FACTORS AFFECTINGBLENDED LEARNING APPROACH IN TEACHING PHYSICAL SCIENCES CONCEPTS

A Thesis

Presented to

College of Graduate Studies

Samar State University

Catbalogan City, Samar

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts in Teaching Chemistry

NECASIO D. ABUDA

MARCH 2017

APPROVAL SHEET

This thesis, entitled "**FACTORS AFFECTING BLENDED LEARNING APPROACH IN TEACHING PHYSICAL SCIENCES CONCEPTS**" has been prepared and submitted by **NECASIO D. ABUDA**, who having passed the comprehensive examination, is hereby recommended for oral examination.

ELMER A. IRENE
Professor, SSU
Adviser

Approved by the Committee on Oral Examination on February 17, 2017 with a rating of **PASSED**.

VICTORIA M. TAFALLA, Ph.D.
Dean, College of Graduate Studies, SSU
Chairman

MARILYN D. CARDOSO, Ph.D.
University President, SSU
Member

JOSE S. LABRO, Ph.D.
Vice President for Administrative Affairs, SSU
Member

ESTEBAN A. MALINDOG, JR., Ph.D.
Personnel Association President, SSU
Member

RONALD L. ORALE, Ph.D.
Vice President for Planning, Research Extension Services, SSU
Member

Accepted and approved in partial fulfillment of the requirements for the degree, **Master of Arts in Teaching (MAT) major in Chemistry.**

February 17, 2017
Date of Oral Examination

VICTORIA M. TAFALLA, Ph.D.
Dean, College of Graduate Studies

ACKNOWLEDGEMENT

The researcher wishes to express his profound and heartfelt appreciation to everyone who, in one way or another, contributed and helped to the realization and completion of this study.

First and foremost, the researcher is deeply grateful to the **ALMIGHTY GOD** for His provision of strength, knowledge, wisdom and understanding in the realization of this study.

I would like to express my deepest gratitude to my adviser, **Mr. Elmer Irene**, for sharing his brilliant ideas, unending patience, guidance, encouragement and brotherly advice towards the completion of this research.

My sincere thanks to the panel examiners chaired by, **Dr. Victoria M. Tafalla**, Dean College of Graduate studies, **Dr. Marilyn D. Cardoso**, President of Samar State University, **Dr. Jose S. Labro**,Vice President for Administrative Affairs and **Dr. Ronald L. Orale**, Vice President for Planning, Research, and Extension Services for their constructive comments and suggestions for the refinement of this research.

My sincere thanks to **Dr. Florabelle B. Patosa**, Dean College of Arts and Sciences, for her moral support, advises, and encouragement.

A special thanks to **Mrs. Emma Q. Tenedero,** my colleague in the College of Arts and Science and a friend of mine for sharing her expertise on Statistics

and helping me interpret and analyze the raw data of this study. Truly the researcher is indebted to her.

I am also deeply thankful to **Engr. Esteban A. Malindog Jr.,** a member of the panel of evaluators for sharing his resources on literature and studies related to the research study.

I would like also to express my profound gratitude to **Ms. Nathalie Ann C. Alaga**, my colleague in the College of Arts and Science and a friend of mine for her help in editing my manuscript.

My sincere appreciation to **Mrs. Adela S. Abaincia**, for her motherly advice and encouragement that motivated me to pursue this undertaking.

I am also grateful to **Mrs. Mae V. Cañal** for her support and assistance during my data gathering on determining the IQ and EQ of the students.

I am also thankful to **Mrs. Virgina Orale**, College Librarian of the University for her assistance in lending the researcher the important reference materials.

I would like also to express my sincere thanks to my **Colleagues** in **College of Arts and Sciences** for their moral support and encouragement.

My sincere thanks to the **Students** who participated this undertaking for their cooperation and support. Indeed their participation and information were very beneficial to the success of this study.

My deepest gratitude to **NanayBelen, Tay Tito, Kuya Jovan, and Ate Apple** for their encouragement and financial support during my pre-oral and final defense.

I would like to express my deepest gratitude to my **Parents, Brothers, and Sister** for their unconditional love and untiring support.

Most especially, I would like to express my whole-hearted thanks to my ever supportive, caring, and loving wife **Charlotte** who was beside me through thick and thin during the conduct of this study. Her trust, love, and support gave me strength and courage to boost my confidence in pursuing the completion of this research. I must also acknowledge the precious treasures that God has given me: my daughter, **Zyrene,** my sons, **Zhaijan** and **Zhian** who are the source of my happiness and joy every time I feel weary and stress.

DEDICATION

I dedicate this humble work of mine especially to:

ALMIGHTY GOD, the giver of life and the source of everything,

To the woman beneath my wings, **CHARLOTTE**, for her love, care, understanding and support

To my precious treasures in my life, **ZYRENE, ZHAIJAN, AND ZHIAN** for their cheerful smilesand warm hugs serve as a tranquilizer that eases my weariness and stressness every time I go home late.

To my **PARENTS, BROTHERS, AND SISTER**who are there for me through ups and downs in my life.

To my **STUDENTS** who continuously inspires me to become more efficient and effective mentor.

ABSTRACT

The study determined the factors affecting blended learning approach in teaching physical science concepts of the selected Bachelor of Science in Information Technology and Bachelor of Science in Architecture students in Samar State University for school year 2015-2016. Experimental method of research using pre-test – post-test single group design was employed in this study. The subject of this study included 102 first year Bachelor of Science in Information Technology students from the College of Arts and Sciences and 31 first year Bachelor of Science in Architecture students from the College of Industrial Technology who were enrolled during the second semester in the school year 2015-2016. The students usually used of memorization, internet, made brief and organized notes, problem exercises, and comprehending the lesson while studying. They usually utilized text books, internet, modules, hand outs, and lectures notes written during the discussion as their learning resource. Generally, the subjects were knowledgeable enough in using the internet as evidence by the grand mean posted at 2.66. Using the blended learning in teaching physical science concepts was effective as there was a significant difference between their scores during the pre-test and after the post-test. In selecting appropriate approaches, methods, and strategies in the delivery of instructions, teachers should consider the individual differences of their students, especially with regards to the IQ and EQ level.

TABLE OF CONTENTS

Chapter 1

THE PROBLEM AND ITS SETTING

Introduction

In our age in which technology has been advancing, and information has been rapidly increasing and refreshing, the importance of the education has been growing accordingly. While the developments observed in science and technology in the 21st century has expanded the duties and responsibilities of the education system, they have also brought new opportunities. The fact that our world has been turning into an information-based world, the value of information increases; the acquisition of information in the right place and at the right time is of vital importance for individuals and society.

Educational technology holds a very important place for the implementation of the theories produced by educational sciences and the improvement of these implementations (Peşmanet, et al., 2012).

One of the innovations of technology is the Internet. The 'Internet' is formed by conjoining two words that imply an international network: Inter (International) and Net (Network) (İşman, 2008). The educational system has also benefited from the advantages brought by the Internet. The Internet, which offers learners access to information and the opportunity of written, audio and video communication, has entered into a very rapid development process all

over the world. This has caused Internet-based education to expand rapidly (Odabaşı, et al., 2007).

Şahan (2007) stated that Web-based education is a new education model which can be used to support the acquisition of new information skills and for the enrichment of students' learning habits and experiences. Many education techniques such as presentations, discussions, demonstration, answer-question, brainstorming, case studies, information hunt, cooperative learning, problem centered learning can be conducted in a Web-based environment.

Nowadays the rapid growth in the use of learning technologies, particularly the use of the internet and web-based communication has led to many educators to discover and develop many teaching approaches, methods, and strategies that are learner-centered and technology oriented. These innovations emerged due to the quest of educators to provide meaningful learning experiences for students in the academic setting. These innovations of teaching styles have shifted the role of educators in the academe being the reservoir of knowledge, to being guide or facilitator, collaborator and a broker of resources.

Blended learning instruction is one of the various teaching approaches being used to deliver meaningful learning experiences. This approach has been defined by researchers in different perspectives. Graham (2006:3-21) defined blended learning systems is a combination of face-to-face with computer-mediated instruction wherein according to Allen, et al. (2007) a blended course

has anywhere between 30% to 79% of online content delivery with the remaining content delivered in a non-web based method such as face-to-face instruction. While Ross and Gage (2006:155-168) differentiated between web and technology-enhanced courses that incorporate online supplementary components within traditional courses without reducing face-to-face time and hybrid courses where in-class time is replaced by online course work.

A number of researches suggested several reasons in support of using blended instruction. Like for instance, the study conducted by Pereira, et al. (2007), Chandra, et al. (2012), and Yapici, et al. (2012) were only few of the studies conducted that proved the effectiveness of the blended learning approach in instruction.

In embracing such changes, the Philippine government has implemented R.A. 8792 known as e- Commerce Act requiring all heads of government institution including State Universities and Colleges to implement information technology plans to facilitate better, more efficient and transparent services.

In consonance with the mandate, the Commission on Higher Education requires all State Universities and Colleges to focus their infrastructure development on ICT with the establishment of an audio visual and computer center, and acquisition of hardware that will provide the state-of -the art facilities in the classrooms, libraries, laboratories, and offices. CHED Medium-Term Higher Education Development Plan states that SUCs and HEIs strategic planning initiatives must include implementation of information technology in

all academic disciplines, in research, extension, and classroom instructions in an interactive mode.

In compliance, Samar State University has come up with integrated information systems strategic plan to upgrade its' existing network system to provide better services. Furthermore, the University has also faculty development plan that empowers its academic personnel to be innovative, technology oriented, and to be updated in the current trends and issues in educational aspects. In envisioning academic excellence, the University is conducting seminar-workshop annually for its faculty.

Several years ago blending learning approach was introduced to the academic personnel in the University. The faculty undergoes orientation and training in the seminar-workshop on how to implement this approach. This approach has been utilized by faculty in both undergraduates and graduates courses in the academic environment of the University up to the present.

