



Philippines: Strength and Weakness of Science Curricula

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The Philippines is a country in Asia whose curriculum requires English as the medium of instruction; even so, the scientific ability of students in the Philippines is not so good as seen on PISA 2018. Many things can be learned from the curriculum of other countries to illustrate how the curriculum should be perfected. This article provides an overview of how science lessons are taught in Philippine schools and their obstacles. The method used is an In-depth Interview with qualitative analysis. This article suggests that the medium of instruction is essential for the continuity of the learning process in the classroom; at the same time, this can be a lesson for schools in any country that will carry out the bilingual process in their schools or use a second language as a medium of instruction, to pay attention to the long-term effects on students and conduct research before applying the approach.

Keywords: Medium of Instruction; Philippines; Science Curricula

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INTRODUCTION

A cross-cultural study will show the strength and weaknesses of education policy. A comparison study within two countries or more (cross-cultural) begins the trends since the popularity of globalization has arisen for over two decades (Bray, 2010). As the scientific concepts are universal across the world, various researchers see a cross-cultural study as a part of a programme to explore students' understanding of a specific topic and whether it is influenced by the differences teaching and learning methods in the different educational contexts (Tan et al., 2008).

For the teacher, they can learn how to conduct a well-structured classroom. Teachers can learn from another country that has more strength than other countries, such as Filipino that already use Bilingual Education.

This research will explore the Filipino curricula. This study aims to describe the general curriculum in the Philippines and use it as the preliminary research for comparative study to get insight from Filipino Teachers.

METHODS

An in-depth interview was conducted in this study. The conversation is designed to simulate depth of meaning from the participant's perspective (Rutledge & Hogg, 2020), and an Open-ended question is used in the current research. To conduct an interview, one-on-one conversations allow individuals the psychological space and time to tell their own story in their own words (Rutledge & Hogg, 2020). For analyzing and coding, ATLAS.Ti[®] is used to get the point in the data interview.

RESULTS AND DISCUSSION

A cross-cultural study will show the strength and weaknesses of education policy. For example, Rahayu & Kita (2010) suggest Japanese chemistry teachers and textbooks authors. They suggest introducing the technical words of chemistry carefully so that students do not confuse the scientific meanings of the words.

Language plays a crucial role in the formal instruction. Herron, in 1996 argues that the meanings of the same words in science chemistry and everyday life are different. In other words, students can understand the language of chemistry only within chemistry contexts (Chiu, 2007). For example, the word 融化 (Rónghuà) as melting and 溶解 (Róngjiě) as dissolving in Mandarin is almost similar in pronunciation and meaning.

The research from Chiu (2007) also reveals the most impressive finding that the Chinese characters that, on the one hand, served to facilitate student understanding of the nature of chemistry (such as acid rain implies acidity or the Chinese character with 金 "gold"), and on the other hand, had a

detrimental effect on students' conceptualization (such as carbon hydrate with 酸, the acid in Chinese). Even the same character (酸) represented a different nature of matter.

The previous research proves that different approaches, languages, and countries have different strengths and weaknesses. Teachers need to realize that the knowledge comes from wester (English). The solution for these problems, Chiu (2007) stated that students should be introduced to the correct meanings of chemistry words only after acquiring some schemas (using mother tongue) in chemistry contexts. What if teachers change the All Instructional in the classroom to English? Because the source for science is from Western in English. Let us see what happen with the Filipino teacher.

Curriculum Expect from Filipino Teacher

K-12 (K to 12 Curriculum) is the latest curriculum of the Philippines stated in 2013. Roy Montebon (2014) states that students generally perceive that implementing the new science curriculum positively affects the way they learn science concepts, acquire scientific skills, and develop scientific attitudes and values. Among the different learning domains that the K12 science curriculum wants to improve are the values and attitude formation domain that students agreed to have relevant to them. Lastly, students generally perceive that their teachers judiciously implement the K12 curriculum. As mentioned by the interviewee that

"the curriculum Expect us, as a teacher, in the Philippines, is to deliver a very good teaching learning process in a in the students like, for example, the students should achieve the certain skill or at the end of the of the concept that is being discussed with the teacher, if for example, inside they talk about certain concepts in chemistry, and then the teacher should also kind of knowledgeable enough to deliver the that certain concepts. so that at the end of kind of, we have these kinds of formatting something in formative tests in the Philippines."

