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Boon or Bane: The Lived Experiences of the Robotics Club Members of Philippine School Doha at the Onset of Robotics

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Background. The advent of robotics has certainly changed the world. Not only did it influence the way people live their lives, it has changed the way teaching and learning have always been done. In this regard, the present research centers on the lived experiences of the robotics club members of Philippine School Doha. It focuses on how the members view the robotics club. By learning their insights, recommendations can be cited to mitigate problems related to robotics and cite recommendations to make the robotics club more relevant in this 21st century setting. ***Method.*** This qualitative paper made use of a phenomenological research design to understand the lived experiences and perceptions of the participants, specifically Robotics club members, relative to the central question: "How do robotics club members of Philippine School Doha perceive the offered Robotics program of the school?" Data were gathered using one-to-one interview that consists of twenty-five developmental questions and were analyzed using an inductive approach in theme development. ***Findings***. Findings have shown that students perceive robotics and the robotics club as gateway for the many breakthroughs in life. There are, however, a few hardware and software issues present. Nevertheless, it is still critical in preparing the students for the challenges of 21st century learning. ***Conclusion***. The rise of robots from the early times up until now has undoubtedly brought great advancements in different areas, especially in the education setting. It is indeed a boon to students who are deeply immersed in technology. The robotics club would create highly-abled students who are imbued with critical thinking and problem-solving skills. ***Recommendation***. To fill the literature gap, this paper suggests to future researchers to further expand the pool of participants to elicit a wider range of responses.

Keywords: Robotics, Robotics Club, Education, Innovation, Artificial Intelligence, Programming, Technology

INTRODUCTION

The rise of these machines is inevitable especially now that people are more interested in the production and further development of Artificial Intelligence (AI) and Robotics Technology. According to Siraj (2017), the evolution and utilization of Artificial Intelligence (AI) is causing an imminent and rapid shift to almost every aspect of life, with today's children undergoing a very distinctive life to that of their parents (Taguma, 2018). The robots have not just overrun the workplace, they are developing skills, moving up the corporate scale, showing remarkable potency and retention rates, and increasingly pushing aside their human counterparts (Mcneal, 2015). The potentialities of these machines are beyond expectations and the further development of these will surely bring people to unexpected situations that

will inevitably of use especially in the modern-day and the eventuality.

To equip people for the forecasted modifications to their lives, it must be ensured that learning and training are attuned to the new demands of the workplace and society (Tucker, et. al., 2017). There is now a need to start considering robotics in education as a lifetime learning partner. This is because the 21st century skills that students must possess may not be readily addressed by the present curriculum being used.

In preparation for the future world, several schools are introducing robotics to their curriculum. Programs teaching robotics became popular in developed countries and are becoming more widespread in the developing society as well. "Robotics is used to teach problem-solving, programming, design, physics, math and even music and art to students at all levels of their education," (Miller & Nourbakhsh, 2016). Students in K12 schools will graduate into a workforce that is full of technology, in an era where robots will grow extensively used in our daily lives (Study International Staff, 2019; SI News, 2019).

Teaching robotics to students strengthens and enhances the students' skills while developing their knowledge through production and programming (Acer for Education, 2017). Admittedly, the advent of robotics holds substantial promise for helping address some of society's most pressing challenges. "Incorporating a consciousness of AI and its challenges into the way we provide and experience learning over the career lifespan could be one way of fully realizing the human and technological benefits of this next frontier," (Chrisinger, 2019).

Not only does the incorporation of robotics in education helps the students learn and enhance their skills but it also helps the world, when the robot industry continues to prosper, in addressing the constraining challenges faced by the people. Robotics in the curriculum will equip the youths with the proper knowledge needed for this 21st century setting. "The purpose is to encourage educators and schools to integrate educational robotics in their curriculum to create a useful learning environment for students to exhibit their knowledge and develop the important skills needed for their futures," (Rahim & Mouhamad, 2019).

With these in mind, this paper discusses the lived experiences of students who are enrolled in the robotics club in PSD. The research mainly focuses on how they perceive the club. It also discusses the problems encountered, and puts forward several ways to create a better robotics program not just in PSD, but in other basic education schools. The verbalization of the students' experiences unveiled three themes: (1) **Setbacks** - which address the problems encountered by the students like the scarcity of resources, budget, and time; (2) **Breakthrough** - which discusses the advantages that robotics program in school bring to the club members; and (3) **Solutions** - which present some solutions to the problems encountered in the setbacks and recommendations for the further development of robotics in school.

In a nutshell, robotics is a phenomenon that has exponentially grown throughout the years. Since the rise of these new technologies is gradually imminent, schools should start to incorporate robotics in their curriculum. The younger the students are exposed to robotics, the better they will prepare for a technologically-advanced society such as the one they have now. The study highlights the advantages that robotics brings and argues that despite the glaring challenges it brings, it still ushers a new era of unprecedented growth and progress.

METHOD

Research Design

A qualitative research design was used to better understand the human behavior being explored. "We define qualitative research as an iterative process in which improved understanding to the scientific community is achieved by making new significant distinctions resulting from getting closer to the phenomenon studied," (Aspers and Corte, 2019).

To better extrapolate the lived experiences of the respondents, phenomenolpgy was utilized. It is used to gain an understanding of underlying reasons, opinions, and motivations of the participants.

Through the use of a qualitative phenomenological approach, the researchers were able to comprehend the ideas and insights of the participants as members of the robotics club of PSD.

Research Locus and Sample

This study was conducted in Philippine School Doha, abbreviated as PSD. It is the

leading learning institution in Qatar as far as Philippine basic education is concerned. The school was established on October 3, 1992 to serve the educational needs of the children of the Overseas Filipino Workers in the State of Qatar. Its birth was the result of the determination of pioneering members of the Filipino community in Doha under the auspices of the Philippine Embassy. As required under Philippine laws, the school has been incorporated as a non-stock, non-profit educational corporation and is duly registered as the Philippine School in Doha, Incorporated in the Securities and Exchange Commission (Philippine School Doha).

Figure 1 **Map of Qatar**
Retrieved from: www.lonelyplanet.com

A total of seven robotics club members were selected to be the respondents through qualitative non-probability purposive random sampling. The chosen candidates met the necessary criteria set (at least 3 year-membership in the club, has passion for science and technology specifically in robotics, and will be pursuing courses related to robotics) by the researchers to ensure that valid responses that will definitively describe the experience of being members of the robotics club will come to the fore.

