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LEARNING APP IN A SYSTEMATIC REVIEWING

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Abstract
The purpose of the study was to find out a systematic reviewing of apps for instruction in the context of creative arts in Nigeria Junior Secondary Schools. The study also investigated the influence of gender students' taught with apps. The quasi-experimental design, which is of the pre-test and post-test was used. The research sample was drawn from two randomly selected secondary schools. One intact class in each sampled school was also randomly selected for the study. The students from the sampled class were further stratified along with gender boys and girls. The Learning App, Validated test, and Marking guide were the instruments. Two hypotheses were tested using Analysis of Covariance and t-test. Findings indicated that students taught with apps performed significantly better than those taught without. It also revealed the gender of students was not a factor in the performance of students when they were taught using apps this was because there was no significant difference between the performance of male and female students. Based on these findings, it was recommended that the use of apps should be encouraged in teaching creativity in Nigeria schools.

Keywords: learning apps, systematic reviewing, students' gender

Introduction
Learning involves a process that supports individuals to build up capabilities through the gaining of knowledge, values, skills, and attitudes for societal and personal development (Odewumi, 2017). Educational stated goals will be difficult to be accomplished without providing the needed technologies because technology broadens the application of proficiency by the instructors to disseminate knowledge, manage and provide new methods for learners (Hong & Songan, 2011). Information and Communication Technology (ICT) has greatly influenced the interaction services and pedagogical rendered by instructors within and outside the students' environment during and after instructional delivery (Omiola, 2011). In essence, ICT is a novel technological process and development that enables collect, process, and disseminate learning contents (Iyeke, 2011).

According to the study by Garcia, Welford, and Smith (2016) ICT has diverse sets of instruments and devices that facilitate and brought improvement to knowledge. In the same vein, Zubairu and Isyaku (2015) stated that the utilization

of ICT provides the learners' needs, it also promotes independent and collaboration knowledge acquisition in the context of both the learners and instructors. The use of ICT in education facilitates easy dissemination and effective utilization of pedagogies in learning, this provides learners with the privilege to acquire knowledge either collaboratively or independently (Hismanoglu, 2012). Also, Geer and Sweeney (2012) submitted that using educational technological tools would facilitate instructors and learners to be comfortable in achieving the stated goals in instruction. More so, the study of Odewumi, Adeniran, and Falade (2018) stated that the advent of ICT, coupled with the internet has revolutionized instruction dissemination from classroom-based to content sharing and delivery via m-learning and e-learning making it significantly and ubiquitous contribute to the pedagogical process. Mobile technology has facilitated myriads of experiences through learning creativity with apps.

Previous studies have confirmed the creativity in arts as relevant and significant in developing the learners. Although, the study of Unegbu (2014) established that there are abundant life and continuity in creativity in terms of child arts. Odewumi (2015) submitted that fine arts bring out a great value of creativity in an individual child. Soetan and Odewumi (2016) mentioned that fine arts serve as a preservation of creativity in the cultural heritage of learners. Odewumi, Okeke, Abdulhammed, Uzoma, Okuche (2015) expressed that art and cultural heritage develops and prepare an individual in creative ways for a valuable living within the society. The authors further divided Art into Non Visual and Visual. Visual art is visible products while non-visual art is those whose products that cannot be seen with our naked eyes, they are purposely for entertainment and recreations. Creative art is a branch of visual art.

Creativity can be understood as having the power or quality to express individuality in his way. Children prefer to learn in creative ways, they learn better and sometimes faster creatively mostly things they see rather than just memorizing abstract information given by their tutor or parents (Usman, Odewumi, Obotuke, Apolola, & Ogunyinka, 2014). Elufadejin (2016) affirmed that arts education is valued in that it develops creativity and cultural awareness, it also creates a particular form of knowledge that requires work and understanding of skills. The author further mentioned that the aforementioned skill assists the learners to link with other subjects on the school curriculum. It was concluded that arts education generally includes music, dance, drama, and visual art. Similarly, Thormann (2008) submitted that arts education provides a creative ability to support the power of transformation and exhibition in different fields of art. It plays a vital role in the life of art students. Arts education fosters developmental knowledge acquisition and skill gained. It is a powerful instrument that prepares the future of students with special needs through direct contact of experiences from the instructors. In essence, it supports the complete development of the child and prepares the child for a better life filled with opportunities, learning, joy and plays a crucial role in the overall success of the learners (Catterall, 2009).

A study by Weller and Anderson (2013) confirmed that teaching and learning have metamorphosed to be positive through the use of technologies. In teaching

and learning of fine arts, relevance technological instructional tools have been employed. For example, Ikponmwosa (2013) study confirmed that the teaching strategies with technology have helped the students to move forward on intentions to take up Fine and Applied Arts as a career. Kuratko and Hodgetts (2007) expressed that the conception of an individual which included the willingness has created a successful collaborative team on creative skills acquisition through technological tools. The skills acquisition is a product of m-learning and E-learning.

Mobile learning is believed to be a branch of e-learning which utilizes the ubiquity and flexibility of mobile devices to offer students additional learning opportunities (Fan, Radford, & Fabian, 2016). The mobile devices are based on the ideology of the internet which assists the application software to function effectively (MacNeill, 2015). This application is sometimes called apps (Wasserman, 2010). Railean (2012) explained the apps as instructive empowered learner-centered tools based on the ideology of online and creates solutions globally for classroom teaching and learning.

In recent times mobile apps provide the potential for instruction through the use of technological devices. A number of mobile apps have been developed and used for instruction in the classroom context based on mobile platforms (Alqahtani & Mohammad 2015). However, studies have argued that few learning apps were effective in learning, while the majority of the apps have not been pedagogically useful, because of how it was developed and the purpose it was meant for. Nevertheless, the inception of mobile technological devices like phones has brought instruction to a standardized stage and teaching and learning become more meaningful through online podium (Huet & Tcheng, 2010).

Furthermore, researchers affirmed and established that the ideology of mobile technologies is built on the internet, this earnestly promotes accessibility to learning resources online, adequate instruction acquisition anywhere and anytime (Fu, Su, & Yu, 2009). Studies have confirmed the perceived usefulness of online resources for instructions. For example, the study of Hashim, Ahmad, and Ahmad (2011) stressed the introduction of Java as a useful online learning material for sciences, languages, and calculations. Similarly, Alhazmi and Rahman (2012) confirmed the frequent use of the online tool in educational institutions for learning. In essence, an online environment, promotes social integration, collaboration, and group cohesion for instruction (Zydney & Seo, 2012).

Mobile apps create an innovative scheme for instruction globally (Kim, Rueckert, Kim, & Seo, 2013). It provides a prospective clue for teaching and learning at anytime and anywhere via learners utilizing different mobile technological devices (Egbert, Akasha, Huff, & Lee, 2011; Hoven & Palalas, 2011). Mobile apps promote significant improvement in collaboration between instructors and learners (Choi, Kim, & Kim, 2016).

Although, Mobile devices, such as iPods, tablet PCs, and mobile phones have been acclaimed as an integral part of learning apps (Kim, Kim, & Choi1, 2016). The empirical researches on mobile devices issues by researcher have different findings bordering on divergent discipline. The study of Hsu and Ching (2013) concluded that mobile devices were useful, positive, and enhance learners'

performance in learning.

Despite the advantages of mobile devices in learning, the study by Kim, Rueckert, Kim, and Seo (2013) mentioned some obstacles confronting learning through the use of mobile technology devices. For example, learners' easy of usage and adaptation of mobile devices for communication and entertainment is a general problem of the app for learning. Despite, the connectivity, mobility, learner's skillfulness, ability, and self-control, management is another obvious problem facing students' usage of mobile devices (Okeke & Umoru, 2012). Moreover, the digital tools in research have been acclaimed on both opportunities and challenges (Davidson, Paulus & Jackson, 2016). Nevertheless, the study of Hsu and Ching (2012) mentioned the provision of adaptability and ease of use to the mobile device in terms of connectivity as a means of solution.

Empirical studies on apps for instructions remained controversial among scholars. For example, the study of van Arnhem (2015) mentioned the usefulness of apps in the study of the library as very effective. Similarly, Zou and Li (2015) emphasized the teaching of the English language with apps as positive among the learners. In the same vein, Widodo (2017) expressed the use of apps for the teaching of Mathematics was productive and successful. In essence, Alqahtani and Mohammad (2015) submitted that recitation of the Holy Quran as being effective when utilizing apps for teaching the verses among teenagers.

Previous researches have revealed the effectiveness of apps in the delivery of instruction globally, some of them are Hsu and Ching (2013) whose study examined the educators utilized limited programming and experiences to design apps for collaboration, guidance, and peer support. The authors stressed that apps are the web-based program for inventive and functioning instruction. It was concluded that apps met the diverse need of learners in teaching and learning. Also, in the study of Railean (2012) on mobile apps and instruction, the author stressed that apps provided the possibilities of learning among undergraduate and K-12 education. It was further concluded that different steps should be embarked on to ensure the dynamicity and flexibility in learning.

The problems of learning of creative arts have been stressed by many scholars. For example, Olurinola (2016) submitted that lack of interest, inadequate enough teaching arena, and unfavorable time table as a major defect. Archibong (2012) further mentioned the scarcity of relevant textbooks and qualified teachers. Poor attitude of administrators, community, and parental ideology brings discord to the learning of fine arts. Despite this, creative arts reduce joblessness and the creation of handiwork labor for the youthful age (Adeyemo, 2013). The problem of its teaching can be alleviated through the use of apps.

Although the most known researches on apps are on designing, developing, and usage which was basically on language acquisition skills. Although Cummins-VanHerreweghe (2017) argued that a learning app is a tool for teaching in collaboration between the instructor and learners. Nevertheless, the current study attempts to fill the existing gap by looked into learning apps in the context of learning creativity in arts. The study also attempts to see the influence of the variable of gender when utilizing apps as m-learning and e-learning strategy in Nigeria Junior Secondary School. Furthermore, the study researched into the

students' performances when they embarked on educational apps for learning of selected creative arts topic in the context of Nigeria Junior Secondary school.

In this study, the following research questions were addressed: First, what is the difference in the performance of students taught with learning apps and those exposed to conventional teaching? Second, what is the difference in the performance of male and female students taught with learning apps? These null hypotheses were tested in the course of this study: Firstly, there is no significant difference in the performance of students taught with learning apps, and those taught using conventional teaching. Secondly, there is no significant difference in the performance of students when they were taught with learning apps.

Method

The design used by the researcher for the study was the quasi-experimental designed, which consists of pre and post-test. Purposive random sampling is applied to select two Junior Secondary Schools offering creative arts as a subject on the school curriculum. These schools which have been in existence for more than ten years were selected based on the following criteria: Equivalence in having standardized Creative art studio. Experienced instructor teaching creative arts. School ownership belongs to the government. The mixed school composition of both male and female students. Also, learners made available Mobile devices like a mobile phone with enough space.

Intact classes in the two schools were selected and randomly re-grouped to experimental (apps) and conventional groups through simple random sampling. Also, the students were grouped according to their sexes (male & female). The instrument used were; Creative Arts Learning Apps (CALA). Test, Making guide, Methodology, and instructional materials for the conventional group. Creative Arts Learning Apps (CALA) was developed by the researchers in relating to the Junior Secondary School Two curriculum on creative arts as approved by NADEREC. The design, creation, and development of the CALA were prepared by the researchers with the help of the Heads of the Department of creative and visual arts of the two schools, the Internet and available Creative arts and Visual Arts Textbooks, this was given to computer specialist to produce the app in mp3 format.

The learning instrument CALA was later given to a specialist in Fine and Applied Arts, Educational Technology, and Computer Science, for the face and content validity of the apps. The validated test instruments consisted of Creative Arts Test (CAT) of 50 multiple choice objective items taken from the validated Junior Secondary School III past question prepared by the Ministry of education Oyo State. The Test (CAT) was on the topics taught. And contained five options (A-E) as possible answers to the question. Students were asked to carefully pick the correct answers by shading the letters out of "A" to "E", which is the correct option for each item. CAT was first administered to both the experimental and control groups as a pre-test and again for the post-test after it had been rearranged.

The apps contained six weeks' topics. The sample consisted of 60 creative arts students of 31 males and 29 females which form the two research. The first week was used to familiarize the learners with the lesson and checking of the

suitability of the mobile devices in terms of space, speed, and suitability for the intended work. The treatment group was given the topic through Bluetooth into their various mobile phones on weekly bases.

On experimental procedure, the aims and objectives, including the modality of the experiment was written in the instructional booklet given to both concerning instructors and learners. The experimental groups were guided on how to use the instruments' apps and were instructed to be heedful and take notices of instruction given. The content to be taught weekly is recorded in the memory card with mp3 format. The mp3 and the memory card in which the content to be taught weekly are handled to each student at the beginning of each week. The instructor explains in detail the operating of the apps. The students access the learning content through the mp3 players provided at the venue of the lesson and the instructor evaluates each weekly topic along with the students while the mp3 is collected back at the end of the lesson.

The treatment lasted for six weeks after which the test was administered. The control group was team taught with along with the two researchers. On completion of teaching and learning on the prescribed week of study, the test was given to both groups. The students (both groups) were examined in the classroom with writing materials on paper-based test under the supervising the creative arts teachers and researcher's assistance. The marking guides were given to creative arts teachers to mark the students' work and record their marks immediately. The students' raw scores were collected and analyzed using t-test and Analysis of Covariance (ANCOVA) with Statistical Package for Social sciences (IBM SPSS Statics) version 21 at 0.05 alpha level.

Hypothesis testing:

Ho_1: There is no significant difference in the performance of students taught with learning apps and those taught using conventional teaching.

The hypothesis was tested with the ANCOVA statistic method, to compare the mean scores of students in the experimental group with the pre-test scores serving as covariates. The result is as reflected in Table 1.

Table 1. ANCOVA Table of Students Taught with Apps and Taught with Conventional Method

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	1351.723[a]	6	225.287	6.173	.001
Intercept	5998.089	1	5998.089	164.352	.000
VAR00001	322.606	1	322.606	8.840	.008
VAR00003	1240.811	5	248.162	6.800	.001
Error	656.917	18	36.495		
Total	134796.000	25			
Corrected Total	2008.640	24			

Significant at 0.05

Table 1 reveals that the calculated F value of 6.800 is significant because .001 significance level is less than 0.05 alpha levels. This indicates that there is a significant difference in the post-test mean score of the students. Therefore, the null hypothesis is not rejected.

Ho_2: There is no significant difference in the performance of male and female students taught with learning apps.
The hypothesis is tested with t-test statistic methods to compare male and female mean. This is shown in table 2.

Table 2. t-test Statics of Girls and Boys Taught with Apps

Variables	No	Mean	SD	Df	t-value	p-value
Boys	31	64	12.0			
				48	13.690	.000
Girls	29	32	5.3			

Table 2 shows that the calculated F value of 13.690 is significant because the significant value of 13.690 is lower than 0.05 alpha levels. The result implies that there is a significant difference between post-test mean scores of male and female students. That is, male students' score differs significantly from the female students score when both were taught with apps. Therefore, the null hypothesis is rejected.

Findings and Discussion

The two hypotheses in this study were rejected. There seems to be similarity in the findings of this research with those of some researchers. The finding is agreed with the findings of MacNeill (2015) who confirmed that there is positive in learners' respondents on apps, attitudes towards use, and inclusion in the research academic environment. The findings conform to the study of Alqahtani and Mohammad (2015) who findings stressed that students have high satisfaction while engaged in the use of apps for study. The findings are in line with the findings of Moonen, (2015), Suwantarathip and Wichadee, (2014) whose findings declared apps as given learners more benefit in a solitary way. The finding favored the findings of Brodahl and Hansen (2014) who findings declared apps are being positive in relating instruction and contribution given to their learners. The results of the findings are in line with Zou and Li (2015) who mentioned the significance of apps in terms of motivation and given relevancy to subjects on the school curriculum. Also, it was in agreement with the findings of the study of Kutluk and Gülmez (2014) who findings students strongly agree with easy-to-navigate content in m-learners.

More so, the result of this study agreed with the finding of Railean (2012) whose findings stressed that apps promote highly intention to use and promote convenient resources accessible for learning instruction. The finding supports the findings of Kitsantas and Dabbagh (2010) who expressed that using of apps by students bestow self-regulated learning. The findings are in line with the findings of Brodahl and Hansen (2014), Zheng, Lawrence, Warschauer, and Lin (2015) whose findings inveterate / confirmed that apps improve learning in collaborative ways with their peer. The findings are in agreement with the findings of Shea and Bidjerano (2013) whose findings confirmed that apps play a significant role in Malaysian education.

The findings contradict the findings of Chantoem and Radanovich (2015) who study reacted that using apps indirectly promotes positive and collaboration group assignments with the learners.

Conclusions

The following were the conclusions derived from the findings. Learning apps can enhance students' understanding of fine arts concepts and acquisition of skills and improve their performance. On gender, male and female students exposed to learning apps performed significantly different. The following recommendations arose from the findings of the study. First, the use of apps could be encouraged in teaching arts. Second, educational technologists could be encouraged to develop apps as an instructional aid for students in secondary school arts. Third, school principals or representatives of the government are advised to support teachers financially to enable them to produce learning apps.

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SINDESO: FOSTERING HIGH ORDER THINKING SKILLS THROUGH REAL PRACTICE EDUCATION

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Abstract
This study aims to know the Sindeso program hosted by Sekolah Alam Pacitan and to know the development of Higher Order Thinking Skills (HOTS) in Sindeso program. The researcher used a descriptive qualitative research design. The researcher collected the data from the students joined Sindeso, the teachers, the communities. There were 130 students divided into ten groups. The research was conducted in February 2018 during the Sindeso program in Wonoanti, Tulakan Pacitan, and Sekolah Alam Pacitan. The data were collected by implementing observations and interviews. After being collected, the data were analyzed using Miles and Huberman data analysis step, including data condensation, data display, and drawing conclusion/verification. The result showed that the Sindeso program is conducted into three stages: preparation, main, and evaluation. Higher-order thinking skills (HOTS) is developed through analyzing, evaluating, and creating process.

Keywords: Sindeso, HOTS, real practice education

Introduction

Education is an essential component of human lives. It deals with all aspects of human beings. Ideally, it brings "brightness" to people's lives. However, education is not as simple as going to school or being literate. It covers the whole dimension of human lives. Some perception appears that being highly educated people means being superior in their education marks. The students who are called "clever" refer to those who have a score above KKM. Therefore, the parents swarm to register their children into some courses. It aims to improve children's scores in their rapport book. In some cases, the children do dishonest actions to keep their score high, like cheating on exams.

However, emphasizing score is no longer essential in children's education. The value plays a vital element in it. Score leaves number, but value gives much more beneficial to children. Education is more complicated than a score. It deals with students' process in developing themselves to face the world. However, education is not only transferring knowledge from books or teachers. It does not cover the student's creativity and thinking. The students need to be more creative than listening to the material from the teachers. This sort of learning has a

negative effect on the psychological development of students, isolates students, neglect them, and make them feel insecure and exile, eventually leave students without sufficient skills (Nourdad et al., 2018).

Indonesia faces the challenge of education. The low level of reading interest has become a challenge for the education system in Indonesia. In March 2017, the World's Most Literate Nations (WMLRN) issued research on human literacy in 61 countries worldwide. Ironically, Indonesia is placed in the 60th position. The developed countries place the first ten in Scandinavian, Finland (Wibowo, 2016). In 2012, BPS claimed that 91% of young learners in Indonesia prefer to watch the television rather than reading a book. There were only 17% who love reading books. Besides, UNESCO issued that index literacy level in Indonesia is 0.0001. It means that there is only one person who reads the book among 1000 people (Hasan, 2017).

However, reading habits dealing with literacy can improve student's creativity and creative thinking. The literature reveals an agreement between theorists and researchers that there is a strong relationship between reading comprehension, critical thinking, and prior knowledge (Aloqaili, 2012). By reading, children can activate their imagination and creativity. The sense of curiosity plays an important part here. It is much more useful than watching television. Watching television limited the student's interest since the action and information are transferred clearly. By creating imagination, children can develop their thinking. Curiosity can alter children's thinking. Jirout and Khalr (2012) define that Children who are curious by trait have been shown to have better question-asking abilities(Alaimi et al., 2020). However, it is not merely the only predictor. Istiani (2015), Herayani (2016), Saironi (2017), and Solehuzain (2017) arguing there is a positive influence of curiosity on students' creative thinking skills although it has a slight percentage because of many factors influencing students' creative thinking skills (Mulyati & Junaedi, 2021).

Undeniable, memorization is also part of the education system. The students tend to memorize the material from books or the teachers' material. Teacher-centered learning still becomes a common phenomenon in Indonesia. Why? The conventional method, like remembering or answering the question on the student's worksheet, does not need the teacher's creativity in the assessment. The teacher can quickly assess the students' task based on the answer key. It assumes that the teacher is "the smartest" figure in the classroom. Besides, the sense of practicality makes the conventional teachers "comfortable" toward the traditional method. They do not need to bring students into the real practice of education.

Those conditions need to be omitted. The teachers have to elaborate their ability supported with facilities to create a modern style of teaching. Memorizing the material makes the students have "temporary understanding" toward the material because they do not "feel" the real implementation of learning. As an example, when the teacher brings a picture of the body in part of body material is not sufficient for teaching vocabulary for students. Without using the image, they can use their own body. The teaching-learning process can be enjoyable by completing the material with a song entitled "head shoulder knees and toes."

Therefore, developing students thinking ability become the key to the modern education system. The teachers need to arouse students' critical thinking. Critical thinking later called as HOTS, is popular nowadays. The education Minister, Muhadjir Effendy, said that the question for Computer Based National Examination is much more complicated than the previous years. It happens because there is 20 HOTS question from all list of item. Hopefully, the students have five thinking competencies: critical thinking, creativity, innovation, communication ability, teamwork, and self-confidence. Tragically, the students still are unfamiliar with HOTS. Ivie (1998) argues that in most classrooms, higher-order thinking receives little or no attention (Tan & Halili, 2015). Yuliati, Siti Rohma; Lestari (2018) state that the preliminary study conducted on 100 students in January 2018 found that a majority (80%) of students answered that they still did not know the whole concept of HOTS; most (95%) students do not have references related to HOTS; a majority (70%) of students answer lecture assignments given by the lecturers are only paper-based so students only take from internet sources without prior analysis, and a majority (78%) students want a learning source for the form of Instructional Evaluation courses that taught about HOTS.

Developing HOTS can be implemented in various subjects. The teachers can perform it both in the classroom teaching-learning process or outside the classroom. In Sekolah Alam Pacitan, HOTS can be seen from the implementation of real practice education called Sindeso. Sindeso is a yearly event when the students join two-day camp in the villages in Pacitan. They have to enter the villager's activities as well as complete the projects. The students are divided into groups with 10-12 members for each group. One teacher supervises each group. During the program, they can implement six thinking competencies developed by Blooms' Taxonomy later revised by Krathwohl in 2001. Therefore, this program is nearly urgent to be identified. Hopefully, the other schools will imitate the program.

Thinking skills are fundamental in the educational process because it generates other aspects of learning. Related to this phenomenon, Krulik and Rudnick (1999) classified thinking skills into four-level categories: recall thinking, basic thinking, critical thinking, and creative thinking (Siswono, 2010). Memorization is the basis for recall thinking. The students are guided to memorize the material in the teaching-learning process. Therefore, it leads them to answer the question based on the data from books. The basic thinking refers to the understanding of subtractions and addition. It gives the students competency to raise a question based on their knowledge. Critical thinking refers to the ability to check, connect, and evaluate all aspects of a situation and problem. The last is creative thinking. It refers to be more complex thinking process. It leads the students to synthesize and create new ideas holistically.

Developing children thinking is one strategy to increase the education system in Indonesia. The students are not only having Low Order Thinking (LOT) but also to reach Higher Order Thinking (HOT). In this case, Remembering, Understanding, and Applying are considered as verbs used for Low Order

Thinking Skills (LOTS), while the three others; Analyzing, Evaluating, and Creating, refer to High Order Thinking Skills (HOTS) (Juhansar et al., 2016).

HOT is originally derived from Blooms' Taxonomy in 1956. Later, it is revised by Anderson, L. W., & Krathwohl, D. R. in 2001. Years later, many theories are supporting the understanding of HOTS. According to Tomei (2011), HOT includes the transformation of information and ideas. The mentioned transformation occurs when pupils can combine facts and opinions, synthesize, generalize, and explain the hypothesis, and they can also arrive at some conclusion or some interpretation.

According to Heong et al. (2011), higher-order thinking is using thinking widely to find a new challenge. A learner's thoughts can affect the ability of learning, speed, and effectiveness of learning. By having high thinking skills, students are not only accepting the knowledge from the teachers but also elaborating on aspects of life. They will have a high curiosity. High curiosity leads to a student's creativity.

Teaching by implementing HOTS is much more beneficial for students. Michael and Jones (2015) in Nourdad et al. (2018) said that there was a significant difference between the performance of the students taught by higher-order methods and lower order methods of instruction. Besides, it revealed that teaching higher-order methods were more beneficial and constructive for students. Similarly, Grigatte (2005) researched the effect of using HOT strategies on developing a child's thinking skills. There were fifty-seven children at the age of six who took part in the experiment. The researcher's findings showed that pupils who received treatment were more creative and showed high degrees of cognitivism (Nourdad et al., 2018).

Viewing back to Bloom's Taxonomy, HOTS is classified into six categories: knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, 1956). While the newest theory, Anderson and Krathwohl (2001), in (Wilson, 2016), said that the cognitive process dimension (the verb) consists of remembering, understanding, applying, analyzing, evaluating, and creating.

1. Remember, retrieve relevant knowledge from long-term memory.
2. Understand, construct meaning from instructional messages, including oral, written, and graphic communication.
3. Apply, carry out, or use a procedure in a given situation.
4. Analyze, break material into its constituent parts and determine how the parts relate to one another and an overall structure or purpose.
5. Evaluate, make judgments based on criteria and standards.
6. Create, put elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure.

In the original taxonomy by Bloom, there is a cumulative hierarchy because the classes of objectives were arranged in order of increasing complexity and cumulative because each class of behaviors was presumed to include all the behaviors of the less complex classes (Krietzer et al., 1994) in (Amer, 2006). At the same time, Krathwohl (2002:213) added that mastery of each simple category was a prerequisite to mastery of the next more complex one. Therefore, there is a revised taxonomy. The revised taxonomy by Krathwohl separates the noun and

verb components of the original knowledge category into two separate dimensions: the knowledge dimension (noun aspect) and the cognitive process dimension (verb aspect) (Anderson, et al. 2001:308).

Method

This is descriptive qualitative research. The researcher elaborated on the development of HOTS in the Sindeso program hosted by Sekolah Alam Pacitan. The researcher collected the data from the students joined Sindeso (130 students divided into ten groups), the teachers, the communities. The research was conducted in February 2018. The research was conducted in Wonoanti, Tulakan Pacitan, and Sekolah Alam Pacitan. The data were collected by implementing observations and interviews. The researcher acts as the instrument, meaning that the researcher participates in every single step of research. After being collected, the data were analyzed using Miles and Huberman data analysis step, including data condensation, data display, and drawing conclusion/verification.

Findings and Discussion

The Sindeso Program

The Sindeso or *Sinau ing Ndeso* program is an annual program carried out in the middle of the second semester in each school year. This program aims to introduce rural life to students. Not only by observing the villagers, but also participating in various kinds of activities carried out by the surrounding community. The Sindeso program is divided into three main stages: preparation, implementation, and evaluation.

Preparations have been made before the program takes place. The teachers survey the decided site. The program is spread in several villages in the Pacitan district. For each year, activities are focused on one village but consist of several different houses. Sindeso 2018 was conducted in Wonoanti, Tulakan, Pacitan. Then, the teachers divide the students into several groups. After dividing groups, the teachers give a briefing for the participant. It was carried out to understand the characteristics of their place before going directly to the field. A teacher accompanies each group. In the preparation stage, the participants were assisted by teachers to prepare various needs during the Sindeso program. Therefore, on the program day, the students are ready to join all the activities.

In the main phase, participants are directly involved in the villagers' daily program and the school program. The students, guided by the teacher, ask permission from the homeowner. Then, they go directly to follow daily homeowner activities. The evaluation phase includes the Sindeso exhibition after the program ends. A week after the program, the students, guided by the teacher, show their projects and activities.

HOTS in Sindeso Program

Analyzing

Analyzing means breaking materials or concepts into parts, determining how the aspects relate to one another or how they interrelate, or how the parts relate to an overall structure or purpose. Mental actions included in this function are

differentiating, organizing, and attributing, as well as *being able to distinguish between* the components or parts. When one is analyzing, he/she can illustrate this mental function by creating spreadsheets, surveys, charts, or diagrams, or graphic representations **(**Anderson and Krathwohl's Taxonomy, 2001) in (Wilson, 2016). In this phase, they can compare or contrast two processes in making something. They analyze the situation and get the answer by interviewing with the villagers. They need to be active in making a report (final assessment of the Sindeso program).

