference point (e.g. , chair, door, another person)	**PHYSICAL EDUCATION** • Locomotor Movements	• Play charades that will show the correct way to move in different pathways and levels. • Apply in other activities: pupils may get a partner and ask them to describe how they move their body going to different pathways and levels using locomotor movement in relation to a reference point such as chair, door, or other person.
	compares and contrasts the movements of objects (e.g. faster/ slower, forward/ backward, stretching/compressing)	• **PHYSICAL EDUCATION** Self-Space and General Space	• **Self-Space** - is a place where you can do movements on one's space 1. Body bending 2. Arm stretching 3. Leg swinging • **General Space** - is a place where you can move in the entire play area 1. walk forward, backward 2. run around the play area 3. play "open the basket" • *Apply using other objects in describing the movements of objects.

• **Sources and uses of light and Sound, Heat and Electricity**	• observes sources of light and sound, heat and electricity • identifies different uses of light, sound, heat and electricity	**Sources of Light/ Heay and Electricity** **FILIPINO** • **Liwanag at Dilim**	• Iugnay sa aralin ang kailanmaliwang at madilim sa isang araw. • Ipaliwanag kung saan nanggagaling ang liwanag sa tuwing araw at sa gabi. • Ipaliwang din ang iba pang pinagmumulan ng liwanag tulad ng apoy at sa mga ilaw naginagamitan ng kuryente. • Ipaunawa sa mga mag-aaral ang mga bagay na nagagawa natin ng mabilis at maayos sa tulong ng init, liwanag at kuryente. • Ipaisa isa sa mga mag-aaral ang mga buting dulot ng paggamit ng liwanag, init at kuryente
		MUSIC • **Sounds**	• Identify sources of sound such as: a. animals b. objects c. musical instrument d. nature e. people • Have the pupils realize that some sounds are pleasing to hear and some are not. • When sound is unpleasing it is called **Noise** Help the pupils appreciate and recognize the importance of

			sound in their everyday life.

Proposed Program for Integration of Primary Science Competencies to different Learning Areas for Grade 1 and 2			
UNIT 4 EARTH AND SPACE		**Integrated to:**	
Content	**Learning Competencies**	**Subject/s**	**Topic**
The Surroundings • People • Animals • Plants • Lakes, Rivers, Streams, Hills and Mountains	*The learner…* • observes the surroundings at home, in school, in the community, in the locality (town, city, province) • relates the importance of the surroundings to people and other living things	**ENGLISH** • **Answer wh-questions**	• **<u>WH- Questions</u>** • Using wh- questions to recognize and identify things that they see in their surroundings, at home, in school, in the community or in the locality such as people, animals, plants, lakes, rivers, streams, hills and mountains. - What – asks about an object or objects - Who – asks about a person or persons - when – asks about the time or the date - asks about a place
Weather • **Types and effects of weather in the community** • **Safety and precautionary measures**	• describes the changes in the weather over a period of time • communicates how different types of weather affect activities in the community	**ENGLISH** • **Adverb**	• a word or phrase that modifies or qualifies an adjective, verb, or other adverb or a word group, expressing a relation of place, time, circumstance, manner, cause, degree, etc. (e.g., *gently*, *quite*, *then*, *there*).
		HEALTH EDUCATION Engaging in Physical Activity	• Things that can be done during sunny, windy, and rainy seasons • Clothes to wear in different seasons. • Different indoor and outdoor activities.
Natural Objects Seen in the Sky • **during daytime** • **during nighttime**	• describes the natural objects that are seen in the sky during daytime and nighttime	**ARTS** • **Colors Around Us or** • **Shapes Around Us**	• **Primary Colors** - discuss the natural colors of objects found in the sky during daytime and nighttime. Stars – RED Sun – YELLOW Clouds – BLUE / WHITE • **Shapes of objects found in the sky** Star – STAR Moon – CRESCENT Sun - CIRCLE

	• communicates how the natural objects in the sky affect daily activities	**HEALTH EDUCATION** Wearing clean clothes appropriate to the activity	• Learn the different kinds of clothes and its uses. • Identify the things to wear and use during sunny, windy, rainy season. • Things to wear during hot and cold weather.
	• practices precautionary measures to avoid the harmful effects of the Sun's heat and light.	**HEALTH EDUCATION** Physical Activity and Protection from the Sun	• Enjoy fun in the Sun safely - It is also healthy to play under the sun. - It is a primary source of vitamin D that helps absorb calcium or stronger and healthier bones.
	•		- Too much exposure can be harmful. It can cause skin damage. - Always use protection. Use sun block. - It is not healthy to play under the sun from 10 o'clock in the morning to 4 o'clock in the afternoon.

