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Project SMARTER as an Intervention towards Intensifying Action Research Competencies of Basic Education Teachers

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ABSTRACT

In the era of educational reforms, action research becomes highly relevant especially in basic education as this gives the teachers and the school leaders the opportunity to revisit and improve their educational practice. These explanatory sequential mixed methods study sought to investigate the effectiveness of Project SMARTER in intensifying the action research competencies of basic education teachers. Forty basic education teacher-participants (n=40) were subjected to Project SMARTER's ten-day training intervention. Participants were pretested prior to the intervention to determine their entry knowledge on action research and were administered posttest to determine the knowledge gained through the intervention. Quantitative results revealed that participants performed significantly better from introductory to intermediate level of action research knowledge before and after the Project SMARTER intervention. To further validate the results, a qualitative phase where eight basic education teachers (n=8) were interviewed regarding their views and experiences as participants of the

Project SMARTER. The phenomenological inquiry yielded three essential themes: ready to act: becoming action researchers, armed to teach: becoming teachers of research and trained to train: becoming research trainers. These essential themes signified how the project had impacted the participants as teacher-researchers, research teachers and trainers. Implications and recommendations are provided for higher education institutions, concerned government institutions as well as project implementers to consider to make project initiatives like Project SMARTER successful and sustainable.

Keywords — Action Research, Project SMARTER (Statistical Methods and Action Research Training for Educators and Researchers), intervention, mixed methods explanatory sequential research design, Philippines

INTRODUCTION

Research in education is indispensable. Research plays a key role in shaping the quality of education the students received from schools. Through research, teachers are able to gain a better understanding of the pressing problem they encounter in their day-to-day classroom instruction which leads to the formulation of solution-intervention towards the improvement of educational practices. With this, students are benefitted as the primary end-users of the findings and outputs of every educational research undertaking.

In the worldwide educational system, research is considered to be the soul of education and learning (Department of Education, 2016). Aiming to provide solutions to many current problems, research is vital, and necessary part of modern education as this brings about the generation of new knowledge (Migosi, Muola & Maithya, 2012; Koshy, 2005). According to Todd (2010), in order to improve and develop teaching, research into classrooms is needed. As educational practitioners, it is vital to know what actually happens in our classroom, how learners behave, what learners think, what educational practices we should revisit, what interventions we should develop and the effect of this intervention to students' learning. These all could lead to the conduct of action researches.

Action research in education presents many benefits not only for the learners and educators but for the educational system as well. This is a tool used by education practitioners to discover strategies for improving teaching practices (Sagor, 2010; Mills, 2001; Sikula, 1996; Andrew and Johnson, 2012; Mctaggart,

1997). It bridges the gap between theory and practice, between academic research and day to day applications in the pursuit of practical solutions to issues of pressing concern (De Zeeuw, 2003; Brudbury, 2005). It provides educators with new knowledge about how to improve educational practices or resolve significant problems happening in schools and in the classroom setting whether to test a new instructional strategy, assess a new curriculum or evaluate existing educational practices (Connor et al, 2006; Stringer, 2008; Hine, 2013; Kidd & Kral, 2005; Nolen & Putten, 2007; Bogdan). It is also a valuable experience for educators since when they do action research, they become leaders, researchers and decision makers (Connor et al., 2006; Sax & Fisher, 2001).

In Malaysia (Meeran & Osman, 2013) and the Philippines (Department of Education, 2016), the inculcation of action research culture has been fostered at the primary and secondary levels. Novice teachers are encouraged to embark on researches related to their teaching in order to improve their practices as well as students' learning (Meeran and Osman (2013). In Singapore, the government is promoting action research in schools. However, studies revealed that Singaporean teachers need to be equipped with the conceptual and methodological skills in conducting action research (Soh, 2006).

On the other hand, the teacher's lack of research expertise or skills has a knock-on effect causing further problems. A teacher who has little experience or knowledge about research may design or conduct research with low reliability and validity, e.g., the research may not actually produce findings which address the targeted research topic (Todd, 2010; Somekh, 2006). Because of these problems, the research is also likely to have low publishability which could also mean low research productivity (Lertputtarak, 2008; Migosi, Muola, & Maithya, 2012).

Also, in the course of doing action research, it is important for researchers to understand statistical data analysis so that they can be informed, evaluate the credibility and usefulness of information, and make appropriate decisions. Proper use of statistics will make one's results and findings more accurate, more believable and more useful (Brown & Saunders, 2007). In addition, an essential component of ensuring data integrity is the accurate and appropriate analysis of research findings (Begum & Ahmed, 2015). Improper data analyses may lead to misleading scientific findings and may result in a negative view of scientific research (Begum & Ahmed, 2015; Shephard, 2002). In the same way, improper statistical methods may result in incorrect and invalid conclusions which leads to unethical practice (Ali & Bhaskar, 2016; Bhalerao, 2011; Gardenier & Resnik, 2002).

