

# Calculus and Flexibility Learning Amid Corona Virus Pandemic; Live Experience

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**Abstract:** This study used phenomenological approach in exploring the lived experiences of Bachelor of Science in Statistics student in the Flexible Learning (FL) in their calculus 2 subject in Samar State University during covid 19 pandemic. Seventeen (17) students participated in the study. Participants are Bachelor of Science in Statistics second year students of Samar State University for first semester for the school year 2020 - 2021; From the data analyses, four major themes emerged: (1) Follow the stay at home government policy ; (2) Financial (3) Learning difficulties and barriers and (4) Self - Learning Skills. The result suggest that these student participants experienced Learning difficulties and barriers because of some factors such as dependence to the teacher and other classmates, technological, individual and community barriers but because of their desire to achieve their goal and dreams to finish their studies they try to break their learning difficulties and barriers in their calculus 2 class or subject and be motivated to make the requirements to pass the subject. Their lived experiences can encourage and inspired students experiencing hardship, anxieties and problems to bit covid 19 pandemic to pursue their education despite of the challenges. Based on the data analysis in this study the results concluded that the live experiences of the Bachelor of Science in Statistics students in Calculus 2 class, Flexible learning can be a learning modalities in time of covid - 19 pandemic crisis.

**Keywords:** Flexible Learning, covid 19 pandemic, calculus 2, Bachelor of Science in Statistics.

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## 1. INTRODUCTION

Several months after the initial backlash in March 2020, Commission on Higher Education (CHED) Chairperson, Prospero De Vera qualified the idea of flexible learning as “more encompassing than online learning.” De Vera explains that while online learning requires internet access, flexible learning does not necessarily require connectivity. Instead, it “focuses on the design and delivery of programs, courses, and learning interventions that address the learners’ unique needs in terms of pace, place, process, and products of learning” (Parrocha, 2020).

In the Philippines, Commission on Higher Education (CHED) issue a memorandum circular no. 4 series 2020, which is the subject is the guidelines of implementation of flexible learning for Higher Education Institutions (HEI) for the Philippines. Beginning Academic Year 2020 - 2021 flexible learning as a delivery mode was adopted and in following the memorandum the Samar State University under the banner of CHED implemented the flexible learning modality to address the need of education in time of pandemic.

To answer this memorandum, the Samar State University (SSU) among other State Universities and Colleges (SUC) of the Philippines implemented a flexible learning modality as a delivery of instruction to continue it mandates to provide and uphold service excellence in instruction for the customer satisfaction amid’s corona virus pandemic and the Bachelor of

Science in Statistics(BSS) as one of the offered curriculum of the university has been put into a flexible learning modality and calculus 2 is one of the major subject for BS Statistics curriculum.

Flexibility Learning is a pedagogical approach allowing the flexibility of time, place and audience including but not solely focused on the use of technology (Cassidy, et. Al, 2016). Although it commonly uses the delivery of method of distance education and facilities of education technology, this may vary depending on the levels of technology, availability of devices, internet connectivity, level of digital literacy and approaches (Macalde, 2020). Learner and teachers are co-creators of knowledge and have control of customization of the learning experiences for enhancement of learning grounded on the realities of our learning and teaching environment. Flexible learning is a convertible teaching and learning design that considers the students' needs for various access to course content and recognition of diverse learning styles (Alfonzo, 2020).

Quentin (2020), states that school closing is very controversial, and it can have spillover effects on a large number of students in receiving schools. It can affect the quality of teaching and learning and academic achievement particularly for students with special needs or those with learning difficulties that often requires more physical attention and guidance from the teachers. Though, technology can be used to remedy some of the fall - outs from school closures, but it cannot replace the important effect of face-to-face interactions by students and teachers. Besides, many students do not have the necessary access to supportive technologies which makes it harder to maximize the potentials of learning technology during school closures.

The study of Onyema (2020) in titled Impact of Coronavirus Pandemic on Education show that COVID-19 has adverse effects on education including, learning disruptions, and decreased access to education and research facilities, Job losses and increased student debts. The findings also show that many educators and students relied on technology to ensure continued learning online during the Corona virus pandemic. However, online education was hindered by poor infrastructures including, network, power, inaccessibility and unavailability issues and poor digital skills.

Various countries around the world, various educational platforms were utilized like YouTube, learning management system (LMS), digital library, internet streaming or broadcast, repositories like Open Educational Resources (REA), and the like based on their availability in a particular country. Higher education makes use of Zoom and Google Hangouts, while teachers were encouraged to take advantage of various websites, such as Facebook, WhatsApp, Google forms. EdTech Hub, UNESCO Education Alliance, Learning Keeps Going (U.S. consortium), Inter-Agency Network for Education in Emergencies (INEE ), Commonwealth of Learning, and many others (World Bank, 2020b).