REFERENCES

Akerson, V. L., Buck, G. A., Nargund-Joshi, V., & Weiland. (2011). The Importance of Teaching and Learning Nature of Science in the Early Childhood Years. Journal of Science Education and Technology, 537-549.

Asian Scientist Newsroom (2012) Retrieved from https://www.com/2012/02/academia/ Philippine-deped-removes-science-and-health-in-grade1-2-classes-202/.

DepEd Order, no. 25, s. 2002 (2002). Implementation of the 2002 Basic Education Curriculum. Retrieved March, 2019 from http://www.deped.gov.ph/2002/06/17/do-25-s-2002-implementation-of-the-2002-basic-education-curriculum/.

Dulay, M. (1998). Selected factors affecting the senior students' interest in Science of the Northern Philippines. Unpublished master's thesis, University of Northern Philippines.

Furner, J. & Kumar, D. (2007). The mathematics and science integration: A stand for teacher education . Retrieved January 8, 2017. from http://www.ejmste.org.

Implementing Rules and Regulaions of the Enhanced BBasic Education Act of 2013 (2013) Retrieved March, 2019 from https://www.officialgazette.gov.ph/2013/09/04/irr-republic-act-no-10533/K to 12 curriculum guide Science (Grade 1 – 12) (2012) Retrieved January, 2019 from https://www.gov.ph/documents/20147/233614/SCIENCE-K-12-Curriculum-Guides-Grade7.pdf/02c5020b-a9df-cc74-598b-e6f979d5bb32?version=1.0.

Losty, S. (2012). Integrating Science. Irish Teacher National Organization Publication.

Pawilen, G. & Sumida, M. (2005). A comparative study of the elementary Science curriculum of the Philippines and Japan. Retrieved April 30, 2013 from www.ed.ehime-u.ac.jp/~kiyou/2005/pdf/19.

Pegg, J. (2010). Integrating literacy into elementary science: teacher concerns and resolutions. Retrieved March 10, 2017 from ejlts.ucdavis.edu/sites/.../Pegg_EJLTS.

Psychology Notes HQ (2012). Erik Erikson's Stages of Development – Stages 3 and 4. Online Resources for Psychology Students. Retrieved January 2019 from https://www.psychologynoteshq.com/eriksonstagesofdevelopment3-4/.

Quismundo, T. (2012). K-12 will Strengthen-not drop- science. Retrieved January 2019 from https://newsinfo.inquirer.net/140097/k-12-wiil-strengthen%e2%80%93not-drop%e2%80%93science#ixzz5Z4orbXZ4.

Rochmyaningsih, D. (2012). Indonesia's Plans To Cut Science Classes Raise Protests. Retrieved January 2019, from Asian Scientist: https://www.asianscientist.com/2012/10/academia/indonesias-plans-to-cut-science-classes-raises-protests-2012/.

Sarmiento, P. (2013). Experts Caution Against Removing Science Classes From Primary Schools Read more from Asian Scientist Magazine. Retrieved January 2019, from Asian Scientist: https://www.asianscientist.com/2013/02/academia/experts-caution-against-removing-science-from-school-curriculum-022013/.

Tan-Fabian, M. (2012). Science by the Wayside: DepEd's Wrong Choicec. Retrieved January 2019, from Filipino oFreethinkers: https://filipinofreethinkers.org/2012/02/06/science-by-the-wayside-deped%E2%80%99s-wrong-choice/.

The K to 12 Basic Education Program. Retrieved January 2019 from https://www. officialgazette.gov.ph/k-12/.