The teacher's main concept is good in the learning process (Pedagogy) and knowledgeable enough.

Science Education in the Philippines

Teachers need to consider that every country has different approaches. Every country has a different way to teach science. For the Philippines, the official instruction of curriculum to teach all courses in using English.

"Okay, the medium of the instructions is always English, and always English. And sometimes if the students don't understand some terms in science. The teacher, the official language in school are two; Filipino and English. So in science, math and science, math and other, especially in English, and the as much as possible, the medium of instruction is English. In public school"

"like for example, I will tell you this kind of subject area, that, for example, in teaching math, in teaching English and in speaking science, those are the vital, vital, vital, vital subjects that needs to be thought in the english. And other other subjects are being taught in philipino, or other subjects are being taught

in mother language sometime. So, so the students are equipped with different kinds of languages in that in in, in, in the elementary school in the Philippines, so, so but the focus with the the teaching math, teaching science or teaching English in the Philippines, in elementary school, we the medium of instructions is as much as possible, it should be english. And if the students don't understand, don't understand the concept or idea about it, or the lesson about it. Maybe the teacher, that's the time the teacher would elaborate, explain it more through mother language or through philipino. So second option is mother language."

Low Performance in Science

Filipino students' poor achievement levels in science have been documented for several years now ([Bernardo et al., 2008](#)). Also, in PISA 2018, as shown in Figure 1.

[\[Figure 1 about here.\]](#)

Given the poor performance of students in the NEAT and NSAT (the National Elementary Achievement Test [or NEAT] and the National Secondary Achievement Test [or NSAT]), Filipinos should not have been surprised with the results of the Third International Math and Science Study administered internationally in 41 countries in 1998, and which showed the Philippines as ranking second and third from the bottom in mathematics and science tests respectively ([Lingard, 2013](#)). Even in 2018, Filipino students were ranked as the second from the bottom in math and science.

Everybody in the Philippines must become a linguist, but the quality is often low. The greatest segment of time in the school curriculum is devoted to language work. Eventually, this problem may become less acute, either by the achievement of a truly national language or by a change of policy; but at present, it is a major obstacle to education in general and science education in particular ([Hubler, 1964](#)).

The language problem is continually uppermost in the minds of teachers. They ask how they can teach science when the children cannot understand the language. The answer, of course, is to use concrete materials and experiences to circumvent language difficulties. Direct experience also is the best way to develop word meanings in any language. However, to compound the difficulties, suitable teaching resources are most limited. Asked by another teacher how direct experience could be provided to make atomic structure understandable, one teacher replied: "I always explain difficult concepts in the vernacular to avoid the language problem." Thus, the problem persists ([Hubler, 1964](#)).

The English language has enjoyed a privileged status in Philippine formal education since US President McKinley declared it the medium of instruction of the Philippine public educational system in 1900. However, the pre-eminence of English has been vigorously called to question since then ([Bernardo, 2004](#)).

One additional issue is that the official language of instruction in science classes is English. However, it is recognized that for most teachers and students, a mixture of English and Filipino dialects is used in classroom instruction and conversation ([Beasley, 1999](#)).

However, this English only order gave way to the official letter of instruction that seemed to acknowledge the difficulty in using the language of the people (however defined) when there were no teaching materials in the native languages. The reason why English-Only; first, the American teachers could more effectively teach in English. Second, English was thought to be a language that could unite the Filipinos from the different regions who spoke different languages and dialects. Third, English was thought of as the language that would provide the Filipinos access to civilization ([Bernardo, 2004](#)).

However, using English does not always mean good.

The impact of this on meaningful verbal learning at the high school level is not clearly understood. Filipinos (500 Filipino principals and teachers) generally believe that if the medium of instruction were their first language, more meaningful learning might be forthcoming. Government policy would suggest that this is unlikely to occur in the foreseeable future ([Beasley, 1999](#)). The pros and cons are very strong in applying this policy ([Bernardo, 2004](#)).

Shohamy ([2011](#)) stated that experiments provided empirical evidence on the pedagogical benefits of using local languages in education, or to state it negatively, on the pedagogical disadvantages of using English as a medium of instruction.

Two other relevant developments in the educational circles contributed to the criticism of the English-only policy during the 1950s. The first was the UNESCO monograph affirming the necessity of beginning schooling in the students' mother tongue 'because they understand it best and because to begin their school life in the mother tongue will make the break between the home and school as small as possible' ([UNESCO, 1953; Bernardo, 2004](#)).

