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Research Article

STATISTICS FOR TEACHERS' ACTION RESEARCH (STAR) MODULE : A DEVELOPMENTAL STUDY

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ABSTRACT

Action research is commonly used by practitioners and education specialists to evaluate and enhance their pedagogy and practice. This type 1 developmental research aimed to develop instructional material that could help teachers conduct action research. The method entailed using the Missouri Historical Society's (2003) document analysis guide to analyze previously published research regarding difficulties teachers faced while doing action research. Next, design and development of Statistics for Teachers' Action Research (STAR) module. Lastly, 30 teachers and 5 experts evaluate the adherence of STAR module to the elements of curriculum dimensions, namely, balance, articulation, scope, integration, continuity, and sequence using the instrument developed by Sagge and Bacio (2022).According to the findings, one of the challenges that instructors faced when doing action research was a lack of proficiency in statistical data analysis. The STAR module was created and one of its special features is that it contains screenshots of the step-by-step process of performing statistical computations in SPSS. Moreover, teachers and experts gave a "very high" adherence suggesting that the STAR module was highly approved by the evaluators, and no revisions were needed. Thus, STAR module is a material on which teachers can rely in terms of statistical data analysis to decrease the burden of doing educational and action research. Teachers can use this as a guide during their statistical data analysis. Other math instructors may utilize the research's output as instructional material, and it is recommended that its effectiveness be further evaluated.

Keywords: statistics, action research, module, document analysis, curriculum design.

INTRODUCTION

The Philippine educational system is rapidly evolving as a result of a number of factors, including ASEAN integration, global competitiveness, globalization, the integration of ICT in teaching, and other key internal and foreign challenges. As the Department of Education implements its new K–12 programs in all basic education institutions in the Philippines, some crucial aspects should be considered, such as evidence-based policy, increased student achievement, improved curriculum, instruction, and assessment, teacher quality, and teacher professionalism (Abaya, 2017; Tindowen *et al.,* 2017).

Several critical considerations must be taken in order for basic education institutions to satisfy the demands of a world that is changing quickly. The need for action research in a traditional classroom environment in the twenty-first century is one of these characteristics (Chou, 2011; Hazelton *et al.,* 2010). Therefore, in order to promote a research culture in schools and improve educational results for both local and global competitiveness, teachers must integrate action research into their daily work.

The Department of Education (2017) defines action research as a form of systematic, reflective inquiry used to improve instructional practices or address problems in any operational unit, including the office, classroom, or school. The ideas of the reflective teacher and the teacher as the researcher are closely connected to action research. To do action research, one must take a rigorous, critical, and self-reflective look at their instructional conditions. It then aims to actively intervene in complicated situations to bring about changes and even increased the quality of teaching. Additionally, action research is in the hands of teachers, and the process of teachers reflecting on their teaching practices includes reflexivity, action, and transformation (Burns, 2014). Action research has been shown to have positive effects on a variety of academic areas, including bettering teaching and learning, encouraging instructors to reflect on their practices, and fostering their professional development. Its most particular results are in the improvement of students' academic achievement, the encouragement of positive behavior and values, and the development of life and survival skills (Burns, 2011; Dick, 2006; Taylor *et al.,* 2013).

In fact, the Department of Education launched and carried out a number of projects and programs to institutionalize action research in Basic Education. This includes the implementation of the DepEd No. 24 series of 2010 (Basic Education Research Fund), DepEd No. 13 Series of 2013 (Establishment of a Policy Development Process at the Department of Education), DepEd No. 13 series of 2015 (Revised Guidelines for the Basic Education Research Fund), DepEd No. 4 Series of 2016 which is the amendment to DepEd No. 43 Series of 2015, and DepEd No. 39 series of 2016 (Adoption of the Basic Education Research Agenda).

In connection, the research output of teachers is still poor, despite the institutionalization of research in basic education and several Department of Education efforts and programs (Vinluan, 2011; Mapa, 2017; Kiley *et al.,* 2005). In the division of Passi City in 2017, there were 242 secondary teachers, but only 7 were recorded by the division office, or 2.89%. In the academic year 2017–2018, 71 teachers from the Division of Iloilo, specifically 33 from elementary and 38 from secondary, did action research. However, this only represents only 0.46% of the Division of Iloilo's 15, 402 teachers, or 9,727 elementary school teachers and 5,675 secondary teachers. Moreover, in the study by Bacio *et al.,* (2022), an informant stated that teachers do not know what statistical test to utilize in their studies. They are not used to using parametric or non-parametric methods like t-tests or ANOVA. Once they've used a certain tool, they expect to use it again when they conduct research in the future. The fact that so few teachers are conducting research is quite disturbing.