As an example of the analyzing process, the students can compare the process of making Tempe. They differentiate two methods in making Tempe: first is by using yeast and the second is by using natural yeast from Waru leaves. Waru leaf or Hibiscus leaves serve any function other than to present a firm and inert attachment surface and to maintain adequate relative humidity during the incubation of the leaf sandwiches (Nout et al., 1992). Waru leaf is chosen due to the low-cost and biodegradability factor. This process raises students' analysis between Waru leaf and yeast for its effectiveness.

All of these processes are an example of the analyzing process in HOTS. By learning in real practice beyond the classroom wall, students do not only learn about the theories but also make trial and error based on the surrounding condition. They are forced to think creatively and solve problems quickly. Like the example mentioned above, the villagers usually make Tempe by using plastic. But, the students propose it using hibiscus leaf for natural fermentation and reduce the problem of plastic waste.

The other group may analyze the process of a coffee plantation. They differentiate the process of coffee into coffee powder. The villagers use traditional methods to process coffee. They compare and find the effectiveness of processing coffee by using modern hulling and by a hammer. The process from coffee seed until deserved in a cup is a long journey. The villagers usually do natural processing or dry processing. It is the oldest way of coffee production. The coffee seeds are dried on a plastic or bamboo carpet under the sun for a week or ten days. Then, they remove the fruit casing by hammering. The process of hammering can be done before the heating process. This process needs a long time mechanism. Besides, it is also unpractical.

Evaluating

Anderson and Krathwohl (2001) (Wilson, 2016) said that evaluating is making judgments based on criteria and standards through checking and critiquing. Critiques, recommendations, and reports are some of the products that can be created to demonstrate the processes of evaluation. In the newer taxonomy, *evaluating* comes before starting as it is often a necessary part of the precursory behavior before one creates something.

This part leads the students to raise their critical thinking as well as their creative thinking. They do not only critically critic the situation or thing, but also creatively find the solution. The solution and methods are based on their knowledge from school. However, they lack experience rather than the villagers. Sekolah Alam Pacitan makes the education system by compiling and combining

the theories and the real application. However, their activities in the villages is not a surprising activity even though the projects and activities are new for them. Each year, the school find different school around Pacitan district to rich the students' knowledge and experience.

Evaluating is an essential step before creating it. As an example, the students assess the effectiveness of Tempe packaging among using banana leaves, Jati leaves, plastic, and banana stem. Each of them has specific strengths and weaknesses. Packaging Tempe using banana leaves or Jati leaves needs a more protracted process because they make Tempe smaller. They consider the width of the leaves. Using plastic is more efficient than using traditional plates, but it is not recommended due to plastic waste. However, using a banana stem is used to make a bigger size and more expensive Tempe. They calculate the most recommended shape due to effectiveness and efficiency.

Through this process, they prepare some considerations to judge and decide. They learn to solve problems through scientific reviews. Children begin to show problem-solving behaviors from early young ages. Thus, children who identify problem situations can investigate the causes and consequences, create thinking processes, and choose appropriate solutions. For this reason, problem-solving skills are one of the most basic and critical skills that children can use throughout their life (Bahar & Aksüt, 2020).

For this reason, problem-solving is a soft skill that must be mastered by the students. For example, when they choose to wrap Tempe by using Banana Stem, they have reasons that it is applicable and low cost since all of the villagers have Banana Stem. They will not choose a thing based on likes or dislikes. They have analyzed before evaluating. By making a decision, they also communicate with their teams. They build their ability in teamwork and collaborative learning. Collaborative learning is essential. It provides a lot of benefits to preschoolers as well as to the learning process. The activities that are subject to collaborative learning are several (language, mathematics, art) and help children develop social, cognitive, and emotional skills that will be useful in their lives (Zisopoulou, 2019). Learning together also builds students' empathy. Sparks (2017) said that collaboration in the classroom could help students think more deeply and creatively about a subject and develop more empathy for others' perspectives.

All of these values are important for children in the future. Teamwork leads children to build a relationship and compromise with other people. They can work cooperatively. They can argue their ideas in group discussions, even raise the solution. They can learn "take and give" information and build a sense of responsibility. They also brave themselves to be involved in group decision making. All of these values can be rooted in direct learning methods like in Sindeso. As their condition is more challenging than inside their classroom. So, they must have surviving skills, as for themselves and their group.

Creating

Creating is the last step in developing higher-order thinking skills. According to Anderson and Kratwohl (2001) in (Wilson, 2016), creating is putting elements together to form a coherent or functional whole; reorganizing elements into a new

pattern or structure through generating, planning, or producing. Creating requires users to put parts together in a new way or synthesize components into something new and different making a new form or product. This process is the most difficult mental function in the new taxonomy.

Creating is the peak of HOTS. It leads to the overall development of thinking. The students create new construction based on their experience from remembering step, then continued understanding, applying, analyzing, and evaluating. The teacher leads them to make a new creation that is different from the existing design. As an example, the students make Tempe in a more modern shape by using a jelly mold. They have different shapes of Tempe based on the mold, such as animal shape, flower, or other shapes. They assume that the new shape of Tempe will make children like to eat Tempe because of the unique shape of Tempe. Besides of its uniqueness, molding Tempe in the jelly mold is more effective than wrapping it by using leaves or plastic bag. It causes wastes. However, jelly mold or chocolate mold is reusable.

By creating innovation, the students will develop their high order thinking skill. Innovation is vital in this industrial revolution, 4.0. era. Innovation can affect people's lives. Like the example, by innovation, the conventional Tempe has been created into various shapes Tempe. It increases the selling because the shape attracts the customers. Another design is found in different processing of traditional herbal. There are multiple traditional herbals in the village that give benefits, like ginger, turmeric, galangal, etc. The villagers usually process it into conventional herbs. Then, they sell it in the traditional market. By adopting innovation, those herbs can be processed into long-term Javanese traditional herbs. They make it in powder form and package it in modern packaging design. Collaboration among schools and communities can create innovation.

Discussion

Sindeso program can be the pilot project for implementing High Order Thinking Skills in education, especially for young learners. Learning is not merely admitted as the formal program inside the classroom with planned steps and material. Education must be recognized as a part of life. It is beneficial for students to face a challenging future. Therefore, learning beyond the classroom wall can be supplementary material and resources for students' knowledge, especially children. Increasing attention is being given to the role of the outdoors as an important aspect of childhood internationally (Lester and Russell, 2010) (Bentsen, 2012). Children are connected related closely to the environment since they learn everything from the surroundings for every single step of their development.

Strong-Wilson and Ellis (2007) explain that childhood is often the first place where we begin to see and use the environment imaginatively [and where] we can begin to notice how our surroundings can take on a life of their own that contributes to children's learning (Robson & Mastrangelo, 2018). Makin (2003) defines the term environment in early education settings as "an aggregate of conditions and influences on learning, including both the physical environment (layout, range of resources, access, and use) and the psycho-social environment

(interactions between staff and children, among peers, and between the setting and its wider context of homes and communities) (Robson & Mastrangelo, 2018).

In Sindeso, children can get much knowledge and value for learning, starting from the preparation until the evaluation. As they go directly to the field, they learn not only everything in the surroundings, but also how to survive in a new place. As an example, when they practice making Tempe with the homeowners, they do not learn about the material and the process of how to make Tempe. Still, they also learn how to sell Tempe in the local market and communicate with the customers. It is the most meaningful learning. Making Tempe might be learned from books or internet sources, but their attitudes in communication with the customers give them courage. Besides, they also know to manage communication with customers.

During the process, they also develop their creative thinking. They cannot predict the programs in Sindeso, or it is far from their daily lives. They live in the city without doing the activities of people in the countryside like planting coffee, farming, making crafts, etc. therefore, all those events raise their curiosity. Those curiosity leads them to be more talkative in asking for much information from the homeowners. They are also asked to write everything they want to know about all the activities. By doing this, their higher-order thinking skills are developed well. They do not only answering the question like they do in the classroom. But, society makes improving their thinking. All of the processes in Sindeso raise students' meaningful learning. Therefore, from the participants, most of them said that Sindeso is an exciting program. The surroundings support the combination of their knowledge from the classroom make them learning thoroughly.

Conclusion

This research aims to know the implementation of HOTS in the Sindeso program. Sindeso is a yearly program of SD Alam Pacitan by combining school learning and real practice education by sending students into some villages and learn villagers' activities. They camp there and joining all of the activities done by the homeowners. Actual practice education, as implemented in the Sindeso program, can develop higher-order thinking skills (HOTS) for students. The students can develop three thinking through daily activities with villagers, analyzing, evaluating, and creating. There are many values found in this program. The students can be an independent person to handle themselves. They must prepare what they need in the program. They stay far from their parents and live together with their friends, teachers, and villagers. Despite self-independence, they learn to work collaboratively. They do teamwork. They share ideas, give opinions, analyze and solve problems, and create inventions. They build their empathy by working together. They will learn how to defend their ego wisely and accept other people's opinions. They know traditional tools and types of equipment for living. They learn how to cook conventionally by using a traditional stove with firewood. All these processes lead them to have meaningful learning. They do not know by opening a book or searching on the internet, but they learn directly in the field.

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THE TENDENCY OF PERSONALITY DISORDER SCREENING IN EARLY ADULTHOOD

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Abstract
A personality disorder is often under-diagnosed in the normal population. It is important to detect personality disorder through screening at an early stage. This study was carried out to assess the tendency of personality disorder at an early stage. A descriptive quantitative study was adopted. The sampling technique used in this research was consecutive sampling. Data were analyzed using descriptive and frequencies to describe the demographic characteristics and the tendency of personality disorder based on cluster. There was 546 late adolescence in the normal population. Of these, 49 met the criteria for the inclusion criteria. The result showed that the majority of the participants were girls (86%), with age 20 years (60%). This study also showed that the high-risk personality disorder was dominantly by narcissistic (57%) in Cluster B and the least dominant of high-risk personality was avoidant (4%) in Cluster C. The results of this study provide important information for the normal population to prevent actual personality disorder among people at an early stage. These findings also recommended further research to determine the extent of personality disorder type and its influence on the normal population.

Keywords: Early stage; Personality disorder; Screening; Descriptive quantitative.

Introduction

The tendency of personality disorder is often undetectable because it needs a long-term marked deviation from cultural expectations. This causes a major concern for health care providers. Some people with personality disorders will experience difficulties in their relationships, at work or school, but it appears that there is no distress for themselves but not for others. It needed a high self-awareness among early adulthood to realize the tendency of personality disorder through screening. So that the personality disorder instruments are important to detect at an early stage (Stieglitz, 2007). It would be necessary to prevent personality disorder among healthy individuals through early detection.

A personality disorder is a way of thinking, feeling, and behaving that deviates from the expectations of the culture, causes distress or problems functioning, and lasts over time (DSM-5, 2013). Utami and Pribadi (2013) found that 117 prisoner 13-20 years old has clinical personality such as negativistic, depressive, and histrionic. The participants in Utami and Pribadi research have face problems with family discord, insensitivity in their social, and insecurity with their peers. Based on DSM-5 (2013), the 10 specific personality disorders are grouped into three categories called "clusters" that consisted of cluster A, cluster B, and cluster C. Cluster A itself included paranoid personality disorder, schizoid personality disorder, and schizotypal personality disorder that characterized by odd or eccentric behavior. Meanwhile, Cluster B is more dramatic, emotional, or erratic behavior. Antisocial personality disorder, borderline personality disorder, histrionic personality disorder are included in this Cluster B. Cluster C associated with anxious or fearful behavior. Avoidant personality disorder, dependent personality disorder, and obsessive-compulsive personality disorder.

Huang et al (2009) found that the prevalence estimates for personality disorder clusters average 3.6% for Cluster A, 1.5% for Cluster B and 2.7% for Cluster C. Meanwhile Mergui (2015) through multiple imputation method found that prevalence of personality disorder estimates were 4.6% Clustered A, 1.6% Cluster B, 2.4% Cluster C, and 6.1% any personality disorder. Many kinds of research in Indonesia investigated personality type in early adulthood especially in the normal population using Myers-Briggs Type Indicator (MBTI) (Wandrial, 2014; Setiawati, 2016) and using Type-D personality questionnaire, such as Tangka (2014).

In Indonesia, research on the tendency of personality disorder among the normal population is limited. Amalia's research on 80 employees in the normal population found that the higher the conscientiousness score, the higher the tendency for obsessive-compulsive personality disorder. Hardika et al (2019) found that there was an association with self-esteem and loneliness on narcissistic personality disorder tendencies. Meanwhile, Pakha (2014) found that there was an association between antisocial personality disorder tendency with game online addiction in Surakarta. There has been limited research in Indonesia investigated personality disorder screening based on a cluster of personality disorders among early adulthood. This study aimed to assess personality disorder risk among early adulthood in the normal population.

Method

A descriptive research design was adopted. In this study, the researchers describe the personality disorder screening in early adulthood. This study was conducted on 8 January 2018 and 5 March 2018. A population of all students in a school with a number of 446, the sample used 49 participants. This is considered a large sample from a minimal standard of 10% of the population. We used a consecutive sampling technique. The samples were taken from all subjects that fulfilled the inclusion criteria until its number met. Participants were recruited in the educational setting. The following inclusion criterion: (1) eligible to

participate in the study, (2) had not received psychological treatment. Students with substance abuse were excluded.

The researchers received ethical approval obtained from Poltekkes Kemenkes Semarang. The participation in the study was voluntary, Each participant was informed of the purpose of the study and the estimated time required to complete the personality disorder questionnaires, and their right to withdraw without penalty. The participants gave fully informed consent. The data for this study using The Indonesian version of personality disorder questionnaires. Paranoid quiz (Research Team, 2020) is 8- items with range score 20-35 (severe category), 17-19 (possibly category), and 0-16 (unlikely). Schizoid quiz (Schizoid mental health) is 36-items with range score 33-36 (severe category), 27-30 (possibly category), and 21-24 (unlikely). Schizotypal quiz (Psymed, 2020) is 12-items with range score 33-48 (severe category), 20-32 (likely), 15-19 (possibly category), and 0-14 (unlikely). Anti-social self-test (Ietherapy, 2020) is 40-items with range score 31-40 (severe category), 17-30 (likely), 7-16 (possibly category), and 0-6 (unlikely). Borderline test (Research Team, 2020) is 12- items with range score $\geq$33 (severe category), 20-32 (likely category), 15-19 (possibly category) and 0-14 (unlikely). Brief Histrionic Personality Scale (BHPS) by Ferguson & Negy (2014) is 11- items with range score 35-44(severe category), 30-34(possibly category), and 11-29 (unlikely). Narcissistic quiz (Research Team, 2020) is 40-items with range score >20(severe category), 16-19 (possibly category), and 12-15 (unlikely). Avoidant quiz (Illness, 2020) is 14- items with range score 12-14 (severe category), 8-11 (likely category), 2-7 (possibly category), and 1-2 (unlikely). Dependent personality questionnaire (Perry, 2005) is 8- items with range score 19-24 (severe category), 13-18 (likely category), 7-12 (possibly category), and 0-6 (unlikely). Obsessive-compulsive quiz (Research Team, 2020) is 20- items with range score >12 (severe category), 9-11 (possibly category), and 0-7 (unlikely).

It is used for identifying different classes of personality disorder severity already at the screening stage of the diagnostic process (Lange et al, 2012). The measures of the Indonesian version of personality disorder screening demonstrated satisfactory internal reliability. Cronbach's alpha for this instrument was .845. Descriptive and frequencies were used to describe the demographic characteristics and risk of personality disorder based on clusters.

Findings and Discussion

Most participants in this study were 20 years (60%) and women (86%). Socio-demographic characteristics are summarized in table 1.

Tabel 1. Socio-demographic variables

Variable	N(%)	Mean	SD
Age			
19 years	6(12)	3.35	.19
20 years	29(60)	3.47	.09
21 years	14(28)	3.60	.17
Gender			

Man	7(14)	3.35	.17
Woman	42(86)	3.44	.16

According to the socio-demographic result, the participant's age between 19-21 old years. This is supported by research by Mergui (2015). His research findings mentioned that in cluster B, patients were more likely to be younger ($P < 0.001$), unmarried ($P = 0.005$), and without organic medical illness ($P < 0.001$). Based on gender, most of the participants were a woman (86%). Meanwhile, Huang et al (2009) mentioned that personality disorders are significantly elevated among males, the previously married (Cluster C), unemployed (Cluster C), the young (Clusters A and B).

The results of the current study indicate that the most dominant of high-risk personality disorder was narcissistic (57%) in Cluster B and the least dominant of high-risk personality was avoidant (4%) in Cluster C. DSM-5 (2013) mentioned that a person with a histrionic personality disorder may be uncomfortable when he/she is not the center of attention, consistently use physical appearance to draw attention or show rapidly shifting or exaggerated emotions.

Descriptive statistics for personality disorder risk using the PDS-10 questionnaire are presented in Table 2.

Table 2. Distribution of personality disorder risk in early adulthood (N=49)

Personality disorder screening	**Mean**	**SD**	**N(%)**			
Cluster A			Severe	Likely	Possibly	Unlikely
Paranoid	4.89	4.44	0(0)	0(0)	1(2)	48(98)
Schizoid	8.00	2.91	0(0)	0(0)	0(0)	49(100)
Schizotypal	11.31	7.19	0(0)	6(12)	3(6)	40(81)
Cluster B						
Antisocial	5.14	3.45	0(0)	0(0)	13(26)	36(74)
Borderline	11.27	7.15	0(0)	7(14)	8(17)	34(69)
Histrionic	17.53	4.76	0(0)	0(0)	0(0)	49(100)
Narcissistic	19.74	3.58	0(0)	28(57)	17(35)	4(8)
Cluster C						
Avoidant	3.61	1.82	0(0)	2(4)	16(33)	31(63)
Dependent	9.44	3.23	0(0)	8(17)	8(17)	33(66)
Obsessive-compulsive	7.97	2.87	0(0)	6(12)	19(39)	21(49)

The results also indicate the least dominant of high-risk personality disorder was avoidant (4%) Avoidant personality tend to social withdrawal and low self-esteem. Mendatu (2007) classified this sign with a type D personality which consisted of social inhibition and negative affectivity (Donollet, 2005). Since this study was conducted in an academic setting, This finding study accordance with Tangka, Lumi, and Ponge (2014) through their research on 120 nursing students found that individuals with a type-D personality tend to have maladaptive coping.

DSM-5 (2013) mentioned that A person with an avoidant personality disorder may be unwilling to get involved with people unless he/she is certain of being liked, be preoccupied with being criticized or rejected, or may view himself/herself as being inferior or socially inept.

This results by Hsiung (2019) found that 58% of late adolescents were identified to be at risk of mental health during the screening. Chernomas & Shapiro (2013) mentioned that with all the challenges during their study and difficulty to achieve their competency skills, put the nursing students in a high-risk group related to stress, anxiety, and depression compared with non-nursing students. These study findings are useful to detect personality disorder tendencies and raise self-awareness so that the participants could finish their development tasks in academic and prevent actual personality disorder.

The study has several limitations. First, the instrument was self-rated that might be biased. Second, The sample size was small (less than 500 respondents) by the standards of epidemiological studies.

Conclusion

In the view of the normal population, the tendency of personality disorder can cause the further impact of the development of personality disorder. Mental health should be considered as the main factor for early adulthood to finish their task in the academy and for their task development. The results of this study provide important information in the normal population to prevent actual personality disorder in early adulthood. We recommended considering further research to determine the extent of personality disorder screening and its influence on the normal population in a long term.

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LECTURERS' ENGAGEMENT OF OPEN SOURCE SOFTWARE (OSS) FOR LEARNING IN UNIVERSITY OF ILORIN, ILORIN, NIGERIA

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Abstract
The growth and development of education is associated primarily with the use of ICT, whereas, the evolution of the Information and Communication Technology (ICT) gives birth to Open Source Software (OSS), a product of instructional delivery. The research was of descriptive research of the survey type and the population for the study consisted of 300 with 125 male and 175 female lecturers in university of Ilorin, Ilorin, Nigeria. The research instrument was researchers' designed questionnaire titled lecturers perceived ease of use of Open Source Software. The validation of the instrument was done by researchers' colleagues and two lecturers in faculty of education, University of Ibadan. While, the reliability, was pilot-tested on 20 lecturers at the Obafemi Awolowo University, Ile – Ife, Nigeria with Cronbach's Alpha and the values were 0.73 and 0.67 respectively, the instruments were randomly given to the lecturers, and the data obtained were analysed using the descriptive and inferential statistics. Findings revealed that lecturers were positive on the use of the OSS and it was recommended that there should be continued use open source for learning.

Keywords: content and instructional delivery, information and communication technologies (ICTs), online learning, open-source software, teaching-learning

Introduction
Education gives light to world, without education world would have been in complete darkness. Education is the starting point of scientific and technology. Also, the foundation of principle that brought lasting survival and uphold the globe (Akindutire & Akundayo 2012). Bal-Taştan, Davoudi, Masalimova, Bersanov, Kurbanov, Boiarchu and Pavlushin (2018) declared that advancement in technology, industrial, scientific in the world, today and the future are product of education. Therefore, ICT is central for knowledge economy and intellectual development, especially in emerging societies.

"The implementation of information and communication technologies (ICTs) has become widespread for applying for courses, registering courses, taking

classes, to composing assignments and communicating with instructors and others with the same character. One of the cogent reason behind the implementation is the expectation of enhancing the quality of communication and teaching and improving student learning and persistence. One of the most noticeable implementations in higher education is online learning (OL). Unlike traditional face-to-face learning, which requires students to come to a physical classroom with supervision at a particular time, OL utilises ICTs, enabling students to pick their favourite time and location, and even use their personal computers to access the course content" (Sivo, Ku, & Acharya, 2018).

"Technology is one of the essential components in today's educational system, and it should be an instructional facilitator rather than an obstacle to the attainment of the learning outcome. Technological becomes a problem to the user when the costs outweigh the benefits for the use of that tool. It is also a problem when it cannot be customised to meet learning requirements in learning concentrated on a single viewpoint directed by the use of specific tools. Institutions and individuals use different types of Information and Communication Technology (ICT) tools to communicate, create, disseminate, store, and manage information" (Yekini, 2014).

"ICT has also become integral to the teaching-learning interaction, through such approaches as replacing chalkboards with interactive digital whiteboards, using students' smartphones or other devices for learning during class time. The "flipped classroom" model is an example where students watch lectures at home on the computer and use classroom time for more interactive exercises. ICT is a robust collection of elements which includes computer hardware, software, telecommunication networks, workstations, robotics and smart chips, and they are as well known to be the foundation of information systems" (Yekini, 2014).

"Schools make use of a diverse set of ICT materials and tool to communicate, create, disseminate, store, and manage information. In some contexts, ICT becomes integral to the teaching-learning interaction, through such approaches as replacing chalkboards with interactive digital whiteboards. Students use smartphones or other devices for learning during class time, and the flipped classroom model where students watch lectures at home on the computer and use classroom time for more interactive exercises" (UNESCO, 2019).

The source code of open-source software is available in a wide geographical area. Open-source software is a collaborative effort by a group, or team of developer, availability of source code to the user can easily make the software modifiable and useable according to requirement. Open Source Software (OSS) is downloadable and useable for free. The openness of this software makes the availability of the source code for modification and making a difference. The main advantage which OSS has over others is the advantage of sharing, ease of modification and less cost makes OSS an excellent development tool for developing countries (Mittal & Singh, 2013).

"Incorporating technology in classrooms enables educators to craft compelling collaborative learning experiences that support problem-solving and flexible thinking. With the strategic integration of both content-specific and

content-neutral technology, students and teachers can construct learning together in authentic ways that elevate learning" (Picha, 2018).

Open-source software is software whose source code is distributed publically in a wide geographical area and available to users at no cost. Open-source software is a collaborative effort by a group or team of developer. Because of the availability of source code, one can easily modify and use it according to requirements. Open-source software has many advantages over proprietary software, but still, most of the computer user uses proprietary or pirated software. Due to less awareness about the benefits and uses of open source software, it is not used widely in many places (Pardeep & Jatinderpal, 2013).

OSS is often similar to a software called 'proprietary software' because users have neither access to the source code nor the right to copy, modify or distribute their code. "Open source licenses affect the way people can use, study, modify and distribute software. Generally, open-source licenses grant computer users permission to use open source software for any purpose they wish. Some open-source licenses can be called "copyleft" licenses, which stipulate that anyone who releases a modified open source program must also release the source code for that program alongside it. Moreover, some open source licenses stipulate that anyone who alters and shares a program with others must also share that program's source code without charging a licensing fee for it" (Opensource.com, n.d).

Despite these benefits, the acceptance and adoption of OSS in Nigeria pose many questions which need to answer. Higher education institutions across Nigeria hosted an OSS conference in 2010 made substantial investments with the hope of harnessing the benefits accruing from their use in educational institutions (Umar, Datti, & Abubakar, 2016). Several factors which are peculiar to developing countries hinder users from adopting OSS as operational software. Presently, the computer is one of the basic need of everyone. From an individual to business organisations, industries, colleges and universities, everyone uses the computer for their primary purpose. Software (systems and application) is an essential component of a computer system. Systems software coordinates the activities and functions of the hardware and various other programmes, while the application software is programmes that help users solve particular computing problems. Systems software is categorised as "the operating system used to harness communication between hardware, system programs, and other applications; device driver that ensures device communication with the OS and other programmes; and firmware which enables device control and identification. There is also the translator which translates high-level languages to low-level machine codes, and the utility which ensures optimum functionality of devices and applications" (Amuno, 2019).

Application software includes Application Suite, which refers to multiple and related bundled applications for a specific use such as Microsoft Office (Word, Excel, PowerPoint, OneNote, etc.). Content Access Software used to access and view content without manipulating it like browsers and media players, database software used for an electronic filing system for the information used by various computer programmes. Educational software

designed for teaching or learning, to run tests, and track programmes (Struyk, 2017).

In this era, most of the people make use of proprietary and pirated software. This software is not the best options for the convenience of the users. Proprietary software is expensive, which makes it not affordable by many people and pirated software is illegal for usage (Mittal & Singh, 2013). The alternative to this software is open-source software.

"By design, open-source software licenses promote collaboration and sharing because they permit other people to make modifications to source code and incorporate those changes into their projects. They encourage computer programmers to access, view, and modify open-source software whenever they like, as long as they let others do the same when they share their work" (Opensource.com, n.d).

Buffett (2014) defines that "open source software as software developed in a generic collaborative manner, for any application, and available under a license allowing free source code usability, accessibility, reuse, modification, and redistribution for users. He also defined it as software created by a community of people dedicated to collaborating to produce real innovation and allow the evolution of new and better software. It is as also known as a software development and distribution model where the software license guarantees certain freedom. This freedom includes the right to access and modify the source code and to reuse and redistribute the software without constraint or excessive cost" (Buffett, 2014).

Bianco (2011), observes that "open source software is no longer the product of lone coders and that of industrial-strength. Developed of open-source software is by organised communities and sometimes even by major software companies applying the same rigorous processes and high-quality standards as commercial products. Generally speaking, the strength of open source lies in its no license costs, interoperability, easier integration and customisation, compliance with open technology and data standards and freedom from vendor lock-in. Studies have shown that the benefits of open source generally materialise in the medium to long term. Furthermore, because open-source software is free, there is greater flexibility in selecting the level of services or support that a customer wants to pay for, if at all" (Danurdoro & Wulandari, 2016).

Santos, Kuk, Kon and Pearson (2013) stressed that OSS provides the source code and users free access to product made, modify and update the versions of the new product code. Abdalla (2014) argued that increment in the use of information technology and the spread of Internet brings about a great opportunity for instructional delivery with a significantly low cost. In other words, Anjaneyulu, Biradar, Gopinath and Naik (2017) mentioned that the history has it that OSS started with the arrangement of Richard Stallman in 1985 to support the Free Software Foundation movement that promotes the general freedom to study, create, distribute, and modify computer technology software via the General Public Licence. Since then, Open source software (OSS) has turn into an international occurrence that permits researchers around the globe to share information and ability on every day basics exclusive of barriers. FOSS is an

idea and exercise of creation a program source code widely available to people to use (Abdalla, Shanmugam & Dehghantanha, 2013; Vijay & Tyagi, 2014; Stella & Ravichandran, 2017).

In another development, information communication technology can provide adequate means of given education sector by modified both content and instructional delivery to meet learners' needs However, the costs of these technologies and the acquiring of the software, is a barrier facing the technology in implementing Free and Open Source Software (FOSS) (Thankachan & Moore, 2017). According to the study by Mittal and Singh (2013), underutilised of OSS due to it's a lesser amount of awareness to common man is a major problem of OSS. In the same vein, Sharma and Adkins (2006) stated that lack of support in term of the staff is also challenge to adoption of FOSS in India. Similarly, Howard and Mozejko (2015) stated that the struggle for change during implementation is also inclusive in the challenges.

Many studies have confirmed the efficacy of FOSS in the following disciplines, for example, Library Services (Giri & Sengar, 2011), Engineering (Teel, Schweitzer & Fulto, 2012; Kumar & Rabindra, 2012). Electronics Engineering (Nehra & Tyagi 2014), Water Resource Management (Borsi, Foglia, Cannata, Vázquez-Suñé, Mehl, Filippis, Criollo, Ghetta, Cardoso, Velasco, Neumann, Toegl, Serrano, Riera & Rossetto, 2017). Businesses; Institutions (Robbins, Korkmaz, Calderón, Kelling, Shipp & Keller, 2018).

