



Research Article

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Close Mentoring Approach: Enhancing Action Research Skills and Knowledge of Science and Mathematics Teachers

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Abstract

Department of Education (DepED) required teachers' in particular master teachers both elementary and secondary in all subject areas to conduct action research to enhance the performance of students most especially below average learners. This study was conducted to measure how effective close mentoring approaches to assist DepED teachers in Science and Mathematics in doing action research. In addition, this is also to enhance knowledge of these teachers on how to perform action research with their own created innovations. The results revealed all the informant wanted to conduct action research. But because of other commitments, and duties, many of them cannot complete what they have started. There were very few teachers in every schools; therefore, time management is very important because almost all of them have additional functions such as coaches, club advisers, office staff and others. However, the findings of the study suggested that mentoring was effective methods to help science and mathematics teachers to do action research. One science teacher was able to present completed paper in a regional conference. All these teachers have already their own innovations but just need to test for effective implementation. Also, support from higher officials must be priorities to help their teachers who have interest in action research.

Keywords: Enhance, Skills, knowledge, Action Research, Science and Mathematics Teachers, Mentor, Mentee

1. Introduction

Filipino basic education teachers are encouraged to engage in research. This action research can help bridge the gap between teachers and students. This will help empower teachers and increase performance of learners (Hine, 2013). The performance of Filipino science and mathematics students in National Achievement Test (NAT) (Philippine Basic Education, 2013) and Trend in International Mathematics and Science Survey (TIMSS) (Calderon, 2014) in the entire archipelago is very alarming.

Sagor (2019) defined action research as behavioral procedures to collect and examine the actions of certain individual specifically in education system to enhance teaching and learning process. In addition, Research Methodology (2019) stated that action research is a series of action base on researcher's initiate to collaborate with clients or students in recognizing a problem and develop a precise solution to that problem. In the Department of Education (DepEd), action research is a systematic investigation done by teachers to help improve practices in the future (Course Hero., 2019). Currently, DepEd help teacher researchers by providing financial support in creating guidelines and innovations through research. This endeavor is called Basic Education Research Fund (BERF) (DepED Region IV-A, Calabarzon, 2012)

Northern Iloilo Polytechnic State College (NIPSC) as lone college in Northern Iloilo with seven campuses around district is committed to help teachers in DepEd to engage in doing action research. This is due to one of the major courses in all 7 campuses is Education. Most of the graduates are employed in local basic education institutions around Northern Iloilo. But one common problem found out during informal validations on their status in terms of engaging in research, nobody was able to conduct. Thus, with the vision of the college to help our graduates in the call of DEpEd that all teachers must be into research. This concept was materialized. The results of this study will be submitted to the School of Teacher Education to improve the policy in doing undergraduate thesis.

During the visit in the division and regional offices in Iloilo City for pre-survey, it showed that very few action researches were submitted. Most of these papers are for school evaluation purposes. Also, in the ocular inspection organized within 5th District of Iloilo, very small percentage of teachers who are interested to conduct research activities even some of them are teaching research subjects. The alarming gap between teachers who do action research motivated the researcher to involve in this type of study.

The findings of study of Valdez and Lapinid (2015) on Mathematics Teachers revealed that because of various aspects such as materials, social and political causes less to succeed in the conduct of action research. Also, they appeal for the improvement of research training in the boundary of local context. Thus, to improve research trainings conducted by various stakeholders or organizations they must increase the interest of the teachers.

One of the activities employed was workshop. Most widely known, type of professional development is the workshop (Twamley, 2009). The common characteristic of a workshop as professional development is that a person or team of people thought to be expert in the field are brought in to teach teachers how to better accomplish the goal of the professional development activity. While many other types of professional development can be implemented under the guise of a workshop, the main discriminating factor is that one person outside of those being trained is in control of the schedule and the agenda. This arrangement would include, in many instances, college coursework and attendance at a professional conference (Loucks-Horsley, et al., 2003).

In the article of Strauss (2014), many of Chicago teachers complained about Professional Development (PD) sessions as they were treated as kindergarten, thus; the current PD is abysmal. Moreover, she also exposed that most teachers experienced traditional methods and one-shot PD that don't change common practices within the school levels. This becomes ineffective because teachers by nature are also human; constant practice makes skills perfect. There are some implications that trainings must be a continuous process, it needs step by step protocols in order to have quality results.