Data Collection and Ethical Consideration

Data were collected through a survey questionnaire. The survey questionnaire was validated by teachers to ensure that the questions will readily address the topic at hand. Data collection started by writing a letter to the proposed respondents which explains in detail the study to be conducted. Following the respondents' acceptance, the time and place for the interview were set. The interview gave the participants the avenue to share their understanding of the study. Data were recorded by hand and recorded using a cellphone. To maintain confidentiality, the names of the respondents were not mentioned. Instead, the seven respondents were referred to as R1, R2, and so on.

Data Analysis

The researchers followed a step-by-step process in order to analyze the data collected from the respondents. In order to assess the robotics program of the school, the researchers (1) listened carefully to the verbal musings of the respondents through the interview and transcribed the emic response. After which, they have (2) modified and interpreted the emic response to remove unnecessary pieces of information and get the gist from the researcher's naïve understanding of the survey questions. Then, the (3) main ideas/themes were extracted and clustered from the responses through the use of dendogram. Lastly, based on the clustered themes, the researchers created a (4) a simulacrum; the visual representation of all the relevant themes and sub-themes.

FINDINGS

The advent of technology has certainly changed the educational landscape. Not only did it make teaching easier, it has opened a lot of doors in terms of what it means to learn in this 21st century. Truly, to say that education in this present era is driven by technological advancements is actually an understatement. On the contrary, it has become technology-centered wherein both educators and students find themselves caught in the nexus of these innovations.

Due to the advantages that technology brings in the educational paradigm, schools of today have been incorporating it in the curriculum. New programs and activities are being introduced to further meet the demands of students whose knowledge on technologies are far superior to students past. Needless to say, robotics and robot programming have been by-products of such changes in the curriculum.

Admittedly, engaging in robotics requires certain prerequisite skills. Students who are involved in the program need to have certain knowledge and capabilities especially in programming and putting Artificial Intelligence into machines. It is therefore essential for the school not only to introduce the world of robotics to students, but to actually immerse them in it.

With Philippine School Doha's vision to produce globally competitive graduates who are at par with international standards, the school started offering robotics as an interest club. The main objective of this program is to teach the students the basic skills in robot programming. Moreover, it is also an avenue for them to showcase their talents with regard to building their own robots out of Lego parts, engineer their own aesthetic designs, connect with students from other schools who also have the same program, and join local and international competitions in robotics.

In this regard, this phenomenological study attempts to evaluate the lived experiences of Philippine School Doha's robotics club members. It also explores possible recommendations to strengthen it. The verbal musings of the respondents revealed three themes which is shown in the simulacrum in Figure 3. These are (1) **Setbacks** - encompasses the problems the participants encounter while making and programming the robots and perceived challenges in the implementation of the program; (2) **Breakthrough**- contains the positive effects of robotics to the participants and how they use the knowledge gained in everyday life; and (3) **Solution**- includes the participants' resolution to the problem encountered. In this way, the three themes formulated will help in the understanding of the members of the robotics program in Philippine School Doha, the benefits reaped, the problems encountered, the solutions and some recommendations to better the program per se.

Figure 3 **Simulacrum**
Lived Experiences of the Robotics Club Members of Philippine School Doha

Setbacks

Robot programming is a complex process. Students who are mostly involved in robotics have experienced multiple errors in making the robot work. Mostly, setbacks are related to *"software and the hardware issues." (R7)*. On one hand, software issues include the program and programmer. When both the program and the programmer are inefficient, the finished product would certainly not work. When the set of demands are not properly encoded or the one encoding is not entirely knowledgeable, the robot's function is compromised. As the respondents explained:

"The hardest part that I have encountered is creating the program; the set of demands for the robots to do. For example, if you want the robot to pick up an object, your goal is to make the robot do it by itself in a way it can see or sense the world since it does not have eyes or ears or any form of sensory organs, but have motion, light, ultraviolet, and other touch sensors. The hardest part was to formulate an actual program that allows these sensors to work, to find and to carry out an objective." (R2)

"Indeed, mistakes could not be avoided in robot programming. Miscalculations can be a hassle since it affects the student's time. The results of the finished output will not always reach expectations." (R7)

"Some wrong miscalculations, lack of time in making a robot, and programming it." (R5)

Robot programming is never a walk in the park. It requires extensive skill from the programmer. It requires sufficient knowledge and expertise on how to properly encode and make the robot work. It is also vital to keep on practicing, making, and testing robots to achieve the desired outputs.

On the other hand, hardware issues include the problems encountered by the respondents with regards on the physical features of the robots they created. Aside from the software issues, hardware concerns are also pressing. Without the proper external peripheries from which robots can be made from, programs will remain useless no matter how flawless they may be. As the respondents asserted,

"When making the robot you need to maintain the shape of the robot and the things that it needs to do." (R4)

"The way it turns out to be is not always perfect." (R6)

"Memorizing and replacing parts" (R1)

Another problem that was encountered by the students is their lack of knowledge in making and

programming of the robot. As one respondent said,

> *"Honestly, since I am not an expert in making robots, one of the problems that I have encountered in making robots is that I do not know how to properly make a robot. The only time I was able to make robots is with the help of my teammates." (R3)*

Moreover, while studying robotics is advantageous, not all students in PSD are interested in robot programming. Hence, it remains a club. In addition, some students only took robot programming because of influences from friends or from parents who want them to take STEM as a strand in Senior High School or as a glimpse of future profession. They believe that robotic education becomes a requirement for most students who are looking forward to becoming engineers. As the respondents shared,

> *"The time I started to be interested with robotics is when it was my first time to attend robotic classes that my parents were pushing me to. However, years came by, I attended other robotic workshops. I find it more interesting too. It is like a compliment to the other things I am doing." (R3)*
>
> *"My friends were the main cause of that interest. When I was in grade seven, all my friends were interested in robotics so, I joined. For four straight years, I have been in the robotics club of my school." (R5)*
>
> *"My friends invited me to join robotics that is why, and I also developed the interest." (R7)*
>
> *"My parents want me to become an engineer and robotics will help me become one." (R2)*

Moreover, some students took robotics due to media influences. Shows on television and videos in the internet have portrayed robots with unrealistic functions like supernatural powers or abilities. Students thought that they can replicate in robotics what they have seen in multimedia. As one respondent said,

> *"The thing that made me interested in robots is anime. When I saw the robots transforming, I was amazed. I want to make robots that could do the same." (R2)*
>
> *"I enrolled in the robotics because of the cool things I see in television." (R5)*
>
> *"I thought that I can make robot that can do many tasks like dancing and singing." (R4)*

The sudden need for a student to take robot education becomes a setback because programming robots may not be in lieu of the students' passion; only enrolling in robotics due to peer pressure or familial obedience. The end result then, would be half-baked robotics which cannot achieve the objectives set.