More so, many studies have stated the ease of use of FOSS in learning. For example, Teel, Schweitzer and Fulto (2012) examined the tools, and the integration to the course, student's reactions, our experience through open source software among the undergraduate students, the study concluded with the benefits realised in comparing with those in the corporate world also, in addition to the gain from educational environment. Also, the standard development tools as well as the production environments were in favour of the teams. And the instructor always available and provide assistance to students. Likewise, Pankaja and Raj (2013) examined the pros and cons in relating to the use of OSS and proprietary software. The author concluded that adopting open source in education brings solutions to educational problems in terms of cost saving and that Moodle can be useful for large audience of learners. in the same vein, Corbly (2014) mentioned that the types of software and recommended freeware and open source software as the most unique. The author stated that the copyrighted software is given for freely use to others. Although the author has the sole possession to copyright, in this regards the nobody cannot modify the software. Similarly, Nehra and Tyagi (2014) presented an exposition of FOSS helpful to electronics engineering training. The author further examined in relation to outlook of FOSS and their web details. The study concluded with overall creating awareness for instructors and students on learning via FOSS. Also, Singh, (2016) worked on the situation of training relating to utilisation of inventions of technology, the author further developed, Moodle as the suitable open source in learning management software. He mentioned that Moodle is imperative in training, along the electronic learning concept. He concluded with role of useful tools for training and exercise. Likewise, Kim and Park (2018) expressed that the numerous merit of OSS has

transformed organizations' positively and intention to use the services, systems and information quality. In fact, it is clear that using FOSS for instructional delivery deliberatively influence the learners positively.

The benefit of Free and Open Source Software (FOSS) has been delve into by researches. For example, the study by Umar, Datti and Abubakar (2016) stated that individual adoption of OSS, serves as ways of alleviate the cost in regards to licensing and promotes individual technological development. Also, Nehra and Tyagi (2014) declared the benefit of FOSS as follows: Reduce Cost, Reduce Constraint, Prevention of unlawful Copying, Encourages self and independent learning. Similarly, Giri and Sengar (2011) submitted that OSS provides an insight into the implementation of OSS for overseeing the services and activities library and that OSS the potentiality to control the staff positively. Also, Muller (2011) stated that using OSS allow s library to manage, circulate and catalog their materials effectively. In essence, academic institutions are pushy to put a balance to resources and requirements for learning, OSS has confirmed to be a possible solution to such institutions, it also provided creativity in making the technology more sovereign by allowing the researchers to work together in other to find solutions to educational (Taiwo & Downe, 2013).

The theoretical frame work is based on the work of scholars in the field of psychology on the UTAUT model. The term, technology usage and acceptance are ideas within the Information Systems, this has received attention and considerations from different discipline. In this regard, many models proposed for understanding users' and measuring how individual accept technology. The most common models are: (TRA), Theory of reasoned action. (DOI) Diffusion of Innovation, (TAM), Technology Acceptance Model, and (UTAUT). Unified Theory of Acceptance and Use of Technology. The Motivational Model, Theory of Planned Behaviour, and Social Cognitive Theory. UTAUT was utilised for the current study because it is based significant constructs precisely the above models. The model consisted of four determinants and variable.

Previous studies have worked on the UTAUT as momentarily discussed. For example, Rosaline and Wesley, (2017) examined the UTAUT model on the predictors of technology for adoption in instructional delivery. The findings revealed a positive significant relation within the behavioural intention to utilise Technological tools. Similarly, Odewumi**,** Yusuf and Oputa (2018) worked on the use of UTAUT model to recognized the intention based on postgraduate gender to use social media in learning, in south-west Nigeria. The author concluded with postgraduate students' as having positive perception towards usefulness, ease of use of social media for learning. Also, Palau-Saumell, Forgas-Coll, Sánchez-García and Robres (2019). This paper observed the acceptance of mobile applications in relation to a search of restaurant by users. The results revealed that SEM point out that the drivers have the intentions to use was positive.

Likewise, on TAM, Sawadogo (2013) affirms that the Rogers' model does not make distinction between adoption and continuity. So, in trying to overcome some of these limitations, we consider the TAM model in the following section. Among various technology adoption models, there is TAM. This theory explains, through a set of determinants, the adoption of IS. According to

Prasanna and Huggins (2016) the model was newly introduced by Davis (1986, 1989). In relation to adaption to (TRA) which is the theory of reasoned action, which was based on perceived usefulness and perceived ease of use of the technology. The study by Davis (1989) expressed the perceived usefulness is ascribed as the extent of which individual believes that particular arrangement would enhance better performance his work. Also, perceived ease of use as the degree in which individual is aware that using a particular structure would effort free, Prasanna and Huggins (2016) embraced TAM technology adoption model in relation to IS, supported by Jawadi and Vannier (2012) based on the first theory of IS.

Based on perceived usefulness, the study by, Abd. Hamida, Abdul Razakb, AbuBakar and Abdullah (2016) examined the relationships between the perceived usefulness and perceived ease of use, and other criterion variable of TAM on the continuous intention to use e-government. The results were positively related in term of continuance intention and other TAM variables. Also, Lanlan, Ahmi and Popoola (2019) researched into the relationship between technology acceptance (TAM) and with the use of CAS. The study discovered the benefit in connection between perceived ease of use and perceived usefulness on use of CAS. It is on this that the study examined the lecturers' engagement of open source software for learning. It on this that the study examined lecturers' engagement of open source software for learning in University of Ilorin, Ilorin, Nigeria.

Method

Research Design

The researcher adopted the descriptive research of the survey type for the conduct of this research. It will involve the collection of quantitative information using a validated questionnaire to be filled by student-teachers to describe the perceived ease of use, of open-source software for instruction by the university lecturers.

Population, Sample and Sampling Techniques

The population for the study consisted of all lecturers in university of Ilorin, Ilorin, Nigeria. The target population were lecturers in categories of lecturers one and above, therefore, purposive sampling was used to sample 300 with 125 males and 175 females.

Research Instrument

The researcher-developed instrument, questionnaire titled, "lecturers perceived ease of use of Open Source Software. The questionnaire has five major sections, A to C focusing on different aspects of the research questions. Section A of the questionnaire seeks for information on the respondents' biodata, name of the institution, programme of study and the gender. Section B of the instrument deals with awareness of open source software by student-teachers. The section had items on the categories of OSS, and the lecturers used. The section C was made up of 10 items also with four-point Likert Scale response options of Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). This

Section D of the instrument elicits for information on student-teachers' perceived ease of use of OSS for instruction. More so, the section is also made up of 10 items with four-point Likert Scale response options of Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). The final section, Section E is on the challenges which the student-teachers perceive as responsible for low usage of open source software for instructional purposes.

Validation of the Research Instrument

The validation of the research instrument, was first given to the researchers' colleagues, thereafter, the instrument was given to lecturers in faculty of education, University of Ibadan, Ibadan, Nigeria for relevance and suitability of the instruments. Based on their observations and suggestions, necessary modifications were carried out on the draft questionnaire.

The validations were used to modify the instruments and the research questionnaire reliability, was pilot-tested on 18 lecturers at the Obafemi Awolowo University, Ile –Ife. The respondents were not part of the study sample. Internal consistency reliability method was used in eliciting responses from the pilot sample. It was tested with Cronbach's Alpha; values were 0.73 and 0.67 respectively.

Procedure for Data Collection

The copies of questionnaire were given randomly to the lecturers. Researchers personally administered copies of the questionnaire to the lecturers; the data were collated, analysed, ethical standards were also considered.

Data Analysis Techniques

The data to be obtained using the administered questionnaire were analysed using the descriptive and inferential statistics.

Findings and Discussion

Research Question 1*:* What are the OPSS mostly used by the lecturers?

The lecturers' mostly used OSS are: AbiWord, Open Office, Office suite, KOffice, Nvu, GIMPShop, Bbb, Pidgin, Thunderbird, PhpBB, OsCommerce, VirtueMart, Zen Cart, Drupal, Joomla, PHP-Nuke, Ubuntu, Fedora, sipecifically:

1. Linus Open Source Operating System: Ubuntu OS, Zorin OS, Feren OSiFree Office Productivity Suite: OpenOffice, LibreOffice, Apache OpenOffice
2. Infographics: infogr.am, Inkscape, Pixlr.
3. Online Bibliography and Citation Tools: CitationGenerator, Citation Machine – Free, Zotero – Free
4. Testing and Quizzing Tools: ClassMarker, ClassTools, Easy Test Maker
5. Web Conferencing Tools for Teachers: AnyMeeting, BigBlueButton, Jitsi Meet
6. Learning Management System: Moodle, Canvas, Chamilo
7. Open Source Content Management for Website: WordPress, Joomla, Drupal

8. Open Source School Management Software: SchoolTime, OpenSIS, feKara
9. Open Source Screen Capturing Tools for Teachers: Aviary, Clip2 Net, Faststone Capture

Research Question 2

What are the perceived benefits of open source software (FOSS) for learning?

Table 1:
Lecturers perceived benefits of open source software (FOSS) for learning

S/N	Item	Mean
1	Open Source Software (Foss) providing learning for the learners	2.4
2	Open Source Software (Foss) assist my essential aspect of my lesson	2.2
3	Open Source Software (Foss) assists as a flexible means for transmitting contents.	2.6
4	Open Source Software (Foss) provide quick mean of sharing information.	2.5
5	Open Source Software (Foss) arouse my interest to the learners	2.3
6	Open Source Software (Foss) favours my learners assignment.	2.7
7	Open Source Software (Foss) makes my learning real and permanent	2.4
8	Open Source Software (Foss) provides instruction in respect of geographical locations	2.3
9	Open Source Software (Foss) enhances greater electronics awareness the learners	2.8
10	Open Source Software (Foss) assists in solving major subjects educational constraints	2.4
	Grand Mean	2.5

Table 1 revealed that item 8 with the statement Open Source Software (Foss) enhances greater electronics awareness the learners has the highest mean score of 2.8. This was followed by the Open Source Software (Foss) favours my learners' assignment with mean score of 2.7, the items with the lowest mean score 2.3 stated that Open Source Software (Foss) arouse my interest to the learners. On the whole, the grand mean score on the lecturers perceived benefits of open source software (FOSS) for learning was 2.04. Using a bench mark of 2. 0, it could be inferred that the lecturers' generally had positive benefits of open source software (FOSS) for learning.

Research Question 3:
What are the perceived use of open source software (OSS) for learning?

Table 2
Lecturers perceived use of open source software (OSS) for learning

S/N	Item	Mean
1	Open-source software provides the freedom to run the programme for any purpose and anywhere.	2.3
2	The use of open-source software gives the freedom to redistribute copies to colleagues, friends, students, and so on	2.2
3	Open-source software provides flexibility and is customizable by users. New features and tools can be added, or original features changed.	2.1
4	The volunteer help available through the open-source support forums ensuresservice continuity; this eliminates discontinuity of service.	2.2
5	The extensive collaboration of the open-source community ensures ccontinuous improvement of the software.	2.5
6	Open-source software can assist in extending the lifetime of old hardware. For instance, most of the Linux OS distributions and other open-source packages can efficiently run on old computer machines or digital devices.	2.4
7	Open-source software allows for better security, quality, zero vendor lock-in, and interoperability under adherence to open standards.	2.4
8	Open-source software provides better access to quality software to those who otherwise would not have been able to purchase such.	2.3
9	It can guide lecturers and students to develop competence in software development through the customization of open-source software.	2.6
10	It encourages boldness in terms of learning among the lecturers and students	2.0
	Grand Mean	2.1

Table 2 with lecturers perceived use of open source software (FOSS) for learning, revealed that the item with the statement OSS can guide lecturers and students to develop competence in software development through the customization of open-source software, has the highest mean score of 2.6. this by the mean score of was followed by the mean score of 2.5 with the statement, the extensive collaboration of the open-source community ensures ccontinuous improvement of the software 2.5. the item with lowest mean of 2.0 stated that OSS encourages boldness in terms of learning among the lecturers and students. The grand mean score was 2.06 taking the benchmark of 2.0, it could be inferred that the Lecturers perceived use of open source software (FOSS) for learning was positive.

Conclusion

The results of this study have shown that Open Source Software (OSS) is downloaded and used for free, the open nature of the software makes the source code available for modification and alteration and that due to sharing, ease of modification and reduced costs OSS do frequently utilised by the lecturers in University of Ilorin. Here, there are recommendations for the lecturers, schools, and government. Firstly, lecturers should continue to give priority to academic utilization of OSS. Secondly, schools should provide functional internet for the lecturers to access the Open Source. Lastly, government at all levels are to update open source periodically for its use in teaching and learning

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NOTICING GRAMMATICAL PATTERN ON ONLINE SHORT STORIES BY LEARNING GRAMMAR THROUGH GRAMMAR TRANSLATION METHOD

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Abstract
Memorizing structure pattern is very tiring and often resulting in failure. Learners often try to adapt it in conversation and writing, but it sometimes ends up with unsatisfactory. The process of implementing grammar-translation methods to explain how to structure patterns built and used leads learners to understand it clearly and it could decrease the level of confusion significantly. Furthermore, to make the patterns learners learned to stay some longer in their minds, they can notice the grammar content in short stories. The use of online short stories could ease them to read more to support noticing. Thus, learning grammar pattern boosted by the grammar-translation method and using online short stories to notice grammatical pattern could develop students' proficiency in implementing grammar both in spoken and written.

Keywords: noticing, grammatical pattern, implementing, grammar-translation method, confusion

Introduction

Learning grammar is something undesirable subjects faced by some students in the teaching-learning process. Learning grammar means memorizing some formulas to build some sentences to make speaking, writing, listening, and reading activity understood by learners. Most of the students withdraw themselves while getting involved in learning grammar when they focus on doing some tasks in their books.

Using a book course, nevertheless, is provoking withdrawal among the students. They feel unconvinced with some tasks included in it. It seems that the assignment distracts them from gaining the optimum understanding in learning the material. They are just doing questions and answers along with the discussion. It looks like doing the same pattern from the unit to the other in the teaching-learning process (Chou, 2010).

Moreover, memorizing is something boredom to do for some students. The failure of keeping data stays longer in their mind leads them to be frustrated. It hinders the students to get involved in learning English. It seems to be a burden for them to keep remembering a lot of things in their head like mathematical rules (Yule, 1999). Finding out a solution to escape from that problem is demanding.

Practicing a lot is an option. Practicing to construct sentences, based on the grammar rule, is challenging. This kind of practice is implementing explicit learning. The students are putting the grammar rule into their writing. To make the written product seems natural, the teacher can invite the students to notice grammar content in some short stories. The teacher could raise some questions by using the words 'why and what if' to noticing grammar patterns found in the text (Vickers &Ene, 2006).

The process of explicit learning by adopting grammar rules into writing could be developed into implicit learning by noticing grammar content in the text. The use of grammar-translation methods to learn grammar rules is also helpful for the students to see the whole picture of learning grammar. The students can see the perspective of grammar usage by using their mother tongue as the introduction (Sysoyev, 1999).

Frankly speaking, teaching grammar to EFL students is inviting an obstacle. Most of the students are reluctant to learn English due to grammar. They complained a lot about the grammar rule implementation in both speaking and writing. That is why most students in EFL countries, especially in Indonesia, could not use English properly in both speaking and writing. They got a failure to this kind of phenomenon especially in adult learners (Cahyono et al., 2016).

Theory

Grammar is focusing on the use of words to build sentences. By using grammar, people can interact with each other meaningfully. It enables people to sustain their heritage language (Evans &Green, 2006). To make the grammar learning and using become easy to understand, the implementation of the grammar-translation method is an option. It is the old method, but people still use it nowadays in learning English (Richards & Rodgers, 1986).

Nevertheless, using the grammar-translation method to emphasize the implementation of grammar rules is very helpful for both teachers and students. The teachers will get an easy way to clarify the grammar usage in l1 setting. On the other hand, the students will get a vivid understanding of how to construct sentences properly. Moreover, by translating short stories a lot, students will build a large vocabulary and notice the implementation of a grammar rule (Neyman, p.f. 2002).

In the previous study, Sysoyev (1999) did research focusing on teaching grammar. He introduced the implementation of integrative learning. It means that he used a form-based method to explain the material. He applied grammar rule to build sentences. Moreover, he also focused on the meaning-based method. By implementing the two methods, he also developed the EEE method. It is about exploration, explanation, and expression. In his study, he used textbooks as the resource of the material in doing exploration. He found out that the students felt comfortable using EEE rather than the two others to learn grammar.

The success in the previous study is promising. The students feel relaxed by practicing peer learning in discussing grammar usage. They implemented their grammar knowledge to construct sentences to interact with other students. By adopting such a method, the students possibly miss the natural of the expression. They need authentic material to apply the sentences. They can copy the application of grammar usage from the authentic material in a proper way.

Moreover, using authentic material could lead students to see the whole picture of grammar usage in constructing sentences naturally. It could raise awareness of grammar pattern application on both speaking and writing because it contains the real template of constructing sentences. The aim of this research is to see the influence of using authentic material and GTM to help the students in adopting grammar usage. To satisfy the purpose

of the study, a research question needs to be established.

Theory Application

Bettering to learn grammar

Students are most likely to learn something easy. They love to do something practical. They are reluctant to take part in grammar discussions. It seems that grammar discussion is something hard to do. Nevertheless, grammar is a tool to make the sentences work like what the speakers intend to express. Finding out a good way to help learners keep grammar patterns work properly, teachers need to be creative. Choosing any resources to enhance the students' participation in learning grammar is undeniable. Teachers need to be creative and innovative to invite students to take part. The atmosphere of learning grammar could be warm by satisfying the students' need to gain the essence of grammar usage. The use of media online authentic material like poems, lyrics, and short stories are suggested in classroom settings (Saricoban and Metin, 2000).

The grammatical pattern in speaking

The rules people need to imply in building sentences is grammar. With grammar, people can deliver what they infer. Failing to put grammar in the right place will invite confusion between speaker and listener. What the speaker says will be caught differently by the listener from what genuinely the speaker intends to convey if the speaker does not use the rules of grammar properly. Therefore, it leads speakers not to dare to express their ideas as much as they want. They tended to be reluctant to speak up. They will get embarrassed if they put the wrong grammar patterns into their sentences. They do not care that spoken is different from writing. Actually, it would be fine as far as the product of speaking is understood by listeners (Lim (2003). The students need to be conscious that the level of understandable utterance is very important in speaking practice rather than implying the right grammar rules.

Grammar translation method

GTM or grammar-translation method is one the method used to explain grammatical rules. On some occasions, the teacher is using l1 to explain grammar usage in constructing sentences. It is the old method had ever used, but it is still very useful to help learners understand how grammatical patterns work. They can see the vivid explanation of grammatical rules by using l1 and l2 vice-versa delivered by their teacher. This kind of way can provide a mutual relationship with the usage of grammar in l1 and l2. This kind of phenomenon can help the learners see the whole picture of how to implement a grammatical pattern in written or oral products.

Moreover, negotiating to mean and interacting meaningfully in l2 are the two things the students need to develop in order to emphasize the implementation of grammatical patterns in constructing sentences. The repetition of practice is somehow important for the student to make their understanding of learning grammar develop properly (Vasilopoulos, 2008).

Functional grammar-translation method

Functional is a kind of effort to make something to be useable. Involving communicative language is also functional because the activity is not abstract. It is concrete and useable. Practice makes perfect. This kind of saying is applicable to help students achieve good results in learning grammar. The activity like discussion could lead students to practice of implementing grammatical pattern into utterance. They will be aware of controlling their speaking product (Belchamber, 2007).

On the other hand, combining communicative language teaching and the grammar-translation method seems possible and interesting to adapt to teaching grammar and translation. It could make the activity challenging. It involves the role of students more. The students will be accustomed to implementing the grammatical pattern in practicing speaking. They will translate l2 into l1 in their head to express their ideas. They will negotiate the meaning of utterance properly to produce understandable intentions. This

kind of activity is also called "the functional-translation method" (Weschler, 1997).

Grammar in verbal expression

Verbal expressions are uttered by people to make communication among them clear. They are a series of sentence buildings used to deliver the intention of the speakers. To grab the message of the speaker's perspective, listeners will catch the implementation of grammar rules in the utterance of the speakers. The rule of grammar is internationally standard patterns used by people all around the world who use the same language.

On the other hand, a writer in writing some sentences needs to figure out the way how to construct them. The implementation of grammatical patterns in the written product can tell the readers when, where, and how the evidence happened and so forth. The ability to adopt a grammatical pattern into the written product is very important. The proper usage of grammar to build sentences in written is exactly essential.

Nevertheless, using a computer could foster the development of verbal proficiency. Computers can be used to aide in teaching English language learners in core academic subjects, such as reading and writing. Computers can aid in vocabulary development as well as verbal language. The students can notice how the grammatical pattern implement on the text and they can be warned by automatic word correction (Ybarra, 2003).

Noticing grammatical pattern

Noticing is basically the idea that if learners pay attention to the form and meaning of certain language structures in input, this will contribute to the internalization of the rule. By noticing, the students will see the proper implementation of the grammatical rules. It could help the students to develop their competence to keep the accuracy of grammar usage (Batstone, 1996 in Noonan, 2004).

Moreover, noticing is a kind of step to move from explicit into implicit learning. In the beginning, the students will learn how the grammatical pattern works in constructing sentences. The effort to understand grammar usage by doing some exercises is a kind of way to put the input into the students' heads. Learning the material step by step will enable the students to be capable of using grammatical patterns into sentence building. This kind of phenomenon could be a burden for the students to remember all the material they had learned. They need to remember which pattern should be adapted to build sentences to deliver their ideas. By noticing authentic material like online short stories could help the students comprehend the usage of the grammatical patterns. Noticing the implementation of grammatical patterns a lot on the text will help the students keep their memory of grammar learning stays longer in their heads. This kind of activity is called implicit learning. It is a good way to enhance the teacher and students to discuss grammar usage (Noonan, 2004).

Noticing grammatical content

Noticing grammatical content is a good way to see how grammatical patterns work. Showing a sentence taken from a short story to students to notice the grammatical pattern is an optional way to make grammar sound natural. There are many benefits to using literature in the EFL classroom. By reading the authentic material, the students could see the distinction of the lexical and grammatical structure exposed to the text. This kind of activity also enables the student to widen their perspective of understanding other cultures (Savvidou, 2004). While noticing a grammatical pattern on the text, the teacher can ask the students to explain why the grammar pattern is implied in such sentences and what if they are changed to the other patterns. By doing such kind of activity with the various patterns of grammar and sentences, students are possible to keep all the grammar patterns stay longer in their head and they will be accustomed to implement them in the spoken or written products.

Short stories

Short stories expose some grammatical patterns to construct sentences. Students

can use the materials of short stories to notice how the grammar works. Choosing a short story material is very important. It is a good way to invite students to get involved in the discussion. The teacher should be selective in choosing the topic of the text. The proper material used in the classroom could enhance the students' desire to get involved. The story is short but fun (Clifton, 2006). Moreover, the teacher can ask the students to search the grammatical patterns implied in the story sentences. After finding the grammar patterns, students can identify which grammar pattern used in such story sentences. Later on, the teacher can invite the students to get involved in discussions that implement grammatical patterns in building sentences. Online short stories

Short stories are available in a lot of media. The Internet is one of them. It is a valuable resource. Students and teachers can access it anywhere and anytime. They are able to get some materials free but some are not. They are both in need of them to satisfy their references to enlarge their input knowledge. Indeed, they can choose any desirable materials at their own level. The way to get such kind of material is quite easy. The students just click the mouse to choose the intended materials (Krajka, 2000).

Autonomous learner

The autonomous learner is a helpful strategy to keep the students' interest in getting involved in the teaching-learning process. The students will be free to choose the materials they want to learn. People are most likely to learn something they love to do. It means that learning something somebody loves to get involved is a good way to optimize the result of learning. Online short stories are containing various topics and titles. Learners can choose the one they love to read. At any rate, individual learners differ in their learning habits, interests, needs, and motivation, and develop varying degrees of independence throughout their lives. It is very important for the teacher to give the students their freedom in choosing the topic of the material. This kind of freedom could boost their progress in gaining the learning target (Tumposky, 1982 in Thanasoulas, 2000).

Noticing grammatical patterns in online short stories

In short stories, the author writes all of his opinions marvelously. He implements lots of grammatical patterns in delivering his intentions on them. The teacher can use them as a model of how to implement grammatical rules properly. He can ask his students to analyze how grammatical patterns work. Analyzing grammar content in short story sentences is an activity that could be adapted by the teacher in teaching grammar. After discussing a grammatical rule, the teacher can invite the students to come into a website containing short stories. The teacher could tell the students which topics they can choose to implement the material discussed. On the other hand, the reading of extended passages expands vocabulary, improves writing, and enhances general language competence (Nagy & Herman, 1987; Krashen, 1984; Grabe, 1991, respectively in Antepara, 2003). It puts previously learned vocabulary and grammar into meaningful contexts and teaches new words.

The benefit of noticing grammatical patterns in online short stories

Learning by doing is a proper expression to describe the benefit of using short story materials to better the students' perspective about grammar usage. After explaining the grammar rules in any kind of method, the teacher can try to make his explanation to be vivid and natural. The repetition of analyzing sentences containing grammar discussed could help students see how the grammar discussed used in the written products. Moreover, the students can implement it by copying the way the author implies grammar patterns in sentences properly. Furthermore, the teaching of literature subject is compatible with a focus on the development of English fluency precisely because by discussing the issues presented in the novels or short stories, students can convey their thoughts through language, promote higher-level thinking skills, and use language authentically (Shang, 2006).

Learning grammar

There are some points to discuss in this study. One of them is about grammar pattern. The importance of grammar to construct sentences in both spoken and written is inevitable. It is a kind of thing to enable the speaker, listener, writer, and reader to convey and understand their intended opinion (Lim, 2003). To implement the grammar pattern, the students need to learn it. There are many ways to learn it. The grammar-translation method is one of them. Using this kind of method both the teachers and students use l1 and l2 to comprehend the definition of the pattern discussed. They could see how the grammatical pattern formed and used (Vasilopoulos, 2008).

Moreover, the functional grammar-translation method is essential. It is a kind of effort to implement it into real contexts like in speaking and writing. Using it in both discussions and written could bring the students into a real practice of implementing a grammatical pattern (Belchamber, 2007). Verbal proficiency is needed by speakers and writers. They need to make their spoken and written product be meaningful. They need to practice a lot to make it proper. On the other hand, using a computer to control their writing is useful. It has an automatic correction for the writer's product (Ybarra, 2003).

Nevertheless, noticing the grammatical pattern in the text is very helpful for the students. It is a kind of template for implementing grammar on how to construct sentences. The students could ensure their perspective of grammar usage on building sentences by noticing grammatical pattern exposed to the text (Noonan, 2004). The text used to notice the grammatical content could be a short story. It is short but fun. It could ease the students to read it. The online short stories are favorable. The students could choose desirable topics (Antepara, 2003). Using online stories to notice is provoking the students to be autonomous. They will develop greater by being autonomous. They would be free to choose the proper way to fit with them (Thanasoulas, 2000).

The online short stories are the authentic ones. By reading such materials, the students can adapt their grammar knowledge to grammar usage (Jurafsky, 2003). They can copy the proper usage of grammar for practicing in written and spoken. The students can build their confidence in applying the proper grammar in expressing their ideas. Their grammar knowledge can be built by adapting GTM. It meets the aim of the study and answer the research question. It is also completing the previous study. Other researchers can develop it for some details to satisfy the need for teaching grammar.

Conclusion

Exposing online reading materials like short stories help students understand and know how grammar patterns work. The students can notice the grammatical pattern in the text. They can adapt their previous knowledge of grammar with the content of the text. To build grammar skills, the use of GTM is promising. They can understand how the grammar used in the proper way by using their mother tongue as the introduction. By noticing the content of the short stories, they can see the perspective of grammar usage to implement in the spoken and written settings. This kind of method can be used by the teachers to teach grammar. It also inspires other researchers to develop it for some further.

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ON THE DARK SIDE OF LEARNING CALCULUS: EVIDENCE FROM AGRIBUSINESS STUDENTS

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Abstract
This study focused on evaluating the agribusiness students' negative experiences in learning Calculus. The study employed 121 agribusiness students in the first semester of the school year 2019-2020 at Visayas State University, Baybay City, Leyte, Philippines. Selected secondary data from the study of Casinillo and Casinillo (2020a) was utilized in this study. With the aid of a correlational research approach, this study stresses to explain the nature and characteristics of negative effects of learning calculus which is very helpful for improving the level of achievement of students and modifying the strategy of mathematics teachers. Results showed that most of the agribusiness students don't have enough background in pre-calculus topics since there are only 9% of them took a STEM strand during senior high school. Seemingly, it is revealed that students are experiencing extreme stress, natural emotional exhaustion and frustration, and average absenteeism, somatic burden, and laziness in learning Calculus. It is found out that the negative experiences of these agribusiness students are significantly related to each other. This suggests that these negative experiences are inter-correlated and dependent on each other which is wearisome to their studies and leads to poor academic performance. However, these students are driven to pursue studying calculus since it's part of their requirements in their degree program. Hence, by proper motivation and appropriate teaching strategy in Calculus, these students can progress their level of achievement.