There were already studies conducted by some faculty in the academe that investigated the effect of blended learning with the aid of technology integration in the performance of the students in the classroom environment. The study of Araza (2007), Baco (2006), Estrada (1988), Irene (2003), and Tenedero (2015) were only few of the studies conducted in the University which had proven the effectiveness of technology integration in improving the learning outcome of the students.

While these findings cited above support the positive effect of blended instruction on individual learner's learning, there is a lack of research to examine what learner and instructional variables within blended learning environment individually or collectively influence student learning especially in academic settings.

Ghassan, et al. (2007) suggested that, in introducing and implementing blended learning in any organization, several factors are involved and affect the model to be used. Such factors have to be identified and integrated so that the delivery of learning contents and the execution of the learning process are conducted in the most useful and appropriate way within the given environment.

In Samar State University there is no study conducted on determining the factors affecting blended learning approach thus, this motivated and aroused the curiosity of the researcher to conduct this study particularly on determining the factors affecting blended learning approach in teaching physical sciences concepts.

Statement of the Problem

The study determined the factors affecting blended learning approach in teaching physical sciences concepts of the selected Bachelor of Science in Information Technology and Bachelor of Science in Architecture students in Samar State University for school year 2015-2016.

Specifically, this sought answers to the following questions:

1. What is the profile of the subjects, according to:
   - 1.1 age;
   - 1.2 sex;
   - 1.3 average family income per month;
   - 1.4 entrance test scores;
   - 1.5 intelligence quotient;
   - 1.6 emotional quotient;
   - 1.7 technology literacy index, and
   - 1.8 attitude towards science?
2. What are the study habits of the subjects in terms of:
   - 2.1 frequency of studying the subjects;
   - 2.2 duration of the study;
   - 2.3 time of study;
   - 2.4 place of study reference ;
   - 2.5 materials/ resources, and
   - 2.6 study practices?
3. What is the internet access profile of the subjects according to:
   - 3.1 site;
   - 3.2 frequency;
   - 3.3 duration, and
   - 3.4 internet literacy?

4. What are the average scores of the subjects in the:

4.1 pretest; and

4.2 posttest?

5. Is there a significant difference between the average scores in the pretest and the posttest?

6. Is there a significant relationship between the average scores in the pre-test? and posttest of the students and their profile?

7. How do students evaluate blended learning approach at the end of the experiment?

Hypotheses

The following null hypotheses were formulated and tested based on the above specific questions:

1. There is no significant difference between the average scores in the pretest and the posttest of the student-respondents.

2. There is no significant relationship between the average scores in the pre-test? and posttest of the student-respondents with the following variates:

2.1 age;

2.2 sex;

2.3 average family income per month;

2.3 entrance test scores;

2.4 intelligence quotient;

2.5 EQ;

2.6 technology literacy index;

2.7 attitude towards science;

2.8 study habits;

2.8.1 frequency of studying the subjects;

2.8.2 duration of the study;

2.8.3 time of study;

2.8.4 place of study references ;

2.8.5 materials/ resources;

2.8.6 study practices;

2.9 internet access profile;

2.9.1 site;

2.9.2 frequency;

2.9.3 duration;

2.9.4 internet literacy.

Theoretical Framework

The study is primarily anchored on the Bruner's constructivist theory of learning. This theory emphasizes that good and real learning information is not based on what the instructors says or the learners heard even if the learners repeating this information over and over. In addition, the constructivism theory emphasized that the learners construct and built the information inside their mind based on their experiences and prior knowledge. Even more, this

constructing for the information influences the learners' environment, society and language. Likewise, each learner has their own methods, way to understanding, and experiences to build knowledge, which effecting the learning processing. In other hand, the instructors will spend so much time to repeat and confirm the information, but these ways will not help the learners to retain the information in their mental way(Aldoobie, 2015).

Therefore, the role of educators is not to let the students accept new ideas just because others tell them to do so. Instead, the student should be taught how to become informed decision-maker by letting him criticize and analyze new information and draw conclusions based on careful consideration of all the data. For a new concept to be meaningful, it must be intelligible (sensible and understandable), plausible (believable), and fruitful (must serve to solve a problem). If the new concepts do not meet these conditions, students may not see the benefit of changing their misconceptions (Bob, 2001). Thus, students should be provided with varied learning opportunities.

This study finds another theoretical anchorage in the theory of multiple intelligences proposed by Edward Gardner (cited by Eysenk, 1994, 192-193). This theory states that there are eight kinds of intelligence that exist in humans each relating to a different sphere of human life and activity , These include verbal-linguistic, visual spatial, body kinesthetic, auditory musical, logical mathematical, interpersonal communication, intrapersonal communication and naturalist.

According to Gardner, schools must strive to develop on intelligences, at the same recognize that children will usually excel at only one or two of them and should not be penalize for this. As applied to this study the ability of the students to utilize network technologies is a kind of visual - spatial intelligence since the use of web base technology involve the need to follow certain commands. While the ability of students to solve practical problems in physical science subject in this undertaking is a kind of logical mathematical intelligence since this subject requires mathematical concepts.

Connectivism learning theory by Siemen (2005) also supports this study. This theory elucidates how internet technologies have created new opportunities for people to learn and share information across the World Wide Web and among themselves. These technologies include web browsers, email, wikis, online discussion forums, social networks, YouTube, and any other tool which enables the users to learn and share information with other people.

According to Siemen (2005), much learning can happen across per networks that take place online. The role of the instructor is to guide students to information and answers key questions as needed in order to support learning and sharing on their own. He also emphasized that students should be encouraged to seek out information on their own online and express what they find.

Conceptual Framework

In the schema, the bottom frame showed the research environment of the subjects of the study who were the selected college students in the College of Arts and Sciences and College of Industrial Technology enrolled in the second semester school year 2015-2016.

The center frame shows the process used in the conduct of the study. The study considered the profile variates such as age, sex, entrance test scores, intelligence quotient, emotional quotient, study habits, internet access, and technology literacy index, average family income, and attitude towards sciences of the students as the independent variable or treatment variable, while the pretest and posttest results were considered as the dependent or criterion variables.

The profile variates of the subjects were collected using a validated questionnaire except for the entrance test scores, IQ and EQ for these data had been obtained from the Guidance Office of the University. The subjects have taken the pretest and posttest in the beginning and end of the experiment. Blended learning approach was utilized in the delivery of subject matter. The result of the pretest and posttest of the subjects and their profile variates had been analyzed and subjected to statistical treatment to determine what particular profile variables of the subjects directly affect in using blended learning approach particularly in teaching Physical Sciences concepts.

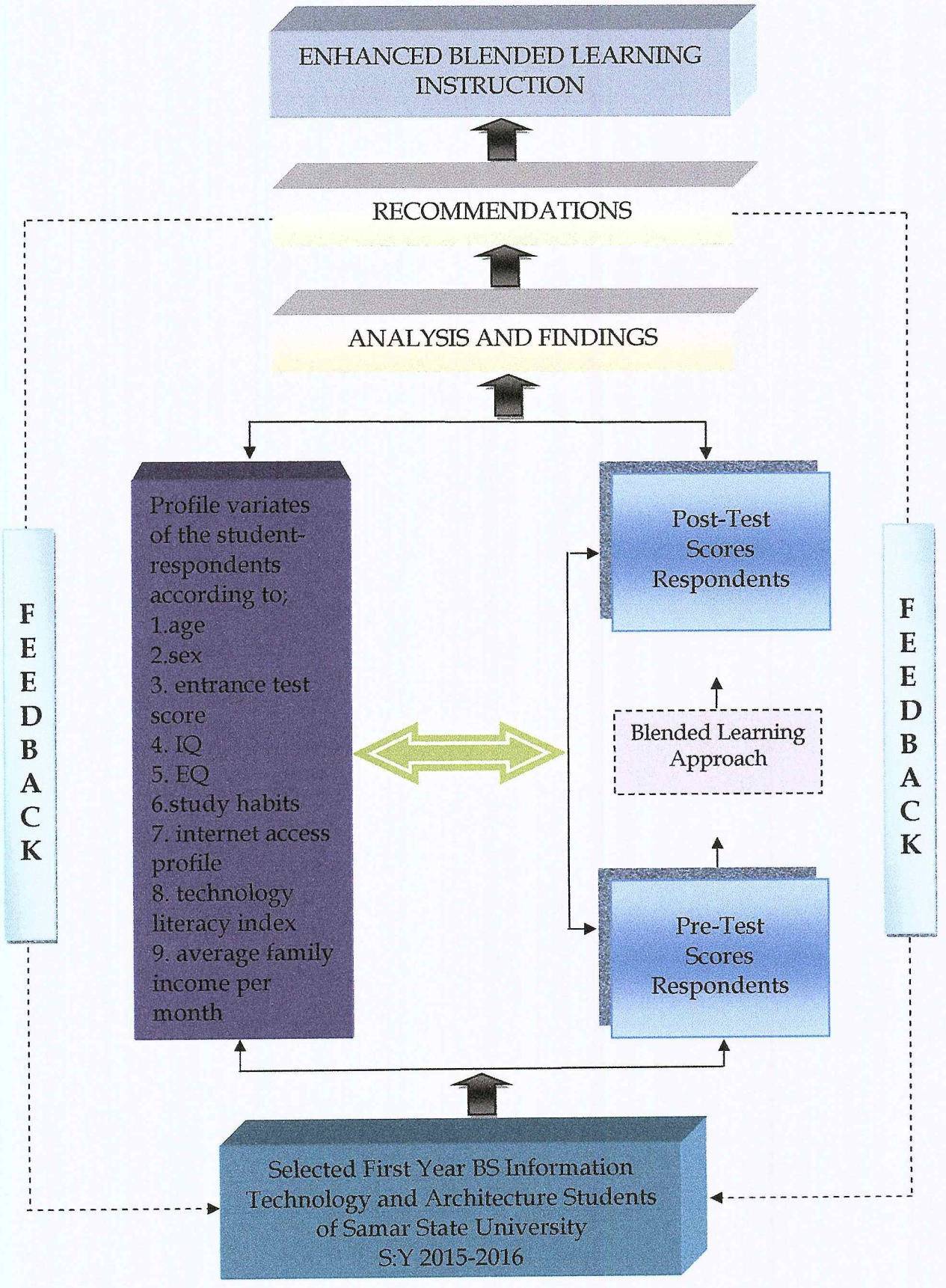

Figure 1. Conceptual Framework of the Study

The results served as the basis on how to implement blended learning approach effectively to teaching as an output of the study.

