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Best Practices of Secondary Schools Offering Special Science Curriculum: An Appreciative Inquiry Toward the Development of a Primer in Science Investigatory Project

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**BEST PRACTICES OF SECONDARY SCHOOLS OFFERING SPECIAL
SCIENCE CURRICULUM: AN APPRECIATIVE INQUIRY TOWARD THE
DEVELOPMENT OF A PRIMER IN SCIENCE INVESTIGATORY PROJECT**

A THESIS
Presented to
The Graduate Studies and Teacher
Educational Research in Indigenous Peoples Education
Philippine Normal University
North Luzon
Aurora, Alicia, Isabela

In Partial Fulfillment
of the Requirements for the Degree
MASTER OF ARTS IN EDUCATION
with specialization in Science Education

JESS T. MANZANO

June 2021



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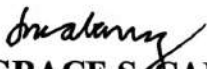
APPROVAL SHEET

The thesis entitled "**BEST PRACTICES OF SECONDARY SCHOOLS OFFERING SPECIAL SCIENCE CURRICULUM: AN APPRECIATIVE INQUIRY TOWARD THE DEVELOPMENT OF A PRIMER IN SCIENCE INVESTIGATORY PROJECT**" prepared and submitted by **JESS T. MANZANO** in partial fulfillment of the requirements for the degree of **Master of Arts in Education with Specialization in Science Education**, is hereby recommended for approval and acceptance.

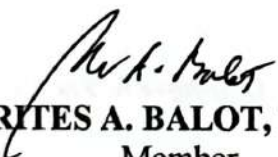

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Abstract

Name : Jess T. Manzano

Title of Study : Best Practices of Secondary Schools offering Special
Science Curriculum: An Appreciative Inquiry Toward the
Development of a Primer in Science Investigatory Project

Key Concepts : Best Practices, Appreciative Inquiry, Science Investigatory
Project

Degree : Master of Arts in Education

Specialization : Science Education

Adviser : Jandy S. Danzalan, MAEd

Schools are recognized once they produced students who got winning Science Investigatory Projects (SIP) in the science fair in any level. The best practices of each winning schools through the lens of the teacher on the SIP have not been explored in read literature. Also, there is no unified SIP primer that can be utilized by the schools. Therefore, the present study aimed to discover the best practices of secondary schools offering special science curriculum and the development of a primer in SIP. This study guided by phenomenology research design, uses purposive sampling technique with 14 most qualified teacher-participants from Schools Division office of Isabela. The validated researcher-made interview guide with the process of Appreciative Inquiry-4D model



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approach directed the researcher towards gathering relevant details vital to the determination of best practices. The lived-experience from the interview were analyzed using interpretative phenomenological analysis. The best practices of schools offering special science curriculum are (1) teachers' self-improvement and strong commitment in research endeavor, (2) mentoring student outside the school premises, (3) provision of conducive working atmosphere, (4) interdisciplinary and integrated approaches in research, (5) favorable scientific attitudes and research habits, (6) participation in science fair and engagement in research exhibit and promotion for continuous improvement of research, (7) familiarization of the INTEL ISEF Rules and Guidelines, (8) linkages to the other agencies for support, (9) students are connected to school and (10) adherence to the DepEd memorandum pertaining to the conduct of the national science and technology fair. Finally, the identification of the best practices contributes to the development and validation of SIP primer.



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My sincerest appreciation goes to every one individual who upheld, appealed to God for, and prompted me. Various individuals have contributed essentially to the accomplishment of this research study. I treasure it and feel grateful and wish to stretch out my sincere appreciation to them. Most importantly of them is the omnipotent and omniscient God, the maker of paradise and earth. I love Him and I will consistently acclaim, and worship Him. Much obliged to you Father for giving me the right people who unequivocally help me in doing this study.

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His wife **Ellen Gale** and his son **Jion Elpie Greo**, the researcher's *raison d'être* and emotional moorings have provided much more motivation to strive for a far better tomorrow.

Thank you very much!

The Researcher



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to

My Son, Jion Elpie Greo P. Manzano.

Your daily smiles and embraces are what motivate me
to write, and to keep writing.

This modest work is for you...



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CHAPTER 1. THE PROBLEM AND LITERATURE REVIEW

The gaps and rationale that are pertinent to the study are presented in this chapter. This section provides background of the study, literature review, research problem, conceptual framework, and definition of terms.

1.1 Background of the Study

The body of scientific research contribute to the improvement and understandings. Its quality and its products are the driving force for sustainable development. Many researchers in the field of science furnished concepts, theories and principles that explain the existence of something. They developed technologies that work which this scientific and technological world demands. Numerous dedicated people have spent their lives doing research. These significant contributions made science accessible to everyone. With this, science research and its products provide opportunity, improve the society and make sustainable community.

The aim of science education is to make every individual responsible on its community (Mbowane, 2016). Having knowledge about the nature of science as a human activity has become a necessity and to merely understand the concepts of science is no longer enough. Beyond apprehending science, one must also see its advantages and drawbacks that affects the way of life here and now and even the children's future. These widen one's perspective in science and push to develop and improve the ways in dealing with sciences. Scientific researches play a vital role in preparing the young for effective and successful living. To be more effective, the best practices of teacher and the school



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must be described so that each and every individual in the academic arena will be influenced and should have shared experience in dealing with science research.

The best practices in scientific research effort matter in education. The teaching of scientific research requires the teacher to engage with sets of ideas and values about the science curriculum, pedagogy and assessment. Teaching science with innovations, interests and motivations provides colors to science instructions. The experience in terms of teaching and coaching of the teacher provide necessary skills that the student needs in pursuing research endeavors. The impact of the scientific research has a big contribution to the development of one's capacity in providing the modern world with advanced technologies that help humanity in discovering more things and explaining phenomena.

Department of Education Science Curriculum's foremost program that aims to foster critical thinking, creativity and innovation among students is the Science Fair. Mbowane (2016) found that science fair or expo provide sustainable educational significance. This envisioned youth to be scientifically and technologically literate and it makes them produce science researches and projects. Research outputs are showcased where students convene to present their science studies and undergo a question-and-answer process as a way of helping them refine their projects and assess their science knowledge utilization. It is an undeniable fact that this program plays a significant role as a support mechanism in reinforcing and articulating scientific innovations in the Philippines and in the world.

Doing Science Investigatory Project (SIP) is the school's avenue for students to practice research. It enables students to learn things which they did not learn from inside

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the four corners of the classroom. Aside from memorization, pure discussion and lecture, students could still uncover the huge amount of knowledge and skills as they continue solving problem via SIP.

The enhancement of teaching SIP in the school, therefore, is a need for students to learn exceptional skills and knowledge in dealing with science researches. Thus, there should be a primer in SIP to help teachers and students produce quality researches in science which could be competed in science fairs. Eventually, this research hopes to utilize the best practices of the secondary schools as basis in developing primer in SIP.

1.2 Literature Review

Scientific researches are essential to the continued national transformation. History has shown that scientific progress and advancement are among key drivers of economic development and this serves as a standard. It also needs the continuous upgrading of the current knowledge and skills of each individual who are scientifically literate to respond to the demands of this new society. The goal of science education should be to prepare scientifically literate students who can use science to improve their own lives, cope with an increasingly complex technological world, and make science-related decisions as responsible citizens (DiChristina, 2014). Dogru (2008) found that knowledge of science concepts along with problem-solving and critical-thinking skills will assist students to analyze all sides of an issue and weigh the benefits and/or risks of possible plans of action. To improve the knowledge and skills especially in science, an



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individual should do scientific researches (Cuartero, 2016). This is not only on the benefits of oneself but also to his or her community.

Furthermore, the world understands the importance of scientific research for progress, as the National Science Foundation (NSF) of the United States of America immediately financed research and training to move schools and teachers. Having such a national statement necessitated reforms, which resulted in financing from private and public foundations to develop science research requirements for schools. The American Association for the Advancement of Science (AAAS) and the National Science Teachers Association (NSTA) have both expressed interest in developing science researches.

Also, Philippines indicated that it had made a significant start on such standard. In fact, the 1987 Philippine Constitution acknowledge scientific research as vital in the economic development. Science research is promoted and fostered in accordance with Republic Act 2067 [Science Act of 1958]. The law provides advancement to science, technology and research. This is the basis in making programs that enhances research capability. It gives opportunity to the people of the country to participate in activities related to science researches. However, the number of the science researchers in the Philippines remains small. Graduate thesis and dissertations focus on social sciences. This contradicts the law which tend to establish science, engineering, and technology researches.

Moreover, there are movement that the government agency reinforces to solve the problem on science researches. The law is promoted by the current administration through advancing science and technology (S&T) and innovation in the country as stated

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in the Philippine Development Plan 2017-2022. The government recognizes research and development (R&D) activities that help the country and its people. The government through the Department of Science and Technology (DOST) made programs in R&D to support the Filipinos in their social and economic shortcomings that will make them competitive as this world demands. Similarly, the Commission on Higher Education (CHED) mandates to advance S&T in the academe to enhance learning and research, wherein faculty members are encouraged to conduct science researches, publish these in reputable journals, and present these in accredited conferences (Salazar-Clemeña and Almonte Acosta, 2007; CHED, 2009). On its part, the DepEd particularly the schools, should contribute to the successes of the government on the researches so that the scores in the world researchers and researches will rise. As DepEd Secretary Leonor Magtolis Briones remarked, “Children in this digital age are very much into gadgets, robotics, and technology that our generation could only imagine, or see in films and read in books. Things have really changed and it is challenging to catch up but these advancements are becoming indispensable not only in education but practically in all aspects of life. This is why the Department uninterruptedly supports the nourishment of research capability and innovation among our youth for them to be able to nurture the country’s generation of globally competitive innovators.”

Thus, the science research goals of the country are also pitched down to the basic education level. The national research goals are embedded in the basic education research agenda formulated by the Department of Education (DepEd Order No. 39, s. 2016), particularly in teaching and learning (T&L) agenda. Accordingly, in T&L, science studies

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may be integrated in instructional materials development, community contextualization, and performance-based assessments. In basic education, the latter two make science research possible to be conducted by elementary and high school students – through SIPs. These projects are instruments for students to make real-world connections and solve problems in their community (Autiere, Amirshokoohi, and Kazempour, 2016). Moreover, SIP develop scientific persons by engaging the students to become curious, apply concepts and skills, and appreciate how science impacts the society. Through the conduct of SIPs, students are trained to become problem-solvers, critical thinkers and creative thinkers as they unlock the answer of their investigations (DOST-SEI & UPNISMED, 2011).

1.3 Research Problem

The study aimed to describe the best practices of the secondary schools offering special science curriculum in the SDO-Isabela in terms of SIP through the lens of the teacher and the result of this study were used in the development of a primer in SIP.

Specifically, this study aimed to:

1. Determine the (a) teachers' interest in science research, (b) teachers' experience in terms of teaching SIP, (c) teachers' experience in coaching in science fair, (d) lesson imparted by the teacher, (e) motivations of the teacher, (f) visions of the teacher, (g) innovation of the teacher; (h) plans of the teacher, (i) impact of science research, and (j) ways of teacher to improve science research;



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2. Describe the best practices of the schools offering special science curriculum through Appreciative Inquiry;
3. Develop Science Investigatory Project (SIP) Primer as supplementary material in teaching science research; and,
4. Establish face and content validity of the developed SIP primer.

1.4 Conceptual Framework

The Philippines' science education under the K-12 curriculum is an inquiry-based stressing the importance of providing evidence and explanation through empirical data (K-12 Curriculum Guide in Science, 2016). Doing science research allows an individual to suspend judgement and responsible of having knowledge that is relevant and necessary. Additionally, this brings up individuals to inquire, search, examine and establish relationships to their daily lives.

One of the ways of thinking to develop scientifically and technologically responsible individual is to deal with scientific problems and innovation. SIP or science research is the most applicable in dealing with scientific problems. In addition, most educators agree that doing SIPs play a vital role in learning. Tortop (2013) believes that SIP develops certain skills of the student not only the know-how towards the subject science. The process of scientific method can be used in all fields in life to solve problems. This allows individuals to see the world from the scientists' perspective. For this reason, the SIP of the student should be given priority and the best venue to flourish SIP is the science fair.

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Different science research teachers have had varying levels of success interacting with students and competing in science fairs. Fisanick (2010) agreed that teachers that have spent more time teaching and coaching scientific research give their students with greater knowledge, exhibit scientific skills and are committed to performing SIP. They have had success and failure in competitions. Teachers who are less engaged are anxious to compete in science fair competitions. The inexperienced science research teacher is completely aware of his or her actions throughout the science fair. The expert teacher, on the other hand, is completely confident of his or her actions throughout the competition because he or she is used to coaching students at any level every year. This example depicts the lived experiences of two science research teachers, demonstrating how they had varied experience to the same event. So, science research teachers should have similar lived experience in order to give relevant and important contributions to students doing SIP.

Many teachers have guaranteed that the SIP does not only end in the classroom but also in science fair competitions. In doing the SIP or science researches, one must aim for a higher level than just merely a requirement to the science subject or to the teacher (Cuartero, 2016). Science fair, globally, have significant contributions to the education as well as the country's S&T and R&D. In fact, the existence of science fair takes place in more than 40 years.