Keywords: agribusiness students; negative experiences; correlational research approach; poor academic performance

Introduction
Studying calculus subject is a tough learning process. A lot of students at the college level are struggling to pass the calculus course as part of their curriculum. Apparently, in mathematics class, there are shortcomings and negative experiences in learning that are existing in the classroom environment due to math anxiety (Casinillo, 2019; Maloney &Beilock, 2012; Vukovic et al., 2013). In the paper of Awaludin et al. (2020), it is stated that the common problems in learning calculus are low participation of students, difficulties in answering problem sets, little mastery of basic calculus concepts, and lack of logical minds in problem-solving. To have a good performance in calculus class,

students must be able to actively participate in answering problem sets, have knowledge and thinking skills that can be used in problem-solving for contextual problems, and able to make problem-solving models (Awaludin et al., 2020). This means that students must develop their problem-solving skills in mathematics with the aid of suitable teaching strategies. Furthermore, students must have an interest and enough background on pre-calculus topics (Casinillo&Aure, 2018). However, there are also learning experiences of students that need to be addressed. These are the negative effect of learning due to boggling and difficulties they have encountered in the classroom environment which affects their learning behavior.

In Visayas State University, Baybay City, Leyte, Philippines, Bachelor of Science in Agribusiness (BSAB) is one of the degree programs that require a Calculus subject due to its usefulness in their field of studies. In other words, the Calculus subject is part of their curriculum. According to Berggren (2018), calculus has diverse application in real life that deals with how related variables change. In particular, business-related subjects are dependent on the applicability of Calculus. Leithold (1996) stated that learning calculus can be stimulating and exciting considering that a student knows certain mathematical background in algebra, geometry, trigonometry, and pre-calculus. However, most of the enrollees of the BSAB program are not Science, Technology, Engineering, and Mathematics (STEM) students in the K to 12 Education Curriculum in the Philippines. Hence, these types of students are expected to have difficulty in learning calculus due to their lack of mathematics background. In that case, this results in improper motivation in learning and causes negative effects on their behavior in the classroom. Studies have shown that a negative learning attitude is a growing barrier for many students (Mazana et al., 2019; Popham, 2008). These negative learning attitudes will affect students' likelihood of exhibiting learning problems in mathematics, that is, students are experiencing difficulties with attentiveness and lack of task persistence and flexibility. This is somehow parallel to the findings of Alabekee et al. (2015) that a positive learning experience leads to active engagement. According to Casinillo and Casinillo (2020a), that in the past semesters, about 50% of the agribusiness students failed in calculus due to a lack of self-determination and motivation. Another reason is that they lack the mathematical background to grasp college-level calculus topics. In that case, most of the students are experiencing stress, emotional problem, frustration/disappointment, absenteeism, somatic burden, and laziness in learning (Casinillo&Casinillo, 2020a). However, in the study of Casinillo et al. (2020b), mathematical resilience is one that locates itself in positive psychology which addresses mental wellness and interest despite challenges. Perhaps, self-determination in learning played a vital role in students' development in knowledge and understanding (Conchie, 2013; Denson et al., 2015). This is also supported by Kitchen and colleagues (2018) that cooperative and interactive learning strategies contribute to the promotion of higher-order thinking for students. Hence, to find a remedy for negative experiences in learning calculus, one must understand its nature and characteristics.

To date, studying the dark side of learning calculus at Visayas State University, Philippines has never been done and its concepts are also limited in the literature. Hence, the study is conducted to evaluate the different negative learning experiences of agribusiness students with the aid of the correlational method approach. The result of the study will be used to improve the strategy of the mathematics teacher in any math course at the department level of Visayas State University. In fact, mathematics teachers will understand the situation of these agribusiness students in terms of their learning capacity and limitations. This study is also useful for the students' side since it will provide a better understanding of the negative effects of learning calculus which gives them the idea of how they will react during times of difficulties and how to cope up with negative

experiences. Furthermore, this study is relevant in the sense that it could be used as a guide on how to improve the existing policy in mathematics education in the Philippines.

In this section, we systematically reviewed the existing results in the literature on the negative experiences in mathematics particularly in calculus such as stress, emotional exhaustion, frustration/disappointment, absenteeism/tardiness, somatic burden, and laziness. These dark effects are due to worrying demanding situations in problem-solving in calculus, time pressure due to deadlines, and math anxiety. Several findings in the literature stated that negative experiences and stressful situations in learning can interfere with the achievement of mathematical tasks (Ashcraft & Faust, 1994; Ashcraft and Kirk, 2001; Casinillo, 2019; Casinillo et al., 2020a; Maloney &Beilock, 2012). According to Schiffrin and Nelson (2010), students who were stress in learning are less likely happy and motivated.

Furthermore, due to mathematical anxiety, the students are prone to errors and mistakes in mathematical problem solving which causes frustration and disappointment (Ashcraft and Kirk (2001), Vukovic et al., 2013). In the findings of Ashcraft and Kirk (2001), and Ashcraft and Krause (2007), it is found out that cognitive processes can be negatively affected by the interference of negative emotions or emotional exhaustion, due to math anxiety or pressured situations. This suggests how negative feelings might influence the emotional aspect of students, thus resulting in a drop in academic performance in calculus. A student with emotional exhaustion in learning may result from the sustained experience of negative attitudes towards the subject and unexplained physical symptoms (Olafsen et al., 2017). Similarly, a student who perceive their studies as stressful and who experience somatic symptoms may be more likely to express intentions to laziness in studying or even stop their education, or shift to the other degree programs (Brown et al., 2016). Perhaps, laziness could cause students some serious problems in their futures. In the study of Gillet and colleagues (2014), and Williams and colleagues (2014), it is found that the negative effects of a dislike learning environment are stress, frustration/disappointment, absenteeism, and somatic symptom burden. If a student has excessive thoughts in worrying and fear or major distress in learning, this relates to the somatic symptoms they might experience.

In this study, it stresses the nature and characteristics of the different negative effects of learning calculus to find a remedy and achieve a good academic performance of agribusiness students. Hence, generally, the study aimed to evaluate the dark side of learning calculus of agribusiness students. Specifically, this study wanted to answer the following objectives: (1) to determine the socio-demographic profile of the students; (2) to measure the level of different negative learning experiences in calculus; (3) to construct a correlation matrix between different negative learning experiences in calculus.

Method

The study adopted the research design of Casinillo et al. (2020b) to explain the negative experiences of agribusiness students in learning calculus that deals with correlation analysis. Both descriptive and inferential statistical methods were employed. Descriptive statistics such as mean, standard deviation, the minimum, and maximum value were utilized to describe and evaluate the data used in this study. To explain the negative learning experiences, a correlational research approach was used as an inferential method.

In this study, it utilized the data of the current paper of Casinillo and Casinillo (2020a) entitled "Econometric Evidence on Self-Determination Theory in Learning Calculus among Agribusiness Students." The study deals with the motivation/interest and its influencing factors of students in learning Calculus. However, this study only focuses on the dark side or negative experiences resulted from learning the said subject. Hence,

the study includes some of the demographic profile of students such as age (in years), gender (1=Male, 0=Female), and academic senior high school strand (1-STEM, 0-Non STEM). It also utilized a 6-item scale to evaluate the different negative experiences in learning calculus. Students were asked using a 10-point Likert scale, that is, 1-Not

experiencing to 10- Extremely experiencing. The questions are focusing on the following: Stress, Emotional Exhaustion, Frustration or Disappointment, Absenteeism or Tardiness, Somatic Burden, and Laziness. Table 1 shows the mean perception score interval and its corresponding interpretation.

Table 1. Mean score interval for problems in learning calculus and its interpretation.

Mean score interval	Interpretation
1.00 – 2.80	Not experiencing
2.81 – 4.60	Slight experiencing
4.61 – 6.40	Average experiencing
6.41 – 8.20	Naturally experiencing
8.21 – 10.00	Extremely experiencing

In describing the data of the study, some descriptive statistics were employed such as, mean, standard deviation, minimum, and maximum value. The use of descriptive statistics is to characterize and evaluate the data to provide simple summaries and extract some useful interpretation. The Spearman rho correlation was used to determine the relationship between two variables when at least one of them is ordinal. Then, the correlation coefficient was computed as follows:

$$\hat{r}_s = 1 - \frac{6}{n(n^2-1)} \sum_{i=1}^{n} d_i^2$$

Where n is the number of paired ranks in the sample section and d_i is the difference between the paired ranks. Furthermore, the said correlation coefficient was validated and tested for significance. To avoid an error for the results, the calculation was done with the aid of statistical software called Statistical Packages for Social Science (SPSS) version 20. Table 2 shows the range of the correlation coefficient and its degree of relationship according to Albert (2008).

Table 2. Rule of thumb for interpreting the size of the correlation coefficient of Spearman rho

Range of $\|r\|$	Degree of Correlation
$0<\|r\|<0.3$	Weak
$0.3<\|r\|<0.7$	Moderate
$\|r\|>0.7$	Strong

Findings and Discussion

This section presents the descriptive measures for the demographic profile of agribusiness students. It also discusses the level of experience of agribusiness students to the different negative effects of learning calculus. Furthermore, the study tackles the degree of relationship of the different negative learning behavior and provide some policy inputs to improve the well-being of students in learning calculus.

Demographic Profile of Agribusiness Students

Table 1 shows that the mean age of the agribusiness students is closed to 19 years old. About 60%of the agribusiness students are female and (40%) are males. Only 9% of

these students took Science, Technology, Engineering and Mathematics (STEM) strand during senior high school which implies that these students have lesser exposure to science and mathematics (Sarmiento &Orale, 2016). Perhaps, most of the students who took the STEM strand are enrolling in a degree program that is parallel to their strand. So, most of these students are having difficulty and academically challenged since they don't have enough stock knowledge and background. According to Casinillo and Casinillo (2020a), these agribusiness students were not prioritizing mathematics due to a lack of interest since the said subject is not their forte and some students are just studying mathematics when examinations are near. Hence, these agribusiness students in general are experiencing negative learning behavior while studying calculus.

Table 3. Descriptive Statistics for the variables in the study (n=121)

Variables	Mean	Std Dev	Min	Max
Age (in years)	18.89	1.1324	18	26
Male (1-Male, 0-Female)	0.40	0.4929	0	1
STEM Student(1-STEM, 0-Non STEM)	0.09	0.2887	0	1

Agribusiness Students' Level of Negative Experiences

In Table 3, it shows that Agribusiness students are extremely experiencing stress in learning calculus. This is due to the difficulty of the subject encountered since they don't have enough background and proper training during their high school days. Stress is attained due to long hours of studying the subject without proper motivation, tight deadlines of problem sets and being pressured during exams. This is also due to ever-increasing demands that can leave the students feeling worried, drained, and overwhelmed. According to the findings of Beilock and Carr (2005), if stress exceeds the ability of students to cope, then it starts causing damage to the students' minds and body which leads to poor performance. Emotional exhaustion and frustration/disappointment are naturally experienced by agribusiness students (Table 3). It is worth noting that emotion has a significant effect on the cognitive processes and learning attitudes of the student, including perception, attention, learning, reasoning, and problem-solving (Ashcraft & Krause, 2007; Awang et al., 2013). Hence, once the emotion of students is negatively affected, then it also influences negatively the level of achievement in Calculus. Perhaps, the same thing with frustration/disappointment, it engages in other negatives, self-destructive or addictive behaviors that destroy the learning attitude of students. Table 3 also reveals that absenteeism/tardiness, somatic burden, and laziness are averagely experienced by agribusiness students. On average, it suggests that these types of students are not likely to enjoy the class discussion in calculus. The study of Abecia(2014), and Casinillo and Casinillo (2020b) suggest that happiness in learning is a substantial determinant in achieving good academic performance. However, most of them are not actively participating in the class activities and procrastinating the submission deadline of problem sets/assignments. This goes to infer that due to the somatic burden and learning problems they experience in the learning process, it hinders their grasping ability to the topics and leads to low performance (Sahatsathatsana et al., 2014).

Table 3. Descriptive Measures for problems encountered in learning calculus and its interpretation.

Problems in Learning Calculus	Mean	Std Dev	Min	Max	Interpretation
Stress*	8.27	2.2876	1	10	Extremely experiencing
Emotional Exhaustion*	7.74	2.2676	1	10	Naturally experiencing
Frustration /Disappointment*	7.61	2.3887	1	10	Naturally experiencing

Absenteeism/tardiness*	5.02	2.9196	1	10	Average experiencing
Somatic Burden*	6.04	2.6439	1	10	Average experiencing
Laziness*	5.85	2.6946	1	10	Average experiencing
Overall Mean		6.76			Naturally experiencing

Note: * - Scale 1 to 10.

Correlation Matrix for Different Kinds of Problems in Learning Calculus

Table 4 shows that stress is correlated to an emotional problem, frustration, Absenteeism, Somatic Burden, and Laziness. This indicates that stress in the classroom environment in Calculus subjects affects the students' cognitive behavior and causes different learning problems. According to Beilock and Carr (2001), stressful feelings can also be induced when students are struggling and problematic, such as punishing poor performance with social consequences or low academic achievement which resulted in failing grades. Moreover, mathematics anxiety is increasing due to fear of negative consequences resulted in less efficient strategy use, and even consequently poorer academic performance (Beilock and Carr, 2005). Table 4 reveals that emotional problem and frustration is highly correlated among different kinds of learning problems except for laziness. This suggests that when a student is emotionally exhausted and frustrated, it results in stress, absenteeism, and somatic burden. However, even if agribusiness students are emotionally exhausted and frustrated, they are forced to work with their problem sets and study their lessons for the fact that it is part of their curriculum. In other words, students may feel sad, uncertain, depressed, or anxious in learning calculus, but still overcome their laziness since if they fail, they can't graduate to their degree program. An appropriate teaching strategy might help these students to improve their academic performance (Casinillo&Guarte, 2018). Furthermore, it is revealed in Table 4 that absenteeism is highly correlated to somatic burden and laziness. Several studies have shown that absenteeism and tardiness harm academic performance and learning behavior (McConnell &Kubina, 2014; Raftu, 2017; Van Eck, 2017). If a student has a lot of absences in a class, then there is a higher chance that they are left behind on the lessons. This suggests that it leads to stress and excessive thoughts, and negative feelings and behaviors it resulted in somatic symptom burden. A student with somatic burden might experience insomnia, restlessness, and muscle aches due to emotional distress or anxiety. Somatic symptom disorder involves a person having a significant focus on physical symptoms, such as pain, weakness, or shortness of breath, which results in major distress and/or problems functioning due to stress and depression (Fujii et al., 2018; Gierk et al., 2015; Williams, 2014). This goes to infer that students lead to laziness which stems from reduced grades in their classes and negative learning attitudes.

Table 4. Correlation (Spearman rho) matrix between the students' problems in learning calculus (n=121).

Problems in Learning Calculus	**Problems in Learning Calculus**					
	Stress	*Emotional*	*Frustration*	*Absenteeism*	*Somatic Burden*	*Laziness*
Stress	1	0.677*** (<0.001)	0.604*** (<0.001)	0.155* (0.089)	0.392*** (<0.001)	0.224** (0.014)
Emotional	-	1	0.708*** (<0.001)	0.224*** (<0.001)	0.538*** (<0.001)	-0.017^{ns} 0.856
Frustration	-	-	1	0.378*** (<0.001)	0.558*** (<0.001)	-0.002^{ns} 0.981
Absenteeism	-	-	-	1	0.503*** (<0.001)	0.600*** (<0.001)

Somatic Burden	-	-	-	-	1	0.443*** (<0.001)
Laziness	-	-	-	-	-	1

Note: p-values are in parenthesis.
ns – not significant
*p <0.10
**p<0.05
***p<0.01

Conclusion

This study focused on the evaluation of the different negative effects on learning calculus among agribusiness students. Perhaps, understanding the nature and characteristics of the dark side of learning calculus is one of the goals of the educational system particularly in mathematics to improve its teaching-learning process. Results showed that only 9% of the agribusiness students took the STEM strand which indicates that most of these students don't have enough background in mathematics. Hence, most of these agribusiness students are having difficulties in learning calculus at the college level. Conclusively, this results in extreme stress which affects their learning behavior and leads to poor performance. Also, it is concluded that these agribusiness students are naturally experiencing emotional exhaustion and frustration in learning calculus due to its challenges that they faced. Furthermore, these students are averagely experiencing absenteeism, somatic burden, and laziness in learning. It is found out that these negative learning experiences are inter-correlated and dependent on each other which is troublesome in the classroom environment. However, it is revealed that these students are still moved to learn for the fact that this calculus subject is part of their curriculum. Hence, calculus teachers must facilitate well the student's interest and well-being of students to find a remedy for their negative experiences. Through proper motivation of these students, it can improve their happiness in learning and progress their level of achievement in calculus.

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STUDENTS' MATHEMATICAL COMMUNICATION SKILLS IN SOLVING STORY PROBLEMS BASED ON MATHEMATICAL ABILITIES

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Abstract
The research aims to describe the students' mathematical communication skills in solving story problems based on mathematical abilities. This research is descriptive qualitative research. Subjects in this research involved 3 students tenth-grade science in one of the senior high schools in Sidoarjo. Based on the mathematics scores in the last report card, I obtained one student with high mathematical abilities, medium mathematical abilities, and low mathematical abilities. The research data were obtained from mathematical communication skills tests and interviews based on a communication skills test. The results showed that students' mathematical communication skills are in line with their ability to solve problems on story problems because they are influenced by the level of mathematical ability of each student who is different in written and oral communication skills.

Keywords: mathematical communication skills, problem-solving, story problems, mathematical abilities

Introduction

Communication is one of the important things in the learning process and can make learning come alive because communication is one of the goals that must be achieved in learning mathematics. With the statementSuhaedi (2012) communication plays the most important role because by communicating students can exchange ideas both among students themselves, with the teacher and the environment. The importance of communication in the process of learning mathematics includes sharing ideas and clarifying understanding orally and in writing so that it is clear, convincing, and appropriate in the use of mathematical language(NCTM, 2000). Prayitno, Suwarsono, dan Siswono (2013)argues that mathematical communication is needed to communicate ideas or solve mathematical problems, both orally, in writing, or visually, both in learning mathematics and learning mathematics outside. According toWardhana (2018), the mathematical communication of oral students is the process of delivering ideas or ideas in the form of one's speech. Someone is said to have spoken mathematical communication if they speak and involve mathematical content.

The written mathematical communication of students is the process of delivering students' ideas in written form. Someone is said to have written mathematical communication if they present their ideas in writing. In communicating both orally and in writing it takes a tool and mathematics is that tool, in the opinion of Mundy, et al in (NCTM, 2000). This is reinforced by the statements of Baroody in (Pangastuti, Johan, & Kurniasari, 2014; Izwita, 2009; Nunun, 2012) that mathematics is a language or tool that can be used to communicate ideas or ideas, precisely, and concisely so that information can be conveyed.

In this research, researchers used problems with story problems in the form of descriptions because students still had difficulty in interpreting problems in the form of story problems into mathematical symbols or images and the story problems presented in the form of descriptions would make it easier to express mathematical communication skills, this was revealed byAnsari (2009). This proves that students still experience difficulties in the process of mathematical communication skills. Mathematical communication skills are important in learning mathematics because students who have good mathematical communication can easily interpret and solve a problem. This is consistent with research conducted by Choridah and Nurhasanah, which states that mathematical communication skills are very important to be raised so that students are actively involved in learning and eliminating the impression of mathematics is a difficult and frightening lesson(Choridah, 2013; Nurhasanah, 2019).

According to Ginsburg in Asmana (2018) states students must learn to write, read, and understand mathematical symbols if they want to be successful in solving mathematical problems. Polya in Asmana (2018) distinguishes problems into two types, namely: (1) problems to find; and (2) problems to prove. So in solving story problems, there is a relationship between the ability to solve problems with students' mathematical communication skills. This is reinforced by the opinion of Asmana (2018)which states that in general, there is a consistent linear correlation between understanding the problem of the problem-solving process and communication skills. In mathematics, problem-solving is also an important tool according toOzdemir and Reis (2013). Polya in Asmana (2018) said the steps of solving problems, namely: (1) understanding the problem (understanding the problem); (2) making a plan (devising a plan); (3) carrying out the plan (carrying out the plan); and (4) looking back. So, problem-solving is a process that students go through in solving a given problem by the steps of understanding the problem, making plans, carrying out plans, and checking again.

Every student has different mathematical communication skills so that the ability of communication and problem-solving abilities are thought to be different too. This is supported by a statement fromWardhana(2018), in each class, some students have different mathematical communication skills. This is influenced by many factors, such as the level of mathematical ability, communication skills, ability to express opinions, and self-confidence. Students with different mathematical abilities will have different ways of understanding problems in mathematics and also solving them. Through these differences, the teacher can investigate how far the mathematical understanding and location of the concept errors in students so that the need for classification of students' mathematical abilities. According toLutfiannisak and Sholihah(2018), mathematical communication skills can be classified based on students' mathematical abilities, namely the daily ability of students to follow the teaching and learning process. The mathematical abilities that will be used in this study are divided into three, namely high, medium, and low levels.

However, some researches that examine mathematical communication skills in solving story problems not using any review or using other reviews. Whereas in this study, this study aims to describe students' mathematical communication skills in solving story problems based on mathematical abilities so that researchers want to know whether the

level of mathematical ability will affect students' mathematical communication skills in solving story problems?

This research is important for educators because it can be used as input in designing appropriate learning so that these mathematical communication skills can help students to improve achievement and learning outcomes in class.

Method

In this research, the data were analyzed qualitatively with a descriptive approach. This research was conducted in April 2020 and involved 10^{th}-grade students of science from senior high school in Sidoarjo, as many as 10 who were selected based on mathematics scores in their last report card. Of the 10 students, 3 students were selected with the highest, average, and lowest report card, regardless of gender.

Data were collected bygiving a written test containing several story problems and semi-structured interviews for each students. The material chosen was Three Variabel Linear Equation System because this material requires accuracy so it is not wrong in providing mathematical symbols. See the instrumen for this research in Figure 1.

Solve all the problems properly!

1. Bimo bought 3 packages of sweet soy sauce, 1 packet of soy sauce, and 2 packages of fish sauce, he paid Rp 20.000,00. Santi buys 1 packet of sweet soy sauce, 2 packages of salty soy sauce, and 1 packet of fish sauce, he has to pay Rp 12.500,00. Darmin bought 2 packages of sweet soy sauce, 1 package of soy sauce, and 2 packages of fish sauce he had to pay Rp 16.000,00. If Tamara buys 1 packet of sweet soy sauce 1 packet of soy sauce and 1 packet of fish sauce then he must pay ....
2. Ani, Nia, and Ina go together to the fruit shop. Ani bought 2 kg of apples, 2 kg of grapes, and 1 kg of oranges at Rp 67.000,00. Nia buys 3 kg of apples, 1 kg of grapes, and 1 kg of oranges for Rp 61.000,00. Ina bought 1 kg of apples, 3 kg of grapes, and 2 kg of oranges at Rp 80.000,00. The price of 1 kg of apples, 1 kg of grapes, and 4 kg of oranges are ....
3. At the "MURAH" bookstore Abid bought 4 books, 2 pens, and 3 pencils at the price of Rp 26.000,00. Farhan bought 3 books, 3 pens, and 1 pencil for Rp 21.500,00. Shifa bought 3 books and 1 pencil for Rp 12.500,00. If Ane buy 2 pens and 2 pencils, then he has to pay ....

Figure 1. Test Instrument

Table 1 describes the interview guidelines that guide the observer to collect data. This interview guideline is used to understand and confirm the oral communication process of the written tests they have done. This interview guideline is based on indicators of oral mathematical communication skills according toPuspa, Riyadi, & Subanti (2018), namely (1) expressing mathematical ideas; (2) interpret mathematical ideas (notations and symbols); and (3) evaluating mathematical ideas and solution. However, this guideline does not mean guiding the interviewer to use all question items too rigidly.

Table 1. Guideline for Interview

Indicator of mathematical communication skills	Example of item question
Understanding (express) problem	Do you understand the purpose of this story problem? Explain! What is the idea or concept of the problem? Do you understand every notation or symbol in the story problem? Explain!
Interpret problem	Do you have trouble finding a solution to the story problem? Can you explain about the solution?
Evaluate	Do you check back after getting an answer? Can you explain about the conclusion?

In addition to indicators of oral mathematical communication skills, there are also indicators of written communication skills that also adopted fromPuspa, Riyadi, & Subanti (2018). In analyzing student answer, scoring techniques were used for mathematical communication skills test questions based on the assessment rubric made by Ramadhan & Minarti (2018)shown in Table 2.

Table 2. Item Scoring Guideline Test of Mathematical Communication Skills

Score	Mathematical Communication Skills
0	No answer
1	The answer is wrong but there is a reason
2	The answer is almost correct (the conclusion is not there or the formula is right but the conclusion is wrong or the answer is right the reason is wrong)
3	The correct answer with not complete reason or the answer is a little wrong
4	The answer is correct with correctly and clearly reason

To measure mathematical communication skills individually students use the following formula:

$$P = \frac{X}{Y} \text{ x } 100$$

Information:

P = Level of mathematical communication skills of each individual

X = Total score obtained by individuals

Y = Maximum score of each individual

Furthermore, the results of the percentage score of students' mathematical communication skills are categorized into very high, high, medium, low, very low categories. This category is converted by using a score conversion according to Nurkancana and Sunarta in (Arifani, Sunardi, & Setiawan, 2015).

Table 3. Score Conversion

Percantage	Category
$88 \leq P \leq 100$	Very high
$76 \leq P < 88$	High
$64 \leq P < 76$	Medium
$52 \leq P < 64$	Low
$P < 52$	Very low

Adopted to Polya in Asmana (2018) the indicators of mathematical problem-solving abilities in this research are (1) understanding problems (identifying problem); (2) devise a plan and carry out the plan; and (3) look back. Scoring to mathematical problem-solving ability given as in Table 4 by adopted the rubric fromWahyuningrum & Suryadi (2014)

Table 4. Item Scoring Guideline Test of Mathematical Problem-Solving Abilities

Score	Scale I Understanding	Scale II Plan	Scale III Look back
0	There is no attempt	There is no attempt	There is no attempt

1	Completely wrong to interpret the problem	Solution plan does not fit	Computational errors most of the solution is wrong, wrong answer.
2	Misinterpretation of most of the problems	Partially correct procedures with large error	Computational true, true answer
3	Misinterpretation of fraction problems	Substantially correct procedure with minor errors	-
4	Complete understanding of the problem	Complete understanding of the problem	-
Max Score	4	4	2

The analysis phase is carried out after obtaining data collection from written test data and interviews. The results of tests of mathematical communication skills and interviews were analyzed using indicators established by researchers. First, the results are analyzed using problem-solving indicators to find out how students solve story problems. Then it is re-analyzed using indicators of mathematical communication skills to find out which category the student is in. The stages in data analysis include data reduction, data display, and verification.

Findings and Discussion

Here, the following table categories the research subject based on the level of mathematical abilities:

Table 5. Level of Mathematical Abilities

Name	Category	Code
MR	High	ST
JA	Medium	SS
KP	Low	SR

Mathematics problem-solving abilities code PM, for scale 1 code PM1, scale 2 code PM2, and scale 3 code PM3. For mathematical communication abilities code KM. It also supported the students' interviews.

Student Work

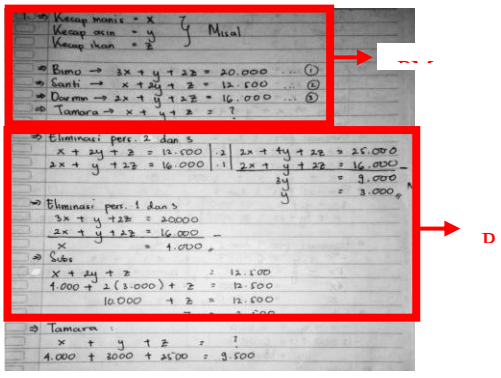

Figure 2. Answer ST in number 1

Based on Figure 2, it can be identified that ST understands the problem by writing things that are known and what is asked in PM1. ST also wrote the solution coherently and clearly seen in PM2. Furthermore, ST writes conclusions correctly using mathematical sentences, but SH does not explain clearly using their sentences. The ST conducts a double check but the ST does not write it down, so the ST answer is correct but the evaluation

indicators are not fill in writing. This was also shown in the interview between researcher and ST. See the transcript of the interview in Figure 3.