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Numerous studies have examined the status of teachers' action research productivity (Kusure *et al.,* 2006; Chen *et al.,* 2010; Arnold, 2008), but few have examined the contributing factors, such as examining their conceptions and difficulties in conducting action research (Inanc and Tuncer, 2011; Ynalvez and Shrum, 2011).

Additionally, the study by Bacio *et al.,* (2022) shows the informant's response. For the time being, I am using the format recommended by the Department of Education in my handbook, which is a very condensed manual for teachers on how to conduct action research. However, if there were more contextualized materials, it might be of greater assistance to us. Furthermore, thinking about data processing strategies is necessary if we are to design a material. That is how to do analysis utilizing software like SPSS or Microsoft Excel. With the foregoing discussion, the researchers conducted this study to look into the root cause of the difficulties of teachers in conducting action research and developing instructional material that can lessen if not solve the problem of the teachers.

Statement of the Problem

This study aims to develop a module in Statistics for Teachers' Action Research (STAR). Specifically, this study sought to answer the following questions:

1. What are the difficulties encountered by the teacher-researchers in statistical data analysis?
2. What instructional material, including its features, can be developed to cater to the difficulties encountered by the teacher-researchers in statistical data analysis?
3. What is the level of adherence of the developed STAR module to the dimensions of curriculum design BASICS: Balance, Articulation, Scope, Integration, Continuity, and Sequence?

RESEARCH DESIGN AND METHODOLOGY

In this study, a developmental research approach was used. Developmental research is described as the systematic study of creating, implementing, and assessing educational programs, procedures, and products that must fulfill the requirements of internal consistency and effectiveness by Seels and Richey (1994 in Nelson, 2004). Also, Determining the process and effects of a specific instructional design and development effort, performing instructional design, development, or evaluation tasks while simultaneously studying the process, or examining the instructional design, development, and evaluation process as a whole or a specific process component are all examples of developmental research. Additionally, Paler-Calmorin and Calmorin (2007 in Ramos, 2020) described developmental research as decision-oriented research that applies the stages of the scientific process in response to an urgent need to enhance current practices.

This research falls under Type I developmental research specifically. According to Richey and Klein's (2005) categorization, Type I developmental research focuses on a specific educational instrument, program, method, or product. The most context-specific study is type I, and this category includes studies that cover not just design and development but also assessment. This research specifically belongs to Type I developmental research. According to the definition provided by Richey and Klein (2005), Type I developmental research is concentrated on a specific educational instrument, program, method, or product. The most context-specific research is type I research, which covers both design and development as well as assessment.

Similarly, this study is based on developmental research because it facilitates the development of the Statistics for Teachers' Action Research (STAR) module, which can serve as a guide in statistical data analysis for teachers' action research. This type I developmental research involved an evaluation of the developed STAR module Furthermore, the IPO model was the basis for developing Statistics for Teachers' Action Research (STAR).

Research Participants

The respondents to the development and evaluation of the STAR were evaluated by thirty teachers and five experts. The teacher-evaluators of the STAR module need to satisfy the inclusion criteria, which are the following: They have (1) taught mathematics or statistics subjects for more than five years in the Department of Education, a private institution, or a state university or college in the city of Iloilo or province of Iloilo; (2) used SPSS or other statistical software; and (3) conducted educational research or action research. Following the inclusion criteria, thirty (30) teachers satisfied these and evaluated the developed STAR module. And five experts were chosen purposefully to evaluate the acceptability of the developed STAR module. They have at least one expertise in the following fields: (1) development and production of instructional materials; and (2) curriculum development. Out of the five, three were mathematics and statistics professors from a state university in Pototan, Iloilo, and two were curriculum and development professors from a state university on the main campus.

Data Gathering Instruments

For this study, the researcher used a guide for document analysis, and evaluation form. The experts established the validity of the instruments. The guide for document analysis focused on identifying the difficulties encountered by the teacher-researchers in statistical data analysis. It was based on the document analysis guide by the Missouri Historical Society (2003). This instrument was used to look into each of the related difficulties encountered by the teacher-researchers in statistical data analysis.