Doing action research is now making a trend especially in the basic education wherein teachers are encouraged to do action research in order to provide a solution to the teaching and learning problems and difficulties they encountered in the classroom level. Results of training need assessment conducted to one-hundred fifty basic education teachers revealed that the majority of teachers are not equipped with the technical know-how of doing and writing action research as well as statistical data analysis. These learning gaps form the basis for designing and developing a research capacity building activity which will serve as a platform for mentoring basic education teachers to become action researchers.

Project SMARTER: Statistical Methods and Action Research Training for Educators and Researchers is a project initiative of the Research and Extension Unit of the Mindoro State College of Agriculture and Technology which aims to provide an advanced training course on statistical data analysis and action research to educators and researchers in the province of Oriental Mindoro. This training course aims to help educators in analyzing the assessment results, student work samples and other performance data in order to identify and address learning difficulties and academic needs which could lead to an action research study and eventually make them competent action researchers.

OBJECTIVES OF THE STUDY

This study aimed to assess the effectiveness of Project SMARTER in intensifying the action research competencies of the basic education teachers. Specifically, this aimed to (1) assess the action research competencies of basic education teacher-participants before and after the Project SMARTER intervention; (2) compare the action research competency score of the teacher participants before and after the Project SMARTER intervention; (3) compare the mean gain score of the teacher-participants when grouped according to teaching positions, length of service, and specialization; and (4) analyze the views and experiences of the participants regarding the effectiveness of Project SMARTER.

METHODOLOGY

Research Design

This study utilized Creswell's mixed method approach specifically the explanatory sequential mixed methods design. In explanatory designs, qualitative

analyses are used to give a clear picture of the quantitative analyses (Almaki, 2016). In this study, qualitative data will be used to support the findings of the first quantitative data to have a clearer picture of the problem being investigated.

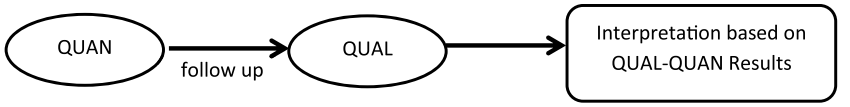

Figure 1. Sequential mixed methods design (Creswell & Clark, 2007)

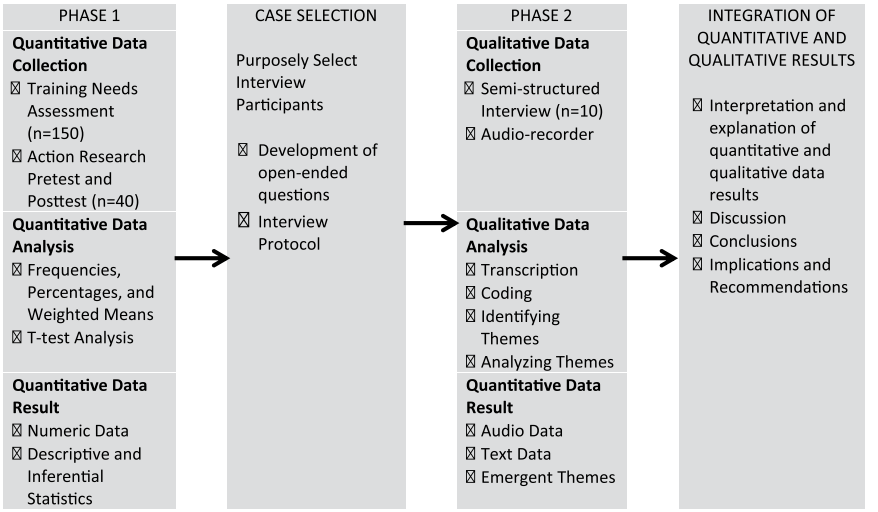

Figure 2. A Visual model of the data gathering procedure for mixed methods sequential explanatory design Adapted from Creswell, 2007)

Research Site

This research project was conducted at Mindoro State College of Agriculture and Technology Calapan City Campus, the only state college in the province of Oriental Mindoro.