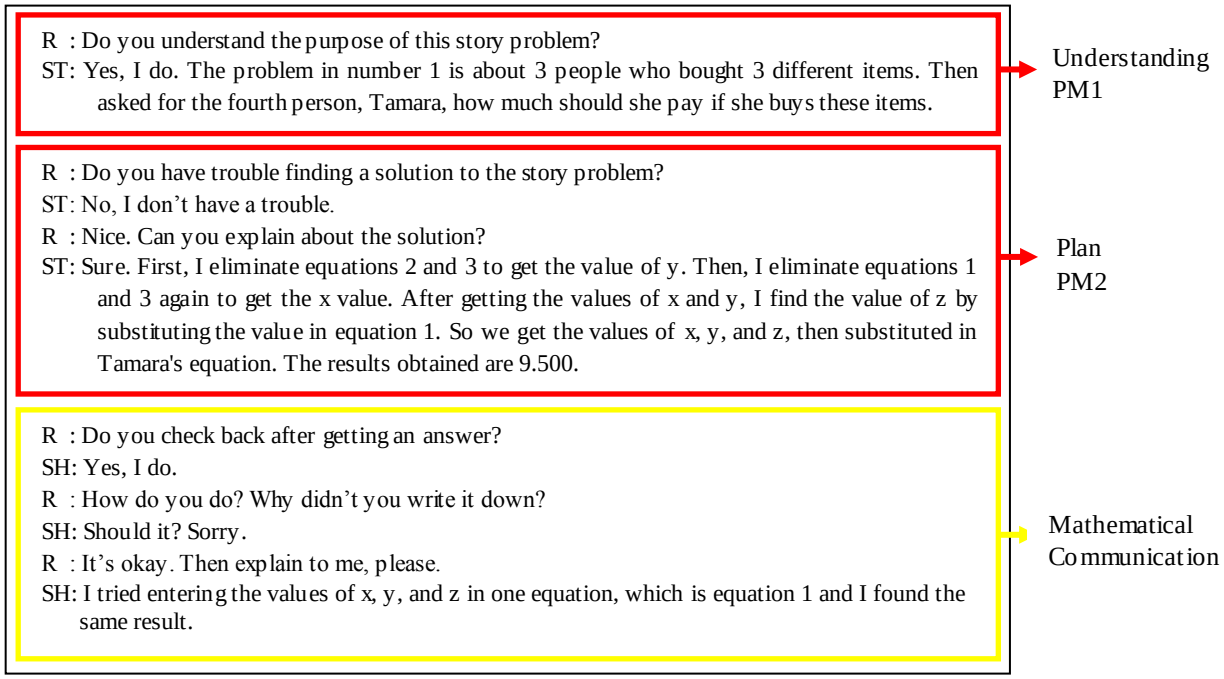

Figure 3. Interview about Understanding, Plan, and Mathematical Communication of ST

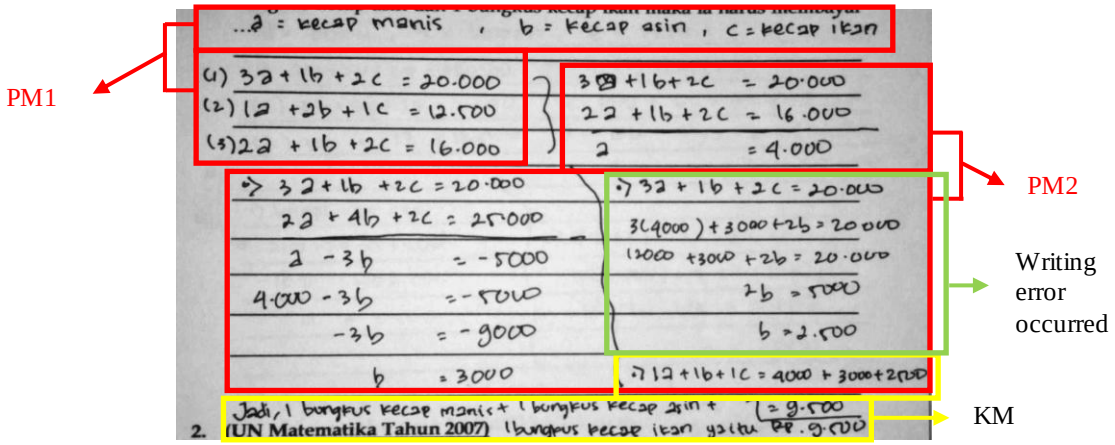

Figure 4. Answer SS in number 1

Based on Figure 4, it can be identified that SS understands the problem by writing things that are known but SS does not write what is asked in PM1. SS also does not write clearly, equation 1, 2, and 3 belongs to whom. SS also wrote a coherent solution but it was unclear because SS did not provide any information regarding the plot or method used in PM2. SS also made a writing error on PM2. Furthermore, SS wrote a conclusion using a mathematical sentence and translated it using his own sentence. SS did a double check but SS did not write it so the SS answer was correct but it did not fill the mathematical communication indicator that is evaluation. This was also shown in the interview between researcher and SS.

R : Do you understand the purpose of this story problem?
SS: Yes, I do. In this problem 1, there are 3 people known where each person bought 3 items. Asked the price of each item and then asked to find out how much money Tamara has to pay.
R : Why didn't you write what it asked?
SS: I wrote but in the end while answering it.
R : I don't think that's what was asked but it's your answer. So you don't write down what is asked.

→ Understanding PM1

R : Do you have trouble finding a solution to the story problem?
SS: No, I don't.
R : Nice. Can you explain the solution that you wrote? Because I feel a little unclear.
SS: Yes, sis. First, eliminate equations 1 and 2 to find the value of *a*. Then I eliminate equations 1 and 3 again to get the value of *b*. After getting the values of *a* and *b*, I find the value of *c* by substituting the values of *a* and *b* into equation 1. Sorry sis, I wrote this wrong.

→ Plan PM2

R : Do you check back after getting an answer?
SS: Yes, I do.
R : How do you do? Why didn't you write it down?
SS: Should it? I don't know.
R : It's okay. Then explain to me, please.
SS: I tried entering the values of a, b, and c in one equation, which is equation 2 and I found the same result.

→ Mathematical Communication

Figure 5. Interview about Understanding, Plan, and Mathematical Communication of SS

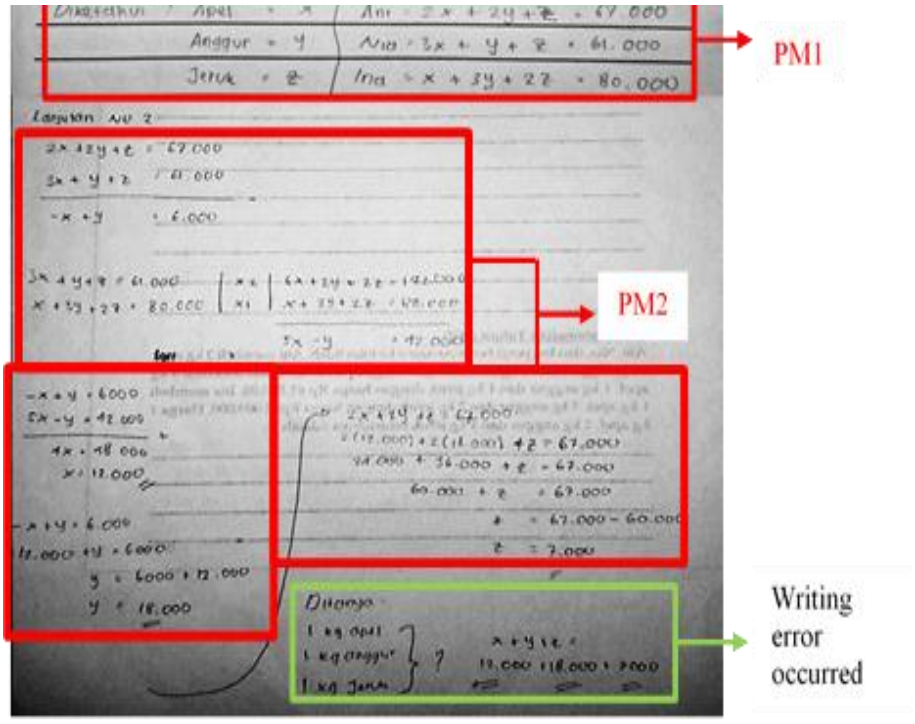

Figure 6. Answer SR in number 1

Based on Figure 6, it can be identified that SR understands the problem by writing things that are known but SR does not write what is requested on PM1. SR writes what is known by elaborating one by one to make the system of the equation clearer. SR also wrote a coherent solution but it was unclear because SR did not provide any information regarding the plot or method used in PM2. Furthermore, SR writes conclusions using mathematical sentences but SR does not explain clearly using their sentences. SR does not do double checks. Therefore, SR's answer was wrong and SR did not answer perfectly. This was also shown in the interview between researcher and SR. See the transcript of the interview in Figure 7.

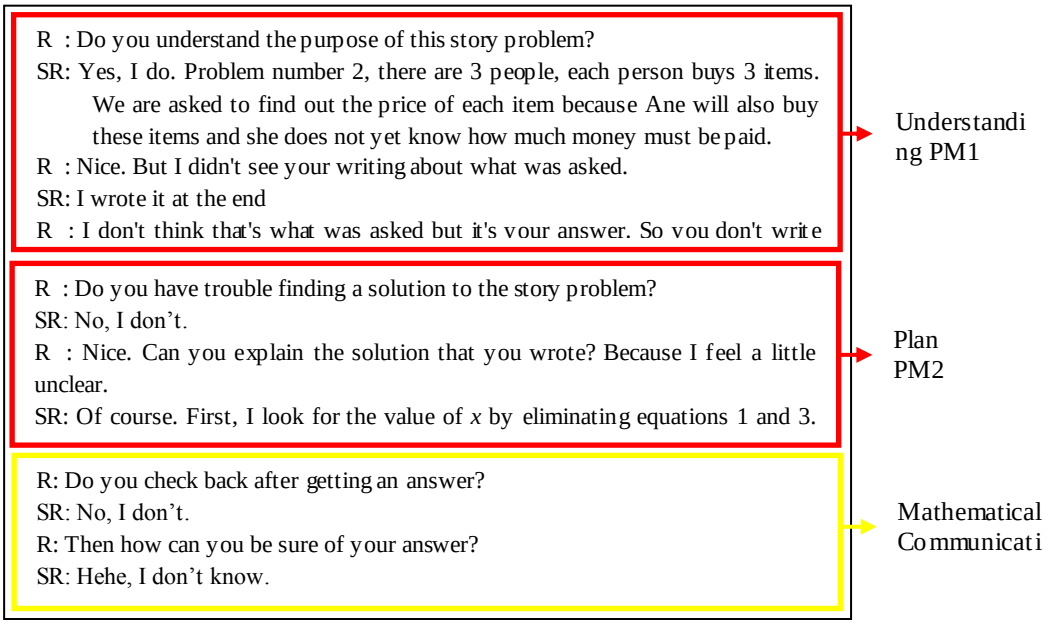

Figure 7. Interview about Understanding, Plan, and Mathematical Communication of SR

Conclusion

From the results of student work, the value of each student can be written to determine the categories of student communication skills and problem-solving abilities is based on the score guidelines that have been mentioned before shown in Table 6.

Table 6. Score of Student Work

Question Item	Aspects		Score		
			SH	SM	SL
1	Problem-Solving Abilities	Understanding	4	4	4
		Plan	4	3	3
		Look Back	2	2	0
	Mathematics Communication Skills	Writing	3	1	2
		Oral	4	3	2
2	Problem-Solving Abilities	Understanding	4	4	4
		Plan	4	3	3
		Look Back	2	2	0
	Mathematics Communication Skills	Writing	3	2	1
		Oral	4	3	2
3	Problem-Solving Abilities	Understanding	4	4	4
		Plan	4	3	3
		Look Back	2	2	0

Mathematics Communication Skills	Writing	3	2	2
	Oral	4	3	2
Total Score (Problem-Solving Abilities)		30	27	21
Total Score (Mathematics Communication)	Writing	9	5	5
	Oral	12	9	6

Data in Table 6 shows the differences in scores on problem-solving abilities and mathematical communication skills. Students with high-level mathematical abilities have high-level problem-solving abilities because ST can understand each given problem, can solve problems, and also check again. However, for the level of mathematical communication skills in writing, ST is included in the medium category. That is because ST can write coherently and clearly, ST does not write the results of re-checking, and ST also only provides conclusions using mathematical sentences but does not provide conclusions with their own sentences. As for the level of oral mathematical communication skills, ST is included in the very high category. That's because ST can communicate coherently and clearly, ST does a double-check so that the answer is correct, and ST gives conclusions using mathematical sentences and with their own sentences.

Students with medium-level mathematical abilities have medium problem-solving abilities because SS can understand each given problem, can solve problems but is less coherent and clear, and also re-check. However, for the level of mathematical communication skills in writing, SS is included in the very low category. That is because SS can write problems clearly but not coherently, SS does not write the results of re-checking then there are some writing errors, and SS gives conclusions using mathematical sentences and with their own sentences. As for the level of oral mathematical communication skills, SS is included in the medium category. That's because SS can communicate coherently and a little less clearly, SS does a double-check so that the answer is correct, and SS provides conclusions using mathematical sentences and with their own sentences.

Students with low-level mathematical abilities have a low-level problem- solving skills because SR can understand each given problem, can solve the problem but there are problems that are solved incomplete, and also do not check again so that there are answers given incorrectly. However, for the level of mathematical communication skills in writing, SR is included in the very low category. That is because SR can write problems clearly but not coherently, SR does not write the results of re-checking so there are wrong answers, and SR also only gives conclusions using mathematical sentences but does not provide conclusions with their own sentences. As for the level of oral mathematical communication skills, SR is included in the low category. That is because SR can communicate clearly but not coherently, SR does not re-check so there are wrong answers, and SR gives conclusions using mathematical sentences and with their own sentences.

These results indicate that communication skills are in line with the ability to solve problems and are influenced by the level of mathematical ability. This is different from Nurhasanah (2019) which states that students make a lot of mistakes in workmanship so that students' communication skills are considered low. Whereas in this research, the level of mathematical abilities influences the mistakes made by students.

Conclusion

Based on the results and discussion, it can deduce students' mathematical communication skills in line with their ability to solve problems for story problems. This is influenced by the level of mathematical abilities of each student. The higher the mathematical abilities of each student, the higher the mathematical communication skills and problem-solving abilities. However, this influence will differ in mathematical communication skills both written and oral. Students tend to be better at solving story

problems by communicating orally rather than in writing. This can be seen in the scores obtained by students, oral communication skills scores higher than the skills to write.Therefore, for further research, it is suggested that other researchers can develop the design of learning methods or instructional media that can improve students' mathematical communication skills in writing. It will be useful for teachers to know the profile of students' mathematical communication skills and use them to evaluate learning methods.

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ACADEMIC STAFF UNION VERSUS GOVERNMENT NEGOTIATION STRATEGIES: A VERITABLE TOOL FOR SUSTAINING INDUSTRIAL HARMONY IN ONDO STATE SECONDARY SCHOOLS, NIGERIA

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Abstract
The study assessed negotiation strategies adopted by ASUSS and the government for sustaining industrial harmony in Ondo State secondary school, Nigeria. The study adopted the survey research design using a quantitative approach. The population for the study comprised 300 Principals, 600 Vice-Principals, and 13,000 teachers from the 300 secondary schools in Ondo State. The sample was made up of 1500 respondents which comprised 90 principals, 180 vice-principals, and 1,230 teachers using a multistage sampling procedure. An instrument was used to gather data. The data collected were analyzed using descriptive statistics. The findings of the study established that the causes of industrial disharmony between ASUSS and Ondo State Government were inadequate teaching and infrastructural materials (96.1%), unfavorable salary structure applicable in the State (97.3%), undue interference of government in union leadership and Government non-implementation of concluded agreements between ASUSS and Ondo State Government (93%). The findings also showed that the causes of the industrial disharmony have made ASUSS and Ondo State Government to have frequent disharmony annually (76.9%), every five years (76.7%), and biennially (76.7%). The results also indicated that the various negotiation strategies that have been adopted by ASUSS and government which include mediation (88.10%), conciliation (62.20%), arbitration (53.6%), formal Inquiry (99%), and reference to the National Industrial Court (99.10%). The results equally showed that the most effective strategies that were frequently used in enhancing industrial harmony were a board of inquiry (52%) and collective agreement (93,7%). The study concluded that mediation, conciliation, arbitration, formal inquiry, and reference to the National Industrial Court were the ASUSS and Ondo State Government negotiation strategies as a means of ensuring industrial harmony in Ondo State secondary schools.

Keywords: academic staff union; government; negotiation strategies; industrial harmony; secondary school

Introduction

In the world today, industrial harmony could be regarded as mutual understanding, compatible interest, and extreme satisfaction of employers and employees in the place of work especially those about the terms and conditions of the contract, collective bargaining, and working conditions. In other words, industrial harmony could mean the ability of

employers to make provision for the employees as regards to their needs and all other necessary working materials that will assist the organization to carry out duties successfully. Thus, industrial harmony is geared towards the ability to reach a mutual agreement between the employers and employees on any issue about employers-employees' interactions or relations. According to Puttapalli and Vuram (2012), industrial harmony is majorly concerned with the mutual interaction between employees and management of the organization by stipulated terms and conditions that guide the employment as well as the workplace. This connotes that both the management and employees team all their effort willingly toward the achievement of the organization's stated objectives and aims. In line with the notion, Mannix (2001) disclosed that industrial harmony is a result of satisfaction derived from employer-employee relations. A cordial relationship between employer and employing is a signal to the development of any country. To Akuh (2016), industrial harmony has brought enhancement to labor productivity which in turn has improved the performance of the education sector, achieved economic growth, and enhanced the standard of living as well as the quality of life. This has created a peaceful working environment that is conducive to accommodate dialogue, tolerance, and other alternative ways to resolve industrial disputes. It has also created a high level of satisfaction for employees. Moreover, having industrial harmony could not mean that conflict of interest bargaining procedure will not exist but proactive, bargaining procedure and collective agreements could be the best method to adopt in preventing the conflicts bargaining procedure from transforming into an uncontrollable crisis.

The expected duty of management from the ideal place of work is to ensure industrial peace as well as harmony in the organization. Thus, as a party in the education sector and as a labor union, ASUSS are expected to foster the spirit of active co-operation and comradeship between teachers and other workers to enhance the social and economic well-being of members and establish welfare funds for the benefit of members of the Union. This is to provide a forum for the co-operation of teachers, the promotion of their welfare, protect the interest of education and the teaching profession throughout the federation. Generally, the parties of industrial harmony are primarily the employees, the employers, and the government. Sometimes, discord may arise among the parties involved which, if not resolved, may lead to industrial disharmony particularly strike actions. In the Nigerian educational system, many problems of incessant industrial disharmonies arise from a misunderstanding among employers, employees as well as the government. Sometimes, government and other education stakeholders do not act as they talk, which may inhibit industrial harmony and give room for protests and unrests which mostly take the form of strike actions by ASUSS.

The forms of protest embarked collectively by the employees are exemplified by demonstrations, mass meetings, strikes, and resolutions. Strikes and other industrial disharmonies are inimical to the achievement of educational goals and aspirations but they are avoidable and can be reduced to the barest minimum when the government, employers, and employees cooperate to harmonize their interests and efforts towards finding a feasible and sustainable panacea to issues bedeviling any of the education stakeholders. According to Adebiyi (2015), ASUSS has a formidable voice to protect the interest and the welfare of secondary school teachers in terms of provision of appropriate working conditions, better pay, and reward systems to the knowledge of the government to positively act upon. Ladan (2012) said that the frequent occurrence of strike actions by ASUSS can be traced to poor conditions of service, low wages, and poor funding. Industrial actions could be sometimes used to put pressure on the government and employers to change policies or on the other way to fulfill mutual agreements between them. Industrial action is otherwise known as a labor strike. In this regard, Adebisi (2004) referred to industrial labor as work stoppage caused by the refusal of employees to work in their place of work. Labour strike usually

occurs in response to employees' grievances in line with history, most of the western countries partially legalized strike actions in the late 19th or early 20th centuries.

In Nigeria, especially in Ondo State, there has not been a long space of industrial harmony between ASUSS and government between 1985 and 1999 as the level of industrial disharmony was worse off during the military regimes. During this time, industrial disharmony also took the form of strike actions as a result of botched agreements especially on the part of the Federal and State governments as well as the use of inappropriate negotiation strategies on the part of both parties (Government and ASUSS). Consequently, during this period, Ondo State also had her share of these national industrial crises in her education sector just like every other state in the country. Industrial disharmony between ASUSS and the government appears to be a result of misunderstanding or use of ineffective strategies by the government during negotiation. However, sometime in the Fourth Republic in Nigeria (1999-2003), ASUSS, the then Nigeria Union of Teachers: secondary school wing embarked on a total strike across all the secondary schools in Ondo State as a result of unfavorable policy and lack of political will to honor mutual agreements. The strike lasted for nine months. In 2005, ASUSS in Ondo State embarked on a sit-down strike for the failure of the Ondo State government to implement the minimum wage policy of the Federal government. Before they embarked on this strike action, ASUSS had written severally and consulted with the government to intimate them of their displeasure and to implement the policy to foster industrial harmony but their consultations yielded no result until the Unions embarked on strike.

According to Adebiyi (2010), in 2009, there was a warning strike that lasted for a week as a result of unfavorable government policy which stipulated that; compulsorily, all classroom secondary school teachers in Ondo State should be computer literate and must be ICT compliant before he/she would be recognized as a secondary school teacher in the State. The enforcement of this policy went as far as to require that all secondary school teachers must present Computer-Based Diploma certificates from notable awarding centers at the Ondo State Ministry of Education before such teachers' names would be included in the state's government payroll. At the end of the one-week warning strike, representatives of ASUSS were invited for a discussion with the Commissioner of Education and some other government representatives to present their grievances. After two days of marathon dialogue, both parties reached an agreement through collective bargaining that led to the re-modification of the policy, that all members of ASUSS in Ondo State should go back to work with or without their Certified Diploma Certificates in Computer-Based training but must compulsorily register with the Computer Training Institute which would be provided for by the government across all the secondary schools in Ondo State to train her teachers on the rudiments of Microsoft office tools. This re-modified policy was implemented and both the government and ASUSS had a win-win situation.

The crash of revenue in the global oil market in 2014 led to the state's reduction of Federal government monthly allocation which created another basis for industrial disharmony between ASUSS and Ondo State government as the latter was unable to pay three months outstanding salaries of the former in December 2015. ASUSS embarked on a local strike in solidarity with some other states of the federation protesting for their outstanding. Ondo State government engaged the representatives of the union and pleaded with them to understand that the situation was a result of the global trend and made reference to the good times of how the State government had treated them well. Based on this, ASUSS resumed and also pleaded with the government to come to their aid to boost their economic strength. The most recent was in June 2016, when all Ondo State workers, including ASUSS embarked on a total strike for 30 working days protesting for five months outstanding. The government also engaged the union in dialogue and pleaded with them to show some understanding and promised to pay a month outstanding which was

paid before ASUSS agreed to suspend the industrial action.

According to Amadi (1999), in Nigeria, the machinery for settling trade disputes was created by the Trade Dispute Act 1990. The machinery is founded on the hierarchy of procedures. At the base and apex of the hierarchy are the collective bargaining processes sometimes involving mediators and the National Industrial Court (N.I.C) respectively. Between these two are the Conciliator and the Industrial Arbitration Panel (I.A.P). The purpose of establishing these bodies is to provide an effective mechanism for ironing out differences between parties to a trade dispute without necessarily having resulting in strikes or lockouts (Amadi, 1999). ASUSS just like most pressure groups seeks the interest and welfare of her members as the main objective. Adebiyi (2016) reported that ASUSS has not been an exemption in this regard to most Unions' objective and as such if there is persistent re-occurrence of industrial disharmony, then the usual negotiation strategies that have been adopted should be re-examined or re-modified for more effective negotiation strategies that would enhance industrial harmony (Adebiyi, 2016). Osad and Osas (2013) clearly stated that government, in their negotiation needs to find new ways of working and negotiating. This could mean that the old principle of command, control, compliance of "they and we" must be challenged and abandoned. Modern business is too complex to profitably separate the thinkers and doers (Osad & Osas, 2013). Studies by Nwankwo, (2000) and Onuoha, (2001) have shown that over the last thirty years, the Nigerian education system has been witnessing an unprecedented industrial disharmony than any other social institution. This could be as a result of its strategic place both in the nation's hierarchy of priorities and how it is considered as a veritable instrument for national development. Due to the incessant occurrence of industrial disharmony, the Nigerian education system has become a shadow of itself with characteristics of non-payment of staff salaries, dilapidated structures, inadequate funding by the government, and brain drain.

However, Ajasa, (2015) posited that the Ondo State government's insensitivity to prioritizing the overhead cost of governance overpayment of salaries of ASUSS as at when due and diversion of funds meant for payment of teachers' salaries to other areas government that can easily make quick returns had constituted to part of the major reasons for industrial disharmony. This has led to a series of industrial actions by ASUSS in Ondo State secondary schools. Between 2010 and 2015, secondary schools' teachers embarked on strike actions seven times despite the negotiation strategies adopted by the government to enhance industrial harmony. Moreover, the studies intervening on industrial disharmony between ASUSS and government most especially in Ondo state are scanty. This has created a knowledge gap that has necessitated this study. Thus, it becomes expedient to examine strategies that would improve industrial harmony between ASUSS and Ondo State government in Ondo State secondary schools; hence this study.

The following research questions were raised to guide this study:

1. What are the causes of industrial disharmony between ASUSS and Ondo State government?
2. How frequent is the industrial disharmony between ASUSS and Ondo State government?
3. What are the negotiation strategies that have been adopted by ASUSS and the government in sustaining industrial harmony in Ondo State secondary schools?
4. Which of the strategies is the most effective towards improved industrial harmony between ASUSS and Ondo State government?

Conceptual Reviews

Negotiation could be regarded as of settle conflict in other to reach an agreement. Negotiation occurs in different organizations. According to Benjamin & Hideaki (2004),

negotiation is a process of combining different divergent positions into a joint agreement under a decision rule of unanimity. They further claimed that negotiation aims to resolve points of difference, to gain an advantage for an individual and also to craft outcomes to satisfy various interests of those involved. Besides, the negotiation could achieve win-win outcomes that will maintain industrial harmony in the organization. Industrial harmony is a sign that there is peace between the management and employee in the organization. In this notion, Akuh (2016) regarded industrial harmony as an industrial environment where employees along with their union and management understand, allow peace, and accept each other as partners in progress in a way that cooperation is ascertained on the rewards, performances, and outputs. Industrial harmony thus involves the ability of the employer and employees to have a proper dialogue concerning the terms and conditions of employment. But when there is no agreement between the employer and employee leads to industrial disharmony.

According to Fajana (2000), industrial disharmony means the inability of the employees and employers to reach an agreement on any issue about employers-employees' relationship. Fajana (2000) further disclosed that industrial disharmony mainly takes in the form of strikes. However, not all the time industrial disharmony takes the form of strike, it also takes other forms like sabotage, rudeness among others. In line with this notion, Muhammad (2014) opined that industrial disharmony occurred whenever the clash of interests exists in worker-management interactions. Industrial disharmony could be expressed in different terms such as trade dispute, strike action, industrial dispute, and industrial unrest. According to Akume and Abdullahi (2013), the causes of industrial disharmonies can be broadly classified into two categories: economic and non-economic causes. The economic causes will include issues relating to the untimely payment of staff salaries, conditions of work, bonus, allowances, working hours, leave, and holidays without pay as well as unjust layoffs and retrenchments. The non-economic factors include indiscipline on part of managers, victimization, and harassment of workers, favoritism, and ill-treatment of staff members.

Empirical Reviews

Sherwyn, Michael, and Judy (2000) conducted a study on the communication discipline. The results of the studies indicated that communication develops the whole person and improves the work of business. A study conducted by Karina (2013) aimed to contribute towards a more precise and comprehensive understanding of listening as management skills. The results suggested that perceived listening quality is linked to situational indicators of emotional well-being and interpersonal trust which enhance good labor-management relations. Meanwhile, Sherwyn, Michael, and Judy (2000) and Karina (2013) majorly focused on the communication aspect of employer-employee relations.

Awe and Ayeni (2013) carried out an investigation of Industrial Relations and National Productivity in Nigeria. The study indicated that productivity in Nigeria can be constrained by poor labor-management relations. The study further emphasized that outcomes of poor labor-management relations were strike actions and other forms of industrial disharmonies like sabotage. Based on the results of the study, improving workers' morale and motivation have been suggested as a way to improve labor-management relations and this can take many forms. Mba (2013) and Henry (2009) in their research reported that managers prefer the use of integrative management strategies which are relatively useful in minimizing the incidence of disruptive labor-management relations and having a positive impact on corporate productivity and organizational performance. A study conducted by Fajana and Shadare (2012) stressed that in the employment relationship, the interests of employers represented by management and employees represented by the labor union have often been opposed in work-organizations.

This has historically been the major cause of disruptive labor-management relations in unionized organizations, not only in Nigeria but also in developed nations.

Theoretical Framework

To better explain this study, this study hinged on the conflict theory propounded by Karl Marx (1848). The theory claims that a society is in a state of perpetual conflict due to competition for limited resources and that social order is maintained by domination and power, rather than consensus and conformity. According to this theory, those with wealth and power try to hold on to it by any means possible, mainly by suppressing the poor and powerless. The theory further argues that individuals and groups (social classes) within the society interact based on conflict rather than consensus. Through various forms of conflict, groups tend to attain varying amounts of material and non-material resources (e.g. the wealthy vs. the poor). More powerful groups will tend to use their power to retain power and exploit groups with less power.