The study of Abiso, et. Al.(2020), the study "A Flexible Learning Framework Implementing Asynchronous Course delivery for Philippine Local Colleges and Universities Corona Virus 19 (COVID 19) pandemic has brought challenges and opportunities in the world and the Philippine local colleges and universities educational system. This paper provides a framework for local universities and colleges in implementing flexible learning procedures. The asynchronous course delivery consists of the design of outcomes-based teaching and learning plan, course materials, scheduled on-line and face-to-face meetings, technology, and center for technology education.

Guerrero, et. Al (2020) e-learning method has a positive influence on motivation, autonomy, participation, mathematical concepts, results and grades. E-learning method leads to improvement in adult students who are studying the mathematical subject in the educational stage of high school, provided that it is compared with the expository method. Therefore, this method is considered effective for its implementation in adults.

Krishnan (2016), Blended courses or hybrid courses have gained popularity over the years because of their flexibility and convenience, depending on the subject matter and the type of learners, traditional classroom learning may be preferred to hybrid learning. Students preferred the face-to-face learning mode. Students are more comfortable interacting with their peers and the instructor in the face-to-face learning mode and they find the face-to-face instruction enables them to learn and understand the mathematics concepts better.

Cassidy, et. Al (2016), their study revealed flexible learning is most relevant to educators seeking to create learning experiences that increase student engagement with complexity and uncertainty. FL approaches can help educators create learning environments that more closely resemble the contexts that students find upon graduation

On the other hand, Calculus is a course that provides a framework for modeling systems in which there is change, and a way to deduce the predictions of such models. The study of SK Lim-Teo (2018), in titled "Attitude of junior college and

tertiary students to calculus'', in general the students have a positive attitude towards calculus. students perceived that calculus is interesting and challenging. However, students are learning calculus by taking notes, memorizing and applying formulae and procedures and they find difficulty when they encounter more conceptual approaches at university levels. A substantial number also believes that practice is the key to scoring well and thus do not see the need for conceptual understanding. Students find calculus boring and they suggest that teachers and lecturers use more interesting ways of teaching calculus.

Researches indicated that the teaching and learning of calculus can be challenging as it involves abstract and complex ideas (Gordon, 2004; Zachariades, Pamfilos, Christou, Maleev, & Jones, 2007). This means that students face difficulties in learning the key concepts of calculus (Artigue, Batanero, & Kent, 2007).

Higher mathematics calculus contains a lot of calculations, clear the focus of the course, and lead students to quickly master the calculation principles and methods. When explaining the partial integration method of indefinite integrals, if the textual knowledge is the main one, the students only grasp the examples in a simple way, and it is difficult to truly master such solving methods (Hui, 2018). Therefore, in the teaching of higher mathematics calculus, students should be guided to practice, through the case teaching method, to guide students to summarize, transform, comb the calculus related theorems, concepts, proficiency in various formulas, and apply to calculus learning and problem solving, reduce the difficulty of the course (Wang and Pei, 2018).

The Samar State University (SSU) armed with its mantra (we innovate, we build and we serve), express its support to the Commission on Higher Education (CHED), in the implementation of flexible learning in higher education and SSU is committed to learning continuity amid the disruptions, because of this commitment the SSU implemented a flexible learning modality for teaching and learning for the school year 2020 - 2021.

Based on the literature review, the researcher was not able to find out if the flexible learning modality was suitable for learning calculus in time of pandemic crisis. This study tries to investigate the live experience of Bachelor of Science in Statistics their live experiences in dealing Flexible learning modality in Calculus 2 amid covid 19 pandemic.

### **Objectives of the Study:**

The main objective of the study can be answered on the following questions:

1. What is the live experiences of Bachelor of Science in Statistics(BSS) in flexible learning modality in Calculus 2 amid the covid 19 pandemic?
2. What are the learning difficulties and barriers encountered by the student participants in the flexible learning in calculus 2 in time of the covid 19 pandemic?

## **2. METHODOLOGY**

### ***Research Design***

This qualitative study utilized phenomenological approach. It aimed to investigate the lived experience of Bachelor of Science in Statistics (BSS) 2<sup>nd</sup> year students in Samar State University in flexible learning in Calculus 2 class during the lockdown because of the covid 19 pandemic. Qualitative research study according to Mills and Birks (2014) "aimed to examine phenomena that impact on the lived reality of individuals or groups in a particular cultural or social context." Phenomenology aimed to accurately describe the phenomenon without a pre-existing knowledge to a framework, but remaining truth to the facts (Groenewald, 2004). More so, using a qualitative research, the researcher would be able to connect with their participants and to see the world from their viewpoints (Corbin & Strauss, 2015). The researcher found this method most applicable to the inquiry in order to provide a comprehensive analysis on the lived experiences of Bachelor of Science in Statistics 2<sup>nd</sup> year student of Samar State University in flexible learning in the Calculus 2 class.

### ***Participants***

Participants of the study were identified using purposive sampling. Using purposive sampling, the researcher can choose their participants that will be fit for the study (Dever & Frankel, 2000). Seventeen (17) Bachelor of Science in Statistics students participated in the study. Participants are students under the math 4 (Calculus 2) classes and use a flexible learning as learning protocol because of the covid 19 pandemic.