In the school context, hardware issues are present when materials needed are scarce. As the respondents claimed,

> *"Yes, because in school, there are limited parts that were given to the students. You also have to share the materials with your colleagues." (R1)*
>
> *"I did experience that when we were programming robots, sometimes, due to management, some parts got lost, so when we are trying to assemble them, we cannot fully fix them because some parts are missing and some parts are not really there, so we have to make it from scratch in which is really tedious and it requires a lot of focus. But with the program itself, not really. The problem for lack of resources mainly falls upon the body of the robot, not the program itself." (R2)*

Robotics certainly has its setbacks. The software and the hardware issues presented affect the program in general. There must be possible solutions to be implemented so that the setbacks cited will be resolved. Nevertheless, these setbacks are not entirely negative as they can be stepping stones towards a better robotics programming in PSD and in other schools.

Breakthrough

Teaching and learning were also influenced by robotics. To address the needs of the 21st century learners, schools started introducing robotics to students. Its main objective is to hone the student's skills, interest, and creativity. This technologically-advance society indeed calls for a comprehensive robotics school program.

The students involved in programming robots noted that making robots proves to be a tedious task. Since robots are composed of parts, when one-part malfunctions, the rest are affected. Restarting the program, they noted, is really frustrating. However, some students have the patience and the passion to try again despite some hindrances. There may be errors, but this enhances the student's critical thinking. Along with the benefits these robots give humanity, the respondents argue that being engaged in the creation of such an innovative technology is genuinely advantageous to the students' intellect and their

preparation in the profession they most likely will have after graduation. As the respondents shared:

"It improves my problem- solving skills and it helps me find ways on how to help humans as well." (R7)

"These robots brought me the knowledge and they brought me understanding on how they should work, the mechanisms and others." (R4)

"Yes, it can help the students to think critically because everyone had the hard time building a robot and programming it, so you need every brain cell you have to make a robot. It can increase in a drastic way, because as I said, you need your brain cells and if you think about it, critical thinking is developed when you're thinking with your deepest thoughts in order to build this robot." (R1)

As the respondents stated, robots are a good tool for improving critical thinking skills. Robots are composed of parts that require different algorithms to apply, in order for it to be completely built. Students who are eager to pursue robotics as their career, join clubs to further enhance their understanding of robots and how the creation of a reliable artificial intelligence is being made.

It appears that most of the students observed that they have gained new skills and knowledge that can be used in real life. Robot programming does not only help them academically; the new capabilities they have learned will be of much help in the other areas of their lives. Problem-solving skills, critical thinking, and paying attention to even the smallest details are not only true to robot programming, but to life as well. Moreover, robotics has also taught them teamwork and collaboration.

"For us robotics club members, when we make robots, it is not an individual task, rather it is a group work. The same thing happens with other companies that invents real robots, because it will not be created with only one person working. Hence, teamwork is important." (R2)

"I want to create robots in order to help the community in their works and make their lives easier." (R4)

"They aid humanity in developing its nation and lessen its burden." (R7)

Robotics is a boon to students living in this generation full of technologies. The program helps the students formulate creative solutions to old problems. It provides them with new and alternative ways to do things. It paves the way for them to be agents of positive change by thinking of new ways to help the society.

"For example, I saw a project of grade 6 students that uses robots for cleaning. I think robotics will really help solve environmental problems." (R6)

"Robots can solve the major problems in society and can make life easier and more comfortable." (R2)

Robotics also helped the students academically. The skills gained helped them understand better the theoretical ideas taught in the classroom. More so, the knowledge they have imbibed will help them in their future careers. As the respondents said:

"Yes, for me, I have been used to calculating robot movements. It could make you knowledgeable in math and physics." (R5)

"It does not only help me physically, but it does help me mentally. I tried and learned making a robot. If a program is wrong, I learn from my mistakes. I adjust it and accumulate knowledge on how to make a robot, so that is how they help me." (R2)

"Many. For some reason, first, they helped me win in a competition, and two, they deliver the task that I could not do." (R1)

Not only do these robots help the students cognitively, but these robots made them globally competitive in a way that it brought them pride and honor especially when they compete. The robotics' club's main objective is not only to teach them how to make and program robots or to help improve their critical thinking skills, but also to link the students from other schools who also have the same program, and join local and international competitions in robotics. As the respondents stated,

"We create robots not only for fun and practice, but also to join contests." (R6)

"Robotics enable me to meet others who I share the same passion with." (R1)

"The robotics program enabled me to gain friends who also love robots. It helped me academically and socially." (R3)

In a nutshell, the science of robotics is a catalyst towards many breakthroughs in the society. It is a game changer that redefined how people live their lives. It provides new insights and knowledge on how to do things better. In a way, its advantages far outweigh its disadvantages.

Solutions

With the use of high-level Artificial Intelligence, nowadays, robots are being programmed to

solve many complex issues. However, it is not devoid of flaws. Setbacks are inevitable, but these are opportunities to create a better school robotics program. Hence, necessary recommendations should be cited to overcome the software and hardware issues presented and encountered by the respondents.

Encountering a problem can really be frustrating especially if one has putted a lot of effort on it. But one should not fret when these unexpected instances happen for it may help you think creatively in a way that you will find solutions to the problems you have encountered. As the respondents indicated,

"Yes, I have experienced the lack of materials while making some robots. I did some improvisation on our design by changing some parts by using those that are available." (R7)

"The possible solution of scarcity in materials is to use recycled materials that are still in good condition." (R1)

"Also, finding an alternative material could be another solution. Controlling of inventory is needed to avoid scarcity in materials." (R2)

Since lack of materials were evident in the school and some parts have gone missing, the members improvised and utilized some old parts.