Significance of the Study

Among those who would benefit from this study are the students, teachers, the administrators, curriculum planners, the parents and future researchers.

Students. The result of this study is expected to motivate students and enhance their interest in the studying the subject. Moreover, this would guide them to effectively use information technology as a vital resource tool for learning.

Teachers. The findings of this study would guide them on how to utilize blended learning approach effectively. Their numerous works would be lessened and more time would be given to supervision granting them a chance to cater the individual needs of the students.

School administrators. The findings of this study would serve as an input for administrators to be aware of the significance of integrating web-based technologies in teaching. Furthermore, this would serve as input in designing technology-oriented learning in improving the performance of students in the classroom.

Curriculum planners. The output of the study would serve as a guide in formulating updated curriculum by integrating web-based technology innovations to enhance meaningful physical science learning.

Parents. This study would make the parents aware of the present innovations in education and would give them a positive outlook on the application of information technology in teaching. Hence, they would not exhibit a passive attitude about any innovation that would be employed in the classroom.

Future researchers. The findings of the study would guide the future researchers in the conduct of similar studies. The result of this study on factors affecting blended learning approach instruction could be a basis on how to adopt this approach effectively to other field of disciplines.

Scope and Delimitation of the Study

This study is an experimental study on determining the factors affecting blended learning approach focused in the student characteristics in teaching physical sciences concepts which was applied to the selected first year Bachelor of Science in Information Technology and Bachelor of Science in Architecture students who are enrolled in the Samar State University, Catbalogan City during the second semester school year 2015-2016.

There were103Bachelor of Information Technology students from the College of Arts and Sciences and 30Bachelor of Science in Architecture students

from the College of Industrial Technology enrolled in Physical Science subject who participated during the conduct of the study.

The pretest-posttest single group research design was employed using scores in the pretest and posttest wherein blended learning approach was the medium of instruction as the dependent variables and the personal attributes of the learners as the independent variables.

The experimentation lasted for about three weeks, that is, from the 2nd week of February to the last week of February 2016. The dates were arranged on the basis of the class schedule of the students. The topic covered in the discussion wherein blended learning was the strategy used were about gas laws, heat, and temperature. A standardized pretest/posttest instrument and questionnaire which were subjected for validation had been administered to the student-respondents in gathering the necessary data.

The study also determined the attitude of students towards the Physical Science subject and evaluated the perceptions of the students with regards to blended learning approach in instruction at the end of the experiment through a 10-item questionnaire.

Definition of Terms

To provide a better understanding of the key terms used in this study, the following are herein defined:

Attitude. This term was conceptually defined as a feeling or way of thinking that affects a person's behavior (https://www.merriam-

webster.com/dictionary/attitude). In this study, it pertains to the feeling of the students of the per see Physical Science as subject.

Blended Learning Approach. It is defined conceptually as an approach in teaching that integrates face-to-face and online learning to help enhance the classroom experience and extend learning through the innovative use of information and communications technology. Blended strategies enhance student engagement and learning through online activities to the course curriculum, and improve effectiveness and efficiencies by reducing lecture time (http://commons.ucalgary.ca/teaching/programs/itbl/).Operationally, in this study it refers to an approach that has been utilized in teaching physical sciences concepts.

Computer. This term is conceptually defined by Adler (1999:100) as a general-purpose machine that processes data according to set of instructions that are stored internally either temporarily or permanently. In this study, it refers to a tool or an instructional device that can aid the learner in learning abstract concepts in chemistry.

Educator. As defined conceptually, it refers to a skilled in teaching; a teacher; a student of the theory and practice of education (Webster's Third New International Dictionary, 1986:723). In this study, it refers to a mentor or administrator working in the educational field.

Emotional quotient (EQ). As defined conceptually, it refers to the individual's ability to identify, evaluate, control, and express emotions

(hhtp://www.deffin.com/difference/EQ vs. IQ). Operationally it was defined as way of thinking or feeling of the students towards their performance in the subject Physical Science.

Effectiveness. This term is conceptually defined as a quality or state of being effective; efficacy (Webster's Third New International Dictionary, 1986:725). In this study, it refers to the extent to which the intervention accomplishes the purpose or achieves learning among the students. The aim of the study is to enhance the performance of the students in the classroom using computer as a tool to aid their learning.

Intelligence quotient. As defined conceptually, it refers to a number meant to measure intelligence. Once the standard measure of human mental capacity; now widely considered to be neither accurate nor fair. Controversy exists today over the effect of race and class on scores and whether IQ tests really measure intelligence. Tests of special aptitudes and personality factors are now favored over the pure intelligence test (http://www.dictionary.com/browse/intelligence-quotient). In this study it is defined operationally as to the ability of students to comprehend and solve mathematical problems in Physical Science concepts.

Internet. This term is conceptually defined as electronic communications network that connects computer networks and organizational computer facilities around the world (https://www.merriam-

webster.com/dictionary/Internet). In this study, it refers to the source wherein students can access of electronic information.

Innovation. This term is conceptually defined as something new or different introduced (Random House Unabridged Dictionary, 1993:984). In this study, it refers to the use of computers in the classroom.

Technology literacy. As defined conceptually, it refers to the ability of an individual, working independently and with others, to responsibly, appropriately and effectively use technology tools to access, manage, integrate, evaluate, create and communicate information (http://www.montgomeryschoolsmd.org/departments/techlit/docs/Definition%20of%20Technology%20Literacy.pdf). In this study, it refers to the ability of students to use computers in accessing information.

Physical Science. It is defined as an area of science that deals with materials that are not alive and the ways in which nonliving things work (https://www.merriam-webster.com/dictionary/physical%20science). In this study, it refers to the academic subject undertaken by the respondents.

Pretest. A test given to a class to determine readiness for the material about to be taught (Webster's Third New International Dictionary, 1986:1797). In this study, it refers to a set of questions given to the experimental subjects prior to the experimentation.

Posttest. A test given after the experiment. It is similar to the pretest but in different form (Calderon, 1993:87). In this study, it refers to a set of questions

administered after the experimental phase of the study that aims to measure the students' level of performance.

Students. In this study, they are referred to as the selected students enrolled in the Bachelor of Information Technology course and Bachelor of Science in Architecture in Samar State University.

Chapter 2

REVIEW OF RELATED LITERATURE AND STUDIES

The section presents and discusses ideas of authors of books, journals, magazines, and newspaper, including excerpts from unpublished materials such as master's theses and dissertation papers that were relevant to the present study.

Related Literature

A review of concurrent literature pertaining to blended learning approach in teaching Physical Science concepts is presented as they are found relevant to the present study.

Technology has increased the breadth and depth of access to education. This is significant because it has been a hallmark of western education that the co-location in time and space of teachers, students, and resources is the *sine qua non* of education. Changing from a classroom-only context to include a major online component requires adjustment for both teachers and students (Swenson & Redmond, 2009). The speedy adoption of educational technologies is evidence that new forms of teaching and learning are possible. However, shifts of this magnitude need major changes in approach from faculty and administrators in education, especially in higher education, where the lectures still dominate teaching practice.

On the other hand, Tchantchane and fortes (2011) pointed out that integration of technology is an essential tool for effective for effective delivery of teaching for all levels of education. Furthermore according to Dias and Atkinson (2011), integrating technology into curricula with the intent of positive influencing teaching and learning has been in a state of evolution over the past 20 years. Driven primarily by hardware and software evolution, accessibility to computers in educational settings, and popular instruction technology trends, technology integration has covered the continuum from instruction on programming skills, self-directed drill and practice, interactive learning software, testing, instructional delivery augmentation, and internet-based accessibility to information, communication, and publication (Dias & Atkinsons, 2011).

The learning environments where instructional materials are transferred electronically or through the Internet or through course software with the help of computer technologies in teaching and learning environments and where the teacher and the learner are in different physical environments are known as e-learning. E-learning is also defined both as a kind of learning which occurs through the Internet, a network or only a computer and as audible, visual and interactive synchronous or asynchronous educational activities. The most significant characteristics of e-learning are that the teacher and the learner are in different physical environments and that the communication throughout the

teaching/learning process is carried out via e-mail, forums, etc. through the Internet.

E-learning is a common method since it is able to present the content of the course in a longer period of time compared to classroom environment and other methods; it allows education for seven days and twenty four hours; it reaches more number of learners; and it ensures a learning environment which is independent of time and place particularly for adult learners, (Dziuban, Hartman, & Moskal, 2004; Osguthorpe & Graham, 2003).

However, e-learning environments pose such disadvantages as hindrance of the socialization process of individuals, lack of sufficient recognition between the teacher and the learner and limitations concerning the communication among learners. These disadvantages have evoked a search for new environments which combine the advantages of e-learning and traditional learning environments. This new environment is known as "hybrid learning" or "blended learning".

Blended learning is described by Thorne (2003) as "a way of meeting the challenges of tailoring learning and development to the needs of individuals by integrating the innovative and technological advances offered by online learning with the interaction and participation offered in the best of traditional learning".