Science fair is an avenue for the student to showcase their SIP. This is a competition where students present and depend their study to the board of judges. The teacher plays an important role for this event as the teacher trains and helps the student in

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the duration of the research course. The success of the science fair is based on the motivation and assistance of the teacher (Mbowane, 2016 & Tortop, 2013 & Molefe, 2011). Additionally, Cuartero (2016) believes that the teacher's attitudes, interest, potentials, strength, experience, connections and expectations help student to come up with a competitive SIP. Therefore, the practices of the teacher about SIP are important. So, more research study should be carried out that deals with the best practices of the teacher to increase effective participation in science fair competitions.

Moreover, DepEd places significant emphasis on the improvement of the SIP through science fair by critiquing and reviewing the research output of the students. They invite external stakeholders, engineers, scientist, graduates from science related course and professors to examine the performance and achievement of one's research. Sometimes, they focus on the problems or errors made by the researchers or the research itself (Jugar, 2013). They did not focus on the extraordinary efforts made by the researchers and the teachers or coaches. This effort could be understood when there is an understanding on the part of the student-researchers and their teachers. Hence, Appreciative Inquiry (AI) approach should be undertaken to moderate such problems.

AI approach is developed by David Cooperrider and Suresh Srivastva in 1980 at Case Western Reserve University. It focuses on asking questions that direct an individual to their core strengths. These core strengths are the best in every people. Additionally, the appreciation of the successes and potentials of an individual (Philips, 2004). In this approach, the participants undergo structured interview with positive questions. Interview uncovers the best in an individual. Affirmative topics are the focus on the interview to

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know the achievements, performance level and successes of an individual as well as the organization.

The AI approach's four (4) D models are basically all about creating reality, certainty, impact, differences, and carrying the best from the past (Valias & Tamagi, 2004). These are the conditions under which interviews are conducted in order to bring out the best in each participant. Before using the 4-D model, the following assumptions must be internalized: Something works in every community, organization, or group; what we focus on becomes our reality; reality is generated in the moment, and several realities exist; people have more confidence to venture into the future (the unknown) when they carry forward pieces of the past (the known); if we bring forward bits of the past, they should be what is best about the past; it is crucial to value differences; and the language we use forms our reality.

In 1990, David Cooperrider and Diana Whitney describe AI's step-by-step process in the 4D model- Discovery Phase, Dream Phase, Design Phase, and Destiny Phase. In the discovery phase, the participant reveals his/her best experience, commitments, and performance in his/her organization. Second, the participant discusses his/her vision and innovation in the future base on his/her experience in the dream phase. For the design phase, the participant tells his/her plan to fulfill his/her vision. Lastly, the destiny phase emphasizes and discovers the best practices of the school through the lens of the teacher participants. The figure below shows the succession of the 4D model of AI approach.

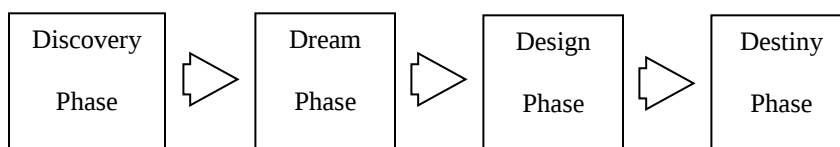
Figure 1



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The Appreciative Inquiry's 4-D Model

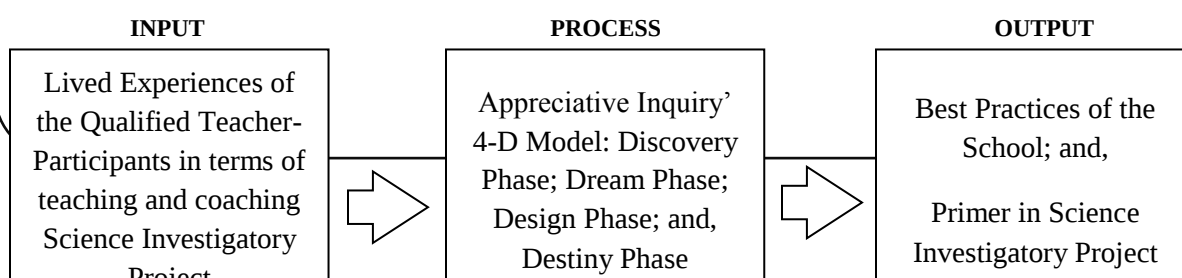


AI approach is applicable in discovering the best practices of schools on the lens of teachers in doing SIP or science researches. AI uncovers the strengths, positive information, favorable values and attitudes and assets that describe the best practices of the teachers and the school as a whole (Lewis et al., 2005).

Schools are recognized once they produce students who got winning SIPs in the science fair in any level. There are schools who specialize in doing SIP wherein they always won in the SIP competitions. There are core strengths of each school which others can or cannot recognize. The practices of each winning school have not been explored in read literature. Also, there is no primer in SIP that can be utilized by the schools to make SIP. As such, it is very significant to consider the best practices of the schools through the lens of the teacher on the SIP as they consciously and unconsciously showcase their research culture in science fair. These core strength and practices can be understood through anchoring AI with the 4-D model. Thus, the study was based on the teachers' lived experience in teaching and coaching SIP in order to describe the school's best practices using AI and develop a primer in SIP.

Figure 2

The Interpretive Research Paradigm



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1.5 Definition of Terms

Appreciative Inquiry Approach. A method of inquiry that focuses on the positive aspects. A method for learning about the teaching and coaching experiences of teacher participants in the Science Investigatory Project (SIP) and discovering the best practices of schools that offer special science curriculum.

School's Best Practices. The study's generated themes and discovered phenomena. Furthermore, through the eyes of the teacher participants, these are the schools' core strengths, potentials, and successes in terms of science research.

Design Phase. The third phase of 4D model of AI approach. During this phase, participants begin to describe exactly what they will do differently in the future. Particularly, their plans and their ways to improve science researches.

Destiny Phase. The fourth phase of 4D model of AI approach. In this phase, best practices are determined based on the 4D model's prior phases.

Discovery Phase. The first phase of 4D model of AI approach. During this phase, the teacher participant expresses his or her true desires. This phase also reveals the teachers' love most in science researches, their experience in teaching and coaching SIP, the most powerful lesson they imparted to their students, and the encouragement in teaching the students.



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Dream Phase. The second phase of 4D model of AI approach. The participants were asked to imagine themselves behaving normally as expected throughout this phase. During this phase, they will present their visions and innovations in relation to scientific research.

Lived Experience. The basis for the data of the study. These are the meaningful and significant experiences of the teacher participants on the phenomena particularly in teaching and coaching SIP.

Science Fair. A competition in which student researchers compete with their SIPs.

Science Investigatory Project (SIP). A scientific research product created by a student researcher under the supervision of a teacher.

Science Research Teacher. The participant of the study who shared their lived experience in teaching and coaching SIP during the interview.

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CHAPTER 2. PROCEDURE

This chapter discusses the research methodology used in this study. These are covered in the sections below: 1) qualitative research design and methodology; 2) research sites; 3) selection criteria; 4) instrument; 5) data collection; 6) data analysis; 7) role of the researcher; 8) methods of validation; and 9) ethical consideration.

2.1 Qualitative Design and Methodology

In order to determine the lived experiences of teacher participants in teaching and coaching SIP, the study used a phenomenology research design. Phenomenology is a qualitative research methodology that focuses on the shared lived experience of a group (Pathak, 2017). Phenomenological studies are useful for recognizing and exploring in-depth experience and practices. Using this method, the researcher was able to deduce the universal meaning of the participants' lived experiences and arrived at a more profound understanding of the school's best practices. The researcher studied and described the lived experience of the participants in an interview using the 4-D model of AI as a data collection procedure. These interviews are a method of discovering what motivates teachers and their students to do their best work (Qutoshi, 2018).

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2.2 Research Site

The research was carried out in Isabela province, specifically in SDO-Isabela. The following secondary schools offered special science curriculum: (1) Dona Aurora National High School, (2) Luna National High School, (3) San Isidro National High School, (4) Cabatuan National High School, (5) Roxas National High School, (6) Salinungan National High School, and (7) Delfin Albano High School-Main. These schools have used best practices in science research, produced high-quality research outputs and products, and competed in science fair competitions at the division level at least once a year.

2.3 Selection Criteria and Participants

The study's participants were chosen through purposive sampling. Purposive sampling is the ideal sample criteria in phenomenological studies since it selects participants with credible experience and information about the instances being examined (Pathak, 2017). Science research teachers from nationally and regionally recognized secondary schools with specialized science curricula were among the participants. There were many qualified volunteer teachers who met the criteria for selection, but the study only included the two most qualified science research teachers from each of the seven (7) selected schools, for a total of 14 teachers. The recommended sample size for qualitative research, according to Fugard and Potts (2014), is 10 to 30 total participants. Furthermore, Clarke and Braun (2013) stated that the study only needs 12 participants to obtain data saturation. Moreover, Sanchez and Rosaroso (2019) had 12 participants in their study who shared their experiences with SIP education and scientific fair


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preparation. Because they share the same experiences as qualified science research teachers at their respective schools, the fourteen (14) teacher-participants in this study provided useful and applicable data. The following criteria were employed in the selection process: (a) graduates of science-related baccalaureate degrees, (b) at least three years of experience teaching science research, (c) at least three years of experience coaching SIP at the division level science fair, and (d) division science fair winners (at least third place). The demographic profile of the participants in the study was presented in Table 1.

Table 1
Demographic profile of the Teacher-participants in the study

Personal Information (n=14)	f (%)
Bachelor's Degree	
Bachelor of Science in Biology	2
Bachelor of Science in Physics	2
Bachelor of Science in Chemistry	2
Bachelor of Secondary Education, major in General Science	5
Bachelor of Secondary Education, major in Biological Science	3
No. of Years Teaching SIPs	
3 to 5 years	5
6 to 8 years	5
9 to 11 years	3
12 years and above	1
No. of Years Coaching SIPs	
3 to 5 years	6
6 to 8 years	5
9 to 11 years	2
12 years and above	1
No. of Wins in the Division Science Fair	
1 to 3 wins	4
4 to 6 wins	5
7 to 9 wins	3

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10 wins and above

2

The majority of the respondents were secondary school graduates with a major in general science, at least three years of teaching and coaching SIP experience, and at least four division science fair wins.

2.4 Instrument

Two research instruments were used in this study: a demographic survey questionnaire and an interview guide. The demographic survey questionnaire was used to select study participants based on the following criteria: (a) graduate of science-related baccalaureate degrees, (b) at least three years of experience teaching science research, (c) at least three years of experience coaching SIP at the division level science fair, and (d) division science fair winners (at least third place). The researcher-made interview guide with the process of AI approach directed the researcher towards gathering relevant details vital to the determination of participants' lived experiences and the schools' best practices. The related literature was reviewed and analyzed to prepare the interview guide questions. The interview guide questions undergone expert validations. Three experts in the related field checked the questions and the overall design of the interview guide. Experts' opinion was addressed to meet the standard of interview process. The eleven questions were based on the AI 4-D model. (1) discovery phase, (2) dream phase, (3) design phase, and (4) destiny phase are the four sections of this paradigm, which are placed in a logical order. As a method, the 4-D model allows participants to communicate their lived experience by expanding the school's best practices while avoiding

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stereotypes. The table below shows categories in the first objective of the study, the part of 4D model of AI and its corresponding questions from the interview guide.

Table 2

Categories in the first and second objective of the study, the part of 4D model of AI, and its corresponding questions

Category	Part of 4D Model	Interview Guide Questions
Teachers' interest in science research, experience teaching SIP, experience coaching in science fairs, the lesson imparted, and motivations	Discovery Phase	1. What do you love most about the science researches (Science Investigatory Project) in your school? 2. What is your best experience in teaching SIP? 3. What is your best experience in coaching contested activities in science fair? 4. What is the most powerful lesson you imparted to your student in your science research class? 5. What encourages you the most in teaching science research?
Teacher's visions and innovations	Dream Phase	6. How do you visualize your school in the next years in terms of science researches? 7. What possible innovations will you probably do in the next years of teaching science research?

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Plans of the teacher, impact of science research, and ways of teacher to improve science research	Design Phase	8. What will you do to achieve your vision/s? 9. What is/are the area/s in SIP where you feel science researches could have the most impact on improving its quality? 10. What specific ways would you like to contribute to improve science researches in your school?
Best Practices of the school	Destiny Phase	11. What are the existing, working and consistent practices in terms of science researches that you as a teacher will continue in the next years?

Question 1, 2, 3, 4, and 5 in the discovery phase are about teachers' interest in science research, teachers' experience teaching SIP, teachers' experience coaching in science fairs, the lesson imparted by the teacher, and the teacher's motivations, respectively. Question 6 in the dream phase is about the teacher's visions, and Question 7 is about the teacher's innovation. Furthermore, in the design phase, Questions 8, 9, and 10 are about the teacher's plans, the impact of science research, and ideas for the teacher to improve science research. Finally, Question 11 demanded the school's best practices.