Students can learn best through their first language, their Mother Tongue (MT). Twelve (12) MT languages have been introduced for SY 2012-2013: Bahasa Sug, Bikol, Cebuano, Chabacano, Hiligaynon, Iloko, Kapampangan, Maguindanaoan, Meranao, Pangasinense, Tagalog, and Waray. Other local languages will be added in succeeding school years¹.

For the approach, Filipino use subject-centred.

"Yeah. So you mentioned about you have science courses and the math courses, and then language courses, right?. Yes. it's different entity."

The thematic approach is the one subject connected with other subjects and integrated within a theme. The thematic approach in elementary schools is applied in the Indonesian system through the curriculum revision in 2013. This approach is applied based on the research that learning is best carried out

¹ <https://www.officialgazette.gov.ph/k-12/>

in thematic work, integrating different knowledge areas that facilitate a deeper understanding of the surrounding world ([Björklund & Ahlskog-Björkman, 2017](#)). Whereas, in Taiwan, the learning approach is based on the subject-centred curriculum. This approach is an established hierarchy of subjects, with the mother tongue, mathematics, and science invariably dominant in perceived importance ([Granville, 2019](#)).

When asked about the condition if students do not want to be scientists. The teacher answered:

"Waw, kind of interesting. mmmm, hmmm, hmmm, for example, you are a science teacher, and you are actually, like for example, students don't want don't want to become a scientist. They will tell themselves, "how can I? How, what is the essence of learning science? If I don't become a science? Yeah, because I just want to, to, to to sing, I want to become a artist". So there are essential, just essential. He said, it's essential for the child to learn science as well, even if he or she wants to become a singer or an artist. It's, it's kind of mandatory. You should learn it, because it's a basic knowledge. Yeah, yeah. You should, you should not, you cannot escape about that, you can have, you cannot say like, Oh, I don't want to learn science, because I don't, I want to become a farmer in the future. Yeah. How can I apply science in my, in my environment? And so are How can I apply science when I become an artist or a singer? So yeah, it sounds irrelevant. But as we go through this course, it is necessary for the students to learn the basic knowledge even though they don't want it, even though they they want some other profession or so other, you know, ideal profession in the future. So it might, yeah, it might for them for the perspective of the students, it might be irrelevant for them, but the school plays a vital role to let them understand that even though you don't need to become a scientist in the future, you still need to know about science. learning sciences is important"

This teacher argument is based on the philosophy of progressivism by John Dewey that took into account the students' individualities, stimulating teachers' creativity and focusing on a practice-based education ([Radu, 2011](#)). Moreover, when it comes to assessment. Teachers commonly believe that if students are not interested in becoming scientists, at least students need to learn the least, the limit, it is like the limit of learning sciences. However, teachers still need to assess; Filipino teacher says:

"Oh, okay. In the Philippines, we have, we have these kind of national achievement test in the Philippines. national achievement test is a kind of a measurement for measurement of the students knowledge in certain subject area. So, we, the teachers prepare them for the National achievement tests, because if Majority of the students fail in certain subject area, in that national achievement test, the principal will analyze the result. And the principal will advise the teacher why it is happening. So, meaning the teaching learning process is not good enough, because the students didn't pass the national achievement test. So, meaning it will always a blame to the

teacher. What if the students are majority of the students pass? Meaning that the teacher deliver well curriculum, deliver well. the performs better in the teaching learning process of the child. Like, for example, I am the teacher, and then I need to prepare them in the national achievement test. And then, when the achieve national achievement test result comes, that the Minister of Education was submitted the basis and then the principal will discuss it to the teachers. So, and then by then they will assess on why your students like these were your students like that".

Instruction: Term of Evaluation

Likewise, national tests aimed at monitoring improvements in learning achievements reveal unacceptable performance levels among the country's elementary and high school graduates. Between 1993/1994, these tests (the National Elementary Achievement Test [or NEAT] and the National Secondary Achievement Test [or NSAT]) were instituted ([Lingard, 2013](#)).