**Data Collection**

In gathering the pertinent data for the study, a unstructured online (Zoom) interview was used in collecting data. This type of interview was the appropriate strategy in collecting qualitative data in this covid 19 pandemic for the safety of the participants and the researcher (Bloom & Crabtree, 2006), this helped the researcher to obtain all the necessary information needed and to allow the researchers to asked follow-up questions for clarification. The content of the interview guide were validated by three professionals who were expert in the field of Mathematics(Calculus). The researcher also provided an agreement that included obtaining informed consent, ensured confidentiality, time and place commitments, permission to record and publish, delineating the ethical principles of research. As to data storing methods, the researcher used note taking and dialogic form interview to reach deeper the responses of the respondents.

**Data Analysis**

In the phenomenological analysis, the following steps utilized in analyzing the data phenomenologically were adopted from Hycner's (1985) process. These steps include the following:1) bracketing and phenomenological reduction; 2) listening to the interview for a sense of the whole; 3) delineating units of general meaning; 4) delineating units of meaning relevant to the research question; 5) defining codes for categories; 6) grouping data into categories; 7) eliminating redundancies; 8) clustering units of relevant meaning; and 9) finalizing the themes to make them into meaningful concepts.

**3. RESULTS**

From the data analyses, four themed emerged: (1) Follow the Stay at Home government mandate to help the minimize or stop the spread of covid - 19 virus ; (2) Financial Gain/Stress, (3) Learning difficulties and barriers in studying Calculus 2 and (4) Self-Directed Learning. The four themes- and sub themes- that emerged from the lived experience of Bachelor of Science in Statistics students some of them have very low self efficacy in calculus. Yet, upon the working and studying through flexible learning in calculus 2 class as part of the student learning modality in the pandemic crisis, the student developed self - directed learning, resulted to developed self reliance, self confidence and self initiative to learned the topics discussed in the learning pockets or modules in calculus 2. Theme 4 illustrates the positive attitudes developed by the students dealing flexible learning modalities in calculus in real life situation especially to the student's major field of specialization. The following sections present the major themes and sub - themes.

**Theme 1. Follow the Stay at Home** mandate of the government to minimize or stop the spread of covid - 19 virus.

To curb the spread of COVID-19, most governments have opted to employ quarantine protocols and temporarily shut down their educational institutions. As a consequence, more than a billion learners have been affected worldwide. Among this number are over 28 million Filipino learners across academic levels who have to stay at home and comply with the Philippine government's quarantine measures (UNESCO, 2020) and part of this big number of students are the student participants of this study the students of BS Statistics(BSS) in Samar State University (SSU).

After the covid 19 pandemic shuttered the world. The Philippine government through the president order a lockdown to prevent the spread of the virus that infected a million of people around the world and a thousands of death. This caused the closure of all government and private institution including schools of basic education to higher educations and one of this is the Samar State University (SSU).

Based on the article II, Section 15 of the 1987 Philippine Constitution provides that the State shall protect and promote the right to health of the people and instill health consciousness among them; The Executive Order No. (E.O.) 168, s. 2014 created the Inter-Agency Task Force for the Management of Emerging Infectious Diseases (IATF) to facilitate inter-sectoral collaboration to establish preparedness and ensure efficient government response to assess, monitor, contain, control, and prevent the spread of any potential epidemic in the Philippines; Section 2(c) of E.O. 168 mandates the IATF to prevent and/or minimize the local spread of emerging infectious diseases in the country through the establishment or reinforcement of a system in screening possible patients infected with emerging infectious diseases, contact tracing, identification of the mode of exposure to the virus, and implementation of effective quarantine and proper isolation procedures; on 28 January 2020, the IATF convened, and thereafter issued regular recommendations for the management of the 2019 Novel Corona Virus Acute Respiratory Disease, which is now known as Corona Virus Disease 2019 (COVID-19); the March 2020 Memorandum from the Office of the Executive Secretary directed all heads of departments,

agencies, and instrumentalities of government, including the State Universities and Colleges (SUCs) to adopt, coordinate, and implement guidelines which the IATF issue on the COVID-19 situation, consistent with the respective agency mandates and relevant laws, rules, and regulations; on 30 April 2020, Executive Order (E.O.) No. 112, s. 2020 was issued imposing an Enhanced Community Quarantine (ECQ) in high-risk geographic areas of the Philippines and a General Community Quarantine (GCQ) in the rest of the country from 01 to 15 May 2020, adopting the Omnibus Guidelines on the Implementation thereof, and for other purposes; based on this omnibus in section 11 Face-to-face or in-person classes at all levels shall be suspended and because of this the Commission on Higher Education (CHED) of the Philippines issued a Memorandum Circular No. 4 “Guidelines on the implementation of flexible learning”.