2.5 Data Collection

Prior to collecting data, the researcher sought permission from the SDO-Isabela superintendent. Then, letter of request was sent to the school heads, requesting that the study be conducted at their respective schools. Fortunately, all of the schools agreed to the proposal and set a date for the study to take place. Based on the selection criteria, the study used a demographic survey questionnaire to identify qualified participants. This survey was conducted before the interview. Qualified teachers in each school were deduced into two participants since they share the same experience in teaching and

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coaching SIP. Furthermore, the two chosen participants have the highest selection criterion profile.

The participants were given a consent document to sign in order to participate in the interview course. The teacher's anonymity and the confidentiality of the information acquired were guaranteed by the researcher. Each teacher's data collection time ranged from 20 to 40 minutes. The study's data were realized by means of an interview guide. The data was merged to define the teachers' lived experience using the 4-D Model of AI approach. The participants were given an overview of the AI method as well as each component of the 4-D model, along with interview questions.

The interviews took place in the morning, from 8:00 a.m. to 10:00 a.m., in a quiet room. Only the participant and the researcher were present, and communication flowed freely, allowing the participant to spontaneously communicate his or her experiences. The researcher put the participant at ease by identifying himself and his involvement in the research process. The interview began once a strong rapport had been established.

During the interview, the researcher remained unbiased and asked the question verbatim from the interview guide. The researcher's interpretations and preconceptions were not appropriately communicated during the interview. Participants were asked simplified questions and probing questions based on the interview guide to allow them to provide additional details about their lived experience and to clarify their answers. Transition questions were also provided to ensure that the interview flowed smoothly. They were allowed to pause and respond to the questions in their preferred method. Direct replies, storytelling, and narrations were used to respond to the questions. They

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also conveyed their personal experience in their native tongue. The interviewee's expressions were also noted. The responses of the participants were completely documented in a response sheet as well as by the use of audio and video recording to fully capture their responses. The researcher stopped asking questions after the participants repeated their response based on their lived experience to the question. The researcher proceeds to the next question on the interview guide when the participants keep getting the same answer.

After the interview, the researcher revealed the participants' responses in order to authenticate their responses. To fully accommodate to the participants' lived experiences on teaching and coaching SIP, clarifications of some responses were explored and modifications were made. After the revisions, the participant affirmed that everything written on the response sheet were correct.

2.6 Data Analysis

The frequency count for demographic survey data, the generated theme, and the number of teachers were employed in the study. The data acquired from the interviews, on the other hand, was analyzed using Creswell's (2013) step-by-step interpretative phenomenological analysis.

First, the researcher separated his observations of the participants' responses from his typical preconceptions about the data obtained. There was no personal bias or prejudice in the study of the participants' responses. Personal experience, as well as the researcher's explanation of the phenomenon, were also omitted from the analysis of the participants' responses. In fact, the responses were viewed as raw, unprocessed data that

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was crucial to the research. Furthermore, the task of portraying oneself as non-influential without prior definition and interpretation was emphasized when transcribing the data. The participant was provided the transcribed responses to double-check and clarify their responses. All revisions made by the participants based on their teaching and coaching experiences in SIP were taken into account.

The researcher next moves on to horizontalizing the data. The researcher considered all of the data to be of equal value. As a result, repeating and overlapping statements were ignored since they were unrelated to the study. Horizontalization took place when the researcher removed any irrelevant expressions, such as stories, expressions and explanations that were not related to the study. The responses of the participants were collated, printed out, and reviewed by the researcher. After cleaning the data, the spreadsheet was used to enter a list of all the teacher participants and their verbatim transcripts so that comparable and significant quotes could be easily captured. Relevant quotes were the codes of the data analysis and were made in each participant's response based on their ad verbatim quotations. Experts were consulted to confirm the accuracy of these relevant quotes. Furthermore, they looked at the relevant quote that corresponded to the participants' responses. The relevant quotes were also forwarded to the participants to confirm the researcher's understanding of the teacher's lived experience teaching and coaching SIP. Experts, researchers, and participants collaborate and triangulate data in order to find relevant phenomena. The constituent parts and textural meaning of the phenomenon were the relevant quotes or the remaining part of the data.

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Finally, the relevant quotes from the participants were bracketed to cluster the data into units of meaning and generate themes or the phenomena. The translated data was divided into meaning units, with each theme having just one meaning. The lived experiences of the teachers teaching and coaching SIP, as well as the best practices of the school, were the focus of these themes. To verify the veracity and clear representation across responses of the teacher participants, other methods such as literature reviews, researcher observation, focus group discussions, and expert validation were used to substantiate the themes derived from the participant's lived experience.

2.7 Role of the Researcher

The researcher ensured that the participants were aware of their status and role in the study prior to the interview. Initial informal interviews were also conducted to assess the enthusiasm and sincerity with which potential participants were willing to engage in the study. The 14 participants with the highest qualification in the selection criteria were chosen by the researcher after the survey and initial interview. A consent form was supplied to these participants, informing them that their participation in the study was completely voluntary. Furthermore, their responses on the interview were not affected by any school-related promotions, nor performance-based incentives. Moreover, the researcher discussed the use of the AI approach in the interview proper. The form of questioning followed a 4-D model pattern such as discovery phase, dream phase, design phase, and destiny phase. Finally, good relationships were developed between the researcher and the teacher participants for them to share transparently their lived experiences on teaching and coaching SIP.

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Amid the interview, the researcher encouraged a great stream of communication and recognized the prompts and expressions of the members. Amities were moreover built and this allowed the researcher to inquire direct questions from the interview guide. Probing and simplified questions were included within the interview to encourage the participants to share rich data around the phenomenon. The reactions of the participants were recorded within the response sheet and audio/video recording. The researcher likewise shared his own experiences on the phenomena that permitted participants not to be influenced nor discriminated but to feel more comfortable in sharing points of interest concerning their lived experiences. The 11 questions were completely replied by the participants within the length of 20-40 minutes.

After the interview, the researcher unveiled the information accumulated to the participants to clarify their responses. After certain corrections, the participants affirmed the information composed within the reaction sheet by affixing their signature.

Within the analysis of data, the researcher kept his subjectivity in reserve throughout and set aside his own experience on the phenomenon. The views and perspectives of the participants were given consideration. Their lived experiences on the phenomenon were prioritized. As such, the researcher avoided individual judgment and presumptions. Be that as it may, the irrelevant statements which did not support the phenomena were taken out within the spreadsheet of data. Through the Creswell (2013) interpretative phenomenological investigation, the researcher generated themes from the relevant statement of the members. Works of literature were checked on to identify studies and research that support the generated themes. The themes were validated by the

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experts to ensure accuracy and eliminate any inconsistencies, which might indicate untruthful phenomenon on the lived experience of the teachers teaching and coaching SIP and the best practices. In addition, the researcher worked collaboratively with the participants and triangulate the themes generated through focus group discussion.

2.8 Methods of Validation

Related literatures were read and studied in order to create an instrument for documenting teachers' lived experiences and discovering the school's best practices. Since the interview is the most appropriate methodology for determining the phenomenon being examined in phenomenological investigations, interview guide questions are required. The interview questions in this study were based on Bliss Browne's "Crafting Appreciative Questions: A How-to Guide," published by Imagine Chicago (2008). Internal validity was increased by having the interview guide questions validated by internal experts in research instrumentation and qualitative phenomenology research. The validators were given a validation form that included the interview guide questions and asked them to evaluate the eleven open-ended questions as appropriate or improper. They expressed their thoughts and suggestions on how the interview may be improved. All of their recommendations were taken into consideration in order to generate validated interview guide questions.

To boost external validity, the researcher's adviser carefully scrutinized the data collection methodology during the interview. The interviews' treatment was considered, as were uniform time allotment, favorable interview rooms, suitable gestures and communication, and proper treatment of the interviewees. The interviews took place

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during the fourth quarter of the academic year, namely February. The teachers' experience in teaching and coaching SIP comes to a close in the fourth quarter. Furthermore, all of the participants' responses were recorded on a response sheet and audio/video recording. The importance of each aspect of the responses was presented; however, the extraneous statements were removed. Only the data that are relevant to the study have been examined.

To guarantee internal consistency, the researcher did not interpret any of the participants' responses. Similarly, the data from the interview was coded by another researcher with competence in qualitative research and scientific education. For the consistency of the research, the researcher's coding was compared to that of another researcher, and the codes were 96 percent equivalent. To resolve the disagreements, reviews and modifications were carried out. To establish units of meaning, the researcher clustered and thematized the codes. These phenomena, which were taken from the participants' lived experiences and recorded in the interview, were compared to observation, focus group discussion, and literature to ensure correctness and clarity across data sources.

By comparing the study's results with a selected group of experts, triangulation was also used to justify the themes developed in best practices. They were told to match the participant's response to the generated themes according to their relevance. The validation result demonstrated that no single phenomena could be characterized by the responses of the participants. When it comes to best practices, an answer must contain at



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least four (4) phenomena. The researcher also informed the participants of the findings and verified the phenomena based on their lived experiences.

The developed SIP Primer was face and content validated by a group of experts. The first expert validator is a Head Teacher who also serves as a resource speaker and lecturer on science research and intellectual property rights. During the 2019 Regional Science and Technology Fair, she served on the board of panels. She has also been a research teacher for over three decades and has won multiple science fairs both locally and nationally. The second expert validator is a Director of Academic and Related Affairs and a doctoral candidate in education with a concentration on science education. Her research was published in a peer-reviewed journal on a global scale. She possesses scientific knowledge as a result of her participation in and presentations at worldwide and national conferences and trainings. The third expert validator is a Master Teacher who is one of the school's main proponents and drivers of special science curriculum. He has attended numerous strategic intervention material trainings and seminars. He is also a writer and consultant for the Department of Education's science learning activity sheets and modules. The rubric used was as follows:

- 1.00-1.49= Not Acceptable (major modifications needed)
- 1.50-2.49= Below Expectation (some modifications needed)
- 2.50-3.49=Meets Expectation (no modifications but could be improved with minor changes)
- 3.50-4.00=Exceeds Expectations (no modifications needed)

2.9 Ethical Considerations

Permission was obtained from the Office of the Schools Division Superintendent of Isabela and their respective school heads, who signed informed consent forms

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permitting the study to be conducted on the interested schools and teachers. The researcher ensured that everyone involved in the research study was well-versed, including the role of the teacher participants, data management, and the utilization of AI approach in the interview. The data obtained have no bearing on the school's internal and external issues, as well as teacher promotions. This was written in the consent form and repeatedly mentioned during the interview. Also, the participants openly and honestly voiced their views on the interview proper. They have the option to withdraw at any moment. They were also informed of their anonymity in the study and that the information they supplied would be kept confidential by the researcher. The pseudonyms "Science Research Teacher" were allocated instead of their complete names, which were included in Chapter 3. (Findings and Discussion)

To develop transcripts for this research study, the response sheets and recordings were cleaned and assessed. The researcher kept the response sheets and recordings after the experts reviewed the transcripts and the participants confirmed for accuracy. The researcher managed the original data properly by keeping it in an online spreadsheet, and it will only be shared if permitted by the participants. Moreover, the recorded responses of the participants will be deleted if it is already not a requirement within the utilization of this research study so that other researchers will no longer utilize the data of the study. The phenomenon that arose as a result of this study highlighted the teacher's overall lived experiences teaching and coaching SIP, as well as the schools offering special science curriculum' best practices in the SDO-Isabela, but it did not represent the teacher's particular lived experience or performance.



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CHAPTER 3. FINDINGS AND DISCUSSION

The chapter deals with the presentation of findings and discussion on analysis of the lived experiences of the participants along with the two particular issues that this study sought to answer. The developed SIP primer and its validation were further described in this chapter.



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3.1 Objective Number 1. Experiences of the Teachers in Teaching and Coaching Science Research

The responses were based on the ten categories of objective number one of this study with corresponding interview questions and portions of the 4-D model of the AI approach. The horizontalization of the interpretative phenomenological analysis yields cleaned data and they were used in bracketing that generated units of meaning or themes as answers to each interview question. It is shown in a table per category with label interview question, part of the 4-D model of AI approach, the generated theme, the description of the theme, chosen code, and the frequency of the responses. The answers to each question were paired with the frequency of responses to determine the most common answer to a question as well as the participants' agreement with the generated themes. The participants' actual responses are then presented to show the validity of the developed themes. Finally, thirty themes emerged from the analysis of responses among fourteen science research teachers as participants of the study.

Category 1. Teachers' Interest in Science Research

Table 3 reveals the four themes generated about the interest in science of the teachers. This category was labeled under the discovery phase of the AI's 4D model.