Participants

The research participants were basic education teachers from different public secondary schools in the Department of Education - Calapan City and Oriental Mindoro Division. Participants were chosen using the multi-stage random sampling technique. In the quantitative phase, one-hundred fifty (n=150) basic

education teachers responded to the training needs assessment on action research. Forty (n=40) teachers were chosen to participate in the Project SMARTER who answered the pretest and posttest and underwent the intervention program. As to the demographic profile, the forty participants were composed of: 70% with at least 10 years of teaching experience, 30% below ten years of teaching experience; 55% holding T1 to T3 position and 45% MT1 to MT2 position; 80% Mathematics major and 20% Sciences Major; and 65% Bachelor's degree graduate and 35% Master's degree graduate. In the qualitative phase, eight (n=8) teachers were selected from the 40 participants in the first phase to participate in the semi-structured interview.

Instrumentation

Data were collected through a survey questionnaire. The self-structured survey questionnaire which dealt on training needs assessment on action research was based on the analysis of related literature and other secondary data sources (Siniscalco & Auriat, 2005; Meadows, 2003; Acosta & Acosta, 2017). It was composed of competencies on action research where respondents were asked to rate their level of knowledge from 1 to 5 ranging from very low to very high level. This was validated by a panel of research experts in the college. This was administered online through Google form for an easy and convenient way of data collection. The result was used as input for developing a capability building design for action research.

A self-structured test on action research in the form of objective and essay type of questions was also administered to the research participants before and after the participants underwent the ten-day intervention through Project SMARTER.

Data gathered were analyzed with descriptive and inferential statistical techniques using SPSS software. Descriptive statistics such as frequency, standard deviation, and weighted mean were calculated for the training needs assessment as well as the performance of the participants in the pretest and posttest on action research. On the other hand, t-test for correlated means was used for determining the effectiveness of the Project SMARTER in intensifying the action research competencies of the participants.

Qualitative Phase

The primary source of data in the qualitative phase was the responses of the selected participants in the interview that provides access to the perceptions and experiences of the participants on the problem being investigated. Semi-

structured interviews were done among the respondents which include key questions which allow both the interviewer and interview to elaborate the questions and responses for a more detailed explanation of the problem being investigated. The qualitative phase was designed to strengthen the results of the quantitative phase. (Creswell & Clark, 2006).

The following steps were observed in the analysis of the qualitative data: transcription of data, coding the data by segmenting, comparing and labeling the text, identifying the themes by comparing and grouping similar codes, and analyzing the themes by reviewing the data within the themes until an understanding of each theme was reached (Creswell & Clark, 2006; Ivankova & Stick, 2007; Leech & Onwuegbuzie, 2007; Olive, 2014; Franklin, 1997).

Ethical Considerations

For ethical research considerations, the researcher secured the informed consent of the participants by explaining in detail the purpose of the study and asking their consent to or decline in participating voluntarily. The researcher also considered the ethics of confidentiality and anonymity by using the results for the sole purpose of the study and by not disclosing the names and identity of the research participants. This research has been reviewed and approved by the College Research Council during the in-house research review and evaluation.

RESULTS AND DISCUSSION

Pretest and Posttest Performance on Action Research of the Participants

Frequency and percentage distribution present the classification of the research participants before and after the implementation of Project SMARTER. As per classification, the majority of the participants have an introductory knowledge of action research prior to the intervention. This implies the need for a research capability building design to improve their knowledge and skills on the conduct of action research. However, after the intervention, there was a remarkable increase in the number of research participants belonging to the intermediate level, although there are few participants who are still at the introductory level.

Table 1. Frequency and Percentage Distribution of the Performance on Action Research of the Participants before and after the Implementation of Project SMARTER

Performance	Pretest		Posttest	
	Frequency	Percentage (%)	Frequency	Percentage (%)
81-100 (Advanced)	0	0	8	20
51-80 (Intermediate)	5	12.5	27	67.5
0-50 (Introductory)	35	87.5	5	12.5
	= 37.5 s = 0.12		= 67.5 s = 0.15	

Difference between Pretest and Posttest Performance of the Research Participants

In order to investigate the effectiveness of Project SMARTER in intensifying the action research competencies of the participants, t-test analysis for correlated means was conducted. Results showed that there was a statistically significant difference between the pretest and posttest performance on action research of the participants (t =14.272, p=.000).

Results suggest that Project SMARTER is an effective intervention in improving the competencies of the participants in doing and writing action research. This is very evident in the participants' workshop outputs like gap analysis and critical thinking tool in identifying and defining the action research problem in their workplace; problem tree, opportunity tree and decision making model in developing alternative courses of action; action plan in selecting a course of action; monitoring and evaluation tool in studying the courses of action as well as action research proposals and review of complete action research report.