Another way on how the students were able to cope up with the setbacks encountered while making and programming a robot was to test it. As the respondents noted,

"So, for example, the robot malfunctions, you could take the robot and try to fix it yourself and reprogram and check all those things that might have brought the robot to malfunction." (R4)

"Sometimes there are a few mistakes, but it can be fixed during testing. The way it turns out to be is not always perfect." (R6)

And if there were any problem, one should immediately take action. The respondents suggested,

"When making the robot you need to focus on the design that will allow the robot to perform its function. Also, you need to fix the program and find the issues and problems that do not make the robot work." (R4)

"These robots can be regulated by always tackling the problems that you will face when creating a robot." (R4)

Furthermore, to avoid any problems in the functionality of the robots. The respondents made sure that they are very keen and careful in making one. As the respondents asserted,

"Memorize your parts and memorize your pieces because if you fit just a tiny bit of piece in the wrong place, it would not work the way you would want it to work." (R1)

"While you are making the robot, you should always consider the hardware and the connections of the robot if its correct or is it misplaced, and you can also consider the program that you will be using that it should be correct so that the robot will function properly." (R4)

"Follow the rules properly so that no issue will happen." (R6)

The robotic program is only as good as the programmer who made it. Conversely, a programmer equipped with the necessary knowledge and skill can formulate an efficient and iron-clad program for the robot to perform the desired output. Hence, proper education of the robotics' members is a must.

Besides the precautionary measures they implemented to fix the problems they faced, the respondents also suggested on improving the robotics program in school so that it would not only help the members improve but also teach other students the essence and the advantages and the disadvantages of these technologies might bring to them.

"For me robotics should be taught in school so that students or future students will be able to understand the concept of robotics and to understand the complex art of robotics." (R4)

"If we start teaching them now, maybe every human would not be displaced in an event where robots would take over the jobs that human beings are doing right now." (R3)

"The robots will function well if and when the programmer is good." (R2)

While the respondents believe that robotics is necessary, it need not be mandatory. Not all students display the same interest in robotics. Though it should remain a club, they must do a better job in promoting it to attract more members.

"Yes, it should not be mandatory because not all students have the interest. If it is going to be mandatory, it would just cause headache for the students who does not have the interest. But we need to make sure to promote it for the benefits it brings" (R5)

"Robotics should be taught but not mandatory because people can choose if they want to learn. I also think it is important to learn because robots will be in the future." (R6)

Moreover, the school must do a better job in promoting its robotics program. This is because students will reap many advantages when enrolled in robotics. At the same time, since technology paints the future, it will better prepare them to become global and meet the demands of 21st century learning. As the respondents said,

"For us robotics club members, when we make robots, it is not an individual task, rather it is a

group work. The hardest part was to formulate an actual program that allows these sensors to work, to find and to carry out an objective, because you cannot just think of having to input a certain task to them." (R2)

"For me robotics can be taught in school so that students or future students will be able to understand the concept of robotics and to understand its complex art." (R4)

"Yes, it can help the students to think critically because everyone had the hard time building a robot and programming it, so you need every brain cell you must make a robot…" (R1)

Aside from education, another possible solution is by giving more time to the robotics students to make the actual robot and examine the fundamental parts of today's robots like the gears, motors, power supply, fuse and the wirings. Improving the energy usage, battery life and purchasing new battery technology is another possible solution. Improper installation can be solved by rechecking the process for the success of the project and safety of every user of the robot before it is fully functional. The problems can be prevented as long as the students are well educated about robotic systems, proper installation, risk assessment and programming. Other users should also be familiar and educated with the safety standards and practices to avoid malfunctions. As the respondents said,

"If the programmers have more time and dedication to develop the robot, the robot will be efficient." (R5)

"While you are making the robot, you should always consider the hardware and the connections of the robot if it is correct or misplaced, and you can also consider the program that you will be using that it should be correct so that the robot will function properly. These can be learned." (R4)

"Being knowledgeable in robotics will be of help in creating a program that will function well." (R5)

For hardware issues, these certain steps can be done according to the participants.

"The possible solution of scarcity in materials is to use recycled materials that are still in good condition." (R1)

"Also, finding an alternative material could be another solution. Controlling of inventory is needed to avoid scarcity in materials." (R2)

Knowing one's inventory can help one determine if one needs new stocks to lessen shortages. It is also good to develop and use new and better techniques to deal with shortages.

Moreover, the school can also add funds to be able to purchase better equipment and parts. This will enable the robotics club members not only to enjoy the club, but to make the most out of the time given to them. As the respondents mentioned,

"I think it would be better if there will be more advanced equipment in school for us to use." (R1)

"The robotics program in school is good. It just needs to update its materials." (R4)

With there are setbacks in robotics, it should not hinder people from harnessing its benefits. Hence, possible solutions where cited which were based on the respondents' ideas and experiences. Their ideas can be used to further understand and to overcome the setbacks that are present in the robotics program in Philippine School Doha.

DISCUSSION

People live in a fast-paced world where nothing remains constant. Each day that passes by, new things are being created and developed. One good example of this is the internet. "Looking back to the 1990s, the Internet was a new commodity many, but not all, households and businesses began to gain access" (Lamey, 2018; Discovertec, 2018). Since then, the Internet has been developed to the extent where it is almost everywhere. Another example is technology. "Just a few years ago, it might have been pure fantasy, but as technology has evolved, many things that once seemed impossible are now a part of the modern conveniences people expect on a daily basis," (Oosterhout, 2018). "From year to year, the evolution of technology is one of staggering promise and opportunity – as well as uncertainty," The future may be concealed, but digital progression recapitulates to reshape the world in ways that encourage people to develop new habits, find new ways to act together and become better human beings. And, in most cases, these changes transmute into a series of opportunities and agitations across every industry (Evans, 2019).

This development of technology has made its way to everyday life marked by its constant use by people, from the youths to education to workplaces. It has improved the workforce through the adoption of tools like the internet and email for communications, word processing, spreadsheets, and presentations for productivity, electronic databases for record-keeping, and robots and Artificial

Intelligence (AI) for automation (Guha, 2018). Digital technologies increase the productivity of the employees in the workplace in a way that "advancements in workplace technology have allowed for us to be able to work anywhere and anytime," (Bennett, et al., 2014).

These technologies, such as smartboards, internet, computers, mobile phones, and the like, are also being utilized in the educational setting. Learners today are fond of lighter and more efficient access to information, the ability to read and share feedback, and interactive learning. "Thousands of educational apps have been designed to enhance interest and participation," (Briggs, 2015). “Technology is an essential tool for the transformation of education in our country,” (Ray, 2017; Marketwired, 2017). Educators admit that learners today have a connection with modern and emerging technologies, growing up with computers and the Internet. In this generation, students conform to changes effortlessly in school, expect immediate access to information, and avoid passive learning (Lim, 2015).

To meet the demand for engineering professionals and to keep its leading role in the world, the United States needs more focus on science, technology, engineering and mathematics (STEM) training (Breiner, et al, 2012; Council of Graduate Schools and Educational Testing Service, 2010; Subotnik, et al., 2009; as cited by Kaya, et al., 2017). As technologies are being utilized in everyday life, schools are also incorporating the robotics program as a means to teach the students the basics about technology specifically programming and production of robots. The concept of integrating robotics into mathematics education began with Lego in the early 1980s (Papert, 1980; as cited by Kelley, et al., 2019).