Table 3

Themes Generated from the Teachers' Interest in Science Research

Interview Question	Part of the 4-D Model	Generated Theme	Description of Theme	Selected Code	Frequency
What do you love most about the science	Discovery Phase	School, Teacher and Student Immersion	The involvement of the teacher and student on the	- Students' application of prior knowledge - Support given by the school	3



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researches in your school?		research process	• Commitment of the teacher in pursuing science research	
	Life-long learning	Experiences and skills that science research can provide to the teachers and students	• Application of science research in the real world • Science research widens the perspective of the teachers and provides opportunities to the students. • Teachers and student's development • Authentic research output and experience	5
	Longing for knowledge	The desire to gain scientific, creative, critical and engineering knowledge	• Discovery of the teachers to the new knowledge • The use of critical thinking among students	3
	Solution-Centered	Scientific researches provide solution to a problem	• Scientific research is a key to solve the problem.	3

The teachers mostly answered the following reasons for their interest in science research: lifelong learning, teacher and student immersion, a longing for knowledge, and solution-centered. The following are a few exact quotations from science research teachers:

“They are encouraged to make discoveries or devices of something that make a difference in peoples or change the world. That activity transcends beyond what is taught in the classroom and enables them to apply what they have learned.” [Science Research Teacher 9]

“It opens opportunities to learners to be exposed to the different science skills and processes as well as train to

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discover possibilities that can contribute to the community.” [Science Research Teacher 14]

Teachers shared that the ability for students to apply what they have learned in SIP to real-life situations is something that most of them like. Students and teachers gain new perspectives and opportunities in research as a result of the skills gained through participating in science fair competitions. The learning gained help students make an authentic research output and contribute to the community. Doing SIP also solves the problem as the participants explicitly affirm this:

“We enjoy doing SIP since it is a problem-solving approach.” [Science Research Teacher 1]

“Science investigatory project brings enlightenment to the problem we want to answer. It is fun because of its different scientific applications.” [Science Research Teacher 4]

Science Research Teacher 1 and 4 think scientific research provides information and understanding needed for problem solving.

“The teacher and students are immersed in the research process. Teachers' collaboration and the school's support during the research defense to produce a high-quality research paper.” [Science Research Teacher 11]

Science Research Teacher 11 emphasized that learning is enhanced in research when difficulties and questions are welcomed. Collaboration between the teacher and the students with the support of the school is needed for the success of the research. The commitments and immersion of the school, as well as those of the teacher and students, are important.

“The part of teaching SIP that I enjoyed the most was learning new things. I'd like to learn more. I'm fascinated



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by the new information that research can bring.” [Science Research Teacher 2]

According to Science Research Teacher 2, SIP brings fascinating information to learn new things.

The participants showed interest in science research characterized by an innate desire that focuses on the teachers' immersion, longing and application of learning, and problem solving. The drive to get scientific, imaginative, critical, and designed information is also evident in the teacher and students' immersion in research preparation. The positive impact of the immersion is a rapid enhancement and growth of the students' hands-on skills. The teacher's and school's immersion encourages students to gain a diverse range of experiences. As a result, students can apply their critical thinking skills while working on their SIP. Science research inspires the attention of teachers who desire to broaden their knowledge. As a result, teachers' passion for science research should be maintained since it allows them to encourage and aid students with their research projects. Activities and interventions that target both the teacher and the student with the goal of raising interest in performing SIP are also suggested.

Category 2. Teachers' Experience in Teaching SIP

In table 4, two themes emerged from the teachers' experience in teaching SIP. This category belongs to the discovery phase of the 4D model of the AI approach.

Table 4

Themes Generated from the Teachers' Experience in Teaching SIP

Interview Question	Part of the 4-D Model	Generated Theme	Description of Theme	Selected Code	Frequency
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What is your best experience in teaching SIP?	Discovery Phase	Student's participation within the teaching-learning process	The engagement, interest and output of the students in learning SIP.	• Student's responsibility towards SIP • Students' interest	6
		Teacher's commitment to the profession	Sharing the capabilities of the teachers in terms of monitoring and working with the students.	• Self-motivation in teaching • Work done by the teacher • Consultation between teacher and student for the improvement of the SIP	8

Teachers' experiences in teaching SIP have been reflected in terms of students' participation in the teaching-learning process and teachers' commitment to the profession. A few specific remarks made by science research teachers can be found within the statement:

“My best experience in teaching SIP is when students give their own ideas or suggestions on how to perform the experiments and come up with a good result.” [Science Research Teacher 7]

Science Research Teacher 7 claimed that the best experience in teaching SIP is when students give their own ideas and suggestions to come up with a good result. Teachers talked on how much fun they had working with their students, who are eager to improve their SIP. The students' feedback was used to develop a SIP that captured their interest and resulted in a successful outcome. The teachers talked on how much fun they had working with their students who are eager to improve their SIP. The students' feedback was used to develop a SIP that captured their interest and resulted in a successful outcome.

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The teacher's tasks and responsibilities were clearly defined by their involvement and participation in the teaching-learning process. One of these is the teacher's commitment to the work. Teachers are committed to supporting students in enhancing their research output and understanding, according to the participants:

“The teacher’s research consultation process poses an academic challenge to researchers since it encourages researchers to use analytical and imaginative thinking to answer relevant concerns and problems.” [Science Research Teacher 11]

“The process of teaching SIP measures also my capability as a science teacher, my work reflects also to the understanding of my students as I am being in my best so as my learners.” [Science Research Teacher 13]

Science Research Teacher 11 and 13 talked about how much they enjoyed working with their students although the teacher’s tasks and responsibilities are hard. They also emphasized the importance to have intellectual ability and mastery of the subject matter so that the teaching learning process will become successful.

The development of abilities, attitudes, process application, and scientific method integration are all required when teaching SIP. This approach motivates teachers to supervise students as they do research or experiments. Their dedication to their work is beneficial to both students and research. As a result, teachers gain experience which keeps them motivated to teach SIP. Furthermore, when students are enthusiastic in learning and participating in SIP, the teacher is kept motivated by their participation.



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Category 3. Teachers' Experience in Coaching SIP in Science Fair

Table 5 revealed the experience of the teachers in coaching SIP in science fair.

This category is discovery phase in the 4D model of the AI approach with two corresponding themes.

Table 5

Themes Generated from the Teachers' Experience in Coaching SIP in Science Fair

Interview Question	Part of the 4-D Model	Generated Theme	Description of Theme	Selected Code	Frequency
What is your best experience in Coaching contested activities in science fair?	Discovery Phase	Benefits of Coaching	The experience, fulfillment and rewards gained in coaching students	- Winning the science fair competition - Self-satisfaction in coaching SIP	10
		Challenges in Coaching	Working hard and bringing the best in coaching the students in their SIP	- Considering the students and the nature of problem in the SIP - Teachers' job in doing SIP	4

Teachers uncovered the benefits and challenges in coaching. A few direct quotations of the science research teachers are:

“Coaching SIP is challenging, but it is fulfilling in the sense that we have reached up to division, regional, and national level. But it is not the winning that matters. It is the experience and based on those experiences we learn.”
[Science Research Teacher 1]

“Coaching at science fair is an achievement though it demands intelligence and hard work. At the same time, the best feeling when you are able to share what you know with the students.” [Science Research Teacher 14]

Despite the fact that coaching SIP is difficult, teachers feel that due to their exposure to various levels of SIP competition, this activity would result in learning. Both the teacher and the student develop shared experiences and sets of common

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understanding through coaching. When students win a scientific fair, coaching tends to be most beneficial as stated below,

“As a coach, the best experience is when students won in the competition.” [Science Research Teacher 7]

While coaching SIP, teachers' best experiences are of their students winning the competition and the challenges it provides. Coaching needs sets of skills and talents. A teacher must have mastery of SIP's content and methods as he/she builds the understandings necessary for the student to create greater research output. It also includes constant monitoring to ensure that the student's research skills and knowledge are improved and expanded. Coaching should be a continuous process that is deeply ingrained in SIP. It creates an environment in which students can conduct research while following the teachers' instructions. As a result, students continue to refine their SIP in order to compete in the science fair and win. When it comes to coaching students for the science fair, teachers should be at their best. Coaching experiences help teachers develop strong leadership skills as they work with students on their research projects. When dealing with the SIP, coaching fosters collaboration between the student and the teacher. Furthermore, it overcomes research difficulties such as financial limits, the demand for needed resources, and many others.

Category 4. Lesson Imparted by the Teacher

The table below discloses the part of 4D model's discovery phase with the lesson imparted by the teacher. There were three themes generated from the responses of the participants on the lesson taught by the teacher.


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Table 6
Themes Generated from the Lessons Imparted by the Teacher

Interview Question	Part of the 4-D Model	Generated Theme	Description of Theme	Selected Code	Frequency
What is the most powerful lesson you imparted to your student in your science research class?	Discovery Phase	Lesson vis-a-vis Content	Lessons in each part of the SIP manuscript	- Stages or part of the research - Considers the objective of the research	4
		Lesson vis-a-vis Attitude	The behavior that can be seen as the teacher teach and the student learn	- Positive attitudes shared by the students in doing research - Interactions between the teacher and the students	4
		Lesson vis-a-vis Skills and Process	Skills and the process involve in research	- Involve student in using the techniques and method of science to gain understanding. - The skill which research demands	6

Lesson vis-a-vis content, lesson vis-a-vis attitude, and lesson vis-a-vis process were among the teachings the teachers imparted to their students in science research. The following are a few direct quotations from science research teachers:

“The parts of SIP, especially the methodology where it is the heart of every science investigatory project.” [Science Research Teacher 1]

When the researcher asked the Science Research Teacher 1, “What is the most powerful lesson you imparted to the students in science research?” Science Research Teacher 1 said that methodology as it is considered to be the hearth of every SIP.

“Patience is an attitude which I think the best thing I shared with my students while making their SIP. {...} This will help them finish their research and from the skills/procedures learned.” [Science Research Teacher 9]

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Science Research Teacher 9 also showed that the best lesson is to be patient because it is one of the best attitudes for making SIP. This point established that favorable attitudes manifested by the students were also imparted by the teachers. Due to the teacher's dedication in assisting the students in the preparation of their research study, the students will reciprocate by following the teacher's instructions. Patience, curiosity, honesty, open-mindedness, objectivity, and other traits can be observed when the teacher and student perform their research. For students and teachers to sustain such scientific attitudes, they should utilize those attitudes in their daily lives. The integration of skills and processes imparted by the teacher to the student in conducting research is also revealed as mentioned by the participant:

“Reading, writing, and researching. These are the skill we want our students to learn. We always include the process of acquiring knowledge through the scientific method.”
[Science Research Teacher 10]

One of the lessons imparted by the teachers is the content, such as research methodologies and objectives. This provides the student with understanding of the concepts and procedures for conducting each aspect of research as well as the importance of each part. Every area of research should be treated equally. This can help students understand what to include and exclude from different portions of a research paper (introduction, literature reviews, method, results, discussion, references). As reported by the participant, attitudes toward teacher teaching were also included as stated below.


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The SIP teacher should teach students how to recognize the components of a science research study, have a good attitude toward research, and provide skills that the research study requires. Students will be able to comprehend some of the numerous ways' scientists generate research ideas. They will also learn about the benefits of conducting research and practice the skills and steps involved in creating a research paper.

Category 5. Motivations of the Teacher

There were four generated themes from the responses of the participants as shown in table 7. This category is a discovery phase of 4D model of the AI Approach.

Table 7
Themes Generated from the Motivation of the Teacher

Interview Question	Part of the 4-D Model	Generated Theme	Description of Theme	Selected Code	Frequency
What encourages you the most in teaching science research?	Discovery Phase	Motivations for the Learners	These motivations apply to or benefit the students.	• Molding the learners • Teaching the students • Students' creativity • Future of the students	5
		Motivations to Learning and Outcome	The contributions made by teacher to the body of knowledge and the result or outcome of science researches.	• Knowledge-application on research • Learning is an endless process. • Benefit the others • Product and impact to the community • Teachers' accomplishments	6
		Motivations from the Learners	Motivations initiated by the learners	• Student's enthusiasm • Student's engagement	3



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The motivation to learn, motivations for the learners, motivations for the outcome, and motivations from the learners all inspire science research teachers to teach. The following are direct quotes from the participants:

“As a research teacher, what motivates me are my students. These are the students we are molding to love research.”
[Science Research Teacher 1]

This showed that one of the most important aspects is to impart to students the love for research.

Teachers were inspired to teach for the students benefit to become creative thinkers and research-oriented individuals. This demonstrates the teachers' unselfishness as they perform their role despite the challenges, they are facing in teaching SIP. Further, teachers were equally motivated by the students' efforts, as stated:

“I contributed all of my experience in coaching and teaching methods to improve the understanding and application of students in research writing when I saw my students putting out their best effort in generating a good manuscript.” [Science Research Teacher 4]

Research is a shared responsibility between the teacher and the students. When students demonstrate their willingness and full effort in completing their SIP, the teacher should showed much more effort. Likewise, when students demonstrate interest and involvement, the teachers get motivated. It can be seen below that the research results inspire the teacher.

“My contribution to the body of knowledge was the driving force for my decision to teach science research.” [Science Research Teacher 8]



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The research contribution constantly provides knowledge and comprehension. Research products benefit and influence the community. Because the research results and product demonstrate the teacher's accomplishments, teachers are driven to teach students.

Motivation is one of the aspects that the student needs to perform or accomplish a task. Teachers' motivation has a great impact on students' learning. The students' desire to learn or to accomplish a task increases when the teachers provide instructional support or intrinsic motivation such as concern for the students' future.

Category 6. Visions of the Teachers

The vision of the teacher was grouped in the dream phase of the 4D model as reflected in the table 8. There were four themes generated from the teachers' responses on the interview.