The researcher acted as mentor in this study. This study is part of the project "Helping Basic Education Teachers to Engage in Action Research." This is a three-part series which started from "The Life Experiences of Science and Mathematics Teachers-Mentors in Formulating Action Research to Enhance Learners' Performance; then followed by "Enhancing Action Research Skills and Knowledge of Science and Mathematics Teachers Through Intensified Workshop" and the last was Close Mentoring Approach: Enhancing Action Research Skills and Knowledge of Science and Mathematics Teachers." The first study revealed that very few teachers know how to do action research because their experiences in college as well as in their graduate programs were all about descriptive survey. Thus, training-workshop was organized as a second study to help these science and mathematics teachers engage in action research. The result revealed that many were interested and as a matter of fact, almost all of them have created innovations and strategies to help increase learners' performance. However, because of additional loads they were not able to finish their studies. Also, as a beginner in the field of action research, mentoring is very important; thus, this research was formulated.

This study focused on close mentoring approach. Mentoring is a long term relationship that supports the development of certain individuals called mentees. This may bring challenges and rewards to both mentor and mentee (Reh, ND). In order to have a good relationship, two parties are willing and interested to teach and learn, they also have same expectations and support each other, and a good communication to connect to eradicate bad behaviors (Mentor: The National

Mentoring Partnership, 2019). However, to have a good result study of Allen et al (2006) revealed a high quality standard such as well-train and selected, and can work intensively must be followed.

2. The Aim of the Study

The main objective of this study is to determine the effects of mentoring approach science and mathematics teachers in doing action research.

3. Methods

This study utilized need assessment among selected informants through interview about knowledge and experiences on action research, and document analysis about researches during undergraduate and graduate programs and training and workshop about action researches and observation during class hours. Grimsley (2019) defined needs assessment as an aid to help to help organization to conduct training to enrich their organization. The researchers submitted letter of request to all schools both elementary and secondary in the northern part of Iloilo to conduct enhancing action research skills and knowledge to their educators during the In-service Training for Teachers (INSET). The informants were science and mathematics in basic education form Northern Iloilo, Philippines. Upon the completion of the training, the informants created a title about their innovations implemented inside their classroom. They also observed some science and mathematics teachers on their methods of teaching.

Then, an interview was conducted about the different strategies and techniques used in their classroom. The interview was tape recorded to capture in details the responses of the informants. Each of them was given 10-15 minutes during the interview which was done during after class. The language used were mixed, Hiligaynon and English.

Then, the informants were asked if they are committed to complete the plans to engage in action research. The researcher act as mentor to the teachers who want to polish their action research. Both the mentor and mentee are government officials, a permit were asked from District Supervisor, principal and school heads for the science and mathematics teachers, and president of NIPSC for the mentor. They usually do the mentoring during free time of the mentor. The mentor is the one visiting the school for the project.

This activity runs for almost a year. The researcher also inspires the teachers to present their paper in any conferences. This study started in 2016 and ended in December 2019.

4. Results

4.1 Educational Qualifications of the Science and Mathematics Teachers

The informants of this study were 4 science and 4 mathematics teachers. See Table 1. According to the records collected 4 are taking graduate studies in management, 2 were on thesis writing on MaED – Science, 1 completed his Doctor of Education in Management, 1 graduated Doctor of Philosophy in Science Education.

Table 1. The informants of this study coming from Northern Iloilo

	Mathematics	Science	Total
Elementary	2	2	4
Secondary	2	2	4
Total	4	4	8

Many of teachers went to educational management in their graduate program because they wanted to become school administrators. But others went to science and mathematics because Department of Science and Technology provide scholarship programs but the support of the Division Office of DepEd is very low. Very few were interested because of lack of encouragement

from higher officials.

Furthermore, the evaluation of researches conducted by the informants from college until their employment showed that all their studies were descriptive survey. Then, this was not follow up because of so many comments in their respective schools. Even though, majority of them went to graduate schools, their knowledge in action research is still limited.

They have to act as coaches in sports, club advisers as well as office staff because of lack of school personnel.

4.2 Workshop Attended by Science and Mathematics Teachers

Many organizations facilitated training/workshop on action research in local, national and international levels approved by the national agency. But all were content base. But all teachers were given the opportunities to attend all these training/workshop sponsored and facelifted by various private and public institutions. With the current needs to improve the skills of science and mathematics teachers in action research it's not yet the priority of many school heads. Even the national government is calling for every teacher to formulate action researches.

Today, with the implementation of Basic Education Research Fund (BERF) of the department all regional offices with the help local division offices organized activities to encourage more teachers to conduct action research. They even invited experts from various State, College and Universities as expert during a long training and workshop. But based on the observation conducted, this is just for those who are selected by their schools who happens to have interest in research.