For the school level of instruction: Evaluation in school level

Commonly, in school, in this national achievement test. In the classroom, teachers commonly have criteria or set the least minimum of student achievement of student outcome. Filipino teacher,

*"So, in the Philippines, it like this, like in one school year of the child it has four term grades, first grading, second grading, third grading for grading. So, in specific third grade, the teacher will mark them based on the quizzes, the performance of that child during the class. So they will have this kind of, you know, criteria on how to grade the students and how they will grade the students. For example, you are the science teacher, a grade you give the students are 90, 92, 95, and maybe 89. **So what does it mean? The principal would know like, Oh, well, What did your students how this 89 grade mark in fourth quarter? So meaning, you have ineffective teaching strategies, you have not good enough.** Then, you didn't explain them will the topic or the topics that they need to be need to learn in the fourth quarter. So meaning the principle would say, Oh, this child is so brilliant because he got 90 in the first term and 92 in the second term, I think it should be, you know, it should be accelerated. However, in the fourth term, he got only 89 How was that? So, it's kind of blame to the teacher. So So that's how we give grades to the students. That's how we'll give criteria to the students on that's how we assess the the learning of the students in a certain subject area."*

Monitoring

For the principal, Jimlan states that the principal needs to have good conditions in emotional intelligence, conflict management styles, and transformational leadership skills ([Jimlan, 2019](#)). For the Philippines, the principal is monitoring, especially in public schools.

"The school principal always do, we have this kind of monitoring tool in every school, and which is only be accessed by the principal. the principal, the principal should take good

care or pick good supervision, oh, yeah, to the teachers to that specific school."

For this case, the principal is a person that monitors the teacher. There is a sense of urgency about improving student outcomes, with the teachers feeling that they are being blamed to some extent by government and department officials for the poor results (Beasley, 1999).

Sometimes, the Philippine principal uses secret monitoring and surprised monitoring to know the teacher performance. And then Philippine teachers have surprise evaluation to the teachers.

"kind of monitoring tool or assessment tool to the teachers, because the principal would know how well how good this teacher is in delivering the lessons of the day"

The tool that teacher use is;

"They do paperwork and read, then submit to the principle. lot of paperwork to do for, for that teacher that needs to read to submit to submit to the principal,"

In this case,

"the principal is responsible to the government and teachers responsible to the principal. So the teachers not responsible to the government directly"

Period: some assessment tool that needs to be accomplished before a specific grading period

"For the period, some assesment tools need to be accomplished before a certain grading period."

This sense of personal concern, and debt of gratitude, reflects the Filipino and Asian values of taking care of one's own, as well as an emphasis on family as a model of employment relationships (Fry & Mees, 2014; Salvador *et al.*, 1997; David, 2019).

Eight principals were interviewed. The result shows that this relationship assumes a personal quality, that of a principle that considers the school a second home. Principal B stated that: "The relationship is like in a home. We consider (our school) our home, our second home". Counsellor B confirmed this; despite serving both college and high school, she maintained close coordination with the principal and assistant principal in the high school department (David, 2019).

The Revolution

Across Asia, countries have signed and ratified the Convention on the Rights of Persons with Disabilities (UNCRPD) (United Nations, 2006) with its clear position of inclusive education as a right. Furthermore, the United Nations Sustainable Development Goals, signed by all states parties (United Nations, 2015), contains Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Therefore, across the globe, countries are pursuing inclusive education to a greater or lesser extent (Faragher *et al.*, 2021).

"Okay, I want to change I want to include actually. I don't want to change, but I want to include some idea about our curriculum about our system, I just want to promote inclusive education, inclusive education because in in in in the

Philippines, students with learning difficulty has been isolated from the regular class. So we have this kind of experimental classrooms, like they, the experimental classrooms, they place all the students with learning difficulties, so so that the teachers will focus will focus more about them, and then, you know, the regular class is still a regular class, but I hope in the future, it will change like, I should, I hope we could, the Philippine government will promote more about inclusive education, although it's very hard to school, it's very hard to do the teachers, it's very hard for the policy, but little by little we can we can change we can adapt, because inclusive education is you know, we don't we don't it's not it's not there, it's use, it's not their fault, why they have the this kind of learning difficulty. So, as much as we want, like, you know, sometimes we learn something from our friends something so through inclusive education, maybe that someone who has been has a learning difficulty, which is included the regular what if, he or she will improve a lot. So like, like that, so that the students with learning difficulty will not think, Oh, I was put in learning difficulty. I guess. I was put in the in the night Yes. I was put in the in the in the experiment classroom, and then, oh, maybe I'm really, really bored, blah, blah, blah. And so it will not it will affect their self esteem. For too long though. I want to bring something that you want to change this inclusive, energy efficient classroom is really important."