Table 8

Themes Generated from the Vision of the Teachers

Interview Question	Part of the 4-D Model	Generated Theme	Description of Theme	Selected Code	Frequency
How do you visualize your school in the next years in terms of science researches?	Dream Phase	Advancement of research studies	Quality research that caters the need of the community	- Research studies that could solve major issues like climate change - Community oriented research	5
		Advancement on research facilities	Level up facilities to cater different researches and needs of the students	- Laboratory equipment - Research library	2
		Advancement on the competition	More winning researches and researchers in the science fair competition	- Joining higher level of science fair competition - Aims for winning in the science fair competition	3



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Advancement
on students'
initiative and
stakeholders'
collaboration

The favorable
attitude of the
students and
support from the
parents and
community

- The students pursue their research independently.
- The parents and community commit their selves in the pursuit of research.

4

The science research teachers' visions include the advancement of research studies, research facilities, science fair competition, student initiative and stakeholder collaboration. Here are a few direct quotes from science research teachers:

“SIP's facility should be upgraded to support future student researchers.” [Science Research Teacher 2]

The discovery and learning process require research facilities. Research facilities are laboratories, libraries and tools that are used to perform research project. When students have access to the necessary equipment and materials in their school, they can do the duties assigned by their teachers on time. This could lead to a smooth flow when doing research experiments. Less time will be spent and other resources will be saved. Experiments and research literature researches outside of the school are costly; hence, every school should have state-of-the-art facilities to support specific instruments essential for research. Rather than showing movies and graphics that the students may not understand, the teacher can provide real-world experience to the students by conducting research projects in the school premises. Another advancement cited by teachers is the students' research studies which are stated below.

“I anticipate a shared of advance quality research and output with my students” [Science Research Teacher 11]



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The teachers also foresaw development in terms of winning the science fair as noted below:

“I see it as more progressive, beneficial, and with a lot of wins in the division up to national competition levels.”
[Science Research Teacher 8]

Science Research Teacher 8 wanted to participate and win science fair competitions at all levels in the following years. The teachers were also hoping for student initiative and cooperation from the stakeholders as mentioned below:

“We want our students to pursue their SIP without our presence.” [Science Research Teacher 9]

“Our school and our stakeholders will have stronger partnership and cooperation.” [Science Research Teacher 9]

Teachers and schools are becoming increasingly concerned with the expansion of research facilities, collaboration with stakeholders, winning at scientific fairs, and producing high-quality research. All of this is for the benefits of the students. If all of this is offered, research will find its place in the school and in the minds of the students. The necessary materials should be provided because students are eager to make discoveries and create answers to community problems.

Teachers believe that research studies will advance in the future with improved tools assisting in the production of high-quality research. Students and teachers will benefit from the changing circumstances that research may confront in the next years as they increase their knowledge and skills. It could be a high level of research education and instruction that is tailored to the requirements of the community. For everyone to


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come across with the advancement of the research they should be technology upgraded and this will benefit not only the teachers and students but the country as well.

Category 7. Innovation of the Teacher

From table 9, there were three themes generated from the responses of the participants. This category is in the dream phase of the 4D model of the AI approach.

Table 9
Themes Generated from the Innovation of the Teachers

Interview Question	Part of the 4-D Model	Generated Theme	Description of Theme	Selected Code	Frequency
What possible innovations will you probably do in the next years of teaching science research?	Dream Phase	Multiple methods for teaching	The use of new technologies or techniques in teaching science research	• Project innovations • New strategies in teaching science research	9
		Robotics and 21st Century topics and concerns	Research topics like robotics, climate change and microbiology	• Robotics • Environmental issue	3
		Experts' advice	Seeking the expertise of other knowledgeable one on the research colloquium	• Partnership with the external stakeholders • Inviting the experts	2

Teachers stated that the innovations they will do in teaching science research were multiple methods, robotics and 21st-century topics and concerns, and seek the advice of experts. Some direct quotations of the science research teachers appeared within the statements that follow:

“Our students are currently uninterested in robotics due to a shortage of materials. I'm looking forward to assisting students in doing such studies in the next years.” [Science Research Teacher 3]



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“I want my student to be engage in the study of climate change adaptation and mitigation, active biocomponents of plants, microbiology, and nanotechnologies.” [Science Research Teacher 2]

Science Research Teacher 3 and 2 emphasized that in order for students to be interested in research innovations especially in technology, the advancement of technology should be provided so that the students will be motivated to do their research.

Despite the challenges that this invention faces, teachers remain committed to aiding students in pursuing their research studies. Furthermore, as indicated by the participant below, the involvement of stakeholders should be included because it adds to the improvement of the student's SIP.

“Establishing a working relationship with our research's external stakeholders. Conduct research and invite experts to discuss research applications, experiments, and new research strategies.” [Science Research Teacher 11]

Others' research knowledge results in a dependable and valid research product. In a research colloquium, a teacher should ask experts to act as evaluators, offering suggestions and comments that will help the student's research work develop. Furthermore, professionals are more likely to share their knowledge on a certain area of research. Teachers and stakeholders should have a positive relationship. Another example of a teacher's innovation is the employment of multiple teaching methods, as described below:

“Use different strategies that involve problem-solving approach.” [Science Research Teacher 7]

“I want to engage my student in hands-on learning”
[Science Research Teacher 14]


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It implies that inventive teaching methods are also required of innovative teachers. Students are capable of understanding research processes and respond to the research challenge provided to them when new technology and strategies are used.

Teachers who collaborate with their students to engage in activities that involve active participation in the conduct of new research were more likely to use innovative teaching approaches. Teachers should participate in activities that require active and direct involvement, such as supervising students conducting research. Furthermore, effective training requires the use of technology to enhance student engagement. It requires cooperation with a wide range of external stakeholders.

Category 8. Plans of the Teacher in Science Research

The plans of the teacher in science research provide three themes. This category is considered to be in the Design phase of 4D model as shown in table 10.

Table 10
Themes Generated from the Plans of the Teacher in Science Research

Interview Question	Part of the 4-D Model	Generated Theme	Description of Theme	Selected Code	Frequency
What will you do to achieve your vision/s?	Design Phase	Self-Drive	The initiative of the teachers to attain the vision	- Attend seminar and training - Optimistic approach to research - Provide alternatives for the sake of research	7
		Fund and linkage Drive	The financial assistance and partners needed to attain the vision	- Support from the stakeholders - Fund assistance	3

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Plan Drive

Focus on the step
by step procedure
to attain the vision

- Setting the move of the research
- Planning and monitoring

4

The teachers' ideas in science research were divided into three categories: self-drive, fund and linkage drive, and plan drive. The following are some direct quotes from science research teachers:

“Continuous education for self-improvement.” [Science Research Teacher 2]

Academic advancement, seminar participation, and training are all viable options for enhancing professional competence and knowledge. Teachers' professional development has a substantial impact on achieving the school's aim for research advancement. Teachers' initiative promotes the learning of students in research. Another factor to consider is the financial aid and support from stakeholders in order to achieve the vision given by the participants. Below is evidence of this idea:

“Asking financial support from the stakeholders.” [Science Research Teacher 9]

It suggests that stakeholder support is also required to fund the school's and teacher's projects that provide students with research possibilities.

“Plan and coordinate with co-research teachers in order to plot the school's demands in order to give high-quality learning research services to students.” [Science Research Teacher 11]

“Develop partnership among the school and the community.” [Science Research Teacher 13]

One of the approaches for enhancing teachers' competency and providing excellent experience to students when doing various SIP duties is to collaborate with



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experts in analyzing, planning, charting, and developing appropriate methods, issues, and concerns.

Category 9. Impact of Science Research

Table 11 displays the design phase of AI's 4D model with the corresponding question on the impact of science research. There were three generated themes based from the analysis of the responses of the participants.

Table 11

Themes Generated from the Impact of Science Research

Interview Question	Part of the 4-D Model	Generated Theme	Description of Theme	Selected Code	Frequency
What are the areas in SIP where you feel science researches could have the most impact on improving its quality?	Design Phase	Before the data	This includes the contextualization of the research and chapter 1.	• Research objective and hypothesis • Significance of the study • Conception of the research • Rationale	4
		During the data	This includes chapter 2 and chapter 3	• Methodology • Statistics • Experimentation • Data gathering • Results and discussion	8
		After the data	This includes chapter 4	• The result of the research • Recommendation	2

The following sections of SIP, according to the teachers, might have the most impact on enhancing its quality: before the data, during the data, and after the data. The following are some actual quotes from science research teachers:

“The research problem because it is the most important component of your investigation. This is the beginning of everything, and it can help you understand the research

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topic and issue you're trying to address.” [Science Research Teacher 4]

Before undertaking research, the student and teacher must understand the context of the topic. This served as the student's foundation for conducting a valid research investigation. Every SIP begins with the justification for the research problem and the research objective. As a result, both the teacher and the student should be familiar with the study's background prior to data collection. It directs them in the appropriate way when it comes to undertaking study. The techniques of data collection and analysis, as mentioned below, are also included among the participants:

“The part wherein students need to conduct survey and collect data from their respondents and experiments.”
[Science Research Teacher 9]

“A valid data collection and analysis improves the quality of research.” [Science Research Teacher 5]

Data collection allows students to preserve and analyze important information for the study. To improve the quality and acceptance of the research study, the validity of data collection and the reliability of the collected data should be validated. Students should be cautious when conducting research and should get help from their teacher before acquiring data for the topic. This may make it easier for them to gather the information they need for their research. With the data gathered, the study's problem can only be solved with the proper data analysis. The outcomes of the research are another factor to consider when improving research.

“The result from the analysis of data and recommendations provide great impact to the future of our research.”
[Science Research Teacher 5]


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The findings and recommendations are also significant and have a considerable impact on the research quality. This is where the study's findings will be presented. This is when intervention or strategy proposals to address the difficulties and constraints found during the research process are made.

All of the SIP's parts are equally significant in terms of enhancing research quality. As a result, every aspect of the research should be thoroughly discussed by the teacher and well understood by the students.

Category 10. Ways of Teachers to Improve Science Research

Based from table 12, the ways of the teachers to improve science research offer three themes. Design phase of 4D model was the label of this category.

Table 12
Themes Generated from the Ways of Teachers to Improve Science Research

Interview Question	Part of the 4-D Model	Generated Theme	Description of Theme	Selected Code	Frequency
What specific ways would you like to contribute to improve science researches in your school?	Design Phase	Inter-institutional collaboration	Involvement of other agency in the improvement of students' research	• Inviting resource speaker for technical assistance • External research evaluator	3
		Availability of research funds and facilities	This pertains to the research laboratory or equipment and financial assistance	• Provision of financial assistance for research • Available and complete set of equipment for research experiment	8
		School-based programs	Inter-school implementation of comprehensive research education	• School research programs • Research training and seminars	3

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Teachers suggest inter-institutional collaboration, research funds and facilities, and school-based programs as approaches to boost science research in their schools. The following are some actual quotes from science research teachers:

“Invite a technical resource speaker and ask the expertise of external evaluators such as DOST, HEIs, and other agencies.” [Science Research Teacher 1]

Science Research Teacher 1 revealed the involvement of government and private agencies in increasing student research outputs. Teachers invite professionals and research presenters to assist and guide students in conducting effective research. The experts' assessment of the SIP improves the chances of winning the science fair competition. Programs initiated by the school and teachers, as listed below, are another technique to enhance research output as evident in the quote below:

“Annual seminars on various types of research, science camps, and field visits to regional DOST.” [Science Research Teacher 7]

Seminars, workshops, camps, and field studies are examples of school activities that promote research quality. More research methodologies and expertise should be available to research teachers. Additionally, teachers should give students continuous training workshops to help them improve their research skills.

In order to undertake research, facilities and finances are also required. This is also one of the methods for enhancing research. This should be offered to teachers and students so that they can conduct research without sacrificing the quality of their work. As the participant mentioned:

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“I will request to increase the amount of money allocated for research in our school and also the provision of science lab equipment.” [Science Research Teacher 13]

It reveals that the availability of funds and facilities, collaboration with other organizations, and school-based programs are all approaches to boost research quality. If funds are available for conducting research, the teacher and student can readily collect data in testing facilities. These funds can be utilized to help fund research projects. Research facilities, such as laboratory equipment, can also give students hands-on experience with experiments. Furthermore, the experience of external agencies that function as evaluators in the research product help the student and research to improve. Furthermore, school initiatives such as training help students improve their research abilities.

3.2 Objective Number 2. Best Practices of the Schools offering Special Science**Curriculum**

Ten themes emerged from the analysis of narratives among fourteen science research teachers. These themes were based on the responses to the question, “What are the existing, working, and consistent practices in terms of science researches that you as a teacher will continue in the next years?” Through the use of the AI approach, their answers were revealed and clustered that served as the best practices of their schools. The destiny phase of the 4D model uncovered the ten best practices and answers objective 2 of this study.



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In the justification of the themes generated as best practices, experts identified their agreement by matching the responses of the participants to the best practices as shown in the table below. They were provided a table with the themes generated, and the responses of the fourteen participants.