Since the 1980s, robotics has taken STEM education by storm. But robotics in the educational setting has come a long way since those early days of "battle-bot" games and matches which involved solitary robots completing simple predetermined tasks (Bartholomew & Furse, 2015). Integrating robotics in the educational setting benefits the students as a way where they can enhance their skills. "Twenty-first-century education systems should create an environment wherein students encounter critical learning components (such as problem-solving, teamwork, and communication skills) and embrace lifelong learning," (Khanlari, 2016). The study made by Khanlari (2016) revealed that robotics, as observed by the teachers, have beneficial effects on the students' lifelong learning skills. "The public strongly supports the need for students to assimilate digital literacy," Technology and Engineering can play a part in helping students grow as computational thinkers and thus become more deeply regarded as part of the educational mainstream (Hacker, 2018).

Given the advantages of robotics to life and learning in general, the results articulated from the respondents’ verbalization revealed three themes. These are (1) Breakthrough which highlights the advantages robotics bring to the world, particularly to teaching and learning; (2) Setbacks which accentuates the problems encountered in its school implementation; and (3) Solutions which addresses the possible recommendations to address the challenges and create a better school robotics program.

Setbacks

While technology is advantageous, a few setbacks are usually unavoidable. Although it has made life easier and more comfortable, it has raised some pressing concerns that challenged even people’s most cherished beliefs and practices.

The school is not spared from the quandaries that robotics brings to the table. As the results have mentioned, there are hardware and software issues present. On one hand, programming as a discipline does not just involve writing lines of code, it is about a process that focuses on solving a specific problem, focusing on a methodical approach (Depešová, Noga, & Migo, 2018). In addition to programming robots, the whole process of it consists of skills such competencies as logical thinking, teamwork, abstract thinking, finding solutions, and effective work organization. The problem in programming robots is that it is extremely time consuming and requires special expertise in coordinating the activities of the robots to avoid any collision (Starke, et al., 2016). Hence, students may have a hard time encoding the programs when the knowledge they gained is insufficient or the needed program is too complex for them to comprehend. When both the students and moderators lack training, the schools’ robotics program will surely be in jeopardy.

Unquestionably, teaching robotics to students could help them improve their critical thinking skills and teamwork. It could create a time management problem, however, especially if there are conflicts in the students’ schedule. “The students stated that the robotics course required that they get together to design and construct their robots and prepare their presentations; however, it was hard to find time after school that was suitable for all team members.” (Liu, et al., 2010)

Robotics would also make it obvious the glaring differences in the students’ robotics capabilities. It sometimes becomes difficult to cope up with other students who are far knowledgeable and skill-honed than others. Liu, et al. (2010) mentioned that although team members could help each other during group

meetings, certain members would always handle certain tasks. For example, student A had better assembling abilities and so was always responsible for assembling the robot. Thus, other members in her group had few chances to work on this task.

Moreover, in the educational system, robotics' influence is not as far-reaching as it should be. Since the establishment of robotics in education is a challenging task, not all schools have introduced robotics to their students, thus not all students have the knowledge or have the opportunity to learn. This is not only because of "technical requirements such as low cost and interactivity but also because of factors depending on the school environment, such as the diversity of the educational programs, the dependence on local structures and languages, or the required training of teachers." (Mondada, et al., 2017) There is no proper funding for the program, so robotics has not become the school's priority. Many K-12 classrooms do not have the budgets necessary to provide each student with the technologies required by these approaches. Bať ko (2018) stated, "The main problems which disable the integration of educational robotics into education is the absence of algorithms and programming in the curriculum for basic schools and insufficient school finance for their buying."

The curriculum has not paid great attention to the robotics program. This may be the reason why students are not that adept when it comes to more complex technologies. Insofar as the fiscal management of the school is a reflection of its priority, robotics has certainly not been given that much importance. Software issues then would revolve around the scarcity of trainings, funds, and time management conflict.

One the other hand, hardware issues further pushes the robotics program into the abyss. According to a statement from Vogtlander, et al. (2019), one of the problems is the variety of definitions which are given to "scarcity" since scarcity is evident that the socio-economic issues play a major role in the supply risk evaluation. To improve the understanding, socio-economic factors must be mapped against problems of availability and access to natural resources. These socio-economic factors include the remoteness of communities, the low consumption level in remote areas due to low income and high costs of distribution, and the lack of availability of human capital and financial capital (Diaz-Maurin, et al., 2018). In addition, innovation, discovery, and technological development might be reliable pillars for the mitigation of resource scarcity (Lapko, et al., 2016). And that is where material criticality comes in.

The concept of material criticality, according to Lapko and his team (2016), was born from the concern that some materials, like metals and minerals, may become scarce and no longer routinely available for production and technology. Also the criticality of material increase with fast-growing demand for scarce and critical materials (Wang & Kara, 2019). It also has an impact on criticality determination since the scarcity of other resources required for production processes, such as energy and water. The time horizons, organizational levels (e.g. company, industrial system, nation etc.) and particular applications of minerals considered impose limitations on criticality determination (Lapko, et al., 2016).

Another disadvantage for the hardware part is that robots are costly due to the initial cost of the equipment and installation, need for integration into the manufacturing processes, need for peripherals, need for training, and need for programming (Niku, 2019). An example for this is the purchase of the da Vinci robot. The da Vinci robot has been estimated the price of around 1.5 million US Dollars, with yearly service cost about 110,000 US Dollars, including the cost of disposable instruments. The cost of the robotic approach was generally higher due to increased operating time (particularly set-up time) and tools, while hospital stay costs were similar (Leung & Fong, 2014). Nowadays, this example of commercially available robotic equipment is also distinguished by the high cost of acquisition, training and machine-tools, as well as the cost of robotic system maintenance (with an annual service contract in excess of US$ 100,000) (Gkegkes, Mamais, & Iavazzo, 2017).

In the school setting, some students may also have encountered issues when learning robotics especially in their behavioral and cognitive experiences. According to the research of Sisman and Kucuk (2019), their participants of the research stated that they had the most difficulty because of wrong assembly, connecting to the wrong port, and the small parts. They complained about assembly issues because the educational robotics kit included tiny detailed parts, and the robots developed in the activities had to be disassembled for the following lesson. In addition, there might be a scarcity in the availability of parts if the school does not pay great attention to robotics education. Purchasing of more advanced parts may also be a hindrance to a school whose budget for robotics is almost nil.