Moreover, the stages in the document analysis were listing the resources, deciding how to organize the information, making copies for notes, ensuring authenticity (credibility, dependability, confirmation, transferability, authenticity) checking for biases by asking questions and evaluating the document.

Lastly, for the evaluation of dimensions of curriculum design, the curriculum development experts answered the adopted evaluation instrument for dimensions of curriculum design of Sagge and Bacio (2022) to meet the standard components or elements of curriculum dimensions, namely, balance, articulation, scope, integration, continuity, and sequence. Each dimension has five indicators to determine if the developed STAR module has met the standards set by the curricularist. For the instruments on the evaluation of the acceptability of the curriculum design and printed instructional materials. Each participant was asked to check the appropriate column for his or her answer. And, to score the responses of the respondents, the following four-point scale was used: 4 "Highly Agree (HA)," 3 "Agree (A)," 2 "Disagree Agree (DA)," and 2 "Highly Disagree (HD)."

Research Procedure

The IPO (Input-Process-Output) model was the basis of the processes of this study. In the **input stage**, it includes identifying the difficulties encountered by the teacher-researchers in statistical data

analysis using a guide for document analysis by the Missouri Historical Society (2003). The processes involved were *listing the resources*, *deciding how to organize the information*, *making copies for notes*, *ensuring authenticity*, *checking for biases, and asking questions*. Then the **process stage** includes the *design*, *development*, and *evaluation* phase of the STAR module. In designing, the steps were adapted from the study of Bacio and Abolucion (2022), which includes *determining initial data, determining the content, and finalizing the design*. After designing, the researcher created the prototype module during the *development* process by including additional content based on the data acquired from the input document analysis and highlighting the step-by-step process in running statistical data in SPSS. The STAR module was submitted to five experts and the adviser for validation. A modification was made to the prototype module based on the comments and suggestions of the validator. *Evaluation* is the final phase of the process. After integrating the validators' suggestions and comments, thirty (30) teachers and five (5) curriculum experts were asked to rate the STAR module's acceptability using the evaluation form. The mean and standard deviation were used to evaluate the data in order to determine the acceptability of the STAR module. The STAR module was finalized in the **output stage**.

RESULTS AND DISCUSSION

Teacher-Researchers Difficulties in Statistical Data Analysis

In this study, five documents were analyzed to find out the difficulties of teachers and students in doing action research and educational researchers through document analysis.

The researcher analyzed two documents that discussed the challenges faced by teachers when doing action research. Although their study contains a number of themes, the researcher concentrated on issues relating to mathematics. The result of the analysis is shown below.

Bacio *et al.,* (2022) results show that teacher *slack knowledge in data analysis*. Statistics expertise is crucial for data analysis. Quantitative research is built on statistics. One should be aware of the relevant statistical techniques to employ in order to meet their study objectives. There are many different statistical tools, and before utilizing any of them, one must fully understand their individual characteristics. Therefore, this work will not be simple if you have no interest in Statistics or Mathematics. This presents a problem for the execution of action research. Although statistical tests and techniques are taught in graduate school statistics courses (assuming they were offered), whether they be manual or utilizing statistical software, if you don't practice and apply them frequently, there is a risk of forgetting what you have learned. Limited statistical knowledge may result from this. If we use statistical software like SPSS and Excel, we may skip the laborious process of manual computation. If teachers do know anything about statistical tools, it is typically little to nothing. Some educators believed that if they had used a certain tool before, they would use it again the following time they conducted research.

Moreover, the study by De Leon (2019) found that one of the challenges in conducting action research is the *lack of Statistical skills*. It is a known fact that not everyone has a natural ability for mathematics, especially statistical calculation, which is a crucial component of quantitative research. He suggested that researchers should make friends with a coworker who teaches mathematics and ask for assistance. Researchers might alternatively resolve it by working with a mathematics teacher; they'll handle the statistical computation; the rest is up to the researchers. If the researchers need help with the data, he/she can also choose to talk with their school's research departments. Anyhow, that is one of the services that the researchers might use to achieve their goals. Online questions and free help are other options. Researchers can also ask a graduate school professor or other students for assistance with your issue. In the event that neither of these approaches proves successful, keep trying. There are studies, however, for which statistical analysis is not necessary. Instead, pursue qualitative research.