Table 2. T-test Analysis of the Difference between the Pretest and Posttest Performance on Action Research

Variables	Mean	Mean Difference	Standard Deviation	t	p-value	Result
Pretest	37.5	40.0	12.07	14.272	.000	Significant
Posttest	67.5		14.44			

Difference in the Mean Gain Scores on Action Research across Length of Service, Teaching Position, Field of Specialization and Highest Educational Attainment

T-test analysis for independent means was conducted to determine the difference in the mean gain across some selected variables. Results showed that the mean gain scores on action research through Project SMARTER across the length of service (t=1.74, p=.093), teaching position (t=0.144, p=.886), the field of specialization (t=0.461, p=.654) and highest educational attainment (t=1.262, p=.216). It means that the participants regardless of the length of service (whether less than or greater than 10 years of teaching experience), teaching position (whether teacher or master teacher position), field of specialization (whether Mathematics or Sciences) and highest educational attainment (whether bachelor's degree or master's degree graduate) have improved and enhanced their action research competencies through the Project SMARTER.

Table 3. T-test Analysis of the Difference in the Mean Gain Scores on Action Research across Length of Service, Teaching Position, Field of Specialization and Highest Educational Attainment

Variables		Average Mean Gain	Mean Difference	Standard Deviation	t	p-value	Result
Length of Service	<10 years	28.35	6.65	13.22	1.74	.093	Not Significant
	>10 years	35.00		10.00			
Teaching Position	T1 to T3	30.09	0.57	13.52	0.144	.886	Not Significant
	MT1 to MT2	30.66		11.76			
Field of Specialization	Mathematics	30.81	2.31	12.74	0.461	.654	Not Significant
	Sciences	28.50		12.68			
Highest Educational Attainment	BSEd Graduate	28.61	4.96	13.25	1.262	.216	Not Significant
	MAEd Graduate	33.57		11.01			

Views and Experiences of the Participants on the perceived effectiveness of the Project SMARTER

Qualitative evidence through articulations and verbalizations of the participants in this phenomenological inquiry revealed three themes related to the perceived effectiveness of the Project SMARTER namely: *ready to act: becoming*

action researchers, *armed to teach: becoming teachers of research* and *trained to train: becoming research trainers*.

Ready to Act: Becoming Action Researchers

Doing action research is now encouraged in basic education institutions. However, the results of the training needs assessment showed that teachers lack basic knowledge in conducting action research because of lack of research capability trainings given to them. Thus, one of the primary objectives of the Project SMARTER is to equip the participants with the knowledge and skills which prepare them to become action researchers. Thus, one measure to assess the effectiveness of the project is to know how the training helps the participants to become competent in doing and writing action research. Confirmatory statements related to this are verbalized by the participants:

> *"Even before I participate the project SMARTER, I have lots of action research problem in mind but these all end up to proposals because after finishing drafts of the proposal, I am lost in the context. I don't know what to do next because I am not knowledgeable about the research process since I am not yet pursuing a Master's degree or even attending training on this. This training helped me to have a deeper understanding of action research and its process and made me ready to complete my first action research paper."* ***-P4***

> *"All things are difficult before it comes easy and which is indeed applicable in the case of action research. Because most of the time, when it comes to doing action research, the common notion is that it is difficult to do. It is because we are not yet skilled in doing it. This project of MinSCAT really made us skilled in doing action research because the training activities and workshops are really designed for beginners like us. Kudos to MinSCAT and the proponents of this project!"****-P5***

> *"When it comes to new knowledge, this project has given us a lot of new knowledge and ideas especially on the conduct of action research which has prepared us to do and write action research which can solve immediate problems in our respective institutions"****-P7***

The statements of the participants show the need for research capacity building activities in the basic education sector for the teachers to be equipped

with the skills in conducting action research. This evidenced by the lack of technical know-how of research of the teacher participants as the majority of them have no research experience and have weak prior knowledge of research. However, Project SMARTER have equipped them with the necessary skills to conduct action research as evidenced by their ability to design, conduct and write action research paper through the mentoring program.