There are several ways that faculty can blend their online and face-to-face instruction. Graham (2006) divided blends into three different categories: enabling blends that focus on convenience and accessibility, enhancing blends

that augment but do not drastically change the pedagogical style, and transforming blends that change the instructional delivery to an active learning model. According to Graham (2006) "transforming blends require students to actively construct knowledge and engage in "intellectual activity that was not practically possible without the technology". He also emphasized that common type of blend used by faculty requires students to complete activities online prior to the face-to-face meetings to ensure that everyone shares a common knowledge base. Then during class time the content can be supplemented and enriched with application and problem solving activities. The face-to-face time can be used to learn the material at a deeper level and link the content to broader topics (Callopy, et.al, 2009). Another type of blend involves teaching the course content during class time and allowing students to think critically and discuss their views about the material through online activities (Aycock, et.al, 2002).

When designing a blended course, faculty must not only consider the elements of effective adult learning and find the right blend between online and in-class activities, they must also address some of the student problems encountered when using the approach such as the lack of technology and time management skills necessary for success in a blended format (Garnham, et.al, 2002). As Tabor (2007) reported that students who disliked the hybrid format mentioned problems with finding materials, receiving less instructor feedback, and perceiving the course content to be too advanced for independent learning.

Aycock and Garnham (2002) in the lessons learned from their hybrid course project at five campuses of the University of Wisconsin stated that there is no "standard approach" to a blended course. They recommended to "start small and keep it simple" since re-designing a course into a blended format takes time.

Osguthorpe and Graham (2003) also added that instructional objectives, many different personal learning styles and learning experiences, the condition of online resources and the experience of trainers play an important role designing an effective blended learning environment and to establish the equilibrium between face to face and e -learning environment.

Ghassan, et al, (2007) suggested that, when introducing and implementing blended learning in any organization, several factors are involved and affect the model to be used. Such factors have to be identified and integrated so that the delivery of learning contents and the execution of the learning process are conducted in the most useful and appropriate way within the given environment.

Wu, et al, (2009) postulated that performance expectations and learning climate are two strong determinants of learning satisfaction with BELS. The computer self-efficacy, system functionality, content feature, and interaction provided an indirect contribution to learning satisfaction via the above determinants. Thus, as students become more confident and capable of learning with BELS and more accustomed to the BELS learning environments, they will

likely expect more benefits from the use of BELS, foster positive learning climate, and, overall, be more satisfied with the BELS learning.

These findings provide initial insights into those factors that are likely significant antecedents for planning and implementing BELS to enhance student learning satisfaction.

Vaughan (2007) pointed out that students enrolled in blended courses can sometimes have unrealistic expectations. The students in those studies assumed that fewer classes meant less work, had inadequate time management skills, and experienced problems with accepting responsibility for personal learning. Students in such courses have also reported feeling isolated due to the reduced opportunities for social interaction in a face-to-face classroom environment (Smyth, et. al, 2012).

Having difficulty with more sophisticated technologies is another challenge for implementing blended learning. This was particularly the case where students had to rely on slow (e.g., dialup) Internet connections (Smyth, et al., 2012). Poor Internet connectivity has been reported to inhibit students' ability to engage in online discussion (King, 2002) and creates considerable frustration (Hara, 2000; Hara & Kling, 1999; Welker & Berardino, 2005-2006), which can negatively affect learning.

Another challenge related to technology is the pervasive access the technology affords. Although the flexibility to learn online and from a distance provided by blended learning is perceived as advantageous, the pervasive

access may also be invasive to learners' personal lives. For some, the online component results in more time devoted to study and less to personal concerns. This can lead to participants feeling overwhelmed and tired (Smyth, et al., 2012). Just as time concerns are a challenge for students, the first challenge for implementation of blended learning for universities is time commitment.

Johnson (2002) estimates that planning and developing a large-enrollment, blended learning course usually takes two to three times the amount of time required to develop a similar course in a traditional format. The other challenge for universities is the lack of support for course design. In order to ensure a successful blended learning experience for students, there must be university support for course redesign, which may involve deciding what course objectives can best be achieved through online learning activities, what can best be accomplished in the classroom, and how to integrate these two learning environments (Dziuban, et al, 2006).

Another challenge for universities implementing blended learning is the difficulty in acquiring new learning technology skills, such as how to foster online learning communities, facilitate online discussion forums, and manage students (Dziuban & Moskal, 2013). As for students, technology can also be a challenge for universities implementing blended learning.

In addition, blended learning can only be successfully implemented if the learners have sufficient knowledge of, and are ready to use, the newly introduced technology. Learners must be trained and equipped to navigate the

information and communication technology used in blended learning (Harris, et al, 2009).

The first institutional factor required for successful blended learning is the allocation of dedicated services to support and assist learners and facilitators throughout the development and use of modules. This includes spending resources on communication to encourage instructors and prospective end-users to become actively involved and fully aware of blended learning initiatives (Garrison & Kanuka, 2004; Harris, et al, 2009). The emphasis in this communication should focus on the learning and the associated outcomes rather than on the use of technology only. It should aim to encourage communication between users and developers, and help those involved to take full advantage of the resources available. However, just as students must adapt to blended learning technology, instructors must be taught to use the technology from the user end in order to effectively facilitate student learning. The attitude, readiness, and technological skills of the course facilitators are equally important, as all of these factors affect how successfully they use, develop, and update the technology-based tools and resources in operation (Harris, et al 2009).

There are also technological requirements that must be met for blended learning to be successful. Stewart (2002) suggests that course content and learning approaches be evaluated for accessibility, with consideration of bandwidth, firewalls, and connection speed, while Childs, Blenkinsopp, Hall,

and Walton (2005) suggest that easy and regular access to technology for both facilitators and learners is a necessary prerequisite for successful delivery of e-learning. Although technology is obviously important for blended learning implementation, due attention must be paid to Sloman's (2007) recommendation that the emphasis should be shifted from a purely technological focus towards teaching and learning methods and styles. Technology should be considered merely as a means to facilitate student learning.

Furthermore, consideration of learners' needs and management of their expectations and level of understanding is important for the development and implementation of successful blended learning modules (Bliuc, et al 2007). Evidence from the literature also suggests that it is important to take account of learners' motivation (Stewart, 2002), to ensure learner readiness (Baldwin-Evans, 2006) and learners' ability to cope with independent learning (Tabor, 2007). Mitchell and Honore (2007), see the attitude and motivation of learners as particularly significant when virtual learning (e-learning) is involved, as those factors affect acceptance and participation. It is important to manage students' expectations, especially the idea that fewer face-to-face classes mean less work. In fact, students must be encouraged to take more responsibility for and autonomy over their learning (Tabor, 2007; Vaughan, 2007).

The cited studies emphasized that technology factors such as computer self-efficacy, system functionality, content feature, internet speed, technology adaptation, learning styles, learners' motivation and attitude are the key

determinants in order for a blended learning to be successful. However, the above mentioned studies did not emphasized thoroughly in consideration to the personal characteristics of the learner as a vital factor in blended learning implementation. Hence, this research was conducted to fill those gaps.

Related Studies

The following were studies conducted by some researchers which have relevance to the present study.

A thesis entitled" The Effect of Simulation & Computer-Aided Instruction on the Performance in Trigonometry of Third Year High School Students of Samar State University was conducted by Baco (2006). The study determined the effect of simulation and Computer Aided Instruction (CAI) on the performance in trigonometry of Third Year High School Students of Samar State University. The researcher utilized the pretest-posttest multi-group experimental design using three methods of teaching Trigonometry specially "Solutions of right Triangle" as the independent variable and the pretest and posttest scores as the dependent variable. It was concluded that the three methods of teaching namely simulation, computer-aided instruction, and lecture-discussion were equally effective methods in teaching the topic "Solutions to Right Triangle" to third year high school students. She further concluded that the age, sex, average family income per month, frequency of study, time of study, location of study

and study practices had nothing to do with the posttest scores of the respondents.

The study of Baco (2006) has a resemblance to the present study in the sense that both studies use computer technology in instruction. However, both of the study differs in terms of the respondents and the strategies employed.

In the study of Tenedero (2015) entitled Extent of Technology Integration in Statistics: Its Implication to Students' achievement, she concluded that teachers should integrate technology in teaching the curriculum to improve students' achievement. In addition to, she noted also that policy makers and educational planners should formulate realistic policies and plans toward a more widespread and efficient computer use in instruction in various higher and basic education institutions.

The study conducted by Tenedero (2015) is similar to the present study in the sense that both studies are all about technology integration in teaching. On the other hand, the studies differ on the methodology and purpose of the study. The cited study used a descriptive-correlational research design to determine relationship among latent factors for effective technology integration while the present study uses pretest-posttest design to evaluate the factors affecting blended learning approach in teaching physical science concepts.

A Study of Student's Perceptions in a Blended Learning Environment Based on Different Learning Styles was conducted by Akkoyunlu, et al (2008). The purpose of the study was to examine the students' learning styles and their

views on blended learning. Results revealed that students' views on blended learning process, such as ease of use of the web environment, evaluation, face to face environment etc., differ according to their learning styles. Results also revealed that the highest mean score corresponds to face to face aspect of the process when students' evaluation concerning the implementation is taken to consideration. The overall findings showed no significant differences between students' achievement level according to their learning styles.

The study of Milne, et al. (2014) dealt on Blended Learning as an Institutional Approach for Enhancing Students' Learning Experiences. In this study, the authors have examined the benefits that blended learning provides to students' learning experiences. The discussion in this paper was focused on lessons learned from academics in developing blended learning, and has reported students' perceptions of the blended learning environment. The data collected for this study included interviews with academics and responses from students to a questionnaire survey. The research findings formed the basis of recommendations for the development of learning and teaching practices and approaches that will enhance students' learning experiences.