(1) *Because of the covid 19 pandemic the government implement a lockdown for all the people in their respected houses and places to stop or minimize the spread of the virus, all establishment was shout down or close including the face to face classes, and the transportation so we need to follow the government so that we can help, I am happy that despite of the crisis, the SSU still continue to have the flexible learning modalities to continue our studies, the university enrolled us for the continuation of our studies” and at the same time we can follow the stay at home policy of the government to minimized or stop the covid 19 virus”.*

(2) *“I am lucky enough that I can still continue my studies even though there is covid 19 pandemic crisis because our university used a flexible learning modalities, we stay in our respected places in our home town, in my case, I am from Rawis, Hinabangan, Samar and we can follow the mandate of the government to stay at home while studying, we still continue learning even in time of pandemic, Thank to God”.*

(3). *In time of crisis it is really safe to be in our family in our home, I am happy that I can follow the government to stay at home while I am studying because its an only way I can help the government to minimize the spread of the virus. I am grateful that our university implement a flexible learning process because we have our own time to study, like the learning pockets that our instructors and professors was given to us for our guide in studying specifically in our math subject calculus 2, and also online discussion using LMS, video chat, messenger, face-book and sometime Zooms, studying while following the mandate of the government to stay at home”.*

## **Theme 2. Financial Gain/Stress**

Samar State University is a public university catering students from province of Samar in which it has 22.1 percent poverty incidence among families in 2018 based on the survey of Philippine Statistics Authority (PSA), 10<sup>th</sup> place among the poorest provinces of the Philippines it means that 2 out of 10 families are poor. Most of the students is struggling financially even before the covid 19 pandemic crisis, this been worsen by the lock down due to the closure of many businesses and the inaccessibility of many service and transportation that affect to jobs of many people. The flexible learning modalities help the students not to spent much money in their studies because the student is at their respected home therefore they will not spent for their daily living allowances, transportation expenses and boarding house rental , this help to the parents and students to allot the money for other personal and family expenses, specially, most of the family income was been affected by the closure of the private and public establishment due to lockdown. Some of the student participants decided to help their parent to have a part time job while studying even though their is pandemic, they earn money at the same time while they study, because of the flexible learning they can manage their time when to study their lessons in aid of learning pockets, zoom schedules and activities sent through messenger or group chats(gc) and answers activities send their instructor in the messenger, therefore they have still time to have a part time job to earn money to help themselves and to their family.

Some participant experience financial stress because of the lockdown, jobs of their family was been affected, no enough income for the expenses of the family, buying internet load for internet access was become a burden to them, even they receive financial support from the government their money is still not enough for their expenses.

### **The financial gain/stress is illustrated in the following statements:**

1.) *“ Because we are at our own home for schooling using flexible modalities like Learning pockets, in spite life is hard now my father was layoff in his job because the store was closed, I am not speeding money for renting a boarding house and for fare”*

2.) *“Because I can study my lessons in the evening in which the internet connectivity is strong, I have time to work during the day, I need to help myself so that can support my studies, although I am only at home I still need money to buy internet load and other daily expenses for the family, thank you that we are in a flexible learning mode to study”.*

3. *“Their is no job, no income because of the lockdown, so buying internet load become heavy for us but I need to spend so that I can down load the learning material and to search additional examples for additional input for the topic discussed on the modules”.*

### **Theme 3: Learning difficulties and barriers in studying Calculus 2**

#### **Sub - theme A. Difficulty adjusting learning styles**

The world is currently heading toward a new educational horizon in which the primary issue involves preparing students to bear responsibility for their own learning as well as for life-long learning beyond the borders of the classroom.

Some of the participants because of their dependence to the teacher and other classmates they find it hard to study on their own, it is hard for them to understand the learning materials on their own, they lack of drive to study since its different from the school setup, procrastination and they are prone to distractions like using facebook, chatting with friends and video games like Mobile legend.

(1) *“I am not used to study alone, I always need teacher to discussed the topic because I used to follow their instructions although I enrolled in BS Statistics I don’t like math- I am having difficulty understanding it. I don’t like numbers, I cannot really know the basic algebraic operation in my own which is needed in dealing topics in calculus 2, even I posed myself to like it I poorly developed the concept in my mind, I am really lost .”*

(2) *“I am having difficulty focusing and concentrating. I force my self to focus in studying the Learning pockets and online discussions yet I am disappointed of myself because I cannot really understand it even in my elementary years, I am not really used to study alone for lessons specially in numbers although I enrolled in Statistics course I need somebody to teach me the lessons specially my teacher .”*

(3) *“I think I won’t be so good with algebraic operations unless I have a really good teacher to really help me with my algebraic operations work exercises which is necessary in dealing with different differential and integral of algebraic functions and she makes sure I understand the topic or exercises before we move on.”*

(4). *“I am used to procrastination, I don’t focus myself with important things specially to my studies, I am prone distractions like playing video games (Mobile legends).*

#### **Sub - theme B. Technological Resources**

Student from Samar State University(SSU) are living from the Catbalogan City, Samar and the nearby municipalities and Island of Western Samar, number one problem of this places is information communication technology (ICT), because mostly in this places are class C and class B municipalities the Local government cannot provide a very strong facilities in ICT, and because of the boom of the need for communication the internet signal was been affected for those places who have internet signals and most of the student participants locations in their barangays have no internet signals. The Philippines does not have a national policy dealing directly with online platforms such as Massive Open Online Courses (MOOCs), Open Distance e-learning (ODEL), and Open Educational Resources (OERs). While there are laws, like the *Open Distance Learning Act* (Sixteenth Philippine Congress, 2014), which provide legal bases for funding such platforms, they are not enough as “some national policies will have to be put in place to sustain the growth” of these online platforms (Bandalaria, 2019) .