The discussions above show that action research was hindered by a lack of data analysis expertise. According to Smeeton and Goda (2003), data analysis is the methodical use of logical and/or statistical approaches to explain and depict, summarize together, analyze, and evaluate data. A lack of these abilities might lead to improper and misleading study conclusions (Sagge *et al.,* 2022). Inadequate statistical analyses distort scientific findings, confuse readers, and may negatively affect how the public sees research (Shepard, 2002).

The next studies will further show what topics in statistical data analysis were least mastered by students and teacher-researchers. Bolivar (2019) survey reveals that the respondents had the least-learned in statistical data analysis. The Competency in Statistical Data Analysis Questionnaire was used to identify them. The study's findings indicate that applying statistical tools for data analysis is the ability in statistical data analysis that is least mastered. Included in this are knowledge of the Independent samples t-test, Paired samples t-test, One-way ANOVA, Mann-Whitney U test, Kruskal-Wallis H test, Wilcoxon Signed Rank Test, Chi-square test of connection, Pearson's Correlation, and Spearman's-rho concepts. This indicates a lack of ability on the part of the students to choose and apply appropriate statistical tools in light of a particular statistical scenario.

Moreover, Añes (2022) employed a diagnostic test created by researchers and administered it to 157 HUMSS Grade 12 students in a National High School. The topics with the fewest students who correctly answered the questions served as the basis for determining the least learned competencies in Statistics for Research. The findings show that sample approaches, hypothesis testing, and descriptive vs. inferential statistics were the least three lessons learned.

Finally, the challenges faced by teacher-researchers were made clear by Bullo, Labastida, and Manlapas' (2021) report. The findings indicate that the majority of respondents found it difficult to analyze qualitative and quantitative data, identify issues and problems to be investigated, develop processes of how to do research and collect evidence, organize and write the findings, and make a relevant presentation and write an article for publication. Additionally, respondents reported having trouble using technology for data presentation and statistical analysis.

The Developed STAR Module

The results of the initial survey may imply that the teachers have difficulties in completing their action research due to lack of knowledge in statistical data analysis. To help the teachers, the researchers produced a contextualize module integrating a step-by-step process of using a statistical software. Instructional materials such as modules are found to be very helpful to teachers and learners (Bacio and Sagge, 2022a; Sagge and Divinagracia, 2023) especially if it's contextualized (Cabiles, 2022; Cepeda, 2023), self-directed (Sagge and Espiritu, 2023), and integrates technology (Sagge and Bacio, 2023; Bacio and Sagge, 2022 b; Bacio and Sagge, 2019 a,b).

There are five units in this module, and they are as follows: introductory concepts, descriptive statistics, inferential statistics, parametric tests, and non-parametric tests. Furthermore, the developed STAR module (shown in figure 1) has the following parts: preliminary parts, unit title, learning outcomes, discussion, and activity. One of its special features is that it contains screenshots of the step-by-step process of performing statistical computations in SPSS software.

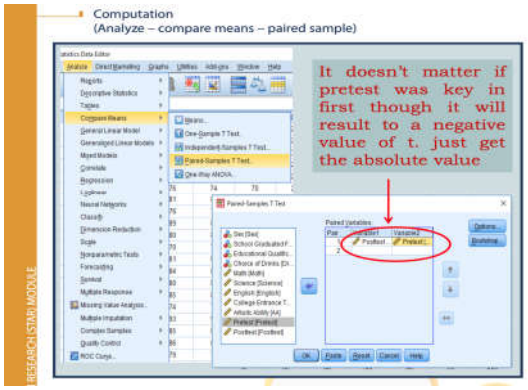

Figure 1. The developed STAR module

Analysis Based on the Dimension of Curriculum Design BASICS: Balance, Articulation, Scope, Integration, Continuity, and Sequence

A statement describing the connections between the parts or features of a curriculum is known as curriculum design. Curriculists must, when considering design, view it on several dimensions: balance, articulation, scope, integration, continuity, and sequence (Ornstein and Hunkins, 2004). The following were the analysis of STAR module based on the Design Dimensions Consideration of Curriculum according to Ornstein and Hunkins (2009).

As presented in Table 1, the overall mean of the STAR module when evaluated by experts was "very high (*M* = 3.82, *SD* = 0.028). This connotes that the STAR module has excellently met the standards of curriculum design consideration. In addition, all dimensions of curriculum design considerations were rated "very high" with mean ranging from 3.50-4.00.