The study about The Effects of Blended Learning Approach on Students' Performance: Evidence from a Computerized Accounting Course was conducted by Banaweh (2011). This study concentrates on providing course materials through a combination of a teaching approach where a variety of online resources are provided in addition to face-to-face classroom sessions. A

prior research suggests that the online provision of course materials can have a positive impact on students' performance. This study adds to the existing literature through investigating the link between the students' use of online provision of course and students' performance in an undergraduate computerized accounting course. The findings have indicated a positive association between the number of online files viewed by students, the number of online discussion messages posted by them, and their performance. A significant relationship was not found between students' performance and the amount of time spent on the subject's website, the viewing of links to websites that were not of utmost importance core to the course being studied, or the passive reading of discussion messages. These findings support the benefits to be gained by providing course materials online and encouraging both faculty members to use online in providing course materials and students to access the materials posted and to actively participate in online discussion.

Kırkgöz (2010) on his study entitled "A Blended Learning Study On Implementing Video Recorded Speaking Tasks In Task-Based Classroom Instruction" investigated the designing and implementing a speaking course in which face-to-face instruction informed by the principles of Task-Based Learning is blended with the use of technology, the video, for the first-year student teachers of English in Turkish higher education. The study consisted of three hours of task-based classroom instruction, complemented with one hour of additional class time, which was devoted to viewing and evaluating students'

video recorded speaking tasks, assigned as homework. A mixed research method was used to collect data from multiple sources: recordings of a pre-and post-course speaking task, analysis of the video-recordings of students' speaking tasks, informal interviews with the students, and a written end-of-year course evaluation survey. Analysis of quantitative and qualitative data revealed that students made noticeable improvement in their oral communication skills, and they were positive in their perceptions of integrating technology in the lesson. The study also indicated that the use of video camera, as a technological tool, had a positive impact on students' viewing and critically evaluating their speaking tasks. Attention is drawn to a number of potential advantages of integrating technology into face-to-face instruction, and it is suggested that video cameras represent a language learning resource worthy of further investigation.

The studies conducted by Akkoyunlu, et al (2008), Banaweh (2011),Milne, et al, (2014), and Kırkgöz (2010) were related to the present study for they used blended learning approach in teaching concepts. However, they differ in terms objectives, methodology and subjects of the study.

Alwan (2009) in his study entitled, "Misconception of heat and temperature Among Physics Students" revealed that most of the students held alternative conceptions of heat and temperature. Many students were confused of the concepts of heat and temperature and could not explain the differences

between heat and temperature. Some students still regard that the words "heat" and "temperature" are the same things.

The study of Alwan (2009) is related to the present study in terms of the subject matter used and the respondents of the study. However, they differ in terms study objectives and methods.

Cassandra (2013) on her study entitled "Investigating Blended Learning in the High School Science Classroom" used quantitative methods to measure student attitudes and learning of science content in both a treatment and control group consisting of 9th grade Physical Science classes. Students in the treatment group experienced one semester of blended learning by using online science modules to supplement their in-class learning while the control group continued to have only face-to-face instruction. The findings show no significant change in student attitudes about science and also no significant difference between the groups on a posttest measuring science knowledge. However, the treatment group exposed to the blended learning approach did show significant growth in science content knowledge from pretest to posttest while the growth by the control group was not significant. Students in the treatment group were also interviewed to gather their opinions of the blended learning experience. Responses show students were engaged by the online simulations and self-paced content but participants also suggested ways to make the blended learning experience more beneficial for student learning.

The study of Cassandra has a resemblance to the present study in the sense that both studies used blended learning as a strategy in the delivery of instruction. In addition, online modules were utilized as instructional materials in both of the studies. On the other hand they differ in terms of the subjects and variables used in the study.

Larsen (2012) researched on the teacher and student perspectives on a blended learning intensive English program writing course, the findings indicated that the teachers needed a fairly minimal amount of pedagogical and technical training to employ blended learning successfully. Collaborative planning also proved very beneficial, together with technical and pedagogical support throughout the semester. Students were found to work more autonomously and focused while becoming more responsible for their own learning. This enabled the teachers to better provide personalized assistance, keep better track of student progress, and cover more materials. Students also liked learning in the BL environment and indicated they would prefer this to ix more conventional classes. Lastly, teacher practice and behavior was found to have minimal influence on student perceptions of the BL environment though some results suggested that teacher experience might be a predictor of student satisfaction with their teachers.

Akyol, et al, (2011) in their study entitled "Understanding Cognitive Presence in an Online and Blended Community of Inquiry: Assessing Outcomes and Processes for Deep Approaches to Learning, focuses on deep and

meaningful learning approaches and outcomes associated with online and blended communities of inquiry. Applying mixed methodology for the research design, the study used transcript analysis, learning outcomes, perceived learning, satisfaction, and interviews to assess learning processes and outcomes. The findings for learning processes and outcomes indicated that students in both online and blended courses were able to reach high levels of cognitive presence and learning outcomes. The results suggest that cognitive presence in a community of inquiry is associated with perceived and actual learning outcomes.

The studies conducted by Larsen (2012), and Akyol, et al (2011) were related to the present study for they used blended learning approach in teaching concepts. However, they differ in terms objectives, methodology and subjects of the study.

Chao, et al, (2015) conducted study on Exploring Students' Learning Attitude and Achievement in Flipped Learning Supported Computer Aided Design Curriculum: A Study in High School Engineering Education. This research aims to explore the benefits of a flipped learning approach for students who are taking an introductory-level curriculum on bridge computer aided design in terms of learning attitude and achievement within the curriculum. In this study, collaborative problem based learning (CPBL) supported by flipped learning, a blended learning design, was integrated into a high school bridge computer aided design curriculum. Ninety-one 17-year-old students from two

K11 classes were assigned randomly to an experimental group and a control group for the study, respectively. To assess the students' achievements and learning attitudes in the different groups, an 8-week (16 h in total) pre- and post-test quasi-experimental study was designed. The results confirmed the effectiveness of the flipped learning approach. Significant differences were found between the experimental and control group in terms of students' achievements. In the experimental group, students' learning attitudes, motivation and self-evaluation were enhanced. In conclusion, the results show that the flipped learning approach has a positive effect on the transfer of learning. Based on the findings obtained, recommendations for the improvement of future K12 engineering education instruction using the flipped learning approach are provided.

Flipping the classroom and instructional technology integration in a college-level information systems spreadsheet course was conducted by Davies, et al, (2013). The purpose of this research was to explore how technology can be used to teach technological skills and to determine what benefit flipping the classroom might have for students taking an introductory-level college course on spreadsheets in terms of student achievement and satisfaction with the class. A pretest posttest quasi-experimental mixed methods design was utilized to determine any differences in student achievement that might be associated with the instructional approach being used. In addition, the scalability of each approach was evaluated along with students' perceptions of these approaches to

determine the affect each intervention might have on a student's motivation to learn. The simulation-based instruction tested in this study was found to be an extremely scalable solution but less effective than the regular classroom and flipped classroom approaches in terms of student learning. While students did demonstrate learning gains, the process focus of the simulation's instruction and assessments frustrated students and decreased their motivation to learn. Students' attitudes towards the topic, their willingness to refer the course to others, and the likelihood that they would take another course like this were considerably lower than those of students in the flipped or regular classroom situations. The results of this study support the conclusion that a technology enhanced flipped classroom was both effective and scalable; it better facilitated learning than the simulation based training and students found this approach to be more motivating in that it allowed for greater differentiation of instruction.

The study of Chao, et al, (2015) and Davies, et al, (2013) has a resemblance to the present study in terms of the research design. Both studies used pre-test and post-test single group design. On the other hand they differ in terms of the objectives, subjects, variables used. In addition, afore cited studies above, differ also in terms of the strategy utilized in the delivery of instructions. The above mentioned studies used flipped learning strategy while the present study uses blended learning approach.

The review of literature and studies cited enlighten the researcher on how to go over with the present study. The ideas and information taken from the previous studies serves as the baseline information that will guide the researcher in conducting this study to become successful and meaningful.

Chapter 3

METHODOLOGY

This chapter discusses the method and procedure employed by the researcher in the conduct of the study. This includes the research design, instrumentation, validation of the instruments, sampling procedure, data gathering procedure and statistical treatment of data.

Research Design

The experimental pretest-posttest single group design (Howardsei, 2009) was used in this study. Pretest and posttest were administered to the subjects in the beginning and end of the treatment. The subjects were taught using flex model blended learning approach wherein students spent four hours in online discussion and one hour face to face. The topics that had been taught during the treatment were heat, temperature, and gas laws.

Instrumentation

The instruments that had been used in data gathering in this study were the following:

Standardized questionnaire. A 65 item test was prepared by the researcher. The test is composed of three major topics namely; heat, temperature and gas laws. The researcher prepared the initial test based on the table of specifications. It was checked by his adviser and other science instructors and

professors of Samar State University who are knowledgeable on the content. Then it was tried out to second year college, Bachelor of Science Secondary Education students from the College of Education of the University. Then the result was subjected to item analysis. Based from the result, twenty three items from the test were retained, nineteen items were revised, and the remaining twenty three items were rejected. The 65 item test was trimmed down to 55 item test.

Questionnaire. This instrument was adapted from Irene (2003), Araza (2007), and Tenedero (2015). The survey instrument was consisted of seven parts. The first part includes the profile related to the students such as demographic characteristics namely; age, gender, average family income, and the course being taken.

The second part is in the form of checklist questionnaire that pertains to the availability of students' technology resources such as android cellphones, laptops, pocket wifi, internet land line connections, tablet, netbook, internet café in the University, and out of the campus internet café.

While the third part is consist of a 30 items questionnaire which utilized Likert-type scale from 1-5 (with response options as follows: 4 - Very Knowledgeable, 3 - Knowledgeable, 2 - Little knowledge, 1 - Very little knowledge,0 - No knowledge) to measure the technology literacy of the students.