Table 13

Themes Generated from the Best Practices of the School, and the Experts' Agreement to the Themes Generated

Generated Theme	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14
1. Teachers' self-improvement and strong commitment in research endeavor	/	/	/	/		/	/			/		/	/	/
2. Mentoring Student Outside the School Premises	/	/		/	/		/		/		/			
3. Provision of conducive working atmosphere	/		/		/	/								
4. Interdisciplinary and integrated approaches in research	/	/	/	/	/		/	/			/		/	
5. Favorable scientific attitudes and research habits			/	/	/		/	/	/	/	/			
6. Participation in science fair and engagement in research exhibit and promotion for continuous improvement of research		/	/	/	/	/		/		/			/	
7. Familiarization of the INTEL ISEF Rules and Guidelines	/	/		/	/	/	/		/		/		/	
8. Linkages to the other agencies for Support		/		/		/							/	/
9. Students are Connected to the School	/	/		/		/	/						/	/
10. Adherence to the DepEd memorandum pertaining to the conduct of the national science and technology fair	/							/		/		/		



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The table shows that the participant's response relates to the different generated themes, which means no single theme associates one response.

Best Practice 1. Teachers' Self Improvement and Strong Commitment in Research Endeavor

Teachers' self-improvement for research is a preparation for the success of research. When teachers are committed to their job, they look for more possibilities that improve their students' research. As the participants disclose:

“{...}Taking risks and learning by doing will always be a component of my research practice. There's still a lot to uncover. As a result, we stay abreast of the latest research problems. {...}” [Science Research Teacher 12]

“Keep on innovating, writing, exploring and discussing research in our school. We attended research seminar-workshop to enhance our capability in research {...}” [Science Research Teacher 10]

“{...}We have a lot of research training scheduled over the next month. We guarantee that we will be kept updated on research knowledge and skills.” [Science Research Teacher 6]

This offers teachers and students with demanding skills that will help them achieve in research preparation and competition. Self-improvement for research educates teachers and students how to do proper research, work independently, and manage time in order to produce higher-quality research.

The participants also noted that the school's confidence in the research programs is clear. The school decided to pursue research because of the teachers' passion and efforts to do so. In fact, according to one teacher,



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“We are always updated to the different environmental issues and to the local problems so that research plan and ideas are always inclined to what problem needed to be answered or cured. We read good books, articles, journal and any published research. {...}.” [Science Research Teacher 4]

While some teachers may argue that conducting research takes time, the end result is inevitable. As a result, teachers should focus on the results or outcomes rather than the amount of time invested. This is backed up by a participant who stated,

“To me, doing research again and again, putting in more effort for research isn't a big deal. {...}” [Science Research Teacher 6]

A science research teacher could not function if he or she did not have a strong commitment to the research study. According to the participant, spending resources is a necessary aspect of conducting research.

“{...} we do research even though we spend money and other resources” [Science Research Teacher 7]

As teachers and students pursue the desire to know and understand their research study, some information they gain is practical and immediately useful in the school. It also contributes to the teacher's development by pursuing information for the sake of finding out and gaining knowledge. Teachers, on the other hand, should constantly welcome professional development and remain committed to research initiatives.

Best Practice 2. Mentoring Student Outside the School Premises

What happens before and after school can be as important as what happens during the school day. There are lots of time to do research inside the school but teachers are assigned also to the other subject areas or tasks. As mandated by DepEd, six hours



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minimum teaching hours are required for all the teachers. In this case, teachers tend to do coaching or mentoring outside the school premises, either in their homes or places that they can work together with their students. Teacher's mentoring outside the school that provide academic activities contribute positively to students' academic development. Mentoring student outside the school premises or Extended Learning Opportunities (ELOs) then is one of their practices. This is affirmed by the participant by saying:

“{...} We advise the students both inside and outside of the school until they finish their research and compete in the scientific fair.” [Science Research Teacher 5]

“{...} We go to the student's residence to complete their SIP.” [Science Research Teacher 1]

“{...} We frequently visit students at their homes on Saturdays and/or Sundays to address key concerns about their research preparation, especially when the science fair is approaching.” [Science Research Teacher 4]

“{...} Students' research skills must be improved, thus we provide our time, as well as our home as a meeting place outside of school, for them to be with us and discuss their SIP.” [Science Research Teacher 8]

ELOs include a broad range of research lineups that provide students with research enrichment and/or supervised activities beyond the school day specifically beyond the research subject time. This could advance students' learning and research capability. As a result, teachers should devote time outside of the classroom monitoring students.

Best Practice 3. Provision of Conducive Working Atmosphere

The atmosphere has a big impact on a student's motivation to work. The key to producing research output, according to the teacher, is to create an environment with

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project innovations and scholastic practices that serve as a foundation or guide to work with. As stated below, this can be accomplished in a variety of ways.

“Our school is conducting school-based science fair, students in research (Grade 8) must produce research team and research (grade 10) must produce an individual SIP within Physical or Life. Project MULAT (Magkaisang Umaagapay sa Larangan ng Agham at Teknolohiya) and CARAPINS (Conduct of Action Research to Address Problems, Issues, and Needs of Students) were also implemented.” [Science Research Teacher 1]

Schools have been transformed into places of learning and research that produce researchers and prepare them for science fair competitions.

“{...} Providing students with conducive learning environment is a must. This allows teacher and student can perform their research task easily.” [Science Research Teacher 11]

“{...} Our school is always aware of the students' and teachers' research endeavors. Our head of the school supports this effort by providing funds to assist students and teachers.” [Science Research Teacher 14]

“{...} We place a high value on research at our school. There are meeting rooms, parks, and a display area for scientific results.” [Science Research Teacher 3]

A pleasant physical space is one aspect of a conducive working environment, but the provision of a conducive working atmosphere is more than that. It entails setting the appropriate tone at work. Through the school's support for students' growth specifically in the pursuit of research, it intends to strengthen teachers' responsibilities in dealing with research. Thus, the teacher's involvement in research includes, but is not limited to,



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building a conducive learning atmosphere. The teacher's role in supporting students' autonomy, relevance, and research relatedness. This motivates student's learning.

Best Practice 4. Use of Interdisciplinary and Integrated Approaches in Research

The teachers show that research is taught in no single approach nor perspective. Being an experienced and exposed teacher in their field of specialization and for some other subjects, they can deliver different teaching style and incorporate other disciplines. The knowledge across a range of disciplines helps them possess a wide range of skills, expertise, experiences and a preparedness to do their assignments. The participants elaborate on this in their statement, which reads:

“Background design, problem solving, flexible teaching is being used in my class for the students to produce best research output.” [Science Research Teacher 3]

“{...} Participating in competitions and teaching research using various techniques.” [Science Research Teacher 7]

“{...} In dealing with research, a single method is ineffective. We use a variety of teaching strategies in science research to encourage students to be more engaged in class while also gaining more knowledge.” [Science Research Teacher 14]

“{...} The use of technology in the classroom, the integration of different courses, and experiential learning are all examples of brain-based education. These are the methods I use to confront students in my research subject.” [Science Research Teacher 2]

“{...} In teaching science research, I would continue to emphasize the use of inquiry-based and interdisciplinary approaches.” [Science Research Teacher 8]

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There is no single teaching method that is suited for all situations, and no single strategy can be the most effective for all students in a given setting. Because excellent science teaching involves a variety of strategies, teachers must organize the need for a diversity of teaching strategies. For example, teachers require a wide range of strategies due to the diverse learning styles, intelligences, cultures, and backgrounds of the students they educate. To give all students with learning opportunities, a variety of instructional styles is required. Second, due to the wide range of content included in the field of science, teachers require a diversity of teaching methodologies. It is easier to teach students about simple machines using hands-on strategies, but it is more difficult to teach planet characteristics in this manner. Third, due to the range of situations in which teachers teach, teachers require a variety of teaching strategies. A Grade 8 teacher who has access to a science laboratory may be able to conduct complex chemical reactions experiments; however, a Grade 8 teacher who only has access to a conventional classroom with no laboratory equipment may be forced to use a demonstration. Teachers should have variety of strategies to accommodate students, contents, and circumstances. This facilitates meaningful learning by creating interactive learning spaces through interdisciplinary and integrated approaches (IIAs).

In IIAs to teaching research, the research topic no longer exists as distinct entities. Research topics are used, as appropriate, to develop an understanding of a particular conceptual theme. Moreover, IIAs are about being able to work together, using different approaches, to solve problems beyond a single discipline's scope.



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Best Practice 5. Favorable Scientific Attitudes and Research Habits

The participants affirm that they have positive scientific attitudes, which they convey to their students in order to maintain their school's research habits. The participant adds to this by saying:

“We developed a young scientist with positive scientific attitude and habits. {...}” [Science Research Teacher 5)

“Students are honest about the findings of their research. They seek advice from us, the teachers, before making judgements on the results of their investigation. {...}” [Science Research Teacher 7)

Scientific attitude is the behavior that can be seen in students as they conduct research and beyond. It guides the thinking skills of the students as they search for meaningful research harvest. Sari (2013) concludes that the attitudes affect achievements.

“{...}. To achieve a high-quality outcome or output, apply scientific attitudes to research.” [Science Research Teacher 10]

“Students at our school are objective and open-minded. On their SIP, we train them to welcome criticism. {...}” [Science Research Teacher 2)

Scientific research, in the curriculum, provides certain scientific attitudes and research habits which are not provided by any other subject. They are part of the equipment and preparation for life which they expect the school to give to its students so that they may play their part in the community as intellectual citizens. In addition, most educators agree that attitudes and habits play a vital role in learning. Success in academic performance could not be attributed to intelligence alone but also to the student's proper attitudes and habit toward the subject. As it was shared by the participants:



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“We were concerned in the students' attitudes toward not only their academic success but also their research. We ensure that they have good research habits, such as completing their given research work. Every day, they present their work. They wish to have their research work reviewed and advised on.” [Science Research Teacher 8]

Favorable scientific attitudes and research habits play an important function in the classroom, since they raise the level of research achievement. As a result, teachers should promote good attitudes and habits toward research and learning in their students.

Best Practice 6. Participation in Science Fair and Engagement in Research Exhibit and Promotion for Continuous Improvement of Research

The schools' and teachers' initiative in participating in research conferences and fora for the enhancement of students' research is credited with the development of research. According to the participants:

“We continue to attend Expo with the purpose of increasing SIP's current quality. The Expo acted as a crowdsourcing platform for students, teachers, industry partners, and specialists to exchange ideas. {...}” [Science Research Teacher 2]

“{...} We attend the science fair whether we win or lose. We understand that in this environment, we, the teachers, and the students, will learn things that we would not have learned in the four corners of the classroom.” [Science Research Teacher 3]

Continuous Improvement of Research (CIR) promotes joint research progress by sharing, presenting, reviewing and critiquing research studies, in which schools work together with other schools and local research agencies, to improve one's research.

“{...} Peer review, having a SIP conference, and bringing in university experts and many others qualified to share



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research information are some of our best practices.”
[Science Research Teacher 1]

“We present a concept paper initially, followed by a title defense and a research proposal to DOST or other private agency personnel during a research colloquium at our school. Both of these activities are equally important. {...}” [Science Research Teacher 13]

CIR improves research by evaluating, assessing, and revising it. It is a continual process because continuous improvements are based on the need to discover what is not already known, what should be improved or removed if it currently exists, and what is working but may be better.

The research journey of special science curriculum schools includes displaying their products and outcomes. This is to present the students' research as it progresses toward completion. The following is taken from the participants' statements:

“{...} We give students the opportunity to promote their work. We gave them the opportunity to present their products as well as their research to the general public by allowing them to participate in a research exhibit hosted by the school and other organizations.” [Science Research Teacher 4]

“The SIP display is organized by curriculum grade level. Students are encouraged to join or submit their entry by section in this event. {...}” [Science Research Teacher 9]

This final activity enhances the school's research culture. Furthermore, a research exhibit is one way to honor students' and teachers' achievements. The school provides a unified meaningful experience that is highly beneficial to the students in some way. The participant goes on to say:



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“Students benefit from title defense, research fairs, on-the-spot writing practices, and a research culture that encourages lifelong and exploratory learning. {...}”
[Science Research Teacher 11]

The school's research exhibit allows students to demonstrate what they've learned, experienced, and discovered. This is one of the most straightforward methods for boosting student achievement, enthusiasm, and research promotion. As a result, students should participate in any science fair to improve their research project.

Best Practice 7. Familiarization of the INTEL ISEF Rules and Guidelines

Students and teachers can maintain the highest standards of honesty and integrity in SIP by familiarizing themselves with the Intel ISEF or Intel International Science and Engineering Fair rules and guidelines. The following is revealed in the statement of the participants:

“{...} In the Intel Isef, we follow the rules and guidelines. This is the highest level in which a student can compete in a science fair. We make certain that all of the Intel ISEF's requirements are met.” [Science Research Teacher 8]

“Because we were aware with the rules and guidelines of the Intel Isef, we were able to ensure the validity and reliability of our SIP, which was backed and endorsed by the DepEd central office. Examining the Intel ISEF's requirement form is one of our tasks as teacher. {...}”
[Science Research Teacher 9]

When completing the SIP, every science research teacher should keep the Intel Isef rules and guidelines in mind. If one follows the guidelines and meet all of the requirements in the Intel Isef, he/she will probably win at any level of science fair. As evident on the participant's disclosure:



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“Forms in the Intel Isef must be submitted at all levels, from the local to the national. As a SIP coach, I double-checked every form so that when the science fair arrives, we don't have to waste time looking for the competition's requirements. {...}” [Science Research Teacher 13]

Every local competition aims to prepare and select participants for presentation and competition at a higher level. The best science researches are showcased at the international science and technology fair. Every student researcher and coach desires to be present at this fair. For them to compete at this level of competition, the teacher and students should get familiar with the Intel ISEF rules and guidelines.