In the time of COVID-19, distance learning became a necessity for learners and educators all over the world (Ali, 2020). Such a form of education, however, need not be limited to online learning (Baggaley, 2008). Some have suggested using cell phones and (SMS) texting technology to facilitate learning (Flores, 2018).

Student view the importance of internet connectivity in our a real life situation in our new normal time during this time the covid 19 pandemic. Students believe that the only way to learn this pandemic time is trough the multi - media learning modalities even in modular to augment the learning skills in any subjects is through the used of internet either in google search by downloading lecture materials or in YouTube for a learning demonstrations and discussions in the topics in the subject, more specially in calculus. As mentioned by one of the participants:

(1) “The flexible learning was hard for me because of no internet signal in our barangay there is no internet signal, we are leaving in one of the barangay of Island of Zumarraga, Samar we need to climb a mountain or go to the sea to have a signal so that we can download references and used YouTube for a tutorial discussions for the topics in our syllabus or we are going to submit our output for the activities, summative test or the exam. Its very hard”

(2) “I wake up very early in the morning like 2 am to 4 am just to have a very good signal so that I can used the internet for my YouTube for tutorial of the topics or downloading and uploading of files, I become sick because of sleeplessness or lack of sleep almost a month because of studying the topics that I cannot understand or to solve problems in calculus 2 that I don't know how to solve”

(3) The low internet or even no signal in our barangay make us students sacrifice to go to the proper town in Paranas, Samar we spend almost 100 pesos every time we send our activity outputs for fare only aside from the internet load it very expensive in our part specially this time pandemic .

(4) “We are three students in our family, me, my brother who is also 3<sup>rd</sup> year engineering students in SSU and my younger sister a grade 8 students, we share only one laptop because we cannot afford to buy for another one”.

5.) “I only borrow android phone in our neighbor to upload and download data for my Learning pockets, when the owner is away because of personal reason I cannot access my lessons and assignment”.

#### **Sub - theme C. Domestic barriers**

Some of the students participants need to help to provide the daily needs of the family, they need to work the household choir, they need to fulfill responsibilities at home because their parents are looking for alternative work to earn money for the family.

Some participants experience family conflict, the relationship in the family become stressful being together in the house for a long time it become emotionally and mentally exhausting.

(1) “I feel like exhausted because of many work to be done at home, household choirs, my parents are working for the family, as an eldest of all my little siblings I need to replace my mother rule to take care of my 3 siblings, I can work my lessons at night or after all my work at home...”

(2) “Because of my parents are arguing always because of our situations now, we don't sometime food for the table, my parents has no work because of the lockdown, the situation made me trouble, I was not motivated to study”

#### **Sub- theme D. Community barriers**

Some of the student participants experience hardships in accessing learning materials such as bond paper, printer and the like because of restriction for mobility due to community lockdown.

Some also experience electricity failure due to brownout because in their place in the Island the power supply from SAMELCO when theirs a heavy rain the supply was been off for security reasons.

The *Community barriers* is illustrated in the following statements:

1.) “It very hard to access learning materials , I cannot print the learning material send to us by our professors because there is no available printing machine, we cannot go the the downtown because of the lockdown, I am not used to used my cellphone for reading the Learning pockets send to us by our professor.”

2.) “The accessibility of the learning materials that we needed in studying the topics in calculus like the books for additional examples to understand the topic discussed in the learning pocket is not available because of the community lockdown I cannot go the my friends and classmates that has the resources”.

3. I am leaving in our Island in Talalora, Samar in a remote barangay, we only rely our electricity of the Samelco, we have only electricity during the night from 6 pm to 9:30 pm, so I have only limited time to study at night.

#### **Theme 4: Self-Directed Learning**

The necessity for learners to become self-reliant, self- disciplined, and self-confident in their ability to direct their own learning is becoming increasingly important in today's sophisticated society. Self -directed learning (SDL) refers to the capacity of learners to plan, implement, and evaluate their own learning activities (Merriam, Caffarella, & Baumgartner, 2007).

In the process of the flexible learning modality in time of pandemic the covid 19 the students' participants developed different learning skills and their positive attitude toward challenging circumstances. The students believed that life is challenging but they make it, just like dealing flexible classes in calculus 2, they believed that they need to discipline themselves to break their fear and anxieties in time of pandemic and in dealing calculus subject, so that they can achieve high grade and success in studies. This discipline they acquired can be applied in dealing other circumstances in facing life as a person, they manage their time and skills and even their negative attitude towards hard things wisely, and along the way applied this skills in dealing life.