4.3 Action Research Title after INSET Training

In-service training for Teacher is an early activity of schools in the Department of Education. Table 2 summarizes the outputs of the selected science and mathematics teachers.

The reaction of these teachers were very overwhelming because they showed interest in learning action research. In terms of definition of action research all of them were well-versed. They even have so many innovations inside the classroom that improve learners' performance.

After the INSET, one science teacher stated;" I have heard action research in my seminars in the division but I am always confused, I don't know where to start. I always have the passion burning inside me that I can do it but nobody would like to help me. All of us in this institution is in blank."

Also, Grade VI Mathematics Teacher revealed; "I have these innovations inside my class, the performance of my students in their quizzes and long exam improved a lot. But I don't what to do."

Table 2. Title of the research proposals of the informants

	Science	Mathematics
Elementary	Diglossic Approach in Teaching Elementary Science: An Innovative Strategy Eco-Trail Strategy to Enhance Pupils Performance in Learning Science Using Philippine Traditional Games as Instructional Materials in Teaching Science	Mathematic Concept Kit (MCK) – Its Effect to the Grade IV Pupils on the Remedial EMS Assessment Test Individualized VS Group Games: A Strategies in Teaching Elementary Mathematics
Secondary	Individual Activities VS Group Activities: Its Effect on the Academic Performance of Science Students Traditional Based Teaching VS Integrated Instruction in the Context of Science Curriculum Interactive Instructional Materials: Its Effect on the Performance of Science Students Differentiated Instruction: An Alternative Way in Teaching Science	Cooperative Learning: Its Effect on the Performance of Grade 7 Students in Mathematics

All participants started to write their research title, they even presented their outputs in front of their colleagues. You could see in their face the excitement, but as we continue with our workshop, many were lost hope. Some have difficulty in defining their research questions but other tried their best. You can feel the enthusiastic interest of these brilliant educators. In writing the methodology, we ask Mathematics teachers to help science teachers. The results unveiled that many Mathematics Teachers have little knowledge about statistics.

4.4 School Visitation

The researchers visited the selected informants of this study and they were mentored. Close mentoring approach were utilized because many of the science and mathematics teachers have limited knowledge about action research. Thus, using mentor-mentee could be a good strategy to help these educators improved their skills and knowledge in action research.

All the participants in the INSET who created a research title, automatically all science and mathematics who submitted a title became informants. The researchers visited them in their home institution for mentoring. They were trained about different parts of the action research, and how to do a proposal based on the memorandum of DepED.

The different innovations of the informants were identified. The researchers observed the classroom of each informant. Based on the observation, the researchers have discovered various innovations such as, card games, interactive science teaching using technologies, utilizing of social media, songs, and others. But many of the informants don't know how to implement creativity into action research.

They spent a lot of money to help below average learners love science and mathematics. But very few understand that this is innovations.



Figure 1. The researcher conduct one on one and group discussion about how to continue their research outputs.



Figure 2 showed that the researcher take time to have a very positive relationship by explaining in details "What is Action Research and It's Important to Education System Today?"

Almost 8 informants formulate a proposal but only two submitted completed research paper; one from mathematics and one from science; both of them were in elementary.

When they asked what motivated them to complete the proposal, they stated;

"Being a teacher it is my commitment to help my students improved their performance. Thus, I am willing to conduct action research even it will take my time. I must know how to manage my time proper. I will conduct this during my class hour. I am hitting two birds in one stone."

Also, one science teacher revealed;

"I really wanted to create a proposal but my time is really cannot permit me to finish what I have started. I have here my introduction, my methodology is still hanging but the mentor already explained everything to me."

In addition, one informant confirmed;

"I was so busy doing other things; I need to submit documents required by my principal. Also, I am over load, and I still coaching a sport event."

Then, another also said;

"I was asked by my head teacher to be an adviser of our club. I am also the coach of basketball. My time is so limited for creating a proposal."

While, one male mathematics teachers said;

"We need money to conduct action research. But my salary is only enough for my family. I always spent much for instructional materials."

4.5 Action Research: I can do it

Many of this informants tried their best to have formulate title, problems and even take time to look for related literatures. However, the lack of resources as well as additional loads such as club

advisers, office staff and others hinder them to continue their proposals.

This science teacher able to finish her study because according to her;

"I have no choice but to conduct this study because I was required by the principal as a Master Teacher. This is one of my duties and responsibilities. But with the help of the mentors, doing action research is actually easy and fun. I am now equipped and ready to do on my own."