Table 1 Curriculum Design Consideration as a Whole

	SD	M	Description
Balance	0.28	3.80	Very High
Articulation	0.28	3.80	Very High
Scope	0.43	3.80	Very High
Integration	0.14	3.90	Very High
Continuity	0.28	3.80	Very High
Sequence	0.28	3.80	Very High
Overall Mean	0.28	3.82	Very High

Note: 3.50-4.00 (Very High), 2.50-3.49 (High), 1.50-2.49 (Low), 1.00-1.49 (Very Low)

Balance. As presented in Table 2, the first dimension that was evaluated by experts in curriculum design consideration was balance. As evaluated by experts, STAR module has an Area mean of "very high" (M = 3.81, SD = 0.40) balance. This connotes that the STAR module has excellently met the standards of curriculum design consideration. In addition, all indicators of balance in curriculum design considerations were rated "very high" with mean ranging from 3.50-4.00.

Additionally, educators work hard to give each component of design the right amount of weight when creating a curriculum. Students may learn and apply information in a balanced curriculum in ways that help them achieve their intellectual, social, and personal objectives (Ornstein and Hunkins, 2009). The scope and the sequence used in the developed and produced STAR module should be balanced in order to meet the educational objectives. To aid teachers in their analysis of the findings from their educational and action research, the topics included in the module were carefully chosen. Additionally, the number of activities was limited to give teachers more time to practice their statistical data analysis skills. Additionally, the topics and activities were examined to see if they are efficient and pertinent to the demands of the teacher. Activities that deviate from the main topic have been changed.

Table 2 Curriculum Design Consideration in terms of Balance

Balance	SD	M	Description
The module...			
1. has a fair distribution of the factors like content, time, experiences, and other elements.	0.00	4.00	Very High
2. was continually improved, and its effectiveness and relevancy were examined.	0.71	3.50	Very High
3. help students to learn and apply knowledge in ways that promote their intellectual, social, and personal goals	0.00	4.00	Very High
4. features a design that was weighted appropriately to prevent distortions	0.71	3.50	Very High
5. has topics that correspond to the learning outcomes.	0.00	4.00	Very High
Area Mean	0.28	3.80	Very High

Note: 3.50-4.00 (Very High), 2.50-3.49 (High), 1.50-2.49 (Low), 1.00-1.49 (Very Low)

Articulation. As shown in Table 3, articulation was the second dimension that experts in curriculum design evaluation considered. Experts have evaluated that the articulation of the STAR module is "very high" (Area Mean: 3.80, SD: 0.28). This suggest that the STAR module has excellently met the standards of curriculum design consideration. In addition, all indicators of articulation in curriculum design considerations were rated "very high" with mean ranging from 3.50-4.00.

Table 3 Curriculum Design Consideration in terms of Articulation

Articulation	SD	M	Description
The module...			
1. was sequenced from one grade level to the next, ensuring that students receive necessary preparation for coursework.	0.00	4.00	Very High
2. seek to combine information from one area of the curriculum with information that is related to it in terms of logic or subject matter.	0.71	3.50	Very High
3. observed vertical or horizontal articulation.	0.00	4.00	Very High
4. sees to it that association between and among elements are occurring simultaneously.	0.00	4.00	Very High
5. ensures that its content or sequences is appropriate and consistent with other modules that are readily available in the field.	0.71	3.50	Very High
Area Mean	0.28	3.80	Very High

Note: 3.50-4.00 (Very High), 2.50-3.49 (High), 1.50-2.49 (Low), 1.00-1.49 (Very Low)

Additionally, articulation refers to the vertical and horizontal relationships between different curricular components that occur later in a program sequence and those that occur earlier (Ornstein & Hunkins, 2009). The STAR module's material is organized to follow vertical articulation. That is the knowledge and skills gained from Statistics and Probability during Senior high School can be used in elementary statistics and inferential Statistics in College if they enroll in mathematics-related courses. Since Statistics were removed from General Education as a result of the revised tertiary curriculum, to help teachers remember what they studied in senior high school or college, fundamental concepts in Statistics were included in the STAR module's Introductory Concepts section. But, if they enroll in a graduate school program, all this knowledge can be strengthened and can be used for statistical data analysis.