Despite the struggle and anxieties in dealing with lessons in calculus 2 subject the students' participant developed self-directed learning skills through flexible mode of learning because of their desire to pass the subject and to be successful in their studies they still insist to pursue the requirements that their instructor had given them. They become motivated to work for the learning activities and problems in the learning pockets because it gives them the opportunity to develop the learning skills by means of solving problem. On this process the student participants developed their analytical skills, independence in solving problem, boost self – confidence and developed interpersonal relation to their classmate.

### **Subtheme A: Personal Resilience**

Personal resilience is the capacity to recover quickly from difficulties or toughness (Oxford Languages dictionary). Personal resilience is important for successful recovery from difficult or stressful circumstances (Hart, Brannan, & De Chesnay, 2014), while coping skills are helpful to resolve or hasten the resolution of a problem (Piergiovanni, & Depaula, 2018). In the context of a pandemic, adequate personal resilience and coping skills are vital to help an individual cope with the negative effects of the pandemic and support their mental health (Labrague & De los Santos, 2020).

(1) *"In the flexible learning process because I am not used to learn without a teachers guidance in the discussion of the topics in our calculus 2 class, I always used the internet (YouTube) to have additional demonstrations in the lessons. I can personally follow the process in solving the given problem in the discussion in the YouTube, like the discussion on integration of Algebraic functions." Because of this process I got challenge, I do my research in the internet and in the YouTube so that I have more knowledge to answer correctly all the problems in the activities given in the Learning pockets or modules given to us by our Professor (Calculus 2), I am happy because I realized I am already developing my analytical skills, self confidence, self reliance and self learning skills that I should have to developed. I really blessed that I try my self to pursue my studies this pandemic (Covid -19)."*

(2) *"I need to finish my studies whatever it takes so that I can help my family someday. In this new normal because of the covid 19 pandemic although I have a lot of fear and anxieties, I decided to try my best to passed all my subjects in my course including my calculus 2 class, I push my self to solve problem and because of this way I realized that I can solve problem even in a flexible learning modalities and of course developed my analytical skills and self confidence. Thank God!"*

### **Subtheme B: Independence**

Even if the students participants have their inhibitions to the flexible learning modalities because of their anxieties and fear in solving calculus problems because of their past failure the desire to pass the subject become their motivating factor to pursue to study of their own following the discussions of their learning pockets and online class discussions and this made them to realized that they acquired independence in solving calculus 2 problem because they believe that they have to study by themselves, the students' participants allow themselves to break their fear not to understand or learn the topics discussed. They believe that it is not impossible for them to learned by their own the skills because it is necessary for their major field of specialization . They need to prove especially to their selves that calculus is part of their major which is statistics specially for the higher statistics like regration analysis and mathematical statistics and the pandemic (covid - 19) crisis is not a hindrance in the attainment of their dreams. As illustrated in the following statement:

(1) *"I know I am not good really good in calculus and other math subjects even in my elementary years, but because I decided to take up the course BS Statistics it is not an excuse for me not to finish my studies and achieve my dreams, the more that I will strive to study harder even in the time of crisis that the modality of class is not a face to face or no instructors that will teach us face to face, it is a flexible learning modality. I push myself to do my requirements with maam and fight my fear and anxieties to study and solve the activities, quizzes and major exams in my own in as output in my calculus 2. In the process of passing my calculus 2 subject, I realized that I can make it. Calculus is fun especially in dealing with integral of algebraic expressions and in vectors space if you can answer the problem correctly. "*

**Subtheme C: Boost self – confidence**

Self-confidence is the belief in oneself and abilities, it describes an internal state made up of what we think and feel about ourselves. Because of the unfavorable experiences of some of the student participant in the pasts in mathematics, the students' participants have less confidence in solving problem and dealing mathematics and so in calculus. This unfavorable conditions and experiences in their growing up years, likely to develop an unhealthy self-esteem and become unconfident of themselves. Some of the students' participants receive negative messages that have been internalized and become part of what they think and feel about ourselves. But, because of the process in the flexible learning specially so that the student participants are at home no face to face discussions they should study in their own, understand on their own and learned on their own this experience had been replaced to a positive outlook in calculus because of trying to passed all the requirement, quizzes, and major examinations they pose their selves to answer problems by solving in their own, that made them realized that they can make it. By the process of solving problem it help them to boost their self confidence again by regaining a positive experience through this flexible learning in calculus.