The conflict theory is relevant to this study because the owner represents the Government while the tenant represents ASUSS. The government is the employer of ASUSS has the power to suppress them because they are the employer of labor who puts foods on government teachers' tables. The government may sometimes use its power not to honor agreements, thereby giving an avenue to exploit workers. Also, under the theory that conflict is an engine of change, some favorable policies and modifications of policies that affect ASUSS have taken place as a result of industrial disharmony between ASUSS and the government.

Method

The study adopted the survey research design using a quantitative approach. The population for the study comprised 300 secondary School Principals, 600 Vice Principals, and 13,000 teachers from all the 300 public secondary schools in Ondo State. Given a total of 13, 900. The sample for the study comprised 1,500 respondents. The multi-stage sampling procedure was adopted to select the respondents for the study. The secondary schools in the State were grouped according to the three Senatorial Districts within the State. A total of 90 secondary schools were in Ondo North Senatorial District; 107 secondary schools were in Ondo South Senatorial District while 103 secondary schools were in the Central Senatorial District. Three Local Government Areas were thereafter randomly selected from each of the Senatorial District. Ten secondary schools were then selected from each of the three LGAs using a purposive sampling technique based on the location of academic staff in each of the secondary schools. From the selected schools, 90 Principals, 180 Vice principals, and 1,230 teachers were selected using the convenience sampling technique. A self-designed research instrument titled "Assessment of Academic Staff Union of Secondary School's Negotiation Strategies Descriptive Questionnaire" (AASUSSNSDQ) was used to collect data for this study.

The instrument contained five sections: A, B, C, D, and E respectively. Section A contained demographic information of the respondents. However, Section B contained five items that were used to elicit information on issues regarding industrial disharmony. Section C also contained nine items that were to gather data on causes of constant industrial disharmony. Besides, Section D contained six items on general information on negotiation strategies, while Section E contained eight items that were used to elicit information on Academic Staff Union-government negotiations strategies and industrial harmony. Face and content validity of the instrument was established using experts' review, and the test re-test method was adopted to achieve the Cronbach's Alpha reliability coefficient of 0.70. Data collected were analyzed using descriptive (frequency counts) and inferential (ANOVA) statistics. Descriptive statistics (frequency counts and percentage

scores) were used for Research Questions 1, 2, 3, and 4.

Findings of the Study

Research Question 1: What are the causes of industrial disharmony between ASUSS and Ondo State Government?

Table 1: Causes of Industrial Disharmony between ASUSS and Ondo State Government

Statements on the causes of industrial disharmony	Strongly Agree		Agree		Disagree		Strongly Disagree		C (%)
	F	%	F	%	F	%	F	%	
Dishonored agreements on the part of Government are mostly responsible for disharmony	101	7.1	998	69.8	306	21.4	24	1.7	76.9
Secondary School teachers' current salaries and wage structure as applicable in Ondo State	1373	96.1	17	1.2	20	1.39	16	1.11	97.3
Some Government policies are responsible for Industrial disharmonies	350	24.5	890	62.2	81	5.7	108	7.6	86.7
Deviation from collective agreements on the part of the Union	41	2.9	190	13.3	1127	78.8	71	5.0	16.2
Inadequate teaching materials and infrastructural facilities for Teachers	99	7.4	1181	88.7	33	2.5	18	1.4	96.1
Low standard of conducive environment for effective teaching and learning processes	859	60.2	498	34.9	64	4.5	6	0.4	95.1
ASUSS Leadership inadequacies with Nigerian labour laws in pursuance of agitations leads to disharmonies	36	2.5	99	6.9	1192	83.4	102	7.1	9.4
Undue interference of Government in Union leadership	475	33.2	854	59.8	39	2.7	61	4.3	93
Disallowance of secession of ASUSS from NUT through intimidation from Government	898	62.8	200	13.9	31	2.17	300	21.13	76.7

Key: Agree and Strongly Agree Combined Response is represented by C

Table one shows that the causes of industrial disharmony between ASUSS and Ondo State Government were dishonoured agreements on the part of Government (76.9%), secondary school teachers' current salaries and wage structure as applicable in Ondo State (97.3%), some government policies (86.7%), inadequate teaching materials and infrastructural facilities for teachers (96.1%), low standard of conducive environment for effective teaching and learning processes (95.1%), undue interference of Government in Union leadership (93%) and disallowance of secession of ASUSS from NUT through

intimidation from Government (76.7%). Based on the results, it is therefore deduced that the causes of industrial disharmony between ASUSS and Ondo State Government were dishonoured agreements by Government, poor salary structure for secondary school teachers, unfavourable Government policies, inadequate infrastructural facilities and low standard of conducive environment.

Research Question 2: How frequent is the industrial disharmony between ASUSS and Ondo State Government?

Table 2: Frequency of Industrial Disharmony between ASUSS and Ondo State Government

Statements on the frequency of industrial disharmony	Strongly Agree		Agree		Disagree		Strongly Disagree		C (%)
	F	%	f	%	F	%	F	%	
There is usually industrial disharmony annually	101	7.1	998	69.8	306	21.4	24	1.7	76.9
Industrial disharmony takes place every other year	1373	96.1	17	1.2	20	1.39	16	1.11	97.3
My Union engages Government in industrial dispute every five years	350	24.5	890	62.2	81	5.7	108	7.6	86.7
ASUSS and Government disagrees biennially	898	62.8	200	13.9	31	2.17	300	21.13	76.7
ASUSS has enjoyed industrial harmony since the last ten years	41	2.9	190	13.3	1127	78.8	71	5.0	16.2

Source: Field survey, 2018

Table two shows that there was frequent industrial disharmony annually (76.9%), industrial disharmony took place every other year (97.3%), the Union engaged Government in industrial dispute every five years (76.7%), and ASUSS and Government disagrees biennially (76.7%). However, ASUSS has not enjoyed industrial harmony since the last ten years (83.8%). This emphasizes the assertion that there has been high frequency of industrial disharmony between ASUSS and Ondo State government. It therefore established that there was frequent industrial disharmony between ASUSS and Ondo State Government

Research Question 3: What are the negotiation strategies that have been adopted by ASUSS and Government in sustaining industrial harmony in Ondo State secondary schools

Table 3: Negotiation Strategies adopted by ASUSS and Government in sustaining industrial harmony

Statements on negotiation strategies	Strongly Agree		Agree		Disagree		Strongly Disagree		C (%)
	F	%	F	%	F	%	F	%	
Collective bargaining that leads to unanimous agreement is a common strategy employed in settling Industrial disputes	31	2.2	42	2.9	1066	74.6	29	20.3	5.10

Government Mediator and not a neutral Mediator is frequently used to broker peace during industrial disputes	194	13.6	1064	74.5	121	8.5	50	3.5	88.10
Does Arbitration panels settle disputes between Government and ASUSS	15	1.1	750	52.5	405	28.3	259	18.1	53.6
Does government appoints Conciliators in attempt to resolve industrial disharmony	99	6.9	791	55.4	507	35.5	32	2.2	62.30
Most often a Board of Inquiry is set up in the interest of both parties	607	42.5	807	56.5	5	0.3	10	0.7	99.00
National Industrial Court acts as the final resort and strategy haven exhausted all other strategy without desired result	909	63.6	507	35.5	9	0.6	4	0.3	99.10

Key: Agree and Strongly Agree Combined Response is represented by C

Table three shows that a government mediator and not a neutral Mediator was frequently used to broker peace during industrial disputes (88.1%), arbitration panels settle use to dispute between Government and ASUSS (53.6%), government-appointed Conciliators in an attempt to resolve industrial disharmony (62.3%), Board of Inquiry often set up in the interest of both parties (99%), and National Industrial Court acted as the final resort and strategy haven exhausted all other strategy without desired result (99.1%) were negotiation strategies that have been adopted by ASUSS and Government in sustaining industrial harmony in Ondo State secondary schools. From the results, it was established that mediation from the government, a reference to an arbitration panel, government conciliation, setting of the board of inquiry, and national industrial court were negotiation strategies that have been adopted by ASUSS and the government in Ondo State.

Research Question 4: Which of the strategies is the most effective towards improved industrial harmony between ASUSS and Ondo State Government?

Table 4: Effectiveness of Negotiation Strategies

Statements on the effectiveness of negotiation strategies	Strongly Agree		Agree		Disagree		Strongly Disagree		C (%)
	F	%	F	%	F	%	F	%	
The National Industrial Court sufficiently settles disharmonies	46	3.2	20	1.4	487	34.1	876	61.3	4.6
Government engages in series of consultations before arriving at decisions	23	1.6	110	7.7	1195	83.6	101	7.1	9.3
Government comes to negotiation table with series of options and not the use veto power	25	1.7	407	28.5	897	62.8	100	7.0	30.2

The Use of Board of Inquiry is an effective negotiation strategy	36	2.5	707	49.5	668	46.7	18	1.3	52
Government Conciliator achieves harmonious relationship during and after industrial disputes	49	3.4	37	2.6	28	2.0	1315	92.0	6.0
Government genuinely exhausts all procedures to resolving industrial disharmony before embarking on litigation (NIC)	112	7.8	44	3.1	1259	88.1	14	1.0	10.9
There are cases where a mediator settles dispute between Union and Government	17	1.2	204	14.3	1180	82.5	28	2.0	15.5
The strategy where both Government & Union skillfully agrees and implements collective agreements works best	954	66.8	385	26.9	31	2.2	59	4.1	93.7

Key: Agree and Strongly Agree Combined Response is represented by C

Table four shows that the use of Board of Inquiry (52%) and the strategy where both Government & Union skillfully agrees and implements collective agreements (93.7%) were strategies that most effective used towards improved industrial harmony between ASUSS and Ondo State Government. This indicated that Ondo State Government used a board of inquiry and collective agreements as strategies towards the improvement of industrial harmony with ASUSS.

The findings of the study established that the causes of industrial disharmony between ASUSS and Ondo State Government were Botched agreements by the Government, poor salary structure for secondary school teachers, unfavorable government policies, inadequate infrastructural facilities, and low standard of a conducive environment. The study is in line with Darmach (1986) who submitted that there was only one basic cause of industrial disharmony which is the clash of necessities between the political class and industrial prerogative. Darmach (1986) stressed issues of salaries and wages as the major cause or source of industrial disharmony. Furthermore, the study concurred with the study of Otobo (2005) who agreed that the government's industrial and economic policies, nature of labor legislation, unpatriotic and unethical behavior of political class among others constitute the external sources of industrial disharmony. The study was also corroborated with Otobo (2005) who argued that internal sources of disharmony include the nature of the physical environment of the workplace, orientation or social consciousness of workers, and low standard of a conducive environment for effective teaching and learning processes. The study also agreed with the study of Azzulence (1999) also supported the assertion that industrial disharmony can be caused when there is a breach of contract policy. These findings corroborated with the opinion of Onyeonoru (2005) who emphasized that industrial disharmony could arise as a result of the incompatible interest of workers and employers in the working environment, the disagreement arising from the clash of interest in terms and conditions of employment resulting from opposing view held by workers about their workplace. The findings also showed that the causes of the industrial disharmony have made ASUSS and Ondo State Government to be frequently industrial disharmony annually as well as every five years.

Moreover, ASUSS has not enjoyed industrial harmony for the last ten years in Ondo State.

The findings further established that to sustain industrial harmony between the ASUSS and the government in Ondo State different negotiation strategies have been adopted such as mediation from the government, a reference to an arbitration panel, government conciliation, setting of the board of inquiry, and national industrial court. The study corroborated the study of Onyeonoru (2005) who disclosed that collective bargaining is an institutional center of piece relations and the best method of conducting industrial relations. Besides, the findings corroborated the opinion of the Nigerian Labour Congress policy Document (2008) who stated that Collective bargaining remains the only solution to constant industrial disharmony, listed some of the conditions necessary for effective collective bargaining to be; freedom of association, favorable political climate, recognition of trade unions, power relationship, willingness to give and take, the ability of the parties to negotiate skillfully, avoidance of unfair labor practice by both parties, willingness to observe the collective agreement that emerges, and to reach an agreement between parties.

The results of the study further established the most effective negotiation strategy used between Ondo State government and ASUSS towards improving their industrial harmony was the board of inquiry and collective agreements.

Conclusion

The ASUSS and Ondo State Government industrial harmony cannot be over-emphasized in the achievement of educational goals. Their harmony would strengthen the attainment of educational objectives. That is why it is imperative that Ondo State government and ASSU identify causes of industrial disharmony between them and adopted the most effective negotiation strategy that would strengthen and improve industrial harmony between them. Therefore, the Ondo State government and other states government are expected to strategies negotiation strategy that would allow industrial harmony with the ASSUS. The findings implicate that the government should adopt a negotiation strategy that would allow industrial harmony with the ASSUS.

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DEVELOPMENT OF MICROALGA DIVERSITY MODULE AS A BIOLOGICAL LEARNING MEDIA TO IMPROVE LEARNING OUTCOMES OF X GRADE HIGH SCHOOL STUDENTS IN PROTISTA MATERIAL

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Abstract
Microalgaeis a biological material that has an abstract nature, meaning that it cannot be directly observed by the five senses and must use certain tools to see it. The objectives of this study were: 1. Producing biology learning media in the form of modules, 2. Knowing the practicality of the module based on the activities and responses of students, 3. Knowing the effectiveness of using modules based on the achievement of indicators and 4. Knowing the feasibility of the module of microalgae diversity as a learning medium biology to improve the learning outcomes of class X high school students on protist material. This research method uses development research or R & D with the development model of Borg and Gall, 1983. The results of the study based on the N-gain value showed that the experimental class got a higher score than the control class and had moderate effectiveness. Based on the validity test conducted by 3 validators, the results stated very valid so that it was suitable for use as a learning medium.

Keywords: module, microalgae, learning media

Introduction

Protists are a kingdom in plant taxonomy. Protists are divided into 3 groups, namely plant-like protists, animal-like and fungal-like protists. Plant-like protists are referred to as algae or algae. Algae have a macroscopic size (Macroalgae) and a microscopic size (Microalgae). Microalgae are often referred to as phytoplantons and are the largest contributor to all photosynthetic activities that occur on earth. About 70% of phytoplankton absorbs CO2, fills the air atmosphere with O2 and also helps the life cycle in the food web in aquatic life (Japa, 2018).

Plant-like protists are grouped into 7 divisions, namely, Chrysophyta, Euglenophyta, Rhodophyta, Pyrrophyta, Phaeophyta, Chlorophyta and Bacillariophyta. However, not all 7 divisions are included in the microalgae (microscopic algae) group. Several divisions that are included in microalgae and are unicellular, namely, Bacillariophyta (Diatomae), Pyrrophyta (Dinoflagellata), Euglenophyta and Chlorophyta (Japa, 2018).

Microalgae as one of the aquatic biota that can carry out photosynthesis. The ability of these microalgae will produce organic and inorganic substances so that microalgae are dubbed as primary producers of waters. In addition, microalgae are water bioindicators that can measure whether or not the aquatic environment is polluted. The more microalgae

in a waters, the lower the air pollution level and vice versa. Microalgae have limited survival in waters which are influenced by the presence of physical, chemical and biological factors. Physical factors include sunlight, temperature, water brightness, and salinity. Chemical factors include pH and dissolved oxygen. Biological factors include the nutritional needs of microalgae (Fitrialisma, 2018).

Microalgae learning material in the subject of protists is included in a separate curriculum, which is found in basic competencies (KD): 3.6, namely, presenting data on the identification of kingdom protists based on the observed characteristics (Japa, 2018). Microalgae is one of the biology learning materials that has an abstract nature, that is, it cannot be directly observed by the five senses and must use certain tools to see it. Therefore, microalgae material can be said to be material that is difficult for students to understand (Octovi, 2015). So it is necessary to have teaching materials or learning media as a support in increasing knowledge and information about microalgae.

Modules are written learning media in printed form with a systematic arrangement containing learning objectives, learning materials adjusted to core competencies (KI) and basic competencies (KD), instructions for independent practice activities, and evaluation activities or exercises to test students' understanding of the material (Daryanto, 2014).With the use of modules, students get convenience and benefits in the form of feedback, increased learning motivation, reduced remedial activities, and completeness of subject matter with directed learning objectives (Khasanah, 2017).

Making printed modules must be creative, innovative and challenging in order to provide enthusiasm and high curiosity for students. As said (Octovi, 2015) the learning process which is challenging will make students more active and can improve their learning outcomes well. The benefits of making printed modules can be used to compare the results of improving student learning. If students use print-based learning media, the subject matter becomes easier to understand, read and designed according to the learning needs of students. In addition, print media is very practical and inexpensive (Hafsah, 2016).

Based on research (Agatha, 2019), protist material, especially microalgae, is less attractive materialstudents because of the many classifications and understanding of concepts that make it a rote material. This is evidenced by the results of observations which state that 66.7% of students state that protist material is material that is difficult to understand and understand, this is supported by the difficulty of students in grouping protists based on the observed characteristics. So it is necessary to have learning media such as modules in printed form in which interesting and innovative materials are arranged in order to meet the needs of students.Research (Sutaman, 2015) also says that to teach protist material, teaching materials or learning media are needed that attract students to be motivated to learn and have an impact on their learning outcomes. Modules are the right learning media because they have many advantages that contain learning instructions, achievement competencies, learning materials, practice questions, work instructions and feedback.

Another advantage of choosing this print module as a learning medium to be developed includes adaptive, self contained, stand alone self instruction, and user friendly which makes this module different from other learning media (Ataji, 2019). In addition, this microalgae learning module has never conducted development research, most researchers develop protist module in general. In addition to this module having advantages, this module also has advantages for the teacher, namely that it can provide ample opportunity and time to pay attention to students individually and can measure the level of learning outcomes of students. (Fitriana, 2017).

Therefore, this study aims to; (1) Producing learning media in the form of modules, (2) Knowing the practicality of the module based on the activities and responses of students, (3) Knowing the effectiveness of using modules based on the achievement of indicators and (4) Knowing the feasibility of the microalgae diversity module as a biology learning media to improve student learning outcomes SMA class X on protist material.

Method

The research method used is development research or R & D (Research and Development) using the development model of Borg and Gall, 1983 (Suryanda, 2016). This model was chosen because it aims to design a product and produce it as a learning medium, in this case a module which is then tested, evaluated, and refined to produce learning media products that are effective, efficient and of course quality and useful (Puspita, 2019).

The Borg and Gall development model consists of 10 steps, but due to the limitations of this study the researcher only uses 7 stages out of 10 existing stages (wibowo, 2018), that is, (1) data / information collection; (2) research planning, (3) initial product development (Design), (4) validation testing & limited trial implementation, (5) revision of limited trial results, (6) implementation of main field trials; and (7) revision of the results of the main field trials (Effendi, 2016). Haryanto (2015) states that open research is free to determine and choose which steps will be used and appropriate for its development research.

This research was conducted at SMA Qur'an Insan Pratama, Parahu Village, Sukamulya District, Tangerang Regency, Banten Province. In this study, there were research subjects who were divided into 2 classes. The control class as the first class and the experimental class as the second class. Each class has 20 students who come from class X IPA at SMA Qur'an Insan Pratama.

The data collection techniques used were; (1) expert validation sheet and material validation sheet for biology teachers, and (2) cognitive test results made in the form of multiple choice totaling 10 questions.

The data analysis technique used consists of:

1. Data analysis for expert validation. This data analysis obtained results in the form of a validator's assessment of the given media. Validator answer sheets are made based on categories which can be seen in table 1 (Abdias, 2019).

Table 1. Expert Validation Criteria for Microalgae Diversity Module

Score	*Criteria*
$1{,}00 < x < 1{,}75$	*Not Valid*
$1{,}75 < x < 2{,}50$	*Less Valid*
$2{,}50 \leq x \leq 3{,}25$	*Valid*
$3{,}25 < x \leq 4{,}00$	*Very Valid*

Source: (Ratumanan & Laurens, 2006)

2. Calculation of the average value, according to (Abdias, 2019) if you want to know the final value of the assessment items, then the number of assessment scores obtained is divided by the number of respondents who have answered the questionnaire. Mathematically it can be stated:

$$X = \frac{\Sigma x}{n}$$

Information:
X = *Average value*
Σx =*total assessment score*
n = *Number of respondents*

To see the effectiveness of the microalgae diversity module, a gain test (N gain) was carried out, which is a test to determine student behavior after the learning process of the protist material has increased or not. Systematically, the gain score can be written:

$$Gain = \frac{\bar{X}\ skor\ postest - \bar{X}\ skor\ pretest}{skor\ maks - \bar{X}\ skor\ pretest}$$

The results obtained from the N-gain will then be interpreted as shown in table 2.

Table 2. Standardized N-gain Criteria

No.	*N-gain result*	*Criteria*
1	*g <0.3*	*Low*
2	*0.3 ≤ g <7*	*Moderate*
3	*g> 0, 7*	*High*

Source: Hake (1999)

The results obtained were then carried out statistical analysis by testing the posttest, pretest and N-gain values in the control and experimental classes. There are several stages of statistical tests that will be carried out, namely, normality test, homogeneity test, and t test (Independent sample T test) using the SPSS 16 application. The significance level in this hypothesis test is 0.05 or 5%. The results of the decision to test the hypothesis if sig. (1-tailed) <0.05 then H0 is rejected and H1 is accepted (Hartati, 2016).

Findings and Discussion

Research on the development of instructional media in the form of a module of microalgae diversity uses a 7-stage R&D model from Borg and Gall which will be described as follows:

Data / Information Collection

The data or information collection stage is the first step in module development. This stage process includes literature studies, field surveys, product needs analysis, and analysis of the curriculum used (Yektyastuti, 2016). The results of literature studies are in the form of module definitions, the characteristics of learning modules as a medium for improving student learning outcomes, and the content of the module material is in accordance with the applicable curriculum (Hawarya, 2014).

The field survey was conducted at SMA Qur'an Insan Pratama Kab. Tangerang. Biology learning in this school uses lecture methods and practice questions with teacher and student handbooks as learning support. However, in certain materials, especially microalgae, students' books are lacking in terms of material and question exercises, so students need learning media in the form of modules as additional information and material.

Needs analysis is based on field surveys that learning biology of protist material can be supported by using learning media in the form of learning modules in order to facilitate student learning systems to improve learning outcomes. The curriculum analysis was carried out based on Core Competencies (KI) and Basic Competencies (KD) based on the 2013 curriculum.

Research Planning

The research planning stage is a product planning to be made. The first thing that is done is to determine the content of the learning material to be included in the module and determine the stages of the learning process such as introduction, KI-KD, objectives, materials, independent practice tests, and practice questions as evaluation (Ditama, 2015).

Early Product Development

The initial stage of product development is to develop a product to be produced in the form of a learning module. This step starts from the module preparation stage and prepares its components such as an assessment instrument for material and media experts, then prepares a learning module, carries out editing and gives it to examiners (Yasa, 2012).

Validation Test & Limited Trial Implementation

The validation test stage is a step in assessing the product being made whether it is feasible to be tested or not. After stage 3 is completed, the module validation test is carried out by 3 high school biology teacher validators as media experts and material experts. The results of this study can be seen in table 3.

Table 3. Validity Test Results by 3 Material & Media Expert Validators

No.	*Assessment Aspects*	*Validator*			*Average*	*Category*
		1	*2*	*3*		
1.	*Technical*	*3.71*	*3.55*	*3.74*	*3.67*	*Very valid*
2.	*Didactic*	*3.64*	*3.72*	*3.94*	*3.76*	*Very valid*
3.	*Construction*	*3.54*	*3.72*	*3.77*	*3.68*	*Very valid*
Total Average					*3.70*	*Very valid*

Based on the results of the module validation test in Table 3, it can be seen that the technical, didactic and construction assessment aspects have met the requirements well. It can be seen from the average technical requirements that are 3.67 with the very valid category, the average didactic requirements 3.76 with the very valid category, the average construction requirements 3.68 with the very valid category and the overall average of the 3 aspects is 3.70 which is in the very valid category.

The technical, didactic and construction requirements that have been met include, first, technical requirements based on assessment indicators, namely, suitability of the cover with the module title, suitability of module content layout, suitability of writing and letters in the module, and module appearance in the form of images and colors that attract interest. learners. Didactic requirements are based on assessment indicators, namely, the material according to the applicable curriculum and being used, the material taught in the module is in accordance with the concept, the suitability of the module material with the learning objectives, and increasing the effectiveness of learning. The construction requirements are that the sentences in the module must be clear and do not cause multiple meanings, the language is easy to understand and interactive, the compatibility between the material and the content of the learning module and the clarity of instructions and the writing format.

Based on the three conditions above with very valid results, this module is declared fit for use, meaning that the product development in the form of this module can be continued to the next stage (Masykur, 2017).

Revised Trial Results are Limited

The feasibility of a product is inseparable from the revision of the validator in the form of suggestions and input for module improvement. to revise the modules made (Sari, 2017). Suggestions and input from the validator include (1) requiring a longer time allocation, (2) adding practice questions to the competency test at the end of the module (3) lack of information regarding the related article, (4) using words that are not simple or difficult for students to understand and (5) there is no glossary in this module.

Implementation of Main Field Product Trials

At this stage the main product is tested to determine the response of students that the learning module made is practical and effective or not. Testing the main product in 2 ways, namely the control class test and the experimental class test. The test results can be seen based on the posttest and pretest values of the N-gain which can be seen in table 4. By knowing the N-score results, the researcher can find out the students' initial and final abilities.

Table 4. The mean value of Pretest, Posttest and N-Gain

Class	*Pre-test*	*Post-test*	*N-gain*	*Category*
Control	*58.5*	*68.5*	*0.18*	*Low*
Experiment	*58.5*	*83.0*	*0.60*	*Moderate*

Based on table 4, it can be seen that the mean score of the control class at pretest was 58.5 and for the posttest it was 68.0. Both are in the low category because the N-Gain value is <0.3, which is 0.18. While the average score in the experimental class for pretest was 58.5 and for posttest was 83.0. Both are in the medium category because the N-Gain value is> 0.3 and <0.7, which is 0.60.

Revision of The Main Field Product Trial Results

After testing the field products, the results show that the learning media in the form of modules that have been developed have the appropriate category to be used and realized to students as a tool in conveying messagesand reference sources for students to learn. (Christiyoda, 2016). Based on the results of the recapitulation of the initial ability statistical test (pretest), it can be seen through the normality and homogeneity test in table 5.

Table 5. Pretest Data Normality Test Results

Kelas		Shapiro-Wilk		
		Statistic	df	Sig.
Pretest	Kon	,929	20	,147
	Eks	,925	20	,122

Due to the small data generated (n = 20) then using Shapiro-Wilk. Based on the results of the Shapiro Wilk test, the control class got a significance value of 0.147 (sig.> 0.05), it was concluded that the data were normally distributed. While the experimental class got a significance value of 0.122 (sig.> 0.005), so the conclusion is that the data is normally distributed. So the Shapiro-Wilk test states that the test results of both classes are normal.

Furthermore, statistical tests were carried out using SPSS 16 to propose research hypotheses. The research hypothesis for statistical test pretest data is:

H0: There is no significant difference between the initial ability (pretest) with the control class and experimental class students.

H1: There is a significant difference in results between the initial (pretest) ability with the control and experimental class students.

Table 6. Pretest Data Homogeneity Test Results

Pre Test

Levene Statistic	df 1	df 2	Sig.
,206	1	38	,652

Based on table 6, it is known that the homogeneity test using the Levene test has shown a significant value for the control and experimental classes of 0.652 (sig.> 0.05). So it is concluded that the data variance of the control and experimental class students' scores is homogeneous (Oktaviani, 2014).

To find out the difference in N-gain scores, the t test (Independent t-test) was carried out, the results of which are listed in table 7.

Table 7. Statistical Test Results Independent t-test (t test)

		Sig.	Sig. (2-tailed)
Post Test	Equal variances assumed	,156	,000
	Equal variances not assumed		,000

Based on table 7, the Sig. Leven's Test for Equality of Variances is 0.156 (Sig.> 0.005). This means that the data variance between each group in the control and experimental classes is homogeneous. So that it can be interpreted in the table of the output results from the t test (Independent Sample Test) above refers to the score in "Equal Variances Assumed".

From the results of the output above in the "Equal Variances Assumed", it is known that the Sig. (2-tailed), namely 0.000 (Sig <0.005), so it can be concluded that H0 is rejected and H1 is accepted, that is, there is a significant (significant) difference between the mean value of the control class and the experimental class (Sujarweni, 2014).

Based on the results of the normality test with the Kormogorov Smirnov test and the homogeneity test with the Levene test, it shows that the data that has been obtained is normally distributed, meaning that the data variance is homogeneous.

If the results of the trial of this main product are not yet perfect, it will be used as material for improvement to perfect this product to become a learning module that students like and are interested in. Students' learning ability on microalgae material can be measured using 10 multiple choice test questions. After testing the results of the pretest scores in the control class and the experimental class got the same percentage value, namely 58.5%, but different from the posttest results in the control and experimental classes. The posttest mean score for the control class was 68.5% while the experimental class was 83%. So it can be seen that the microalgae learning module helps students to improve their biology learning outcomes.

There is an increase in student learning outcomes because the module contains pictures of microalgae with each different division and attracts students' attention. This module is also equipped with simple ways of working and practicum activities so that it helps students to understand the microalgae material more deeply (Sukmadinata, 2012). Based on the statement from Duda's research (2019) the existence of practicum can improve student learning outcomes in the aspects of skills and knowledge that have been

done. This microalgae module will provide encouragement and stimulation to students to complete their assignments well because students feel motivated to learn so that their learning outcomes increase (Ariana, 2020).