Robotics pedagogy is certainly a boon for the 21st century students. It has indeed raised the bar of what it means to teach and learn in the new era. There are challenges, however, in the implementation of this program. While there are difficulties encountered, these need not be the reason to abandon it and settle with was what conventional. Hence, certain recommendations are cited to overcome the challenges presented and create a better robotics program not just in Philippine School Doha, but across science-

oriented schools all over the world.

Breakthrough

Technology is everywhere. It has been evolving and will continue to evolve generation after generation. Various technologies and technological elements including smartphones, tablets, wireless internet, game consoles, TVs, videos, mobile devices, and applications surround and define daily life. Moreover, the diversity of technology increases every year and goes into the daily lives of the students. (Dağhan, 2017)

As technology permeates the different aspects of life, it eventually has made its mark in the educational paradigm. Education now becomes education through technology. Since the advent of the new generation, deemed as digital natives, it has become imperative that education meets the demands of these 21st-century learners. Chalkboards have been replaced by interactive screens that are connected to computers. Grading, employee evaluations, quizzes and assessments are largely being done online. Artificial Intelligence is replacing the traditional teaching methods which resulted in a greater rate of progress. (Raccoon Gang, 2019) Incorporating technology becomes a must then.

It has been observed that the inclusion of technology, particularly robotics, in the curriculum reaps harvest beyond measures. Robot-based Instruction (RBI) would result in positive effects on learners, such as creativity, logical thinking, and interest in learning. (Kim et al., 2014). Robotics gives challenges and opportunities to the learners in improving innovative ideas, disruptive thinking, and higher-order learning skills. (Afari & Khine, 2017)

The key ways artificial intelligence will impact education is through the application of greater levels of individualized learning; known as learning by doing. Adaptive learning programs, games and software are some examples of artificial intelligence that is already happening. These systems respond to the needs of the student, putting greater emphasis on certain topics, repeating things that students have not mastered, and generally helping students to work at their own pace. This kind of education could be a machine-assisted solution to helping students at different levels, with teachers facilitating the learning and offering help and support when needed. (TeachTought Staff, 2018)

“Learning with educational robotics provides students with opportunities for them to stop, question, and think deeply about technology.” (Eguchi, 2014). Not only do students learn how the technology works, but they also apply the skills and content knowledge learned in school in a meaningful and exciting way especially when they are designing, constructing, programming, and documenting autonomous robots.

Incorporating robotics into the education system helps students hone their critical thinking skills. Cuperman, et al. (2013) maintained that 78% of students believed that the practice comprising robotic models would be beneficial. Upon completion of the course, all students claimed that training with robotic models, in particular, robots for design and creation, indeed helped them learn concepts of natural science and technology (Kubilinnskiene, et al., 2017).

Interest in educational usage of robotics in school has grown and many attempts have been made to introduce robotics in school from kindergarten to college, usually in science and technology subjects. However, the introduction of educational innovation in school is not just an introduction to new technologies. The robot is just another device and it is the educational approach that will shape the learning result coming from robotic applications.

Consequently, the use of robots in the classroom proposes students to desirable career paths they may have never thought. It is a classic way to show students that engineering and IT can be fun by making general knowledge easy. Working with robots improves creative problem-solving techniques and promotes the development of basic communication and interpersonal skills.

From the study made by Kubilinskiene, et al. (2017), Nag, et al. (2013) have heeded that over 85% of instructors and students acquired a significant improvement in the areas of STEM and leadership skills. According to the survey results, over 75% of respondents claimed to have improved skills in mathematics, physics, and programming, while over 90% claimed to have improved leadership skills and skills in the development of a strategy. Jaipal–Jamani & Angeli (2017) also added that robotics activity could be an effective instructional strategy to enhance interest in robotics, increase self-efficacy to teach with robotics, improvement in understanding the concepts of science, and promote the development of computational cognitive skills.

Not only does incorporating robotics in education help in the skills of students, but it also helps in generating collaboration among members to successfully make or program a robot. When faced with a perplexing task, the students would allocate task elements to members according to the member’s strengths and then solve the problem together. Since robots can teach students teamwork and

collaboration, Starke et al. (2016) said that robot teamwork can increase profitability and cost-effectiveness in production. The program allowed teacher training and where children have shown great learning abilities, not only in technology but also in collaboration and teamwork. (Scaradozzi, et al., 2015)

Not only do these skills in making and programming robots heighten the critical thinking competency and collaboration skills of the students, but they can showcase these by joining competitions. Students exposed to these types of events gain recognition for the "real-life" application of topics learned inside the classroom to the world of work (Barger & Boyettel, 2015). There are several contests they can join where they can exhibit their skills and learn from other participants. In this way, they can broaden their knowledge on robotics. For instance, Philippine School Doha (PSD) represented Qatar in two World Robot Olympiads (WRO) — "first in the WRO 2012 Malaysia and the WRO 2013 Indonesia (Alagos, 2014; Gulf Times, 2014). Competitions such as this bring together the brightest robotics students who will be the building blocks of a technologically advanced society.

Incorporating robotics in the education system can indeed help teach the students the basics of making and programming robots. More so, it provides plenty of opportunities to develop critical thinking and problem-solving skills. They will also learn to be meticulous in attending to even the minute details. Not only did it break through society, but it has also made its way into the educational landscape. In a nutshell, technology became one of its cornerstone.

Solutions

Software and hardware issues present serious challenges to the implementation and application of robotics to the school curriculum. While this is true, this should not be a cause of angst for certain measures can be taken to remove, or at least, mitigate these concerns. Hence, based on the verbalizations of students and research of relevant studies, the following solutions are proposed.

Schools should start integrating robotics into their curriculum as a way to address the seeming insufficiency of students' knowledge on robotics and the waning motivation and interest for it. One reason why the school should implement robotics in their curriculum is for the educators to understand where the students are struggling and succeeding to help them (Research and markets; PR Newswire Association LLC, 2019). It would develop the students' critical, logical thinking skills, and creativity (Caudana, et al., 2019). "We suggest developing and enhancing the robotics-intensified knowledge, skill, and attitude domains for robotics education," (Jung & Won, 2018). Robotics in education can help spark the interest of the students and further motivate them to enroll in the program; "Students love to partake in activities in which they have full control, something that is possible with robotics," (Lerch, 2018).

Ardito, Mosley, and Scollins (2014) conducted a study about sixth-graders and university students. They observed that the students who were engaged in robot challenges that required teamwork achieved higher scores on algebra, measurement, and probability, all skills related to the group problem solving program in which the students were engaged. Improving their learning in mathematics and collaborative work can help promote the students in engaging in robotics class.