(1) *"In my experience in my calculus 2 class which is a stay at home because of the covid 19 using a flexible learning process, I find it a little bit hard specially in solving problems, learning the topics in integration, learning the skills necessary to solve the integral of the functions and determining a correct formula to be used, I got challenge because from my elementary I got a negative comment of my ability in math, because of this negative comment I developed my low self-esteem, specially math . But because I want to pass this subject I don't want to get failed grade because I am an scholar, I try to make my own activity output, answers the quizzes and exams and I am thankful because it has a positive result I got a high grade. I answer mostly correct on the given problem. I feel somehow a positive feeling about my calculus ability now."*

**Sub theme D. Developed Interpersonal Relation**

Some of the students participant, Bachelor of Science in Statistics (BSS) students in their process studying in calculus 2 through the flexible learning modality when the cannot understand the problem or discussion in their learning pockets, they don't know how to analytically deal with it, they asks their classmate to help them in solving the problem, some ask for the formula an let themselves solve it by their own, as long as they have examples in their note. But some of the students they ask examples from their classmate and follow the process of solving. Because of these circumstances the students developed their interpersonal relations to each other, those students who are low performing in calculus 2 ask assistance to their classmate who has an ability to help them, and create a positive relationship to each other.

(1). *" I am in not good math, I strategized I ask my classmate how to solve the problem and study his given examples and I made my own and I am thankful I learn to solve it like example in solving the integration of inverse trigonometric functions because it needs formula, because of this we become friends."*

**4. DISCUSSION**

Results of the present study showed the emergence of four major themes emerged that would described the lived experiences of Bachelor of Science in Statistics student of Samar State University in the flexible learning, these are (1) Follow the government mandate to stay at home to help the government minimize or stop the spread of covid - 19 virus ; (2) Financial Gain/Stress (3) Learning difficulties and barriers of the flexible learning modality in calculus class and (4) Self-Directed Learning.

In the first major theme which is students participants follow the government mandate to stay at home to help the government minimize or stop the spread of covid - 19 virus. According to the latest study of Medline, et. Al (2020) their study supports the association between the timing of stay-at-home orders and the time to peak case and death counts for both countries and US states. Regions in which mandates were implemented late experienced a prolonged duration to reaching both peak daily case and death counts. Siedner, MJ. Et. Al (2020), stated that Stay-at-home orders were defined as regionwide restrictions of non-essential internal movement (commonly referred to as "lockdowns").

The implication from epidemiological models of COVID- 19 has suggested that intensive physical distancing could "flatten the curve" and prevent the overloading of our health systems according to Gostin LO, Wiley LF(2020). Thus, social distancing measures, aimed at reducing contact between people, include school closings, stay-at-home mandates, and government support for telecommuting according to Inglesby, Nuzzo, and Henderson and Adalja(2020). These

measures have become commonly adopted practices on a world-wide scale (Eubank et al. (2020), Singhal T. (2020) said that with the goal of reducing the frequency of physical contact and subsequent transmission of the virus between persons. This study supported that through the flexible learning modality even though there is a COVID-19 pandemic crisis, the students can follow the mandates of the government to stay at home, and at the same time continue their studies.

The second major theme focused financial gain/stress of the students because of the COVID-19. Although there is a pandemic, there is a health crisis, because of the willingness of the student participant to help their parents for their daily expenses some of them do a part-time job in their extra time and some participants experienced financial stress, incomes of the family were affected by the community quarantine. Due to widespread business closures, especially in lower income populations, national economies are expected to contract, leading to a dramatic rise in unemployment and poverty rates. A report from the World Bank estimated that 11 million people could fall into poverty across East Asia and the Pacific (World Bank 2020). Analyzing the effect of the pandemic on poor communities across four continents, (Buheji et al. 2020) estimates that 49 million individuals will be driven into extreme poverty in 2020 (living on less than \$1.90 per day) or 98.00 - 100 pesos.

The third major theme focused learning difficulties and barriers in studying Calculus 2, these learning difficulties encountered by the student participant were difficulty adjusting learning styles, lack of technological resources, individual and community barriers. Some of the student participants experienced difficulty in adjusting learning new styles from face-to-face to flexible learning modality because of their dependency on the teacher and to their classmates, the change of the mode of learning was hard for them to adjust their system of studying, they find it hard to focus, procrastinating things to be done like to answer their learning activities, student participants entertain many distractions in their studies, like video games and chatting with friends in Facebook and others. Overall some of the participants experience fatigue on the new normal of living and studies due to the lockdown and community quarantine. The participants in this study reported tiredness or physical exhaustion, lack of motivation, worry or fear and anxiety as the most pronounced symptoms. The reported symptoms of lockdown fatigue in this study were similar to those previously identified by the Australian Psychological Society (2020) as cited by , which included sadness, physical exhaustion, reduced interest in previously enjoyed activities, emotional outbursts and anxiety and fear. This result is similar to that of a study by Majumdar *et al.*, (2020) in which Indian professionals and students exhibited various indicators of fatigue, including tiredness, higher stress and anxiety levels and increased worry for their personal security and the safety of their families, after a few months of the home confinement measure.

Technology resources were another difficulty encountered by some of the student participants, some of the students lack technology resources like Android phone and laptops, they just borrow from friends or share from their family member who owned the gadgets, because of poverty the student participants cannot afford to provide this gadget used in the flexible learning modality.