Scope. As shown in Table 4, the third dimension that was evaluated by experts in curriculum design consideration was scope. As evaluated by experts, STAR module has an Area mean of “very high” (M = 3.80, SD = 0.43) scope. This means that the STAR module has excellently met the standards of curriculum design consideration. In addition, all indicators of scope in curriculum design considerations were rated “very high” with mean ranging from 3.50-4.00.

Additionally, according to Ralph Tyler (n.d., as referenced in Ornstein and Hunkins, 2009), the scope includes all of the ideas, subjects, lessons, and unifying themes that make up the educational plan. If the STAR module is utilized in Statistics class, the scope of this subject for one semester is very doable. It covers a variety of subjects that aid teachers in developing their abilities in statistical hypothesis testing, choosing the most appropriate statistical tools, and using and interpreting SPSS data. The module also includes additional topics on reliability testing, choosing participants at random, and reporting data. The created STAR module, which is based on document analysis, has five chapters. For the midterm, the first three units will be covered and the rest will be for finals. The course syllabus's leftmost column is for time allotment. The researchers made sure that the 54 hours intended for one semester were adequately apportioned for each topic in order to ensure that the instructors who would use the STAR module are led and no topics are left untaught.

Table 4 Curriculum Design Consideration in terms of Scope

Scope	SD	M	Description
The module...			
1. contains all of the educational activities designed to stimulate learners' interest in learning.	0.00	4.00	Very High
2. consists of the cognitive, affective, and psychomotor domains of learning.	0.71	3.50	Very High
3. includes every idea, subject, learning opportunity, and connecting thread that makes up the educational plan.	0.00	4.00	Very High
4. is capable of being divided into sections known as units, sub-units, chapters, or sub-chapters.	0.71	4.00	Very High
5. has clear coverage.	0.71	3.50	Very High
Area Mean	0.43	3.80	Very High

Note: 3.50-4.00 (Very High), 2.50-3.49 (High), 1.50-2.49 (Low), 1.00-1.49 (Very Low)

Integration. As shown in Table 5, the fourth dimension that was evaluated by experts in curriculum design consideration was integration. As evaluated by experts, the STAR module has an Area mean of “very high” (*M* = 3.90, *SD* = 0.14) integration. This means that the STAR module has excellently met the standards of curriculum design consideration. In addition, all indicators of integration in curriculum design considerations were rated “very high” with a mean ranging from 3.50-4.00.

Integration also refers to connecting the different information and experience kinds that are part of the curricular design. In essence, it connects every component of the curriculum so that students perceive information as a whole rather than fragmented (Tyler, n.d., as referenced in Ornstein and Hunkins, 2009). The integration of technology through SPSS is one of the distinguishing characteristics of the STAR module. Researchers use SPSS, a groundbreaking application that has changed the way researchers are able to manage important data in a series of simple steps. Working with data is a challenging and time-consuming activity, but this application can manage and operate information with ease due to certain techniques. These techniques are used to analyze, modify, and produce a clear pattern between different data variables. Additionally, the output can be visually portrayed so that a user can easily understand the result.

Table 5 Curriculum Design Consideration in terms of Integration

Integration	SD	M	Description
The module...			
1. connects every type of knowledge and experience in the curriculum.	0.71	3.50	Very High
2. links every component of the curriculum so that learners understand information as holistic rather than segmented.	0.00	4.00	Very High
3. emphasizes the connections between topics and themes across all knowledge domains.	0.00	4.00	Very High
4. contains information derived from global topics and current issues.	0.00	4.00	Very High
5. assures that the topics are related and integrated in other subject areas.	0.00	4.00	Very High
Area Mean	0.14	3.90	Very High

Note: 3.50-4.00 (Very High), 2.50-3.49 (High), 1.50-2.49 (Low), 1.00-1.49 (Very Low)

As mentioned previously, Statistics is the backbone of quantitative research, thus research is also integrated into the subject like determining the correct scale and its interpretation, making correct

decisions and conclusions, and working with the hypothesis. While participating in group activities, students needed to collaborate with one another and preserve the classroom's cleanliness and orderliness both before and after the activity. Values were also incorporated into the activities.

Continuity. As shown in Table 6, the fifth dimension that was evaluated by experts in curriculum design consideration was continuity. As evaluated by experts, STAR module has an Area mean of "very high" (M = 3.80, SD = 0.28) continuity. This means that the STAR module has excellently met the standards of curriculum design consideration. In addition, all indicators of continuity in curriculum design considerations were rated "very high" with a mean ranging from 3.50-4.00.