Best Practice 8. Linkages to Other Agencies for Support

Research is a broad term that encompasses a wide range of activities. Aside from the ability to accomplish it, other agencies and/or stakeholders should be considered as well. The teachers thanked stakeholders for their assistance and stated:

“{...} It is an evident reality that community and industry partnerships play an important role in achieving and supporting science research. We are continuously on the lookout for partners or stakeholders that can help us fund our research projects.” [Science Research Teacher 14]

“{...} Our research partners have been extremely helpful in our efforts. They share their resources to help students with their research. Some even provide financial assistance to students who wish to visit testing laboratories.” [Science Research Teacher 10]

“{...} The assistance supplied by government agencies has a considerable impact on the school's activities, particularly in research.” [Science Research Teacher 13]

“We are overjoyed that we have connections. Those resources that we are unable to supply to the students are



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provided by our helpful stakeholders. {...}" [Science Research Teacher 7]

One of the issues that teachers face is the financial constraints of conducting research. This is due to the fact that research materials are not available without funding. The absence of supplies and instruments in the laboratory, according to Jugar (2013), is an issue that limits good scientific practices. Tools, materials for experiments, testing fees, and other costs are all unavoidable necessities in the performance of research. As a result, teachers frequently seek financial assistance from their connections, such as parents, government officials, and other partners. Mbowane (2016) also highlights teachers' and students' development through networking opportunities. Links to external agencies for assistance help teachers and schools in providing the resources required for conducting research.

Best Practice 9. Students are Connected to the School

Students who feel connected to their schools have a good impact, according to teachers. According to the participant:

" {...} Students at our school are both attached to the school and to the teachers. This is to establish rapport in order to maintain effective communication while conducting research." [Science Research Teacher 6]

"The school and the teacher are concerned about the students' progress. We make sure they've learned a lot from us. Students are also treated as if they were our own children. This is how we make the student feel at ease around us.
. {...}" [Science Research Teacher 4]



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“{...} The school believes that students who are connected to it can have a substantial impact on research output and student improvement.

.” [Science Research Teacher 14]

Students who feel connected to the school are more likely to engage in research and are more confident in their ability to solve research problems. Students with this mindset are focused on research and explain their research's flaws in order to improve it. They are more satisfied with their research studies when they believe they are connected to their research teacher and school. Students' perception that their teachers care about their research journey is referred to as school connectedness. Teachers must develop interpersonal connectedness in their classrooms as they teach SIP in order to better connect with their students. Teachers who are connected are friendly, capable of identifying students' needs and potential, appreciative of students' feedback, and invested in each student's success. The teacher should be fair and encouraging, and establish a loving, structured environment with high and clear standards.

Best Practice 10. Adherence to the DepEd Memorandum pertaining to the Conduct of the National Science and Technology Fair

Following the Department of Education (DepEd) memorandum pertaining to the conduct of the national science and technology fair to make the teacher and students work in accordance with the rules and regulations of the activity. The DepEd memo instructs both the teacher and the student on how to create a sound and winning SIP. According to the study's participants:

“{...} We absolutely adhere to DepEd Memo No.113, Section 2019 of the Department of Education. This enables



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us to do precise studies. The forms specified in the DepEd directive are non-negotiable, thus we must follow them exactly.” [Science Research Teacher 9]

The DepEd Memo No.113, s. 2019 specifies the format and components of the SIP, as well as to the presentation. It assists the student and teacher in identifying additional requirements that must be met prior to participating in the science fair, as stated by the participants:

“{...} Before submitting the SIP to the assigned personnel of science fair, the school ensures that the forms in the scientific fair are completed and signed. Those forms can be found in the DepEd central office's annual memorandum.” [Science Research Teacher 10]

“{...} We are consistently on the list of science fair participants because we follow the Department of Education memos on research and science fair contests.” [Science Research Teacher 1]

The DepEd memo published by its central office harmonized the framework, guidelines, requirements, and activities for the national science and technology fair at any level. This provides a step-by-step instruction for every level of science fair. Following the DepEd memo provides teachers and students with a diverse range of research and science fair experience.

3.2 Objective Number 3. The Developed Science Investigatory Project Primer as Supplementary Material in Teaching Science Research

The primer in SIP is intended to assist science teachers in teaching research to students as they explore and produce solid, acceptable, and winning research at any level



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of science fair. This is based on the best practices of secondary schools in Isabela's schools division office that offer special science curriculum.

It is simple to use, especially for beginners, and it is appropriate for students in any academic level from elementary to senior high school. Each section is explained in the simplest empirical manner possible so that any student may understand it right away. It is straightforward and not overly technical. The details of each part are written in a logical order. Additionally, it analyzes the research timeline or timescale, as well as the impact on students and teachers. It employs black text color because some students or teachers have trouble distinguishing between hues. Furthermore, the primer should be utilized under the supervision of a research teacher.

The contents are organized in order of priority. It is composed of 19 pages that includes the front and back page, introduction and table of contents with the main part: (1) Research Logbook, (2) Research Plan, (3) Required Forms for all Researches, (4) Additional forms, (5) The Research Paper, (6) Research Abstract, (7) Ethical Consideration, (8) Oral Presentation, (9) Display Board, (10) Research Design, (11) Statistics Guide, (12) Hypothesis Testing, and (13) the Best Practices of the School offering Special Science Curriculum.

3.4 Objective Number 4. Face and Content Validity of the Developed SIP Primer

The SIP primer Validation Rubrics were put through a reliability test. This demonstrates the tool's consistency across the three (3) evaluators.

The content and face validity of the SIP primer indicate whether it achieved its goal and assures that it is relevant to science researches, according to the Intel ISEF rules

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and guidelines 2019, DepEd Memo No. 113, s. 2019-Guidelines and best practices for schools that offer special science curriculum

The SIP primer underwent a series of revisions based on expert views and suggestions. On the first review, the rating was 2.9, and when the experts reevaluated it, the rating was 3.8.

The table below comprises the summary of rating and the suggestions of the experts on the face and content validation.

Table 14

Summary of Validation Ratings and The Suggestions of the Experts on the SIP Primer

Expert	First Validation	Second Validation	Suggestions
First Expert	2.9	3.8	Include the Intel ISEF rules and guidelines 2019
Second Expert	3.0	3.9	Consider the DepEd Memo No. 113, s. 2019
Third Expert	2.8	3.7	Emphasize the best practices generated from the research study
Mean	2.9	3.8	

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CHAPTER 4. SUMMARY, CONCLUSION AND RECOMMENDATION

This section presents the summary of the study, summary of findings, limitations of the study, the conclusions, and the recommendation of the study.

4.1 Summary of the Study

The study aimed to: determine teachers' interest in science research, teachers' experience teaching SIP, teachers' experience coaching in science fairs, lessons imparted by the teacher, motivations of the teacher, visions of the teacher, innovation of the teacher, plans of the teacher, impact of science research, and ways of the teacher to improve science research; and discover the motivations of the teacher, visions of the teacher, innovation of the teacher, plans of the teacher, impact of science research, and ways of the teacher to improve science. The study's findings served as the foundation for the development of a SIP primer.

The fourteen (14) teacher participants who were most qualified based on the purposive sampling technique were polled with eleven (11) validated questions from the interview guide utilizing Appreciative Inquiry's 4-D Model. The lived experiences of the teacher participants were analyzed using interpretative phenomenological analysis. Furthermore, the data and findings were evaluated by qualitative research experts, and triangulation from the researcher and participants was taken into account.

4.2 Summary of Findings

The following are the findings in the first objective of the study:



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First, teachers' interests include a longing for knowledge, the provision of solutions to problems, lifelong learning, and immersion in the research process. Teachers have a natural desire to participate in the research process. They research, learn, and grow in order to increase the quality of science research teaching.

Second, the best experience of the teacher in teaching SIP is when they monitor the work of the students in research and when their students participate and demonstrate their interest to them. While the best teacher experience in coaching science fair competitions is when they work hard for the success of the SIP as well as when they win the SIP contests. Third, the majority of teachers concentrate on improving students' skills and teaching them how to conduct research using the scientific method. Teachers also teach students how to have positive attitudes and how to learn research content, particularly methods.

Fourth, the teachers are motivated to teach science research because of their contribution to the body of knowledge, for the benefits of the learner, the product of the research and the students' enthusiasm in doing research.

Fifth, teachers' visions for the next three years include advancements in research quality, school facilities, competitions, and support from students and parents. They also want to win SIP contests at a higher level. Their instructional innovations include the utilization of new technology, robotics research, and environmental issues, as well as consulting with experts from various agencies.

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Sixth, teachers plan to attend a research seminar-workshop to gain research knowledge. They also seek financial support from stakeholders to ensure that their goal is realized.

Seventh, teachers believe that the preparation of research, the data collection procedure, and the presentation of results are all indicators of research quality. All aspects of the research are regarded as if they play a unique role in the research's success.

Finally, teachers aim to improve the availability of research funds, training, and facilities for science research at their school as well as in collaboration with other institutions and the school's program implementation.

The second objective of the study is to describe the best practices of the schools offering special science curriculum and these are: (1) teachers' self-improvement and strong commitment in research endeavor; (2) mentoring student outside the school premises; (3) provision of conducive working atmosphere; (4) interdisciplinary and integrated approaches in research; (5) favorable scientific attitudes and research habits; (6) participation in science fair and engagement in research exhibit and promotion for continuous improvement of research; (7) familiarization of the INTEL ISEF Rules and Guidelines; (8) linkages to the other agencies for support; (9) students are connected to school; and (10) adherence to the DepEd memorandum pertaining to the conduct of the national science and technology fair.

Moreover, the best practices identified were utilized to create a primer in SIP. The developed SIP was then put through a number of validations to ensure that it was fit for its intended use.

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4.3 Limitation of the Study

The results of the study cannot be generalized to any other schools division offices in the country. In this particular study, the lens of qualified teachers identified the best practices of schools offering special science curriculum, the findings have been carefully studied and examined. The study was conducted over a short period of time with limited resources at the provincial level. The research was only conducted in schools division office of Isabela in which the researcher was working so larger studies would need to be done to make the information more accurate. Another limitation of the study is that the participants are the fourteen teachers for at least three years and have placed at least third in the division science fair competition. The study's findings came only from their lived experience in teaching and coaching SIP. The researcher had not been with the participants and in their school throughout so the information known about the best practices is less than what the participants would know. Also, there is no comparison group on the conduct of the study. Moreover, the performance and attitude of students toward the teacher and/or the subject science research; the physical structure of the school and availability of instructional materials; and the participation and commitments of parents-stakeholders were not included in the study, despite the fact that these factors affect the teachers' lived experience.

4.5 Conclusions

The following are the conclusions drawn from the findings of this study's objectives one and two:



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1.1 Immersion in the research process; lifelong learning; longing for knowledge; and, the solution that science research will provide are what the teachers love most in science research.

1.2 The commitment of teachers to their profession motivate them by making sure that their students appreciate what they impart when conducting SIP. Additionally, participation of the students triggers their enthusiasm by showing understanding and interest in learning and doing SIP.

1.3 Coaching is both challenging and fulfilling and teachers learn more with their experiences being exposed in different level of competition which they can use as a guide in developing SIP. Being a coach is gratifying experience when a competition is won, also will power accompanied by responsibility and accountability in divulging vital knowledge to students.

1.4 Discussing the fundamentals of the SIP will guide the students thoroughly in the systematic process of SIP along with it is to have perseverance and determination to complete the SIP.

1.5 Despite the hardships from teaching science, the teacher is inspired by the students. Their eagerness to learn trigger the enthusiasm of the teacher to help them improve their knowledge and skills in making research paper, as they can be molded to be future scientists.

1.6 In the future, when the advanced technology is within reach and readily accessible, it will enable the teachers to enhance their professional knowledge and skills with scientific researches, and improve quality of outcomes.



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1.7 Foreseen innovations are not yet available in the country, like robotics and use of advanced technologies, but by gradually building partnership with different stakeholders, they can make it happen in the near future.

1.8 Coordination and collaboration from different experts who are in the same field is one of the methods which will enhance teachers' expertise in providing quality experience to the student when performing different activities regarding SIP.

1.9 Admittedly there are parts of SIP that could have the most impact in improving science research quality and should be given consideration.

1.10 Academic upgrading, attending seminars and workshops, funding programs related to research are contributory aspects for the school researches to be improved.

2. The study describes the best practices of the secondary schools offering special science curriculum. Teachers' self-improvement and strong commitment in research endeavor drives the teachers to pursue research that they extend their efforts in teaching and coaching students for learning opportunities. Additionally, the teachers provide a conducive working atmosphere that transform schools into an avenue of students' learning with the use of interdisciplinary and integrated approaches in teaching science research. Also, the teachers possess favorable scientific attitudes and research habits which they impart to their students to have a quality research output. This research undergoes series of presentation, review and critiquing for its improvement such as research exhibits and promotion. The support of other agencies is needed in the realization of the research activities. Moreover, increased students' connectedness to the school, familiarization of the INTEL ISEF Rules and Guidelines, and adherence to the

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DepEd memorandum pertaining to the conduct of the national science and technology fair are needed in the success of research undertakings. Finally, the identification of the best practices contributes to the development and validation of SIP primer.