Conclusion

From the results and discussion that has been described above, the researcher can conclude that the development of the microalgae diversity module as a biology learning medium for class X SMA students has conducted validation tests and direct trials to students. The results have shown that the experimental class group gets superior scores than the control class. So that this learning module is suitable for use in school.

Based on the results of the author's conclusions above, the authors suggest that the learning modules that have been created can still be developed extensively both in terms of material and learning activities therein.

The author's gratitude goes to the validators as media and material experts, as well as to the students of SMA Qur'an Insan Pratama for their participation and assistance. The author realizes that there are many deficiencies in writing this article. Hopefully this article can be of particular use to writers and generally for readers.

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LOCAL WISDOMIN LEARNING AS AN EFFORT TO INCREASE CULTURAL KNOWLEDGE: STUDENTS' PERCEPTION AS PROSPECTIVE TEACHERS

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Abstract
Education not only teaches concepts but also the formation of attitudes and characters in preserving local culture. Knowledge of local wisdom is important because it is a means for students to better understand and love their culture.This study aims to determine the response of students and how the ability of prospective teachers to design local wisdom-based learning. A questionnaire and observation instrument were employed in this research. Students' perceptions of learning based on local wisdom were assessed. Besides, the ability of students in designing local wisdom-based learning activities was evaluated. This type of research is a qualitative descriptive study. The results of this research showed students' positive perception of learning based on local wisdom. The ability of students in designing learning activities gives good results. Local wisdom-based learning provides an opportunity for students to get to know their local culture and develop it into chemistry learning activities. The researcherof this study suggests the continuity of the implementation of local wisdom-based learning to preserve local wisdom values.

Keywords: local wisdom, designing learning activities, a prospective teacher

Introduction

Based on ministerial regulations on the basic framework and curriculum structure, learning in the 2013 curriculum requires students to be able to implement the learning outcomes obtained at school to the community, so that there is reciprocity between learning at school and the surrounding environment. Besides, the essence of the 2013 curriculum also provides students with skills and noble characters according to the Indonesian personality. According to the Law of the Republic of Indonesia No. 20 of 2003 concerning the national education system states that the curriculum used in the learning process must pay attention to regional potential, to preserve regional culture,one of which is through local wisdom.

Today, the discussion about local wisdom in supporting progress and building national character is getting more and more attention. In line with this statement, Ufie (2016) said that local wisdom is a characteristic of the nation that must be preserved from one generation to the next. The preservation of local wisdom is very effective through education and the learning process. Local wisdom-based education is education that teaches students to always be close to concrete situations and the phenomena around which

they face. Kongprasertamorn (2007) explains that local wisdom is all forms of knowledge, beliefs, understandings, and customs or ethics that demand human behavior in life in an ecological community. Local wisdom is indigenous knowledge or local genius of a society that comes from the noble values of cultural traditions to regulate the order of people's lives. Local wisdom can be in the form of local knowledge, local skills, local intelligence, local resources, local social processes, local ethics, and local customs (Gondwe & Longnecker, 2014)(Berkes, J, & Folke, 2000). Local wisdom becomes an alternative source that contains basic thoughts or ideas that can be used as a guide in everyday life. Life in the family and community provides cultural knowledge that is absorbed by students from an early age. This cultural knowledge needs to be embedded in learning in schools so that local wisdom values remain sustainable (Harsojo, 2013).

Science learning which includes biology, chemistry, and physics lessons can use local wisdom as a learning resource and can be directed towards contextual learning. According to Hernani, Muzakir, & Siti (2012), the development of local wisdom-based learning has a significant role in the learning process of students and teaching teachers.The values of local wisdom can be used as the basis for character education in schools. These values can be introduced to young people through the learning process at school (Istiawati, 2016). In addition to preservation, introduction, and cultivation of local wisdom values in schools can also motivate students to be more aware of the importance of learning chemistry because it is associated with the environment around students so that learning is more meaningful for students.

The values of local wisdom can be used as the basis for character education in schools. Character education includes very broad variables, some of which are character knowledge, problem-solving skills, communication skills, and attitudes towards teachers (Berkowitz, Battistich, & Bier, 2008). Character education is an effort to direct human attitudes and behavior towards noble life values.

Teachers as the spearhead of educational success are expected to be able to plan, design, or develop this local wisdom-based learning. Students who can preserve local culture and wisdom cannot be separated from the ability of teachers to manage learning activities. The challenge in preparing prospective science teachers is not only the ability to integrate between science concepts but the ability to design learning that can provide students to preserve culture in Indonesia. However, in reality, many teachers have not integrated local wisdom into learning so that the goals of education have not been fully achieved. According to Sudarmin & Pujiastuti (2015) in their research, it explains that community science knowledge is based on culture and local wisdom about something unique and distinctive, has not been widely researched, and developedand has never even been used as a learning resource in science learning.

Based on the background that has been stated above, the researcher is interested in knowing how the perceptions of prospective teacher students towards the integration of local wisdom in learning. This perception is needed to determine the extent of knowledge, interest, and motivation as well as the ability of students asprospective teachers in designing local wisdom-based learning.

Method

This research is a qualitative descriptive study conducted in the Chemistry Education Study Program, Sanata Dharma University, Yogyakarta. This research use open and closed questionnaires and observation sheet to answer the problem; students' perceptions and experience of local wisdom-based chemistry learning. The research was conducted during the fall semester of 2019 to 31 respondents from Innovation in Learning Chemistry based on the Local Wisdom Course. This course must be taken by second-year students. It provides students because as prospective teachers, students need to know chemistry

learning based on local wisdom by inserting local wisdom values into the learning process in schools as an effort to preserve the potential and culture of each region. In addition to the survey, discussion and observation were reviewed. The final report showed the results of the survey (closed-ended questions) and descriptive (open-ended questions) to the integration of local wisdom in learning.

Findings and Discussion

This lecture begins with an understanding of the concept of local wisdom in general, the functions, potentials, and values of local wisdom, then continues with the integration of local wisdom into a lesson. Students design chemistry learning activities based on local wisdom from their hometowns in groups. The types of learning produced are shown in Table 1.

Table 1. Types of Learning based on Local Wisdom

No	The Learning Activity Designs Developed by Students
1	Learning Chemical Element with "Karume" Games
2	Learning Chemical Bonding with "Kawin Mawin" Culture
3	Dakon's Game in Learning the Periodic System of the Elements
4	Electron Configuration "Gatheng" Game
5	"Ampar-Ampar Pisang"Song for Colloid
6	"Wayang" Show with the Play of Chemical Elements
7	"BITA" Game in Acid-Base Material
8	Making Natural Acid-Base Indicators from Telang and Kaca Piring Flower
9	Making Model of Molecular Orbital from Sago Flour

The researcher who also teaches this course makes observations of the learning process being carried out. The results of the observations show that the students have been able to plan, design, and implement chemistry learning based on local wisdom. Chemistry learning is designed by following under with the culture of the area where students come from, in the form of songs, games, cultural customs, art performances, and typical regional plants and regional specialties.

Apart from observation, the research data obtained were in the form of questionnaire data. The results of the questionnaire showed a positive response from students as respondents. Data obtained through questionnaires in the form of student responses to the integration of local wisdom in chemistry learning presented based on the observed aspects and descriptive qualitative disclosure based on the responses given. Based on the questionnaire data, the following information was obtained.

The data in Figure 1 shows that the respondents (54.8% agree) stated that the respondents know and understand the meaning of local wisdom in general. However, as many as 45.2% of respondents quite understand the meaning of local wisdom. This is because respondents do not know that local wisdom can be integrated into learning. Local wisdom according to Alfian (2013) is defined as a view of life, knowledge, life strategies that arise as activities carried out by local communities in fulfilling needs. This is supported by the responses of the following respondents:

> R02: "Before this lecture, I quite understood the meaning of local wisdom and it turns out that local wisdom can be integrated into learning. Very interesting!"

> R06: "I don't really understand the meaning of local wisdom, which I know is limited to the ancient culture that exists in society, but after receiving this lecture, I understand that local wisdom is close to daily life and can be

implemented in chemistry learning".

R29: "It was a very pleasant experience because I was able to show the Papua region, and it was very interesting.

The data from Figure 1 also shows that respondents (67.7% agree) state the need for integration of local wisdom in learning, but only 16.1% of respondents know what types of local wisdom can be integrated into learning. Education-based on local wisdom is education that utilizes local excellence and knowledge through the seven elements of culture, namely language, knowledge systems, religion, livelihood systems, arts, social organizations, and systems of living equipment or technology, which are beneficial for the development of students' abilities (Asmani, 2012)(Wardhani, 2016). This is supported by the results of an open questionnaire:

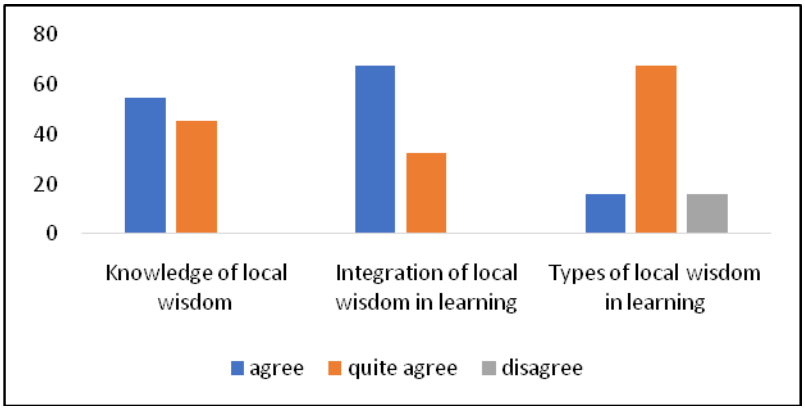

Figure 1. The results of a questionnaire in understanding the meaning of local wisdom

R10: "My experience while attending local wisdom lectures is interesting to me because I can use local wisdom in learning. I can also find out local wisdom from other areas and its relationship with chemistry studies."

R17: "While designing local wisdom-based learning, I feel confused about which type of local wisdom is suitable to be integrated into chemical materials. So that chemistry learning becomes directed and orderly".

Based on Figure 2, it can be seen that as many as more than 85% of the respondents felt happy and motivated in taking lectures on chemistry learning based on local wisdom. Respondents feel happy because it is something new to learn. Learning based on local wisdom will run smoothly if the teacher has the ability and knowledge of the sufficient values of local wisdom, so that it can develop meaningful learning for students and the objectives of education based on local wisdom are achieved (Wibowo & Gunawan, 2015). This is supported by the following response:

R13: "I am very happy because this is my first experience in finding and understanding what local wisdom is that can be integrated into the material in chemistry lessons. I became interested in applying local wisdom in lessons so that anyone who studies chemistry doesn't forget their culture."

R18: "My insight into local wisdom in Indonesia is increasing. It helped me to integrate it into chemistry studies. "

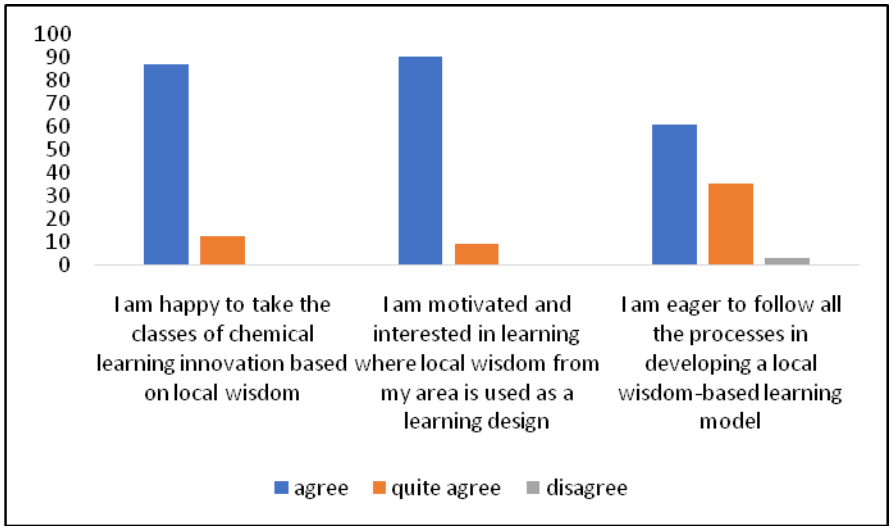

Figure 2. The results of a questionnaire about the Local Wisdom-Based Learning

The very important thing in the teaching and learning process is the expertise and ability of a teacher in managing the teaching and learning process to be more interesting, this is needed in order to increase student interest in learning (Siahaan, 2018). Meanwhile, according to research conducted by Sudiana & Surata (2010), it is revealed that aspects of local culture in learning can increase the effectiveness of the learning process and can increase student interest and motivation. Even the results of research by Febriani, Sudarmin, & Alimah (2020) reveal that the chemistry learning model based on local wisdom can improve cognitive, psychomotor, and affective abilities, as well as critical thinking. Based on the results of the questionnaire, respondents' interest in designing local wisdom-based learning was very high. This is supported by the following response:

> R02: "This course helps me to be dynamic with my friends from the region and explore the wealth in my area that can be used as material for studying Chemistry. Besides that, I could find out the regional wealth of other friends that could be integrated into chemistry lessons. This experience adds insight and builds awareness".
>
> R11: "I am motivated to be even more active in exploring the culture in each region so that I can apply it in learning".
>
> R23: "I am interested in designing chemistry learning based on local wisdom because my insight into local wisdom in Indonesia is increasing. It helps me to integrate it into chemistry studies".
>
> R24: "It requires creativity and knowledge of local wisdom to design this lesson. Therefore, I feel challenged to design a lesson".
> R31: "I felt happy because the learning that is taking place is not too heavy, but it generates and increases my creativity in making a learning model based on more varied local wisdom."

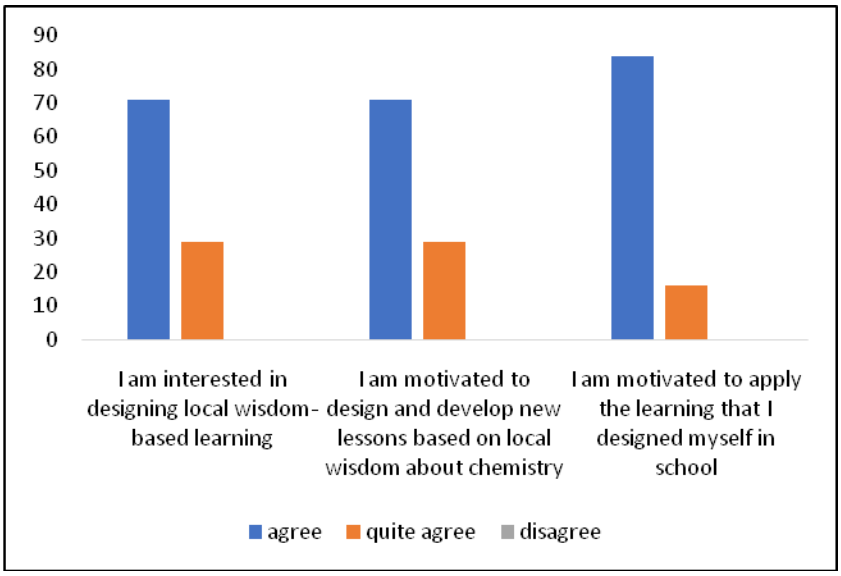

Figure 3. The results of a questionnaire about interest in designing learning

The results of the questionnaire for the aspects of designing local wisdom-based learning are shown in Figure 3. Figure 3 shows that 71% of respondents feel interested and motivated in designing local wisdom-based learning. As many as 83.9% of respondents agreed to implement the learning that had been designed by themselves when teaching in schools later. These results indicate that the respondents gave a positive response to preserving local wisdom. These results are in line with research by Ardan (2016). In his research, it shows that there is a change in the attitude of students to be more concerned about preserving local wisdom after learning to use learning tools that have been developed. Besides, student achievement has also improved significantly. The same thing was shown in the research of Pamungkas, Subali, & Lunuwih (2017).

The results showed that with the implementation of a learning model based on local wisdom, students had more opportunities to develop and hone their creative thinking. Student activeness increases with this learning. Learning based on local wisdom provides benefits, namely creating competent and dignified generations, reflecting cultural values, participating in shaping the character of the nation, contributing to creating a national identity, and preserving national culture (Subali, Sopyan, & Ellinawati, 2015).

However, some respondents experienced difficulties in designing local wisdom-based learning activities. This is because respondents are required to be able to explore local wisdom in their area, which they do not know so far. In addition, determining the type or value of local wisdom that is suitable for use on certain chemical materials is not easy. Students must be able to integrate chemical concepts with existing local wisdom values. This is supported by the following response:

> R08: "In my experience, it is rather difficult for me to find local wisdom that is suitable and suitable to be integrated into chemistry learning. Sometimes there is local wisdom which is really difficult to apply".

In designing learning activities, I certainly faced many difficulties. I have to look for any local wisdom from several regions besides having to understand the existing chemical materials. My difficulty is determining the local wisdom that is most appropriate to be integrated into the chemical concepts I have chosen.

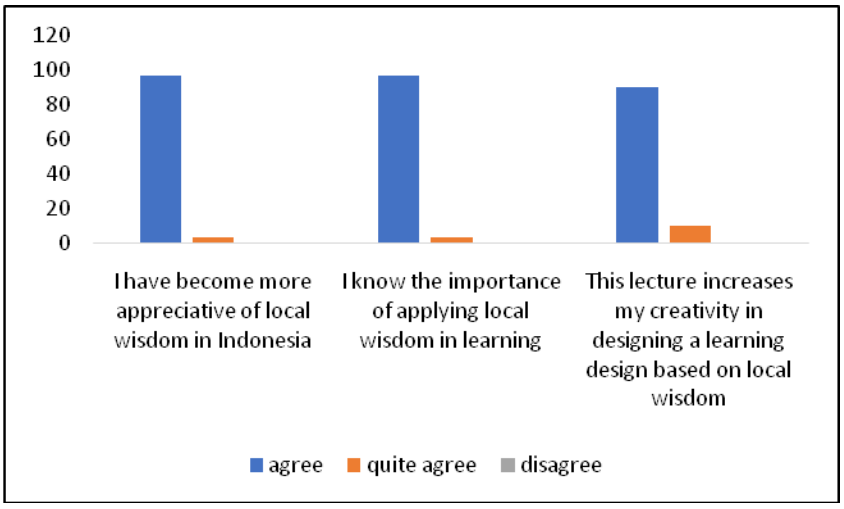

Figure 4. The results of a questionnaire about appreciation and importance of local wisdom

Based on the data shown in Figure 4, as many as 96.7% of respondents agreed with the existence of local wisdom-based learning, the respondents became increasingly appreciative of culture in Indonesia. Respondents also increasingly know how important it is to apply local wisdom in learning. This is in line with Meliono's statement (2011) that the application of education based on local wisdom is an important step that must be taken because the flow of globalization has been going very fast in the use of education, science, and technology.

Figure 5 shows that as many as 86.7% of respondents agree that learning based on local wisdom really provides them to teach at school later. The values of local wisdom that will be given will help students understand and learn every concept in chemistry so that the knowledge obtained by students is not only limited to the realm of knowledge but can also be implemented by students in the form of practice outside of school, namely in the community. The interesting thing from the data in Figure 5 is that 100% of respondents agree that the values of local wisdom really need to be introduced and instilled in students. Respondents agreed to introduce local wisdom values through learning. These results indicate that these prospective teachers have a high commitment to preserving local wisdom.

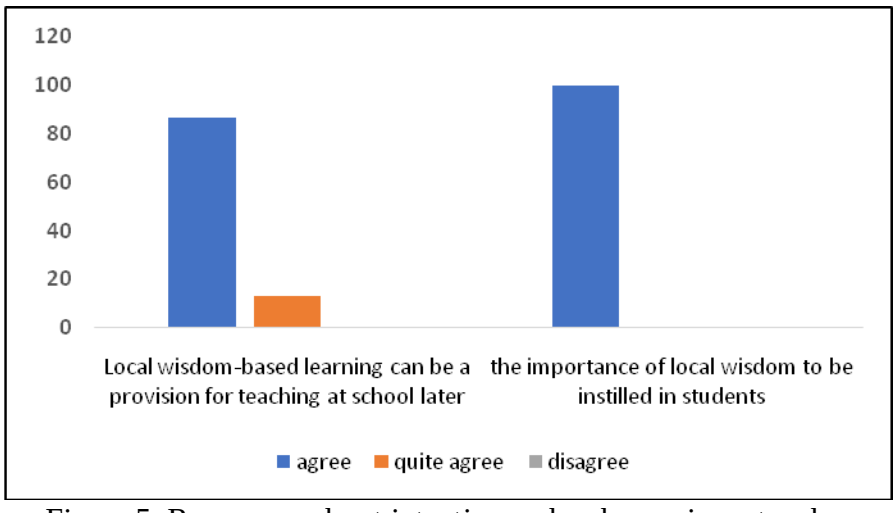

Figure 5. Responses about intentions when becoming a teacher

In addition to preserving, introducing, and cultivating local wisdom values in schools, local wisdom-based learning can also motivate students to be more aware of the importance of learning chemistry because it is linked to the environment around students so that learning is more meaningful for students. By placing wisdom in the learning process, educators, such as teachers, parents, school staff, and the community are expected to increasingly realize the importance of local wisdom-based learning as a means of culture. Teachers are expected to provide students not only with academic abilities but also to become people who love local culture and diversity.

Conclusion

Based on the results of the research described, it can be stated that a positive response from students illustrates the desire and commitment of these prospective teachers to implement local wisdom-based learning. This learning is very important to apply because it is useful for increasing knowledge and understanding as well as a medium for cultivating a sense of love for local wisdom in the region. This positive response is shown by an appreciation of their previously unknown local wisdom and the ability and creativity of students in designing local wisdom-based learning properly.

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INVESTIGATING EFL STUDENTS' PERCEPTION ON ONLINE LEARNING AMIDST COVID-19 PANDEMIC

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Abstract
COVID-19 pandemic has resulted in the shifting of teaching-learning process from the combination of F2F and online learning to full-online one. This study aims to investigate students' perspective on the implementation of full-online learning mode in English classroom with a low-tech environment. Employing convenience sampling, 104 university students participated in this study. Survey method was utilized. The findings showed that (1) the respondents have had various level of familiarity using search engine, social media, e-resources and learning apps that enable them to comprehend the learning content; (2) the use of social media, e-resources and learning apps results a different impact on respondents' perception on learning effectiveness; (3) the respondents are more digitally-literate in using learning application or other online-based platforms and enable to autonomously learn the course materials as well as improve their language skills; (4) support system needs to be increased to engage students in teaching and learning activities; (5) there is a requirement of feedback and consistency in determining course schedule and timeline for task and exam submission. It can be concluded that university students have positive and negative perspective on full-online learning mode. Suggestions are presented in the closure.

Keywords: COVID-19; EFL students' perception; Low-tech environment; Online learning mode

Introduction
As the COVID-19 pandemic is still growing, the Indonesian government issued the Presidential Decree No.7 of 13 March 2020 (which was amended by another Presidential Decree No.9 of 20 March 2020), the Government Regulation No. 21 of 31 March 2020, the Decree No.9 of 3 April 2020, and the Presidential Decree No. 12 of 13 April 2020. Considering the increasing number of confirmed COVID-19 cases, the Indonesian government through the Ministry of Education and Culture (MOEC) wants to guarantee student safety and ascertain the

continuation of teaching-learning process by issuing a learning guideline in which two methods are utilized namely offline and online learning for primary, junior secondary, and senior secondary (Kementerian Pendidikan dan Kebudayaan, 2020b). In addition, at the level of higher education, Director General of Higher Education issued Circular Letter No.262/E.E2/KM/2020 about Learning Activity during Emergency Period of COVID-19 Pandemic which was to bolster the issued regulation mainly on Social Distancing on a Large Scale (PSBB) so the learning activities can be carried out from home in online or offline mode. However, following the condition of COVID-19 spread, Indonesian MOEC supported the online learning to be held mainly in the areas affected by COVID-19 because it promotes physical distancing and reduces virus spread (Chaterine, 2020; Wajdi et al., 2020). Yet, in the implementation of online learning, the point of "adjust[ing] distance learning practices according to the conditions of specific regions" should be taken seriously into consideration (Azzahra, 2020).

There are a number of various terms for online learning i.e. "tele-learning", "virtual learning", "computer-assisted learning", "web-based learning", "e-learning", "networked learning", "internet learning" and "distance education" (Ally, 2004; Anderson, 2011; Benson, 2002; El Mansour & Mupinga, 2007; Sun & Chen, 2016). Further, online learning refers to the learning condition that enables learners to utilize cyberspace to retrieve the content and increase their educational chances (Benson, 2002). On the other hand, Ananthanarayanan (2014) stated that online learning does not have specific definition since it depends on "delivery mechanisms, communication modalities, content types, and access structures". Further, it is stated that online learning allows students to get wider access to information gathering or sharing and enable them to flexibly carry out their education which is not restricted to particular spot or time (El-Seoud, Taj-Eddin, Seddiek, El-Khouly, & Nosseir, 2014; Worthen & Sanders, 1987). Based on the aforementioned literature, online learning is the learning environment that allows learners to undertake their education flexibly and enable them to be more self-regulated in learning process.

In relation to online learning implementation in English classroom context, many projects have been reported. As Whitworth and Berson (2003) reviewed a number of articles, they revealed that the use of computer technology i.e. website has increased and played a significant role in social studies education. Particularly, the significance of technology was also found in K-12 classroom, Thieman (2008) reported that most of pre-service teachers implemented their technology skills for supporting instructional practices in K-12 classroom. However, in their studies of technology integration through online teaching, Arkorful and Abaidoo (2014) and Chawinga (2017) discovered a number of benefits and drawbacks. Further, Pilli (2015) reported the use of social media as the powerful tool in educational aspects. Similarly, Bal and Bicen (2018) revealed that the university students perceived that social media was effective in promoting the information acquisition and increasing their motivation by getting involved in supporting group and environment. Beemt, Thurlings, & Willems (2020) reviewed articles and found that the research on social media use for educational setting has been widely conducted but the studies of interrelatedness among the

aspects such as students, teachers, and school in the implementation of social media still needs further research. In addition, Lewis and Abdul-Hamid (2006) focused on feedback in online teaching and considered it as the significant one for students as they could recognize their learning progress through the given feedback. By the same token, Leibold and Schwarz (2015) reported that feedback enabled the instructor to inform the learners about their academic progress which is highly required for learning effectiveness. Shi (2016) reported that using e-learning platform was also beneficial since students were more motivated to finish and submit the homework before the deadline. The new way of conducting online teaching and learning activities has also been studied in which webinar is considered as an alternative tool (Cornelius & Gordon, 2013; Gegenfurtner & Ebner, 2019; Gegenfurtner, Schwab, & Ebner, 2018; Kear, Chetwynd, Williams, & Donelan, 2012; Wang & Hsu, 2008; White, 2019). Nevertheless, online teaching and learning activities still have several drawbacks which resulted in students' preferences of F2F learning mode over online learning mode (Wakil, Abdulfaraj, Sadula, Tofiq, & Nawzad, 2019).

In Indonesian EFL setting, a number of studies have been conducted related to online learning. To mention some, Tigowati, Efendi and Budiyanto (2017), Cakrawati (2017), Bali and Liu (2018), Mudra (2018), Basri and Paramma (2019), Rachman, Sunarti and Arbain (2019), and Atmojo and Nugroho (2020) may represent the trend. Focusing on the implementation of e-learning platform in English teaching context, Tigowati, Efendi and Budiyanto (2017) found that students' cognitive performance were higher after they were taught by using Schoology. By the same token, Rachman, Sunarti and Arbain's (2019) study revealed that Schoology also contributed to the improvement of students' English learning outcomes at Nursing Program. Then, some researchers emphasized on the students' perception. Cakrawati's (2017) study is on students' perception towards the use of Edmodo or Quipper. Mudra (2018) investigated students' perception in terms of perception and attitudes of Blended Learning, negative impression of Blended Learning and the concept of Blended Learning whereas Basri and Paramma (2019) conducted a research on students' perception by utilizing the modified Acceptance Model. In addition, Bali and Liu (2018) explored students' perception towards face-to-face (F2F) and online learning by taking three factors i.e. social presence, social interaction, and satisfaction into consideration. Then, the current study of online learning implementation was undertaken by focusing on EFL teachers' reflection towards the online teaching they have done in COVID-19 pandemic (Atmojo & Nugroho, 2020).

Previous studies have shown the positive and negative perception on the implementation of online learning. However, a study about students' perception towards online learning mode is still required mainly in a low-tech context or environment (Atmojo & Nugroho, 2020). Accordingly, this study aims to investigate EFL students' perception towards their online learning mode in a low-tech environment before and amidst COVID-19 pandemic in Indonesian tertiary education.