Also, what makes Robotics unique to the human-made world today is the perfect mixture of electronics and software with mechanical structures. This can allow the students to learn about mechanics, sensors, motors, programming, and the digital domain. By introducing the students to Robotics, they can develop their hands-on skills working with programs and mechanics. They can also improve their problem-solving skills, express themselves by using technological tools, and improve their innovative and critical thinking skills. This collaborative learning environment can inspire students to learn whatever skills and knowledge they need for them to accomplish the goals to complete the projects of their interest. (Durães, 2015)

The school can employ a variety of tools to make robotic education more fun and exciting. For instance, LEGO® WeDo robotics kits could also be a good way to make the students be immersed in the process of making robots. It is designed for ages 7+ and consists of building blocks and bricks, a motor, motion, sound, and tilt sensors, and a USB hub. A site license was purchased for use of the computer programming software and a teacher's guide accompanied the software. These kits were selected for use because they are easy to learn how to use and program and the kits are appropriate for the age group of elementary students (grades 4–6) that the preservice teachers would be teaching in schools (Jaipal-Jamani & Angeli, 2017). This could be the best method to get schools to improve their robotics club. Pinto-Llorente, et al. (2018) concluded that the use of Lego Education WeDo materials was useful to transmit and acquire the contents and objectives of natural science in Primary Education.

In addition, Scenario-based eLearning experiences in a Mobile STEM Lab learning environment have been found to influence student learning related to STEM. Scenario-based eLearning experiences can improve student attitudes, interests, and achievements related to STEM as well as improve interests in

STEM-related careers. Further, engaging and positive STEM learning experiences have the potential to improve student attitudes, interests, and achievements towards STEM throughout the instructional day rather than only in STEM classes (Proudfoot & Kebritchi, 2017).

Furthermore, a research was done by Sintov, et al. (2017) which tackles using real-world problems to teach Artificial Intelligence (AI) to diverse audiences. A part of the diverse participants they handled was the University students, in a class of the University of Southern California. In their Freshman Academy course, which is an introductory engineering course aimed at introducing students to ongoing research at USC across various engineering disciplines. In their two-week AI unit portion of the course was also designed based on a seminar at USC titled CS499: Artificial Intelligence and Science Fiction, which have the objectives for the university students to discuss honing probabilistic reasoning skills, enhancing student interest in AI, and high levels of student satisfaction with the learning experience. More than 69 percent of respondents indicated that the activity increased their interest in AI at least somewhat, and more than 80 percent agreed (somewhat or more) that the activity was a valuable learning experience. Additionally, more than 65 percent responded that they would recommend the activity to peers. Qualitative data suggested that respondents particularly enjoyed the interactive aspects of the unit.

Aside from the total inclusion of robotics in the school curriculum, seminars and trainings for both the students and the teachers become a must. A good programmer has to have knowledge and skill to create a robot. Proper education on robotics is a way to feed their curiosity and inquisitive minds. Seminars and trainings provide the perfect opportunity for them to be further immersed in the field of robotics.

Building teacher capacity is integral to improving student participation in STEM higher education (Education Council, 2015) and robotics is a great way to get students engaged and excited about STEM topics. Chalmers (2017) then added “by building teachers’ knowledge and confidence, educators can deliver engaging robotics-based STEM activities in their classrooms. The teachers in this study perceived that being involved in the university robotics outreach program had enabled them to build their knowledge and confidence, had helped motivate and engage their students in the classroom, and inspired students’ future STEM study and career aspirations.” Robotics intervention in a science methods course, over a short duration can enhance preservice teachers’ self-efficacy beliefs to teach with robotics, their science knowledge, and their computational thinking skills. (Jaipal-Jamani & Angeli, 2017)

Building student-capacity is crucial as well. The school can help improve the students’ robotics knowledge with seminars that will be led by robotic experts. It will improve the students' communication skills, engage them to know the latest technology out there and lead them to gain motivation and confidence to build their own robots. Seminars give opportunities to discuss issues related to Robotics, share expertise, skills, knowledge and exchange interpretations. It can offer motivation, solutions to robotic problems and advice on how to handle difficulties. Seminar-based learning is effective in improving generic skills, including problem-solving, critical thinking, and analytical skills. (Baird & Munir, 2015)

Aside from looking at the fiscal management system of the school, the Senior High School STEM (Science, Technology, Engineering, and Mathematics) strand can add robotics as a subject. “Robotics is new to the department and we are looking into strengthening the current program on it and incorporating it in the DepEd Curriculum.” (Sevilla, 2018) The study, therefore, puts forward the argument that robotics should become a specialized subject in Grade 11 or 12 especially those students who are into engineering. Unfortunately, the present set of subjects does not have provision for robotics. It is merely seen as a club which only a few people can benefit from.

"Robotics must be integrated into the schools. It is one of the skills 21st-century learners need in order to succeed in life," De La Salle Santiago Zobel School International Robotics Coordinator Genevieve Pillar told Philippine News Agency (PNA) (Pillar, 2018). But unlike in some science high schools nationwide, Pillar also explained that robotics started in schools as a club just like in PSD. There is a high possibility, therefore, that students forget about robotics after graduation since they enrolled only out of interest or due to passion for technology. Pillar also stated that in 2013, they have started to integrate robotics into the curriculum and is now taught to grade three pupils and above.

The total inclusion of robotics in the school curriculum would create a total paradigm shift in the fiscal management of the school. Hence, additional funding will be given to robotics, new equipment will be purchased, and more trainings and seminars will be available. The researchers argue that with the advantages robotics bring to the pedagogical setting, it is of utmost importance to turn the school into an innovation center; a center where the latest technologies become available; a center where technology is harnessed to solve the many grey areas of life.

Philippine School Doha’s robotics program has certainly a long way to go. The mere existence of

the program, nevertheless, shows the willingness of the school to be at par with international standards. With its vision to form globally-competitive graduates and with its goal to be the first Philippine Science School in the Middle East, the inclusion of the robotics program as a major dimension of the curriculum is all but necessary. When the curriculum speaks robotics, only then can the school achieve these foremost visions. Student and teacher training, allocation of more funds, making it a STEM strand subject, are just some of the ways to help the school create a better robotics program. At the end of the day, the benefits it reaps far outweigh the difficulties.