Moreover, the vertical recurrence of curricular elements is referred to as continuity. For instance, Tyler (n.d. in Ornstein and Hunkins, 2009) stated that if improving reading abilities is a priority, "it is necessary to see that there is recurring and continuing opportunity for these skills to be practiced and developed." The topics in the STAR module were organized in a recurrent way. What they've learned from the current unit will be also used in the next. For those students or teachers who will use the STAR module, the hypothesis testing process was discussed recurrently throughout the discussion of parametric and nonparametric statistical tools. To prevent errors of types 1 or 2, which are undesirable when conducting educational or action research, it is necessary to practice these skills repeatedly.

Table 6 Curriculum Design Consideration in terms of Continuity

Continuity	SD	M	Description
The module...			
1. has vertical repetition of subject matter	0.00	4.00	Very High
2. has ongoing opportunities to practice and enhance these skills on a constant basis.	0.00	4.00	Very High
3. provides the concepts and abilities that should develop and recur during the course of the curriculum.	0.71	3.50	Very High
4. guarantees that students review critical ideas and abilities.	0.00	4.00	Very High
5. was structured in accordance with the relationships between the fundamental concepts and underlying structures of each major subject.	0.71	3.50	Very High
Area Mean	0.28	3.80	Very High

Note: 3.50-4.00 (Very High), 2.50-3.49 (High), 1.50-2.49 (Low), 1.00-1.49 (Very Low)

Sequence. As shown in Table 7, the last dimension that was evaluated by experts in curriculum design consideration was sequenced. As evaluated by experts, STAR module has an Area mean of "very high" (*M* = 3.80, *SD* = 0.28) sequence. This means that the STAR module has excellently met the standards of curriculum design consideration. In addition, all indicators of sequence in curriculum design considerations were rated "very high" with a mean ranging from 3.50-4.00.

Finally, curricularists look for a curriculum that will encourage cumulative, ongoing learning while determining the sequence. Curricula specialists must decide specifically how information and experiences might build on one another. Four of these concepts were first established by Smith, Stanley, Harlan, and Shores (1975, as quoted in Ornstein and Hunkins, 2009): simple to complicated learning, prerequisite learning, whole-to-part learning, and chronological learning. The concept of prerequisite learning was applied in the STAR module. It operates under the premise that understanding certain information is necessary before understanding other information. All the basic concepts were discussed first since these topics are necessary for later sections of the module. Like the ideas concerning measurement levels. This was made clear from the beginning of the discussion because this topic will be crucial in determining the right statistical tool.

Table 7 Curriculum Design Consideration in terms of Sequence

Sequence	SD	M	Description
The module...			
1. has a certain sequence in which linked actions, events, or objects occur.	0.00	4.00	Very High
2. follows content sequencing, leading to the cumulative development of intellectual and affective processes.	0.00	4.00	Very High
3. provides continual and cumulative learning through a vertical link between each component.	0.00	4.00	Very High
4. was ordered in accordance with the logic of the subject matter and how people learn.	0.71	3.50	Very High
5. arranged the topics from where the students can find a closer connection to their selves and experiences so that they can easily relate to them.	0.71	3.50	Very High
Area Mean	0.28	3.80	Very High

Note: 3.50-4.00 (Very High), 2.50-3.49 (High), 1.50-2.49 (Low), 1.00-1.49 (Very Low)

CONCLUSIONS

Not many teachers pursue graduate degrees or enroll in universities with comprehensive research initiatives. Thus, there is a need for the strengthening of research in tertiary education. Students should therefore be exposed to research activities as early as in college. It's a wonderful thing that the research subject and thesis writing have been kept in the new curriculum, and that action research will be necessary during the internship. To generate graduates who are proficient in academics and research, these disciplines, and activities need to be developed and given more attention.

Moreover, training for both beginners and natives in the field of research is necessary. The majority of the Master Teachers in basic education are seasoned educators, and before this, research was either not included in their curricula or, if it was, was not given priority. As a result, many of them have difficulty performing action research since they are either unfamiliar with it or are still adjusting to it. In contrast to the younger generation of teachers, who incorporate research into their curricula. They have the requisite training and research knowledge, making it easier for them to perform action research.

Finally, the STAR module is a material on which teachers can rely in terms of statistical data analysis to decrease the burden of doing educational and action research. Teachers can use this as a guide during their statistical data analysis.

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