Similarly, the fourth part measured the students' internet literacy profile with a 5 -point-Likert-scale (with response options as follows: 4 - Very Knowledgeable, 3 - Knowledgeable, 2 - Little knowledge, 1 - Very little knowledge,0 - No knowledge).

The fifth part indicated the frequently visited website, frequency, and duration in surfing the internet by the students. This was measured by using the following scale 8 - (Everyday), 7 - (Six times per week), 6 - (Five times per week), 5 - (Four times per week) 4 - (thrice a week), 3 - (twice a week), 2 - (once a week), 1 - (never).

In addition the sixth part is in the form of checklist questionnaire that pertains to the study habit of the students with regard to the frequency of studying in a week, time of study, location of the study, materials or resources use in studying, and study practices.

Lastly, the seventh part of the questionnaire is composed of 20 items to determine the student's attitudes towards physical science subject. It is also in the form of a 5 -point-Likert-scale (with response options as follows: 5 - Strongly Agree, 4 - Agree, 3 - Uncertain, 2 - Disagree, 1 - Strongly Disagree).

Validation of the Instruments

The researcher prepared the initial test of the achievement test based on the table of specification following the Bloom's Taxonomy of Learning in which there were nine items in the knowledge level, 15 were comprehension level, seven were application level, twelve were categorized as analysis level, four

items fall under synthesis level, and the remaining three items fall under evaluation level. It was then checked by his adviser and other Science instructors of Samar State University who are knowledgeable on the content. To test the reliability of the test instruments it was pilot tested to the 2nd year BSEd major in physical science student from the College of Education in this University last February 2016.

The test instrument was further subjected to item analysis for facility values and discrimination indices. Out of the original 65-item test, it was trimmed down to 55 items due to low discrimination indices. Moreover, the Kuder-Richardson formula was applied to determine the reliability of the test instrument where in the data used was the scores of the students who participated in the try-out. The Test's reliability was computed to be 0.81, which is acceptable for research purposes. Thus, the test instrument was reliable for the study.

On the other hand, the face and content validity of the survey questionnaire utilized in the study was validated by his adviser and panel of evaluators. The researcher prepared the draft of the survey questionnaire adopted from the previous cited studies, and then it was passed to his adviser and panel of evaluators for corrections and comments. They provided inputs for the revision of the instrument. The survey questionnaire was not subjected to pilot testing following the test-retest procedure anymore in the sense that it was already validated and tested by the cited studies. However, the researcher made

the necessary revision of the survey questionnaire based on the suggestions and recommendation of his adviser and panel of evaluators.

Sampling Procedure

The participants of this study were the three sections (A-C) of Bachelor of Science in Information Technology (BSIT) students from the College of Arts and Sciences wherein BSIT section A was composed of 36 students, BSIT section B, there were 34 students, BSIT section C there 32 students, and 31 BS Architecture students from the College of Industrial Technology of Samar State University. The participants of the study were enrolled during the second semester of S:Y 2015-2016 taking up the subject Physics 101/Physics 223 (Natural Science). They were selected as the participants to facilitate easy supervision and smooth flow of the process of the conduct of the study since they are taking the same subject wherein their instructor is the researcher. In this manner, the researcher used purposive sampling method in this study.

Data Gathering Procedure

In the gathering procedure, the researcher ensured that extraneous factors were considered and taken care of. Data gathering was divided in three phases.

Phase 1. In this phase, the researcher has prepared the necessary instruments such as achievement test and survey questionnaires that were important in gathering the profile variates of the respondents such as age, sex,

study habits, internet access profile, technology literacy index, average family income of parents, and attitude towards science.

The entrance test score of the students were obtained by seeking approval from the concerned personnel from the guidance office to access the needed data. Mean while, in determining the intelligence quotient and emotional quotient of the students, the researcher secured a communication letter addressed to the guidance office to sought assistance in administering the standardized test to measure the IQ and EQ of the students. Test administration was facilitated also with the help of some psychology students.

Right after the instruments were validated the researcher finalized his instrument and personally administered the survey questionnaire to gather the necessary data pertaining to the profile variates of the students, then the achievement test was also employed to measure the prior knowledge of the students with regards to heat, temperature, and gas laws concepts.

Tallying of the data gathered, instructional materials and lesson planning used in the implementation of the blended learning approach was also done in this phase.

Phase 2. In this phase, the researcher oriented the students about the blended learning approach and the changes in terms of the delivery of instruction. The type of blended learning mode adapted was 30% face to face instruction and 70% online instruction. Since the contact hours for classes is 5

hours per week, 1 hour was allotted to face to face instruction and 4 hours was allotted for the students to work online.

The researcher created four personalized group sites in the face book, one for every section wherein the materials for instruction with regards to temperature, heat and gas laws topics had been uploaded. It was on this site wherein online instruction was made. Face book was chosen to be the site of online instruction to facilitate easy checking of attendance during online instruction and this site also is very popular to students with regards to online socialization.

To ensure 100% participation of the students, the researcher regularly checked the attendance online and carefully monitored if the students were really doing the task. During the online instructions students were encourage to be resourceful that would help them meaningfully understand the task given to them. After the time allotted for online instruction students were asked to submit the exercise attached to the uploaded power point learning module in their respective sites to the email of the instructor.

After the online instruction, students and the instructor met in the classroom to discussed the concerns of the students with regards to the given tasked. After which, assessment in the form of quiz was given to them to really measure if they have learned using the online instruction.

This mode of instruction was done simultaneously every week and was based on the class scheduled of the students. This mode of instruction delivery lasted for three weeks.

Phase 3. Lastly, in this phase posttest was administered to the respondents to measure if they learned meaningfully using blended learning approach. Evaluating the blended approach using a questionnaire, tallying of data, interpreting data, and establishing the summary of findings and conclusion were also done in this phase.

Statistical Treatment of Data

The following were the statistical tools used in the treatment of data.

Frequency count. This was used to analyze the subject's profile such as sex, age, internet access profile, and the study habits of the subjects.

Weighted mean. A measure of central location used in this study to find the age, sex, family income per month, , IQ, and EQ of the subjects of the study. This was used also to find the average score in the achievement test, pretest and posttest scores, attitude scores and evaluation of the blended learning approach used in the study.

Z-test. This was utilized to determine whether there was a significant difference between the pretest and posttest mean scores of the subjects after the treatment.

Multiple regression analysis. Used to determine the profile variate of the subjects that have significant relationship to their pretest and posttest scores before and after the treatment.

Chapter 4

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

This chapter deals with the presentation of data gathered through the use of documentary analysis, questionnaires, pretest and posttest. The data presented consist of subject's profile according to age, sex, entrance test scores, intelligent quotient, emotional quotient, study habits, internet access profile, technology literacy index, average family income, attitude towards science, pre-test, and the posttest.

Profile of the Subjects

This section answers one of the major problems of the study, which is to determine the profile of the subjects according to age, sex, entrance test scores, intelligent quotient, emotional quotient, study habits, internet access profile, technology literacy index, average family income, attitude towards science.

Age. As reflected in Table 1 the average age of the male students were 17.27 year old with a standard deviation of 0.85, while average age of the female students was about 17.56 years old with a standard deviation 1.49. Generally, the average age of the subjects was 17. 43 years old with a standard deviation of 1.24.

Sex. Table shows also that out of 133 subjects of the study 62 of them were males that aged between 16-18 year olds, 71 were females that aged 16 - 19 years old.

Table 1

Age and Sex Distribution of the Subjects

Age	Gender Category				Total	Percent
	Male		Female			
	f	Percent	f	Percent		
25	0	0.00	1	1.41	1	0.75
21	0	0.00	4	5.63	4	3.01
20	1	1.61	1	1.41	2	1.50
19	5	8.06	4	5.63	9	6.77
18	12	19.35	15	21.13	27	20.30
17	36	58.06	36	50.70	72	54.14
16	8	12.90	10	14.08	18	13.53
Total	62	100.00	71	100.00	133	100.00
Mean	17.27 years	-	17.56 years	-	17.43 years	-
SD	0.85 years	-	1.49 years	-	1.24 years	-

Average family income. Table 2 shows the average family income of the parents of the students. It is manifested from the result that the mean was Php 6, 812.00 with a standard deviation of Php4, 629.00.

Table 2

Average Family Income of the Subjects of the Study

Income (in Pesos)	f	Percent
23,000 - 25,999	2	1.50
20,000 - 22,999	4	3.01
17,000 - 19,999	1	0.75
14,000 - 16,999	7	5.26
11,000 - 13,999	0	0.00
8,000 - 10,999	25	18.80
5,000 - 7,999	47	35.34
2,000 - 4,999	47	35.34
Total	**133**	**100.00**
Mean	**Php6,812.00**	**-**
SD	**Php4,629.44**	**-**

This implies that the average monthly income of the parents was below the poverty threshold set by NEDA pegged at Php 9,064.00 in 2015 (PSA, 2015).