Armed to Teach: Becoming Teachers of Research

Aside from conducting action research, basic education teachers especially those in the senior high school department are given teaching loads specifically Practical Research 1 and 2 and other research-related subjects. However, teachers of these subjects may have a little background on research or may have no research experience since the conduct of action research has just been introduced to them by the Department of Education. Thus, one of the possible impacts of the project is to see how the training helps the participants as teachers of research. The accounts of the participants support this:

> *"Honestly speaking, I am teaching research and statistics subjects, but I do feel that what I am sharing them is not enough to equip them to become competent in research. We lacked trainings. This training gave us, research teachers, the opportunity to become competent research teachers because the knowledge shared to us by the trainers who are really experts in the field. Truly, Project SMARTER really made us smarter when it comes to research.-**P1***

> *"The good thing about this ten-day training is that it made me confident to teach practical research to my students. I know that this will benefit them a lot especially the approaches and techniques I learned that they could use as student researchers and even in their future research endeavors"-**P3***

> *"I am not teaching research, but this training served as a good start in our career as research teachers because this has taught us lots of knowledge which we can share to our students if ever we will be given research subjects in the future."-**P2***

> *"Even I have graduated master's degree; I have a lot of things learned from the training which I can use in teaching my Practical Research subject. This training benefits those research teachers a lot."-**P10***

*"This training is a great help for me since I am teaching Practical Research subject in senior high school. The workshop activities can be adopted as learning activities for teaching most topics in the subject."-**P9***

The statements of the participants elucidate how the mentoring program has helped them in acquiring strategies and techniques in teaching research subjects in the K-12 curriculum. Their experiences during the Project SMARTER has honed their capability not only to do action research but to teach research to high school students.

Trained to Train: Becoming Research Trainers

From the interview of the participants, basic education teachers are seldom given opportunities to attend research training. Several reasons were identified like research training are expensive and most in-service trainings focus on curriculum enhancement, teaching strategies and the like but not action research. Thus, training the participants to become research trainer even in their in-service training activities is a measure of the attainment of the objective of the Project SMARTER to reach a larger community of teachers being trained to conduct research. The verbalization of the participants affirmed this:

*"In this training, I realized that trainings and seminars conducted by HEIs are different. The trainers are experts in the field and what they shared to us are new to us and very comprehensive. This training does not only make us action researchers but even trainers of research someday. I will definitely share this with my co-teachers."-**P6***

*"This training has a great impact on me because I learned a lot which I can share to my colleagues so that they will also be equipped in conducting action research." -**P4***

*"I have learned so many things from this training most especially because the trainers taught us to step by step process of action research which is good for beginners in research like us. I will share the inputs of this training to my colleagues when I get back to school so that all of us can do action research".-**P8***

The Project SMARTER intervention has also contributed impact to the participants by gaining insights, skills and training design which they can use as research trainers. The knowledge and expertise shared by the resource persons have strengthened their capability to mentor other teachers who are beginners in the field of research.

CONCLUSIONS

The following were the conclusions derived from the study, (1) the basic education teachers have minimal knowledge and experience in designing, conducting and writing action research prior to the intervention; (2) Project SMARTER intervention has remarkably improved the action research competencies of the participants from introductory to a more advanced researcher; (3) Regardless of the teaching position, length of service, field of specialization and highest educational attainment, Project SMARTER has been successful in its objective of equipping the participants with the knowledge and skills on the process of doing and writing action research; and (4) Being ready and trained to become action researchers, research teachers and trainers are vital points that signify how the Project SMARTER has helped the participants in their journey towards their research endeavors.

TRANSLATIONAL RESEARCH

This research project was used as a basis for conducting an extension program to the basic education teachers designed to improve their competencies on conducting and writing action research utilizing the training design and materials of the Project SMARTER.

RECOMMENDATIONS

Action research is now among the agenda in the basic education sector. Hence, the successful implementation of the Project SMARTER aimed at helping the Department of Education in the realization of this research agenda served as the basis for crafting implications and recommendations fully addressed to various stakeholders: HEI project implementers and partner institutions for effective and sustainable implementation of training interventions like Project SMARTER.

First, in terms of training design, project implementers should conduct a needs assessment prior to the conduct of any training intervention to ensure that training content fits the specific needs of the participants and maximize the benefits of the training. Second, in terms of training delivery, close monitoring and evaluation of the project are highly recommended to ensure that training activities are being done as designed and to craft alternative measures as deemed necessary. Third, partner institutions like the Department of Education should take an active part and support especially in granting of incentives to participants which can include but not limited to service credits, financial incentives, and others. Fourth, project implementers should recognize the outstanding achievement of its participants in the training activities to motivate them to always perform at their best. Lastly, both the project implementers and the partner institutions should have a strong partnership agreement through the signing of Memorandum of Agreement for successful and effective implementation of the project.

Furthermore, State Universities and Colleges (SUCs) may also conduct a similar project for the basic education teachers in their locale. Future researchers may also study on adopting other mentoring approaches like e-mentoring in intensifying teachers' action research competencies. Lastly, it is recommended that an impact assessment of this project be done over a three-five year period for validation of the results.

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