CONCLUSION

As we go through the responses of the students, there were challenges encountered like functionality problems. Hardware and software issues transpired when they made and programmed robots. The hardware issues include the lack of materials and frequent defects of the robots and software issues which includes the problems they encountered on evoking certain codes in able the robots to operate.

Technological progressions in many fields make it possible to create machines that were not plausible twenty or even five years ago (Chapman, et al., 2015). These developments made way for new machines that helped humans in their quotidian lives. The pace of evolution in the sector has lately been exponential, leading robotics and automation from niche to mainstream as technology strides and falling costs have pushed it into almost every part of everyday life (Larner, 2017). It also paved a way for solutions to the everyday problems of society.

Work now is easily done raising the productivity to a whole new gear. Robotics also changed the way learning and teaching have always been conceived. Old classroom strategies seem to be obsolete in this day and age where students speak of technology. Without a doubt, it has successfully carved its way into places of learning. 21st-century educators must heed the voice of technology in order to create educational pedagogies that are relevant to 21st-century learners. Because of some new studies and the newly added knowledge, it has become easier for them to program and set up robots since they have already become used to making robots.

Learning Robotics is indeed a boon to students and a benefit for all. It is the integration of robotics as part and parcel of the curriculum to help students be equipped in as they engage in real-life application of these technologies. It helped the members of the club develop and nurture their critical thinking skills by being innovative when finding solutions to the encountered problems. It also helped them enhance their knowledge in physics and mathematics especially in coding the robots. Studying robotics helped the students to be knowledgeable about these advanced technologies and be equipped for the future prospect of these technologies.

There is a need to create an educational pedagogy that makes robotics and other related technologies its foundation. Only then can educators be assured that they are able to meet the demands and needs of students who live in a technology-advanced society such as the one they have now. Robotics is crucial and schools must step up to ensure that a global mindset is inculcated in the students. An educational institution that refuses to acknowledge the signs of the times is haphazard to the progress promised by the science of robotics.

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BIOGRAPHICAL SKETCH

Leonel Andrei N. Rufo is currently a Grade 12 Student under the strand of Accountancy, Business and Management (ABM) of Philippine School Doha. He is also a part of PSD Chorale under the voice category of Tenor. Before he went to PSD, he studied at Philippine International School Qatar (PISQ) to graduate from Junior High. He will soon pursue his goals in College of the North Atlantic-Qatar under the course of Telecommunications Engineering despite of being an ABM Student. He will also be looking forward to continue his studies in Canada to achieve his bachelor's degree for Engineering. He also participated in different activities that is being conducted in the school like Ultimate Dance Battle. And aside from the school works, he is also active in church whilst working hard to achieve his dreams and following his passion.

Crystelle Grace P. Abundabar is currently a Grade 12 student in Philippine School Doha under the Accountancy, Business, and Management (ABM) Strand. Throughout her academic years, she is a consistent honor student. She was one of the Laureola Awardees in her batch and she received both Bronze and Silver awards in her 11th and 12th grade. Additionally, she is also part of the Senior Girl Scout Organization in her school.

She completed her Junior High School in Philippine International School-Qatar with flying colors. And she joined numerous math competitions in the Philippines like the MTAP Math Competition and also Math Wizard Competition in her former school.

After her study in her current school, she plans to continue and pursue her career in Accountancy at the University of Santo Tomas.

Demi Chrissa Marie D. Cadelinia is currently a Grade 12 student under the ABM (Accountancy, Business and Management) strand in Philippine School Doha. She has been a consistent Laureola Awardee in Grade 11 and two consecutive terms in Grade 12, achieving the Bronze award. Furthermore, she is a current core member in HIYAW Chorale. Aside from her academic achievements, she participated in various competitions and activities inside and outside Philippine School Doha. She participated in PSD Idol Season 5 and received an award for being 2nd runner up. During her last two years in Junior High, she has been a constant honor student in Philippine International School-Qatar, achieving both With Honors and With High Honors, and being selected as Best in Deportment in Grade 9 and Grade 10. After graduating high school this coming April 2019, she plans to pursue AB in Multimedia Arts at DLSL (De La Salle Lipa).

Reem A. Donjuan was born on May 10, 2002. She studied in the Philippines before and moved to Qatar in the year 2012. She Graduated Junior Highschool in Philippine School Doha and she is currently a Grade 12 student under the strand of ABM (Accountancy, Business and Management) at PSD. She is currently part of the Senior Girl Scout Organization in her School. She also attended and participated in some Seminars with regards to Research. Despite being an ABM Student, she is currently planning to pursue BS Pharmacy in the Philippines. She was also part of the Top ten during the 3rd Grading of grade 10. Her determination in studies motivate her to reach and achieve her goal.

Julianne Riciel D. Ladic was born on July 21, 2002. She is currently a Grade 12 student under the ABM (Accountacy, Business, and Management) strand of Philippine School Doha. She also participated in different seminars regarding research over the past years in Senior High. She graduated elementary school in Asian Integrated School and Junior High School in Philippine International School Qatar.

After she graduates in high school, she plans to continue her studies and pursue International Travel and Tourism Management in the Lyceum of the Philippines University-Cavite. Despite of all the hardships and trials, she continues to strive for her dreams and overcome the challenges that she may face in life.

Micaella R. Mendoza was born on April 3, 2002. She is a Grade 12 student under the strand of Accountancy, Business, and Management (ABM) at Philippine School Doha. After Junior High School at Philippine International School Qatar, she moved to PSD in the year 2018 to pursue her SHS studies. She participated in different seminars regarding research over the past years in Senior High School. She has already experienced to work as an assistant teacher in Preschool Department and currently an assistant in the Accounting office. After a few months, she will be graduating from Senior High in April 2020 and she plans to pursue her goals at De La Salle University as a Marketing Management student. After finishing college, she will then go back to Qatar in order for her to achieve her goals.

Alixia Louise A. Morales is currently a Grade 12 ABM student in Philippine School Doha. She studied at the Philippine International School of Qatar and then moved to PSD in the year 2018. She received a Bronze award in the Laureola Ceremony when she was Grade 11. She participated in different seminars regarding research over the past years in Senior High. Additionally, she participated in the Battle of the Bands under the group of Bandang Sulok; a part of the HIYAW Chorale group for almost 2 years; and a member of the Senior Girl Scout Organization. Outside school, she is an Altar Server for almost 6 years at the Church of Our Lady of Rosary in Qatar.

Afterward, she will be graduating from Senior High in April 2020 and she plans to pursue a 3-year Course of Dental Hygiene at College of North Atlantic-Qatar, then another 3-year course of International Business in the Carnegie Mellon University of Qatar.