Technology resources of the students. Figure 2 displays the technology resources owned by the students which they utilized in studying their lessons. The result implied that there were 112 or 30.03 percent owned android cell phones, 61 or 15. 35 of them depend on the school's internet café as their technology resource for learning, and 64 of them or 17.16 percent of them depend at the internet cafés located outside the school

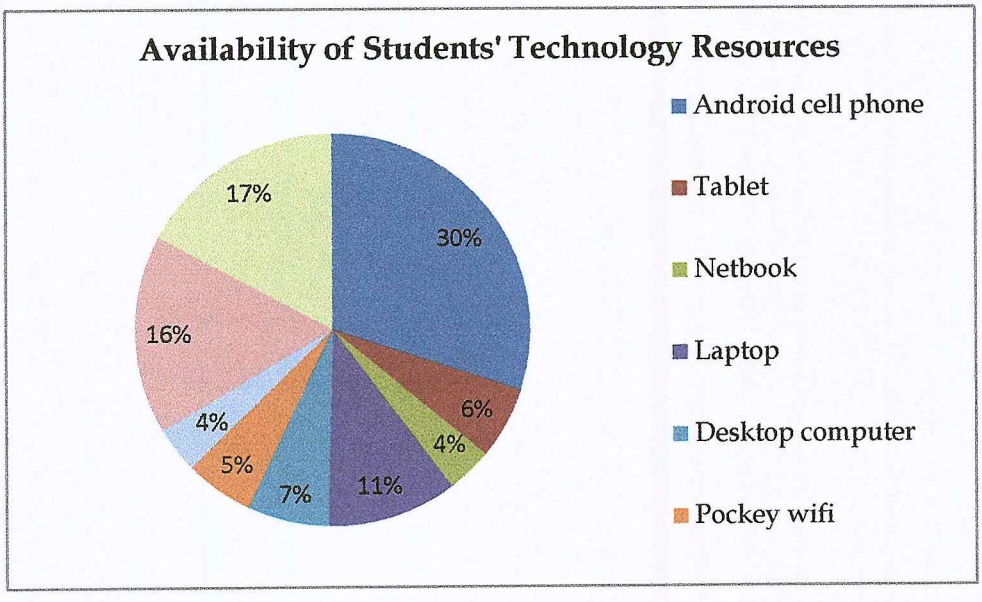

Figure 2 Technology Resources of the Students

Entrance test score. Table 3 displays the entrance test scores during the enrollment period. The test has three components these were, reading, mathematics and science. The result shows that one or 0.75 percent obtained a

score between 85 -87, three or 2.26 percent of obtained a score between 82-84, nine or 6.77 percent obtained a score between 79 - 81, twenty seven or 20.30 percent obtained a score between 76 -78, thirty four or 35. 34 percent obtained a score 70-72, while twelve or 9.02 percent of the students obtained a score between 67- 69 in the three components. The mean score is 73.77 with a standard deviation of 3.62 which means that majority of the students obtained a score between 70 - 77.

Table 3

Entrance Test Result of the Subjects

Scores	f	Percent
85-87	1	0.75
82-84	3	2.26
79-81	9	6.77
76-78	27	20.30
73-75	34	25.56
70-72	47	35.34
67-69	12	9.02
Total	**133**	**100.00**
Mean	**73.77**	-
SD	**3.62**	-

Intelligence quotient. Table 4 shows the data on the intelligence quotient of the students and summarized as follows, 3 or 2.26 percent of the students were high average, 50 or 37.59 percent were average, 41 or 11. 28 percent were in the border line, and 24 or 18.05 percent were extremely low in

terms of IQ. In the regard the subjects had a low average intelligent quotient with a mean of 83. 62 and a standard deviation of 16.97.

Table 4

Intelligence Quotient of the Subjects

Score	Interpretation	Mean	Percent
110 - 119	High Average	3	2.26
90 - 109	Average	50	37.59
80 - 89	Low Average	41	30.83
70 - 79	Booarder Line	15	11.28
55 - 69	Extremely Low	24	18.05
Total	-	**133**	**100.00**
Mean	**Low Average**	**83.62**	-
SD	-	**16.97**	-

Emotional quotient. Table 5 presents the emotional quotient of the subjects. The results implied that along intrapersonal emotional factor only 2 students got the scores within 120 to 129, were rated that had "Very High EQ". This was followed by 27 0r 20.30 percent who got the scores within 90 to 109, were rated that had "Average EQ" and there were 33 students rated as "Markedly Low EQ "who got the scores below 70.

Along interpersonal emotional factor, one or 0.75 of the students got the score within 110-119 were rated has high EQ. This was followed by 28 or 21. 05 percent who got the scores within 90-109 were rated that had "Average EQ" and there were 27 students rated as "Markedly Low EQ "who got the scores below 70.

Meanwhile, along stress emotional factor, one or 0.75 of the students got the score within 110-119 were rated has had "High EQ". This was followed by 26 or 35.34 percent who got the scores between 90-109 were rated that had "Average EQ" and there were 41 students rated as "Markedly Low EQ " who got the scores below 70.

In adaptability emotional factor, 11 or 8.27 of the students got the score within 110-119 were rated has an average EQ. This was followed by 43 or 32.33 percent who got the scores between 90-109 were rated that had "Average EQ" and there were 21 students rated as "Markedly Low EQ " who got the scores below 70.

Along general mode emotional factor, 2 or 1.50 of the students got the score within 110-119 were rated has a high EQ. This was followed by 26 or 19.55 percent who got the scores within 90-109 were rated that had "Average EQ" and there were 51 students rated as "Markedly Low EQ "who got the scores below 70.

Meanwhile, in the total EQ factor, there were 19 who got the scores within 90 to 109, rated as "Average EQ". This was followed by 39 or 29.32 percent who got the scores within 90-109 were rated that had "Low EQ" and there were 46 students rated as "Markedly Low EQ "who got the scores below 70.

Furthermore, in the positive expression EQ factor there were 41 or 30. 83 percent of the students obtained a score within 120 to 129, rated as "Very high EQ". This was followed by 47 or 29.32 percent who got the scores within 110 to

119 were rated that had "High EQ" and there were only 6 students rated as "Very Low EQ "who got the scores below 70 to 79.

The grand mean of 85.42 indicated that the students had a low emotional quotient.

Table 5

Emotional Quotient of the Subjects

Score/Interpretation	Factors													
	A		B		C		D		E		F		G	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%
120-129	2	1.50	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	41	30.83
110-119	1	0.75	1	0.75	1	0.75	11	8.27	2	1.50	0	0.00	47	35.34
90 - 109	27	20.30	28	21.05	26	19.55	43	32.33	26	19.55	19	14.29	12	9.02
80 - 89	60	45.11	37	27.82	47	35.34	42	31.58	25	18.80	29	21.80	7	5.26
70 - 79	10	7.52	40	30.08	18	13.53	16	12.03	29	21.80	39	29.32	6	4.51
under 70	33	24.81	27	20.30	41	30.83	21	15.79	51	38.35	46	34.59		0.00
Total	133	100.00	133	100.00	133	100.00	133	100.00	133	100.00	133	100.00	113	84.96
Mean	84 - Low		79 - Very Low		82 - Low		88 - Low		80 - Low		77 - Low		108 - Average	
SD	10.69		14.49		10.36		14.14		11.78		10.88		14.63	

Technology literacy of the subjects. Table 6 presents the technology literacy index of the subjects. As reflected on Table 6 22 out of 29 indicators pegged a mean between 2.51 - 3.50 which means they possessed those identified skills, while the remaining indicators showed that the subjects had a little knowledge in installing new programs or software such as virus protection software and science based software, uninstalling programs, and software from different website, trouble shooting minor problems in technology devices such as android phones, tablet, and computers, trouble shooting local printer problems, changing the format of the spreadsheets to anything they

need, updating, using a virus checker and knowing when it is time to call a technology specialist, using tablet in messaging and calling.

Table 6

Technology Literacy of the Subjects

Indicators	Xw	Interpretation
1. I know how to use computer for research and do homework and other purposes.	3.27	K
2. I can copy and paste documents from different applications.	3.17	K
3. I know how to check computer, monitor, and wall outlet for power connections.	2.56	K
4. I can use Microsoft word and power point presentation in making school reports and projects.	3.40	K
8. I know how to save and back up data /or software to a removable storage device.	2.65	K
10. I can adjust the appearance of desktop and create shortcuts; re-name icons and identify different types of icons	2.56	K
11. Can apply font, change font size and use features bold or underline.	3.11	K
12. I regularly use spell checker.	2.82	K
13. Can set margins and page properties.	2.83	K
14. I know how to print a file.	2.69	K
15. Can insert page breaks, create columns, create headers and footers and add automatic page numbers.	2.80	K
16. Can make power point presentation.	3.33	K
17. Can add multimedia effects like animations, videos, and sounds on the power point for my reports and school task.	2.56	K
18. I can change the format of the spreadsheets to anything I need.	2.35	K
19. .I regularly update and use a virus checker and know when it is time to call a technology specialist.	2.13	K
20. I regularly use a cellular phone for chatting and calling.	3.12	K

21. I can use other applications in my android cellular phone like camera, video player, calculator, calendar, office suite for opening documents such as pdf and Microsoft documents.	3.10	K
22. I can connect social networking sites using my android cellular phone.	2.92	K
23. I can do researches related to my lesson using my android phone.	3.02	K
25. I can use other applications in my tablet camera, video player, calculator, calendar, office suite for opening documents such as pdf and Microsoft documents.	2.56	K
26. I know how to use my tablet to connect on social networking sites and do researches related my lessons and studies.	2.54	K
27. I can assist my classmates and friends on using different application in the tablet.	2.51	K
28. I can transfer files such as documents, and videos to other gadgets using a Bluetooth device.	3.14	K
29. I can assist classmates and friends in using technology in school.	2.82	K
5. I know how to install new programs or software such as virus protection software, science based software, and etc.	2.18	LK
6. I know how uninstall programs and software from different website.	2.20	LK
7. I know how to trouble shoots minor problems in technology devices such as android phones, tablet, and computers.	2.05	LK
24. I have tablet and I use it for sending messages and calling.	2.05	LK
9. I can trouble local printer problems.	1.73	LK
Grand Total	**67.96**	
Grand Mean	**2.70**	**Knowledgeable**

Legend:

3.51 - 4.00 Very Knowledgeable (VK)

2.51 - 3.50 Knowledgeable (K)

1.51 - 2.50 Little Knowledge (LK)

0.51 - 1.50 Very Little Knowledge (VLK)

0.00 - 1.50 No Knowledge (NK)

Generally the subjects were knowledgeable enough in manipulating gadgets, and other technology resources as pegged with a mean of 2.70.