4.5 Recommendation

The SIP primer is suggested to be used by the science research teacher or coach and students. The science supervisor should provide seminar-workshops and trainings that will capacitate each teacher in teaching SIP or science research. School heads should apply and/or adopt the best practices on science research that empower teachers that adversely affects the achievement in science fairs. Teachers are advised to apprehend their best practices in dealing with the science researches, it will guide them on how they will improve their practices. A parallel study on the best practices in science researches of regular schools, elementary schools, senior high school and other agencies is advised to be conducted for further findings. The conduct of the study to wider population and/or more participants is also suggested to discover other best practices. Additionally, study through the lens of the school heads, students and the stakeholders on best practices in science research are also suggested. Future researchers may also include the factors affecting the best practices of the school and teachers. Moreover, the use of Appreciative Inquiry's 4-D model and Phenomenology type of qualitative research is recommended for describing best practices.



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LIST OF APPENDICES

Appendix A

Science Investigatory Project Primer



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PRIMER

SCIENCE INVESTIGATORY PROJECT

A guide to winning a science fair



Highlights

- Anchored on the Intel ISEF rules and guidelines 2019
- Followed the DepEd Memo No. 113, s. 2019
- Based on the Best Practices of Secondary Schools offering Special Science Curriculum





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Introduction



The 1987 Philippine Constitution espouses the vital role of research in economic development. Science research is promoted and fostered in accordance with Republic Act 2067 [Science Act of 1958], as an effective instrument to intensify science and technology (S&T), research and development (R&D) for national progress. The law is promoted by the current administration through advancing S&T and innovation in the country as stated in the Philippine Development Plan 2017-2022. It even stipulates provision of incentives to further encourage participation in science research activities.

In every school year the Department of Education, through the Bureau of Curriculum Development announces the conduct of the National Science and Technology Fair somewhere in January to March. The conduct of Science and Technology Fair (STF) in School/Area level, Division Level and Regional Level is from September to November. This STF aims to promote Science and Technology consciousness and culture of innovation among youth particularly Elementary and Secondary students both in private and public schools. Furthermore, this is to identify the most creative and innovative student-researchers who shall represent the Philippines in the international science research fairs e.g. Intel International Science and Engineering Fair (ISEF).

This Science Investigatory Project (SIP) Primer is a material for the research students and advisers as they pursue and make a sound and winning research for any level of science fair. It will help you reach the national to the international level of science research fair. It will provide you the necessary forms and information that the science fair requires. It also gives you advice on the preparations as well as the completion of your research course.





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About the Author

Mr. JESS T. MANZANO, the author, is a Physics and Research Teacher at Regional Science High School for Region 02, graduate of Master of Arts in Education with Specialization in Science Education at Philippine Normal University-North Luzon, a research adviser in the last division and regional science research fair and in the 15th National Science Quest 2018 and 3rd National Science and Engineering Fair 2020.

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Appendix B**Research Instrument**

Republic of the Philippines
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The Indigenous Peoples Education Hub
 North Luzon Campus
 Alicia, Isabela

Interview Guide and Participant's Responses

Interview Guide Questions	Simplified Questions	Teacher-Participant's Responses
1. What do you love most about the science researches (Science Investigatory Project) in your school?	Can you please mention one or 2 things that you love most about science researches in your school?	
2. What is your best experience in terms of: (a) Teaching SIP; and, (b) Coaching contested activities in science fair?	Kindly mention one best experience in teaching SIP....in coaching science fair.	
3. What is the most powerful lesson you imparted to your student in your science research class?	What specific lesson have you best imparted to your class?	
4. What encourages you the most in teaching science research?	What motivates you the most in teaching science research	
5. How do you visualize your school in the next years in terms of science researches?	Three-five years from now, what do you envision for science researches in your school?	
6. What possible innovations will you probably do in the next years of teaching science research?	Three-five years from now, what innovations will you introduce in teaching science research? Kindly mention one or two.	
7. What will you do to achieve your vision/s?	What are your ways or steps to achieve your vision/s?	
8. What are the areas in SIP where you feel science researches could have the most impact on improving its quality?	What part of SIP do you feel more engaging?	
9. What specific ways would you like to contribute to improve science researches in your school?	To improve science researches in your school, what do you suggest to be done?	
10. What are the existing, working and consistent practices in terms of science researches that you as a teacher will continue in the next years?	What practices in science research will you continue doing in the next 5 years?	

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Appendix C

Validation Tool for Research Instrument

Research Problem/Objective <i>Describe the best practices of SIP teachers using Appreciative Inquiry Approach in terms of:</i>	Interview Guide Questions <i>Appreciative Inquiry's 4-D Model</i>	Appropriate	Not appropriate	Remarks
(a) teachers' interest in science research;	Discovery Phase 1. What do you love most about the science researches (Science Investigatory Project) in your school?			
(b) teachers' experience in terms of teaching SIP and coaching in science fair;	2. What is your best experience in terms of: (a) Teaching SIP; and, (b) Coaching contested activities in science fair?			
(c) lesson imparted by and motivation of the teacher;	3. What is the most powerful lesson you imparted to your student in your science research class? 4. What encourages you the most in teaching science research?			
(d) visions and innovation of the teacher;	Dream Phase 5. How do you visualize your school in the next years in terms of science researches? 6. What possible innovations will you probably do in the next years of teaching science research?			
(e) plans of the teacher and impact of science research; and,	Design Phase 7. What will you do to achieve your vision/s? 8. What are the areas in SIP where you feel science researches could have the most impact on improving its quality? 9. What specific ways would you like to contribute to improve science researches in your school?			
(f) best practices of the teacher in terms of science researches.	Destiny Phase 10. What are the existing, working and consistent practices in terms of science researches that you as a teacher will continue in the next years?			
Comments/Suggestions:				
_____ Signature over Printed Name of Validator				

Appendix D

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Validation Tool for SIP Guidebook

Instruction: Please indicate the degree of agreement or disagreement on the statements provided below by ticking the number which corresponds to your best judgment. Spaces below for your recommendations and suggestions.

1= Not Acceptable (major modifications needed), **2= Below Expectation** (some modifications needed), **3=Meets Expectation** (no modifications needed but could be improved with minor changes) and **4=Exceeds Expectations** (no modifications needed)

Criteria	Operational Definition	Score				Remarks
		1	2	3	4	
Clarity	The statements in each part are direct and specific. The reader can understand what is being stated. There are no ambiguous sentences.					
Content	The content in each part caters the necessary information for the readers					
Wordiness	Statements are concise. There are no unnecessary words.					
Negative wording	Each sentence is stated using the affirmative					
Use of Jargon	The terms used are understandable by the reader. There are no clichés or hyperbole in the wording of each sentence.					
Appropriateness	Each part is applicable to all situations.					
Technical Language	The use of technical language is minimal and appropriate.					
Application to Praxis	Each part relates to the research practices or expertise of the reader					
Relationship to Research	The SIP guidebook is sufficient to resolve the problem of the student researcher; to answer the researcher's questions; and, to obtain the purpose of making winning research.					
Timeliness	The SIP Guidebook is updated and interesting such that reader will be able to do sound scientific research.					
Visual Appeal	The colors, shapes, pictures, fonts, white space, and overall visual balance of the SIP guidebook. The guidebook is consistent, attractive and captivating.					
Originality	The SIP guidebook has the quality of being new and creative.					
Layout and Format	The parts of the SIP guidebook were systematically arranged and prominent.					

Recommendations/Suggestions:

Appendix E



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Communications

Request Letter to the Superintendent of Schools Division Office of Isabela


 Republic of the Philippines
PHILIPPINE NORMAL UNIVERSITY
 National Center for Teacher Education
The Philippine Peoples Education Hub
 North Luzon Campus
 Alicia, Isabela

February 07, 2020

MADELYN L. MACALLING, PhD, CESO VI
 Asst. Schools Division Superintendent
 Officer In-Charge
 Office of the Schools Division Superintendent
 Schools Division Office of Isabela
 Alibagu, City of Ilagan, Isabela

DEPED - ISABELA
RECEIVED
 DATE 2-7-2020
 BY 8
 RECORDS SECTION

Dear Ma'am,

Good Day!

I am a graduate student of Philippine Normal University-North Luzon, presently working on my thesis entitled "Best Practices of Secondary Schools offering Special Science Curriculum: An Appreciative Inquiry toward the Development of SIP Guidebook". The study aims to describe the best practices of secondary schools offering special science curriculum of SDO-Isabela in terms of science researches through the lens of science and research teachers. Furthermore, the result of this study will be used in developing SIP guidebook.

In view hereof, I humbly request authorization from your office to conduct the study to the secondary schools particularly at (1) Dona Aurora National High School, (2) Luna National High School, (3) San Isidro National High School, (4) Cabatuan National High School, (5) Roxas National High School, (6) Salinungan National High School and (7) Delfin Albano High School-Main.

The teachers' participation in this study is voluntary; so, in my utmost capacity, I will preserve their anonymity as well as the confidentiality of the information that shall be gathered. I understand that a teacher's time is valuable, rest assured that no disruption of classes in the duration of the data gathering.

Thank you very much. I am looking for your positive response.

Very truly yours,

JESSA MANZANO

Approved: 
MADELYN L. MACALLING, PhD, CESO VI
 Asst. Schools Division Superintendent
 Officer In-Charge
 Office of the Schools Division Superintendent

DEPED - ISABELA
RECEIVED
 DATE 2-11-2020
 BY 1047
 RECORDS NO. 1047

Scanned with CamScanner

Consent Form for the Participants



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Republic of the Philippines
PHILIPPINE NORMAL UNIVERSITY
National Center for Teacher Education
The Indigenous Peoples Education Hub
North Luzon Campus
Alicia, Isabela

CONSENT FORM

Graduate Student: Jess T. Manzano
Faculty Member, Regional Science High School for Region 02

Candidate, Master of Arts in Education-Science Education
Philippine Normal University-North Luzon
Alicia, Isabela

Adviser: Jandy S. Danzalan
Faculty Member, Philippine Normal University-North Luzon

I am working with my thesis entitled **"Best Practices of Secondary Schools offering Special Science Curriculum: An Appreciative Inquiry toward the Development of SIP Guidebook"**. Relative to this, I wish to invite you as one of my respondents in this study. Your responses will be processed to describe the best practices of secondary schools offering special science curriculum of SDO-Isabela for the development of SIP guidebook.

Your participation in this study is voluntary; so, in my utmost capacity, I will preserve your anonymity as well as the confidentiality of the information that shall be gathered. I understand that a teacher's time is valuable, and I greatly appreciate if you would give me time to answer my questions following the validated interview guide. Since my research is qualitative in nature, I solicit your patience and cooperation if I keep coming back to ask more questions. I believe that this is an important study that can benefit both of us in the delivery of our commitment to achieve excellence in education specifically in teaching and coaching SIP. Should you require me later to present the result of the study, I am willing to share it with you.

Your consent is needed to fully participate in this study. Otherwise, you do not wish to participate in the study.

Thank you very much for your participation.

Sincerely,

JESS T. MANZANO

I give my consent to participate in this research by affixing my signature.

Signature over Printed Name

Position

Date



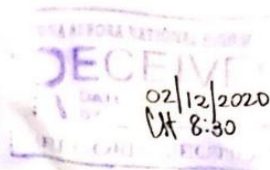
Scanned with CamScanner

Sample Letter to the School Head



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National Center for Teacher Education
The Indigenous Peoples Education Hub
North Luzon Campus
Alicia, Isabela



February 12, 2020

LAILA A. TAGUINOD EdD
Principal IV
Doña Aurora National High School
Sta. Rita, Aurora, Isabela

Dear Madam,

Good Day!

I am a graduate student of Philippine Normal University-North Luzon, presently working on my thesis entitled **"Best Practices of Secondary Schools offering Special Science Curriculum: An Appreciative Inquiry toward the Development of SIP Guidebook"**. The study aims to describe the best practices of secondary schools offering special science curriculum of SDO-Isabela in terms of science researches through the lens of science and research teachers. The result of this study will be used in developing SIP guidebook.

In view hereof, I humbly request authorization to conduct the study in your school. In addition, I am requesting the participation of two science and/or research teachers for 20-40-minute interview.

The teachers' participation in this study is voluntary; so, in my utmost capacity, I will preserve their anonymity as well as the confidentiality of the information that shall be gathered. Furthermore, I understand that a teacher's time is valuable, rest assured that no disruption of classes in the duration of data gathering.

Thank you very much. I am looking for your positive response.

Very truly yours,

JESS T. MANZANO

Approved:
LAILA A. TAGUINOD EdD
Principal IV

**PHILIPPINE NORMAL UNIVERSITY**

The National Center for Teacher Education

CURRICULUM VITAE**Name** JESS T. MANZANO**Date of Birth** November 02, 1992**Place of Birth** Ramon, Isabela**Educational Attainment****Master's Degree** Master of Arts in Education with Specialization in Science Education
Philippine Normal University-North Luzon Campus; 2021**Collegiate** Bachelor of Secondary Education major in General Science
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