Among the different manifestations of fatigue, the participants in this study reported tiredness or physical exhaustion, lack of motivation, worry or fear and anxiety as the most pronounced symptoms. The reported symptoms of lockdown fatigue in this study were similar to those

The fourth major theme focused on Self-Directed Learning, though they may experience difficulty, fatigue and anxiety in the flexible learning because of the pandemic there is no face-to-face classes, they also shared their developed positive attitude which was the positive effects on the flexible learning in Calculus 2 class such as the learning skills and positive character like personal resilience, independence, boost self-confidence and developed interpersonal relations.

According to Oxford Languages dictionary, personal resilience is the capacity to recover quickly from difficulties or toughness (Oxford Languages dictionary). Personal resilience is important for successful recovery from difficult or stressful circumstances (Hart, Brannan, & De Chesnay, 2014), while coping skills are helpful to resolve or hasten the resolution of a problem (Piergiovanni, & Depaula, 2018). In the context of a pandemic, adequate personal resilience and coping skills are vital to help an individual cope with the negative effects of the pandemic and support their mental health (Labrague & De los Santos, 2020).

Student participants believe that it is not impossible for them to learn by their own the skills in Calculus 2, these skills and concepts are necessary for their major field of specialization. This proved especially to themselves that Calculus is part of their major which is statistics specially for the higher statistics like regression analysis and mathematical statistics

and the pandemic (covid - 19) crisis is not a hindrance in the learning this necessary skills. Student participants are at home no face to face discussions they should study in their own, understand on their own and learned on their own, this participants experience had been replaced to a positive outlook in calculus because of trying to passed all the requirement, quizzes, and major examinations they make their selves answer problems in their own, that made them realized that they can make it. By the process of solving problem it help them to boost their self confidence by regaining a positive experience through this flexible learning in calculus.

When participants cannot understand the problem or discussion in their learning pockets, they don't know how to analytically deal with it, they asks their classmate to help them in solving the problem, some ask for the formula an let themselves solve it by their own, as long as they have examples in their note. But some of the students they ask examples from their classmate and follow the process of solving. Because of these circumstances the students developed their interpersonal relations to each other, those students who are low performing in calculus 2 ask assistance to their classmate who has an ability to help them, and create a positive relationship to each other.

The hope that participants lived experiences in flexible or asynchronous modality of learning can be used in achieving their vision and goals in their life to have a better job for brighter future and at the same time achieve their personal mission. According to Lei (2010), motivation varies from different degrees of Intrinsic and Extrinsic Motivation. Intrinsic motivational factors found to be at work with most students include the desire to be involved, curiosity, challenge, and social interaction. In this study, it refers to sense of fulfillment in passing their subjects specially calculus 2. Extrinsic motivational factors include compliance (to meet another expectation, to do what one is told); recognition (to be publicly acknowledged); competition; and work avoidance (avoid more work than necessary). Present study reveals that Bachelor of Science in Statistics student external motivation is to finish their studies and have a job for brighter future for theme and for their families.

## 5. CONCLUSION

This study provides a description of the lived experienced in the flexible (Asynchronous) learning modalities in Calculus 2 in the new normal because of the covid 19 pandemic of the Bachelor of Science in Statistics (BSS) students' of Samar State University. Student participants experienced learning difficulties because of some factors such as learning difficulties in calculus, teacher factor in the past and their previous unfavorable experiences in math but because of their desire to achieve their goal and dreams to finish their studies they try to break their learning difficulties in calculus and be motivated to pass the subject. In their journey in dealing with calculus during the covid 19 pandemic crisis in the flexible learning modalities in calculus, they developed self directed learning that boost their confidence, self - reliance and interpersonal relationship to other. Hence, student participant believe that flexible learning modalities can be a best teaching modalities to avoid the spread or stop the covid 19 virus, what the have learned in the process of the flexible learning modalities in calculus during the covid 19 pandemic crisis can be applied into to other field of endeavor especially to their field of specialization and to the real life situation. It suggest that flexible learning students participants experienced difficulties and anxieties in their calculus class yet they developed self - directed learning because they believe that they can acquire positive learning skills that can be applied into their specialized field in statistics and to their real situations. Their lived experiences can encourage and inspired other student to pursue their education despite of their anxieties and their learning difficulties in time of pandemic crisis.

## 6. RECOMMENDATION

[1] The University must design a program that can cater to the needs of the student such as academic enhancement programs and other students needs during pandemic or dangerous turbulent health crisis.

[2] The University through the Office of the Guidance Services should conduct a intervention program for affected student that can tackle dealing learning difficulties of the students and anxieties in time of crisis and developing one's self.

[3] Interview family members, teachers, friends and other people which the participants is interacting with to fully grasp how student manage their learning difficulties and anxieties in time of health crisis in their studies.

[4] Further studies and in-depth exploration of the lived experiences of the Bachelor of Sciences in Statistics students in flexible learning modalities in calculus is recommended.

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