Method

The respondents were 104 undergraduate students enrolled in four-year English literature major program offered by a public university in East Borneo, Indonesia. There were 50 (48.1%) male students and 54 (51.9%) female students. They were registered in dissimilar semesters e.g. second semester (23 respondents/22.1%), fourth semester (44 respondents/42.3%), and sixth semester (37 respondents/35.6%). The respondents were about 18 to 22 years old. Related to respondents' origin, they came from North Borneo (NB), South Sulawesi (SS), South East Sulawesi (SES), North Maluku (NM), North Sulawesi (NS), East Borneo (EB), and Malaysia (MY). For confidentiality issue, all respondents are reported in the forms of their pseudonym. The summary of demographic information is displayed in Table 1.

Table 1. Descriptive Statistics for Respondents (N=104)

VAR	Age		Sex			
			Male		Female	
	M	SD	Freq	%	Freq	%
	19.875	.98	50	48.1	54	51.9

VAR	Origin							Semester		
	NB	SS	SES	NM	NS	EB	MY	2nd	4th	6th
Freq	5	3	1	1	1	92	1	23	44	37
%	4.81	2.89	0.96	0.96	0.96	88.46	0.96	22.1	42.3	35.6

This study utilized quantitative approach and the main data collection tool was questionnaire in which there were three main sections: (1) demographic information; (2) students' perception on their learning environment before Covid-19 pandemic; (3) students' perception on their learning environment amidst COVID-19 pandemic.

The first section was constructed in order to get the information about the respondents' background including their gender, age, origin, and academic standing (Dörnyei, 2007). In the second section, the researchers provided 14 items which contained Likert scale items, closed and open-ended items. The aim of these items was to investigate respondents' perception mainly on their virtual learning environment and support system before COVID-19 pandemic. Generally, there are several aspects to focus on such as: (1) familiarity on accessing information using search engines; (2) virtual learning activities via LMS, learning accounts on social media, learning channels on YouTube and Websites; (3) motivation to do and submit their tasks; (4) tasks types given by the lecturers; (5) access to course material; and (6) information flow from lecturers to students. The third section consisted of 20 items which contained similar item types used in the previous section. The aspects being emphasized on were still alike to the second one. Yet, there were a number of items that asked the participants to state their reasons for conducting particular things related to their online learning process.

The questionnaire was written in Indonesian in order to minimize language interference and confusion in giving response for each item. Afterwards, the researchers converted the questionnaire into the web-based format (Google Form) so it enables respondents to easily submit their response online. To optimize

gaining the information from the respondents, the researchers provided due date of response submission and set the questions to required mode. After all data were collected, the researchers employed coding using Creswell's approach (Creswell, 2014) for qualitative data taken from open-ended items and use descriptive statistics for quantitative data in order to organize and summarize them.

Findings and Discussion

Findings

At this stage, the findings which were gathered from 104 respondents of this research are presented. The respondents were of 48.1% male students and 51.9% female students enrolling in diverse semesters in academic year 2019/2020. The distribution was as follows: second semester (22.1%), forth semester (42.3%), and sixth semester (35.6%). As they were given 34 questions in the form of open and close-ended questions, followings are their responses.

Learning before COVID-19 Pandemic

In order to simplify the display of the data, the findings of close-ended questions are summarized in the Table 2.

Table 2. Summary of responses for learning before COVID-19 pandemic

No.	Questions	Frequency of Responses					Pct.	Mean	Std.
		5	4	3	2	1			
Q1	Familiarity of using search engine	63.5%	32.7%	3.8%	0%	0%	100%	4.596	0.566
Q2	Frequency of social media use to learn	15.4%	41.3%	34.6%	6.7%	1.9%	100%	3.615	0.895
Q4	Accessing website or another sources	14.4%	38.5%	42.3%	4.8%	0%	100%	3.625	0.790
Q5	Accomplishing assignments punctually	38.5%	44.2%	15.4%	1%	1%	100%	4.182	0.797
Q6	Students' habits to employ social media, LMS, and others	26.9%	39.4%	26.9%	4.8%	1.9%	100%	3.846	0.942
Q10	Frequency of giving assignments and ask to submit it through platform before COVID-19	5.8%	24%	55.8%	11.5%	2.9%	100%	3.182	0.821
Q11	Blended learning	22.1%	31.7%	37.5%	5.8%	2.9%	100%	3.644	0.984
Q12	Improving language skill by using learning application	16.3%	40.4%	33.7%	6.7%	2.9%	100%	3.605	0.939
Q13	Lecturers share information about syllabus and learning module	26%	54.8%	17.3%	1.9%	0%	100%	4.048	0.715
Q14	Lecturers teach language skills	9.6%	47.1%	39.4%	1.9%	1.9%	100%	3.605	0.768

	supported by learning website

Meanwhile, the summary of response for open-ended questions, after coding, is depicted in Table 3.

Table 3. Summary of responses for learning before COVID-19 pandemic

	Questions			
	Q3	**Q7**	**Q8**	**Q9**
Responses	Friends (45.2%) Lecturers (50%) Self-browsing (69.2%) Social media (46.2%)	Personal mobile phone (92.3%) Personal laptop (70.2%) Friend's mobile phone (1%) Friend's laptop (8.7%) Rental PC (1.9%) Parents' mobile phone (0.96%) Sibling's laptop (0.96%)	Campus Wi-Fi (3.8%) House Wi-Fi (56.7%) Boarding House Wi-Fi (10.6%) Personal internet network/tethering hotspot (70.2%) Friends' tethering hotspot (0.96%) Rental (0.96%) Wi-Fi voucher (1.92%) Neighbours' Wi-Fi (0.96%)	Paper (51.9%) File (Video, Word, Audio) (91.3%) PPT, journal, article (16.7%)

Learning amidst COVID-19 Pandemic

In order to simplify the display of the data, the findings of close-ended questions are summarized in the Table 4.

Table 4. Summary of responses for learning during COVID-19 pandemic

No.	**Questions**	**Frequency of Responses**					**Pct.**	**Mean**	**Std.**
		5	**4**	**3**	**2**	**1**			
Q15	Directions or Instructions of Online Application Use	8.7%	43.3%	36.5%	7.7%	3.8%	100%	3.451	0.901
Q16	Frequency of using social media, LMS, and others to interact, deliver materials, and give assignments	40.4%	42.3%	15.4%	0%	1.9%	100%	4.192	0.836
Q17	Frequency of lecturers share link websites or learning sources	21.2%	47.1%	26.9%	3.8%	1%	100%	3.836	0.837
Q18	Frequency of students learn the latest information about topics learned through website	11.5%	51.0%	31.7%	3.8%	1%	100%	3.692	0.764
Q20	Frequency of following free webinars	9.8%	26.2%	37.7%	8.2%	18%	100%	3.016	1.217
Q22	Students' comfort on	6.7%	21.2%	45.2%	17.3%	9.6%	100%	2.980	1.023

	using applications								
Q23	Students' Digital Literacy	18.3%	27.9%	35.6%	10.6%	7.7%	100%	3.384	1.134
Q31	Frequency of finishing homework	39.4%	45.2%	15.4%	0%	0%	100%	4.240	0.703
Q32	Students' difficulties to employ social media, LMS and other supporting applications to learning process needs	19.2%	38.5%	28.8%	9.6%	3.8%	100%	3.596	1.028
Q33	Lecturers' feedbacks	8.7%	34.6%	50%	6.7%	0%	100%	3.451	0.748
Q34	Social media and online learning platform use in teaching and learning	6.7%	38.5%	38.5%	8.7%	7.7%	100%	3.278	0.989
	Social media and online learning platform easiness	9.6%	27.9%	48.1%	8.7%	5.8%	100%	3.269	0.957
	The effectiveness of social media and learning platform use	5.8%	28.8%	44.2%	14.4%	6.7%	100%	3.125	0.962
	The fun of social media and learning platform use	6.7%	26.9%	54.8%	6.7%	4.8%	100%	3.240	0.864

Meanwhile, the summary of response for open-ended questions, after identification and categorization, is depicted in Table 5.

Table 5. Summary of responses for learning during COVID-19 pandemic

No.	Questions	Responses
Q19	Students' acknowledgement about webinar	Yes (49%), No (51%)
Q21	The information givers related to education webinar	Friend (28.3%), Lecturer (43.3%), Social Media (21.7%), Self-browsing (6.7%)
Q24	The frequent online learning platform used by students during COVID-19 pandemic	Zoom (92.3%), Google Classroom (93%), E-mail (7.14%), WhatsApp (26.19%), Jitsi Meet (19.05%), Live Instagram (2.38%), LMS (40.48%), Google Form (2.38%)
Q25	Obstacles experienced by students during online learning	Technical problem (70.67%), learning management (11.33%), personal problem (18.00%)
Q26	Significant difference between online and F2F learning	Strength of online learning (14.17%), weaknesses of online learning (85.83%)
Q27	New things you've learnt from online learning during COVID-19 pandemic	Literacy issue (61.11%), personal issue (31.94%), learning management issue (4.17%), mobile data issue (2.78%)
Q28	What tools do you use to browse your course learning content?	Personal mobile phone (94.2%), personal laptop (71.2%), friend's mobile phone (1%), friend's laptop (6.7%), parents' mobile phone (16.7%)
Q29	What internet access do you utilize?	House Wi-Fi (57.7%), boarding house Wi-Fi (7.7%), personal internet network/tethering hotspot (72.1%), friends' tethering hotspot (12.5%), rental (0.96%), Wi-Fi voucher (25%), neighbours' Wi-Fi (12.5%)
Q30	The given assignment is in	Multiple choice (45.2%), essay (92.3%), monologue

the form of	(37.5%), scientific article (43.3%), project work (60.6%), audio, video, PPT (14.3%)

Discussion

The research findings revealed that university students are well-acquainted with the use of search engine, social media, LMS, and educational websites to support their learning activities. The familiarity of students with digital technology and how they perceive their learning activities through social media, LMS, and educational websites which can be beneficial for academic purposes mainly learning motivation, a change of attitude towards social media use, interaction between peers and lecturers, course materials or information acquisition and skills improvement have been reported (Bal & Bicen, 2018; Beemt et al., 2020; Chawinga, 2017; Pilli, 2015). The interesting point is amidst COVID-19 pandemic period, the use of social media, LMS, and others increases slightly can reasonably be related to the government instruction to all students and stakeholders in education to bolster the application of home learning program which has a purpose of suppressing the COVID-19 spread rate and ensures students' healthy, safety or security, and support are well-monitored and maintained (Kementerian Pendidikan dan Kebudayaan, 2020a).

However, the finding also highlighted several drawbacks of online learning such as cheating, copy and paste, low network, the high demand of internet bundles, and other simultaneous obstacles during the implementation of online course. It is in line with Arkorful and Abaidoo's report (2014) and Chawinga (2017). Further, the emphasis of online learning which has more drawbacks than F2F learning leads to the ineffectiveness of teaching-learning process. The findings echo the previous research results by Bali and Liu (2018) and Wakil *et al.* (2019) about the effectiveness of F2F learning mode than online learning. In brief, F2F learning mode has strength point mainly in term of social presence, interaction, and direct feedback which may delay in asynchronous communication. Related to lecturers' awareness of web usage, the finding showed that they have already utilized it in teaching-learning process as teaching resources. This finding supported previous findings claiming that internet usage enable its users to access information (Thieman, 2008; Whitworth S., and Berson, 2003).

However, students' acknowledgement about webinar is still low. Hence, this factor contributes to students' low participation on joining webinar conducted frequently during COVID-19 pandemic. To note, the lecturers play an important role to share more information about webinar and utilize it in order to familiarize students with digital learning environment. Moreover, webinar can be an alternative teaching tool to optimize the pedagogy (Cornelius & Gordon, 2013; Gegenfurtner & Ebner, 2019; Gegenfurtner et al., 2018; Kear et al., 2012; Wang & Hsu, 2008; White, 2019) mainly amidst and post-COVID-19 pandemic.

Next, amidst COVID-19 pandemic, the students improve their self-discipline in submitting their assignment as they learn from home. It can be related to several reasons such as the deadline and pre-requisite of passing the course. This finding supported Shi's (2016) that students were enthusiastic to submit their

assignment through online platform since the students should accomplish their current assignment before continuing to the next topic. Besides, they are given deadline that encourages them unconsciously to resolve their assignment. However, the deadline of assignment which changes unpredictably makes them stressful. Therefore, the assignment submission timeline has to be well-informed. Later, the lecturers also should give a feedback immediately since it is significant to develop "the instructor-learner relationship, improve academic performance, and enhance learning" (Leibold & Schwarz, 2015) and allow students to acknowledge the points they need to improve before they keep on learning new topic (Lewis & Abdul-Hamid, 2006).

Conclusion

The current research findings showed that the university students have positive and negative perception towards the implementation of online learning in a low-tech environment amidst COVID-19 pandemic. There are positive and negative perceptions towards the transformation of learning mode (from the combination of F2F and online learning into full online learning mode). The positive perception is (1) the university students are already familiar with the use of search engine, social media platform, e-learning resources and educational websites in order to support achieving the learning goals; (2) the university students get empowered by the development of their digital literacy in using learning application or other online-based platforms; and (3) the university students can expand their knowledge about particular learning applications that enable them to autonomously learn the course materials and improve their language skills.

In contrast, the negative perception which is echoed by the university students e.g. (1) the difficulty to be optimally participating in online learning mode because of the high demand of internet bundles, low network coverage, frequent local power outage; (2) the need of lecturers' feedback is required to improve students-lecturers interaction for the recognition of achieving the indicators and improving language skills; (3) inconsistency of schedule in conducting online class and assignment submission timeline can influence students' learning motivation in learning process.

Considering the aforementioned positive and negative perceptions, there is an expectation of accelerating the learning mode mainly online learning mode because the on-going spread rate of COVID-19 pandemic is still happening. The lecturers should be adaptive and creative in providing course materials and assessing the students' progress during teaching-learning process by taking into account several aspects coming from the technical, learning management, and students' personal issues while the students should be ready to participate actively and optimally in order to achieve the learning goals for the sake of their own competence and skills.

Given the importance of online learning environment in post-pandemic period for EFL students in tertiary education, future research in this area is needed to investigate students' needs mainly latest topics and issues in English language and literature so the lecturers can create an appropriate, meaningful, and contextual

full-online course design to facilitate students' learning. Further studies can also be emphasized on exploring lecturers' voice of their difficulties in conducting online learning mode and examining educators and teacher educators' challenges in assessing language skills using online learning mode and the strategies they apply to overcome teaching obstacles in the field.

The followings are several suggestions that can be conducted in promoting online learning mode amidst COVID-19 and post-COVID-19 pandemic. First, there is an expectation of accelerating the learning mode mainly online learning mode because the ongoing spread rate of COVID-19 pandemic is still happening. Thus, eclective method is recommended to engage students in the teaching and learning activities. The learning plan and kinds of activities which utilize online learning mode should get careful attention and suitable with the topics, availability of learning resource, students' accessibility towards learning resource, assignment submission timeline based on types of assignments, students' learning facilities, and the students' condition viewed from their domicile and financial conditions related to network coverage and internet bundles demand. It is significant to take into account since not all of students have the sufficient facilities or accessibility to join or enjoy their transformation of learning mode during this current environment. To note, the role of lecturers as the facilitator or navigator should be enhanced so they do not only provide course materials but also prepare themselves to get ready for and get students familiar with the learning mode transformation (Setyaningsih, 2020). In short, lecturers should be professional and adaptive to current ways of teaching. Second, lecturers need to develop their digital literacy particularly in using learning apps, social media, and e-learning resources as part of their professionalism in the midst of COVID-19 pandemic. Besides, they should introduce and explain about webinar and how it benefits the students to have more various experiences, perspectives, and knowledge viewed from the different contexts shared by the experts or peers from different regions and/or countries around the globe. Third, since direct response is difficult to give in asynchronous mode, lecturers need to inform the students about the time on which they will get the feedback of the assignments which have been submitted previously. It is to ensure the students that they do the assignments purposefully and have significant values not only for themselves as part of course prerequisite fulfilment but also get clear suggestion or feedback for further learning focus and skills improvement. In short, lecturers have to invest their time, energy, and patience (Suherdi, 2017) to provide extra time for giving feedback. Besides, lecturers are also expected to develop their professionalism by joining more online training in order to keep themselves up-to-date in utilizing online applications or e-learning platforms and considering the essential indicators of competence and skills for designing appropriate course syllabus during this pandemic and post-pandemic period. Fourth, amidst COVID-19 and post-COVID-19 pandemic, the university students need to develop their language skills by utilizing more applications, social media platforms, websites and e-learning resources. Particularly, it does not only familiarize them with the use of digital learning resources but also indirectly help them to promote 21st century skills.

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TEACHERS AND STUDENTS' PERCEPTIONS ON THE IMPLEMENTATION OF K-12 SPIRAL PROGRESSION APPROACH

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Abstract
This study was conducted to determine the perceptions of the Teachers and Students on the implementation of the K-12 Spiral Progression approach in teaching Secondary Mathematics at Dr. Geronimo B. Zaldivar Memorial School of Fisheries (DGBZMSF). The study utilized the mixed-method design (quantitative-qualitative research design). Interviews, questionnaires, and observation were used to gather data. The data were collected, analyzed, and interpreted using the following statistical tools: frequency, percentage, and medians. The study showed that most teachers and students were in favor of the implementation of the said curriculum. One of the teacher respondents noted that "The K – 12 program will greatly help us develop and upgrade our educational system in the Philippines, so we may be able to compete globally with our students who are fully equipped with the 21st-century skills", another teacher respondent said, "it provides additional training for the students in preparing for college." According to a student respondent, "K-12 Program can enhance and learn more or know more about mathematics and others", another said that "this new curriculum will prepare the students in college and improve the student's skills." However, they admitted that their performances were much better using the old curriculum. In the qualitative part of the study, the responses were categorized. The study found out that the Spiral curriculum had greatly influenced the curriculum, particularly the content and transitions of subjects, the secondary schools, the learners, and especially the teachers. Based on the findings, teachers were still adapting to the new curriculum. They needed more time and training to master all the fields and learn new teaching strategies because it is challenging to teach something that does not have the necessary mastery. They can teach other branches of their significant subjects without an in-depth discussion because it is not their specialization.

Keywords: spiral progression approach, K-12 curriculum, Math education

Introduction

Nature and Importance of the Study

In the curriculum, the Spiral Progression approach is adapted from the Spiral curriculum model of Bruner (Lucas, 2011). Bruner emphasized that teaching could often lead to cognitive growth is increased. If teachers plan to teach it using only the comprehension level of the instructor, the student may not understand the definition. To build continuously on what they have already studied, the curriculum should be built in a spiral manner. In line with the findings of Clark (2010), Bruner saw the function of the teacher as that of translating knowledge into a format appropriate to the current state of understanding of each child. Davis (2007) added that Hilda Taba also affected the design of the spiral curriculum as designed around concepts, abilities, or values in horizontal learning integration. Following the findings of Clark (2010), Bruner saw the position of the teacher as translating knowledge into a format suitable to the current state of understanding of each child. Davis (2007) added that in the horizontal integration of learning, Hilda Taba also affected the design of the spiral curriculum as designed around concepts, abilities, or values.

The principle in the approach to spiral progression is to introduce learners to a wide range of topics and disciplines before they master it by constantly learning it, but with the distinct deepening of difficulty. Elementary Algebra was taught in the old curriculum in the first year. The second-year was Intermediate Algebra, Geometry in the third year, and Trigonometry, Statistics, and Probability in the fourth year. However, the idea of those essential areas is being trained all at the same time in a new secondary mathematics program introduced in 2012. Students are subjected to a spiral progression approach each year in which four areas are taught per grading period. Mathematics includes many topics of life.

Enhancing the quality of primary education in the Philippines is urgent and important. Due to that, one of the discussions of DepEd is to improve the basic education program of the country in a manner that is least upsetting to the existing curriculum, most affordable to government and families, and consistent with international practice through the K-12 policy. The poor standard of primary education is expressed in Filipino students' low achievement ratings. Many students who finish primary education do not have adequate mastery of the skills available. One theory is that students do not get much instructional time or time on assignment. The insufficient readiness of high school graduates for the world of work or entrepreneurship, or higher education, reflects this standard of education. Graduates of high school often do not possess the requisite skills or emotional maturity necessary for the world of work.

This study is significant to the Department of Education, the schools, administrators, teachers, parents, students, and government and non-government organizations.

Education Department

This research shows the level of implementation of K to 12 in the DGBZMSF (Dr. Geronimo B. Zaldivar Memorial School of Fisheries), where this study was carried out. This data, relative to such a new curriculum, can be used as feedback on the compliance of the schools in this study.

Schools

The data they will obtain from this study can be used as a guide to K to 12, along with the problems and concerns of the heads of school and the teachers experienced in such implementation.

Schools Managers

The same difficulties and problems they face and the implementation of K to 12 from which they can gather ideas about how to synchronize the parents' predicaments and their role as the implementers of the new curriculum can also be reflected in this study.

Undergraduates

In this report, their predicaments will be exposed so that concerned authorities may become conscious.

Objectives of the Study

The following are the main objectives of the Assessment of K-12 Spiral Progression Approach in Mathematics:

1. To determine the readiness of the teachers, students, and schools on the implementation of the new curriculum
2. To compare and explain the academic performance of students of the two curricula (old and new)
3. To determine students and teachers' perceptions on K-12 Spiral Progression Approach

Scope and Limitation

The subjects of this study include the degree to which Dr. Geronimo B. Zaldivar Memorial School of Fisheries (DGBZMSF) applies the K-12 Spiral Progression Approach in terms of its impact on teachers, their perceptions of it the academic performance of the student, and the preparation of the teacher.

The variables comprising the readiness of the student are their competence and academic success, while instructor willingness involves teaching skills, teaching strategies, and educational materials.

Ten teachers and 50 Grade-10 students from Dr. Geronimo B. Zaldivar Memorial School of Fisheries (DGBZMSF) Albuera, Leyte were respondents to the report. The timeframe, on the other hand, includes the 2017-2018 academic year.

The data treatment was delimited to interpret the views of the respondents along with the items given in a questionnaire on the subjects provided by the researchers.

Method

The mixed-method (quantitative-qualitative design) design was used for this. At Dr. Geronimo B. Zaldivar Memorial School of Fisheries, this was carried out. The following statistical methods were used to capture, analyze, and interpret the data: frequency, percentage, medians, and more on the descriptive form of statistics. Ten secondary teachers and 50 Grade 10 students from the said school were recruited within randomly selected sections of DGBZMSF using the critical

sampling method. A validated, researcher-made, Likert questionnaire type scale was used. In the qualitative part of the analysis, the respondents chose to respond by writing five open-ended questions from the researchers.

Findings and Discussion

(Sample: 10 Teachers and 50 students; Population: 32 Teachers and 150 students)

Table 1. The readiness of the teachers on the implementation of the new curriculum

Indicators	Scale					Median	Description
	5	4	3	2	1		
The school was prepared for the K-12 Curriculum Implementation.	0	2	5	2	0	3	Prepared
The teachers were prepared for the K-12 Curriculum Implementation.	1	4	3	1	0	4	Much Prepared
The students were prepared for the K-12 Curriculum Implementation.	0	2	7	1	0	3	Prepared
Uses student-centered teaching style in Mathematics	1	2	3	2	0	3	Prepared
Better understanding of the topics in Mathematics	1	2	2	2	0	3	Prepared
Expert in solving and analyzing Math Problems	0	0	1	4	1	2	Slightly Prepared

Table 1 shows that some of the educators agreed that the students, teachers, and school were prepared for the introduction and use of student-centered teaching and a deeper understanding of the subject, although they were only marginally prepared for the expertise in solving math problems.

Table 2. The readiness of the students on the implementation of the new curriculum

Indicators	Scale					Median	Description
	5	4	3	2	1		
The school was prepared for the K-12 Curriculum Implementation.	22	11	12	2	4	4	Much Prepared
The teachers were prepared for the K-12 Curriculum Implementation.	12	17	15	7	0	4	Much Prepared
The students were prepared for the K-12 Curriculum Implementation.	5	18	19	5	4	3	Prepared
Uses student-centered teaching style in Mathematics	6	18	11	15	0	3	Prepared
Better understanding of the topics in Mathematics	8	16	13	10	3	3	Prepared
Expert in solving and analyzing Math Problems	3	12	16	13	6	3	Prepared

Table 2 (according to the students), the students, colleges, and teachers were prepared for the execution; they were already prepared through the use of student-centered teaching styles, a better comprehension of the subject, and experience in solving math problems.

Both students and teachers are generally prepared for the implementation of the K-12 curriculum, especially in mathematics teaching. It is possible to feel the real influence of this new program in 10 years.

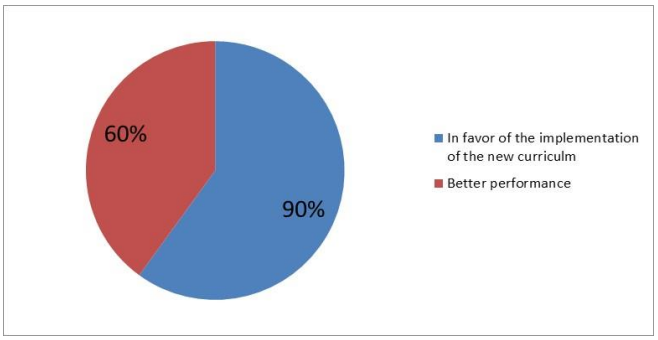

Figure 2. Academic performance of teachers using the old and new curriculum

Figure 2 indicates that most teachers (90 percent) were in favor of adopting the new program. But with the old curriculum (60 percent), they said that their performances were much higher. The lower performance of teachers in the new curriculum could be because they are not yet trained and ready to adopt the new curriculum, and are still adapting to it.

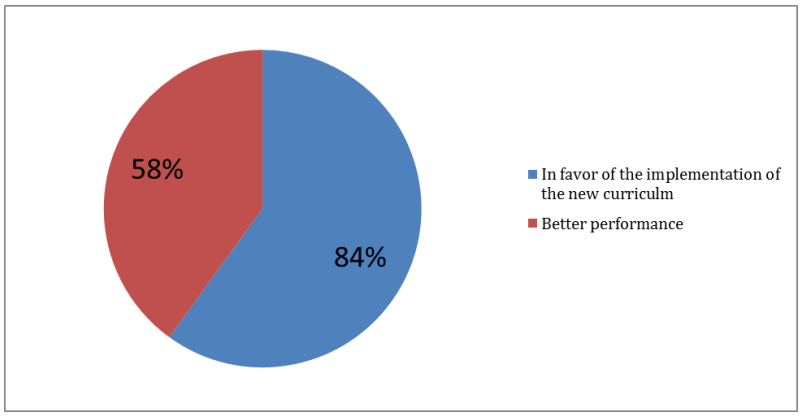

Figure 3. Academic performance of students using the old and new curriculum

Figure 3 suggests that most of the students (84 percent) were not in favor of adopting the new program. They said that with the old curriculum (58 percent), their performances were much higher. Like the teachers, the students were not prepared for the abrupt changes in the curriculum, and their performance was certainly affected.

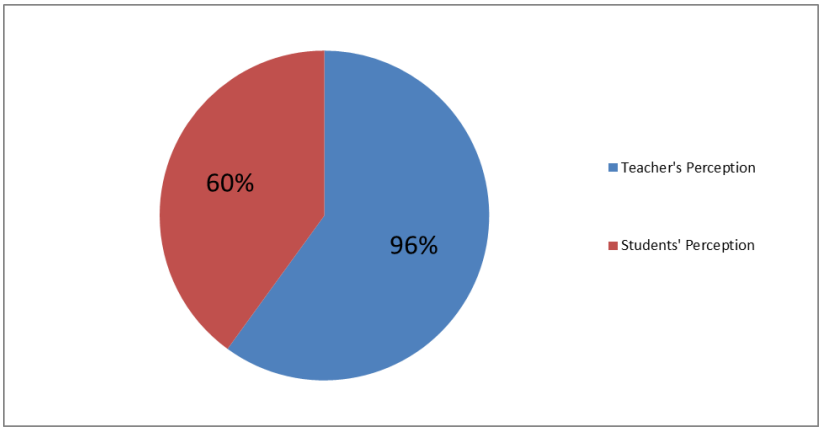

Figure 4. Students and Teachers' perception of K-12 Spiral Progression Approach

Figure 4 indicates that most teachers and students (60 percent and 96 percent) have positive expectations of introducing the new curriculum. While unprepared, teachers and students alike believe that the K-12 Program will help

alleviate the declining standard of education in the Philippines. They hope that the software will soon be able to bring good results.

Conclusion

The following findings were drawn after researching the views of teachers and students on the K-12 Spiral Curriculum at the Dr. Geronimo B. Zaldivar Memorial School of Fisheries (DGBZMSF). First, The teachers, pupils, and schools were not ready to adopt the new curriculum that way. Almost everybody was in the most difficult transition process of the aforementioned curriculum change.mSecond, the change in the curriculum caused students and teachers to have a high adjustment approach to this spiral progression, especially on the contents of each subject. Third, they were all in support of the latest program being introduced because it brings many advances and fresh challenges. Even, they performed better with the old curriculum than with the new one as the students and teachers compare their academic results between the two curriculums.

4) Many students and teachers have optimistic opinions on the introduction of the new curriculum. They may have struggled a lot from the transition, but they still look forward to the best that this new program can bring.

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