The output completed was presented to 17th Annual Regional BIOTA Convention and Scientific Sessions last February 2017 at Sarabia Manor Hotel and Convention Center by the researcher. The teacher-researcher was not able to present the paper because she was not allowed to attend the conference due to some financial constraint.

However, when she was asked about the presentation;

"I am willing to present the paper in the conference. This will help boost my interest in doing action research. The suggestions of the experts in the conference will enhanced this paper."

This showed that the informant has an idea of the importance of presenting research paper in any conferences. Thus, it must be given priority of the school heads to help their educators to experience oral or poster presentations.

In addition, she stated;

"I will try to present this paper next but in a higher level because our teachers in graduate studies always telling us to present our research outputs. Research conferences often help us boost our interest to engage more in doing action research."

This research project is a good start to understand the needs of DepED teachers in the district. This is also the baseline to conduct more researches in the future.

We are also encouraging the informants to finish their proposal within the year. We are willing to help them enhance their action researches.



Figure 3. One on one interview with the research and the informant.

When the informants were asked, they affirmed;

"I promised that no matter how heavy my loads and duties, I will take time to complete my proposal. This is just a matter of time manage. My experienced as informants of this study really inspired that action research is really easy if you love your students and your job."

Another informant uttered;

"I will really submit myself to commit what I have started. This mentoring is very important to me as well as to my other co-teacher. We have value the sharing of the mentors to us."

4.6 Close Mentoring Approach

The result showed that time is one of the greatest problem encounter during the mentor-mentee approach. The researcher was not able to complete the required number of days to mentor the teachers because prior comments. Also, the teachers have other designation aside from his and her teaching loads. But because of commitments and setting priorities one research was complete, two were about start and the remaining is still on concept paper. But the drive of the mentor to help these teachers, they went beyond the call of duty. They even stayed late at night as well during weekend and holidays just to create more innovations during the implementation of the action research.

According to Science Elementary Teacher;

"I am really motivated to conduct this study because of your commitment. You have given so much time and even stayed with me late at night. All the hard work and sacrifices really paved off went I present my paper for a conference. I hope there are more teachers like you willing to help us."

Figure 1 revealed the output of the informants using mentoring approach in doing action research. A large portion goes many of the science and mathematics teachers have started a proposal. Follow by not able to start doing action research due to some commitment given to the informants. A small portion was one teacher was able to finish an action research. Even, this 1 complete output can give a big impact to other teachers. This will be a way to encourage that research is fun and interesting.

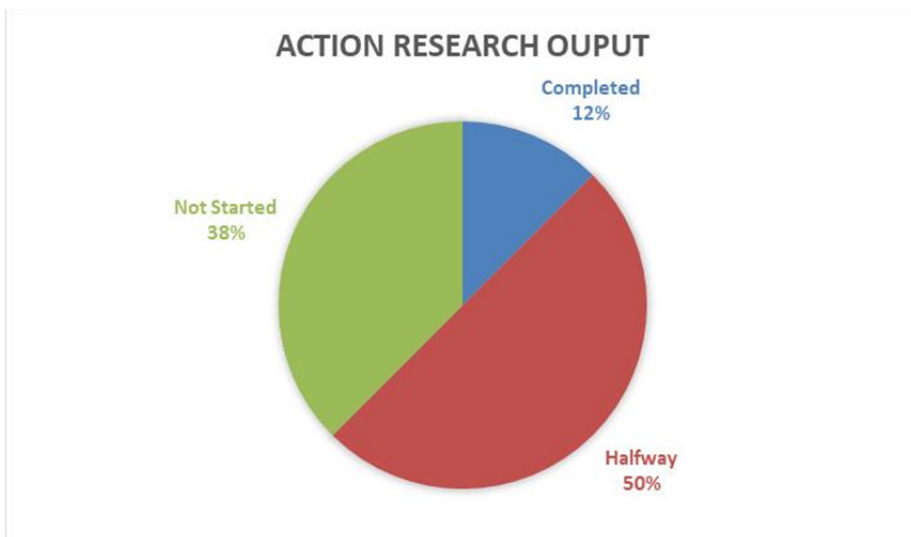


Figure 1. Output of informants in doing action research.

5. Conclusion

Close mentoring is an effective strategy to help science and mathematics teachers in basic education to do action research. All teachers will be requiring by the department to have action

research very soon. One presented research output in a science conference is a good start. This will increase the interest of every teacher young and old.