Barriers to inclusive education and other issues noted by Lim and Thaver (2014) include:

- excessively competitive school culture (Korea),
- challenges of policy to practice implementation leading to exclusionary practices (Malaysia),
- public pressure rather than policy being the driver for more inclusive education practices (Hong Kong),
- cultural perceptions of disability, and challenges with policies and resources (Thailand),
- need for teacher education to support and promote inclusive practices (Brunei Darussalam, Singapore), and
- the capacity of mainstream schools to include students with disabilities (Singapore).

In September 2019, the Philippine Department of Education launched *the Transition Curriculum for Learners with Disabilities* in different packages (not publicly available). This curriculum is based on a program implemented in Ireland. There are five transition program packages available for students with disabilities. Common to all these packages is to support these students to become functionally literate and holistically developed Filipinos (Pawilen, Sibayan, Manuel, & Buhat, 2018).

The Philippine Department of Education recently released the revised K to 12 basic education guidelines (DepEd, 2019). A new component of this document is the Inclusive Education Policy Framework for Basic Education, released as the Fifth Annex to the Basic Education Guidelines (Faragher *et al.*, 2021).

The role of teachers and researchers is crucial in the implementation of inclusive education in the Philippines. Efforts to promote inclusive education in various dimensions

of education such as in curriculum, programs and projects and recruitment are observable based on the uploads in Department of Education portals; however, whether these research-based or purely experiential efforts remain unclear and need further inquiry (Faragher et al., 2021).

While progress towards the provision of inclusive education is evident, a significant issue for equitable provision of inclusive education in the Philippines is the presence of civil unrest. Schools in war-torn areas in the Southern Philippines present evidence for inadequate support from the government. Besides its geographical characteristics, the situation is exacerbated by the continuous conflict between armed groups and the government (UNICEF, 2018; Faragher et al., 2021).

CONCLUSIONS

The description of the Philippine Curriculum provides a brief overview of the importance of the medium of instruction that teachers and students need to equally well understand in the classroom. The description of Filipino educators can also be a reference for educators in any country to pay attention to communication with students. In addition, the description of Filipino educators can also be a consideration for schools in several Asian countries, such as Indonesia, Taiwan, Korea, and Japan, to consider the long-term effect on the development of science and mathematics on students by using secondary language as a medium of instruction.

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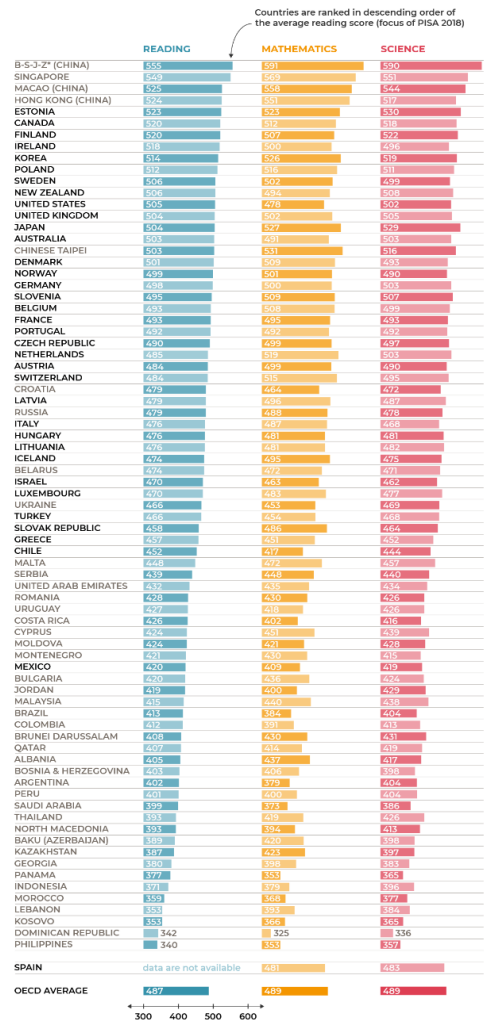
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PISA 2018 results

Snapshot of students' performance in reading, mathematics and science



Source: OECD, PISA 2018 Database || *B S J Z refers to Beijing, Shanghai, Jiangsu and Zhejiang



FIGURE 1 / PISA Results; Philippines in the Bottom