They are all committed to do action research with the help of a mentor. All these teachers have their own innovations. All of them are really creative; they have innovations that help improve the performance of their learners. But limited time due to another designation given such as coaches, class and club advisers, and office work, financial supports and resources must be given importance by the administration. They must tap teachers who have interest in research. Administrator should improve their skills and knowledge by sending them to various trainings, seminars and even conferences.

Also, commitment should be a priority of the teachers. Time management is very important for science and mathematics teachers. But, all administrators must encourage their teachers to engage in research and de-loading should be implemented properly. Master teachers must be encouraged to conduct action research to help other teachers in the district or in the school.

6. Recommendation

Financial support is a good strategy. Certain amount must be allocated from school funds as well as Local Government Unit School Board. Also, incentives are good form of inspiration among teacher to encourage them to do research. Or even sending them to international conferences abroad is a good reward but certain criteria must be followed. Another way to inspire them is by sending to graduate school programs as scholar. Science and Mathematics teachers can apply at Department of Science and Technology, Science Institute of Education (DOST-SEI) or even abroad like Ministry of Education, Culture, Sports, Science and Technology (MEXT) of the Japanese Government. This is a good training ground to enhance their research knowledge and skills.

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References

- Allen, T. D., Eby, L. T., and Lentz, E. (2006). Mentorship Behavior and Mentorship Quality Associated with Formal Mentoring Progress: Closing the Gap between Research and Practice. *Journal of Applied Psychology*, Vol. 9, No. 3, pp. 567-578.
- Calderon, M. T. F. (2014). A Critique of K 12 Philippines Education System. *International Journal of Education and Research*.
- Course Hero. (2019). Department of Education, What is Action Research. Course Hero, Inc. Retrieved April 17, 2019 from <https://www.coursehero.com/file/p6a4if8/Department-of-Education-What-is-Action-Research-Action-Research-is-a/>.
- DepEd Region IV-A, Calabarzon. (2012). Research. Concept Global, Advertising Inc. Retrieved April 18, 2019 from <http://depedcalabarzon.ph/research/>
- Grimsley, S. (2019). What is Need Assessment? Definitions and Example. Study.com. Retrieved April 18, 2019 from <https://study.com/academy/lesson/what-is-needs-assessment-definition-examples-quiz.html>.
- Hine, G. (2013). The Importance of Action Research in Teacher Education Program. *Teaching and Learning Forum*, Murdoch University. Retrieved May 23, 2019 from https://www.academia.edu/4082600/The_Importance_of_Action_Research_in_Teacher_Education_Programs
- Loucks-Horsley, S., Love, N., Stiles, K., Mundry, S., & Hewson, P. (2003). *Designing professional development for teachers of science and mathematics*. Thousand Oaks, CA: Corwin Press.
- Mentor: The National Mentoring partnership (2019). Closure: Curriculum. Boston, MA. Retrieved May 23, 2019 from <https://www.mentoring.org/closure-curriculum/>
- Philippines Basic Education. (2013). The National Achievement Test in the Philippines. Retrieved April 4, 2019 from <https://www.philippinesbasiceducation.us/2013/07/the-national-achievement-test-in.html>
- Reh, F. J. (ND). A Guide to Understanding the Role of Mentor. Retrieved June 12, 2018 from <https://www.thebalancecareers.com/a-guide-to-understanding-the-role-of-a-mentor-2275318>
- Research Methodology. (2019). Action Research. Necessary Knowledge to Conduct a Business Research. Retrieved April 17, 2019 from <https://research-methodology.net/research-methods/action-research/>

- Sagor, R.. (2019). Guiding School Improvement with Action Research. ASCD. Retrieved April 17, 2019 from <http://www.ascd.org/publications/books/100047/chapters/What-Is-Action-Research.aspx>.
- Strauss, V. (2014). Why most professional development for teachers is useless? The Washington Post. Retrieved April 19, 2019 from https://www.washingtonpost.com/news/answer-sheet/wp/2014/03/01/why-most-professional-development-for-teachers-is-useless/?noredirect=on&utm_term=.27e307299b9a
- Twamley, S. M. C. (2009). *Action Research and Its Effects on Teacher Efficacy: A Mixed Methods Case Study*. Susan M. Cooper-Twamley. Unpublished Dissertation Graduate Faculty of Baylor University.
- Valdez, P. N. and Lapinid, M. R. (2015). Constraints of Math Teachers in Conducting Action Research in the Philippines: Right Analysis. *Malaysian Journal of Learning and Instruction*, V12, pp 1-19.