Attitude towards Science of the subjects. Table 7 displays the attitude of the subjects in the experimental group towards Science. As shown in the said table, the highest mean was 4.05 which they agree to the statement that they find the subject enjoyable. The second highest mean of 3.81 signified that they were interested in knowing more related concepts in science. The mean of 3.68, interpreted as "agree", was posted on the statement such as: "I like to discuss the subject with my classmate", "I am free to discover some principles in science", and "I can relate the significance and importance of the subject in explaining certain environmental phenomena". The lowest means within 2.51-3.50. on the other hand, signified uncertain, were reflected on the statement such as: "I love memorizing the formulas, theories, and principles regarding on the subject", "I like dealing with problem solving regarding on the subject", "I find the illustrations and solutions to solving problems in physical science understandable and meaningful", "I can express my ideas freely in the discussion of the lessons", "I find it easy to solve word problems in physical science", and "I find it easy to solve word problems in physical science". Overall, the grand mean of 3.63 indicated a favorable attitude of the students towards science subject.

On the other hand, signified uncertain, were reflected on the statement such as: "I love memorizing the formulas, theories, and principles regarding on

Table 7

Attitude of the Students Towards Science

	Indicators	Xw	Interpretation
1.	I find the subject enjoyable.	4.05	A
2.	I find the terms, theories and concepts interesting and easy to understand	3.58	A
3.	I like to discuss the subject with my classmate.	3.68	A
6.	I enjoy answering the exercises given by the teacher.	3.71	A
7.	I like the subject because they are interesting and easy.	3.53	A
8.	I am free to discover some principles in physical science.	3.68	A
9.	I am enthusiastic to participate in the discussion of the subject.	3.66	A
11.	I can relate the concepts of the subject to my friends and classmates.	3.75	A
12.	I always feel excited coming to our physical science class.	3.53	A
14.	I am grateful of the teaching made by my teacher about physical sciences.	3.77	A
15.	I am interested in knowing more related concepts in physical science.	3.81	A
18.	I find the subject useful in everyday activities.	3.76	A
19.	I appreciate the significance of knowing concepts, theories, and principles in physical science.	3.73	A
20.	I can relate the significance and importance of the subject in explaining certain environmental phenomena.	3.68	A
4.	I love memorizing the formulas, theories, and principles regarding on the subject.	3.23	U
5.	I like dealing with problem solving regarding on the subject.	3.46	U

Table 7 continued

Indicators	Xw	Interpretation
10. I find the illustrations and solutions to solving problems in physical science understandable and meaningful.	3.48	U
13. I can express my ideas freely in the discussion of the lessons.	3.47	U
16. I enjoy dealing with solving problems in physical science.	3.46	U
17. I find it easy to solve word problems in physical science.	3.48	U
Grand Total	**72.50**	
Grand Mean	**3.63**	**Agree**

Legend:

4.51 - 5.00 Strongly Agree (SA)
3.51 - 4.50 Agree (A)
2.51 - 3.50 Uncertain (U)
1.51 - 2.50 Disagree (D)
1.00 - 1.50 Strongly Disagree (SD)

the subject", "I like dealing with problem solving regarding on the subject", "I find the illustrations and solutions to solving problems in physical science understandable and meaningful", "I can express my ideas freely in the discussion of the lessons", "I find it easy to solve word problems in physical science", and "I find it easy to solve word problems in physical science". Overall, the grand mean of 3.63 indicated a favorable attitude of the students towards science subject.

Study Habits

This section describes the study habit of the students with regards to the frequency and duration of studying their lessons in a week, the time they usually study, the place where they study, materials and resources that they usually utilized, and their study practices.

Frequency and duration of the study. Table 8 and 9 indicates the frequency and duration in studying of the subjects. It was noted that out of 133 students, 97 or 72. 94 percent of them were studying only once to three times a week and the average time spent in studying was 150. 42 minutes or equivalent

Table 8

Duration of Study of the Subjects

Duration (in minutes)	f	Percent
3000	2	1.50
540	1	0.75
300	8	6.02
240	3	2.26
180	5	3.76
150	2	1.50
120	17	12.78
90	2	1.50
60	30	22.56
50	10	7.52
45	4	3.01
40	6	4.51
35	15	11.28
30	15	11.28
below 30	11	8.27
Total	**131**	**98.50**
Mean	**150.42**	
SD	**407.04**	

to 2.5 hours in a week with a standard deviation of 407.04. This implies that they spent less time in studying their lesson.

Table 9

Frequency of Studying of the Subjects

Study Habits	Frequency	Percent
Frequency		
1x/week	10	7.52
2x/week	46	34.59
3x/week	41	30.83
4x/week	23	17.29
5x/week	5	3.76
6x/week	1	0.75
Everyday	7	5.26
Total	**133**	**100.00**

Time of study. Preferences of the subjects with regard to time of study are shown in table 10. The result shows that 58 or 27.62 percent of the students preferred to study in early morning, 15 or 7.14 percent prefers during noon time, 16 or 7.62 percent preferred in the afternoon , 94 0r 44. 76 percent preferred to study in the evening, and 26 or 12. 38 percent of them preferred during midnight in studying.

Table 10

Subjects' Preference of Time of Study

Time of Study	f	Percent
Early morning	58	27.62
Noon time	15	7.14
Late afternoon	16	7.62
Evening	94	44.76
Midnight	26	12.38
Others	1	0.48

Place of study preferences of the subjects. The preference to place of study by the subjects is also shown in Table 11 and it was summarized as follows, 30 or 11.81 percent of the subjects preferred to study in the internet café, 35 or 13.78 percent preferred in the library, 20 or 7.87 percent preferred at the school grounds, 113 or 44.49 preferred to study at home, 33 or 12.99 percent preferred in the vacant classrooms, while 23 or 9.06 percent of them preferred to study in their classmates' house.

Generally, students preferred to study in the evening and early morning probably for the reason that there is no disturbance while they were studying. The subject preferred to study at home so that they can focus and they usually spent studying also in the internet café and school library so that can access variety of resources.

Table 11

Place of Study Preferences by the Subjects

Location	f	Percent
Internet café	30	11.81
Library	35	13.78
School grounds	20	7.87
At home	113	44.49
Vacant classrooms	33	12.99
Classmate's house	23	9.06
Others	0	0.00

Materials/resources and study practices. As shown in Table 12, 65 or 18. 31 percent of the subjects preferred internet as their resource in studying lessons,

40 or 11.27 percent preferred reference books prescribed by their instructors, 7 or 1.97 percent preferred magazines, 39 or 10.99 percent preferred textbook available in the library, 35 or 9.86 percent preferred modules given by their instructors, 5 or 1.41 percent preferred journals, 64 or 18.03 percent preferred handouts given by their instructors also, 7 or 1.97 percent preferred newspaper while , 93 or 26.20 percent of them preferred to utilized their lectures notes they had written during the discussion.

Table 12

Instructional Resources and Study Practices of the Subjects

Materials/Resources	f	Percent
Internet	65	18.31
Reference books	40	11.27
Magazines	7	1.97
Textbooks	39	10.99
Modules	35	9.86
Journals	5	1.41
Handouts	64	18.03
Newspaper	7	1.97
Lecture notes	93	26.20
Study Practice		
Memorization	68	21.94
Making brief and organized notes while studying	48	15.48
Make use of internet	46	14.84
Compehension	59	19.03
Paraphrasing(telling ideas using words)	27	8.71
Mnemonics	23	7.42
Concept mapping	5	1.61
Problem Solving exercise	33	10.65
Others	1	0.32

Study practices of the subjects can be gleaned also in Table 10. The result implies that 65 or 18.31 of them used memorization in studying their lessons,

48, or 15.48 percent were making brief and organized notes while studying, 46 or 14. 84 percent used internet or online resources to access information that was relevant to their topics that they were studying, 59 or 19.03 of the subjects simply comprehend the topic that they were studying, 27 or 8.71 utilized paraphrasing, 23 or 7. 42 used mnemonics, 5 or 1.61 used concept mapping, while, 33 or 10.65 percent of the subjects preferred to used sample problem exercises given by their instructors in studying specially with mathematical concepts.

The result in Table 10 implies that the subjects usually used of memorization, internet, made brief and organized notes, problem exercises, and comprehending the lesson while studying. They usually utilized text books, internet, modules, handouts, and lectures notes written during the discussion as their learning resource.

Internet Access Profile of the Subjects

This section describes the internet access profile of the subjects with regards to their frequently visited websites, duration in surfing the internet , and internet literacy index.

Frequently visited website of the subjects. As shown in Table 13, face book rank first as the most visited website by 133 or 20.91 percent of the students, secondly, Google by 123 or 19.34 percent of the students, third was YouTube with 114 or 17. 92 percent student-users, consequently followed by twitter, instagram

and Yahoo. On the other hand, Skype and schoology were the less frequent visited website by the students.

Table 13

Frequently Visited Website of the Students

Site	f	Percent
Facebook	133	20.91
Google	123	19.34
Youtube	114	17.92
Twitter	94	14.78
Instagram	89	13.99
Yahoo	81	12.74
Others:		
Skype	1	0.16
Schoology	1	0.16

Table 14

Frequently of Surfing the Internet of the Subjects

	Facebook		Google		Youtube		Twitter		Instagram		Yahoo	
Frequency	f	%	f	%	f	%	f	%	f	%	f	%
Everyday	43	32.33	12	9.02	9	6.77	0	0.00	0	0.00	2	1.50
6x/week	16	12.03	12	9.02	5	3.76	3	2.26	2	1.50	4	3.01
5x/week	12	9.02	11	8.27	17	12.78	6	4.51	3	2.26	3	2.26
4x/week	13	9.77	18	13.53	15	11.28	0	0.00	1	0.75	1	0.75
3x/week	15	11.28	19	14.29	12	9.02	6	4.51	3	2.26	4	3.01
2x/week	13	9.77	23	17.29	15	11.28	5	3.76	6	4.51	7	5.26
once/week	15	11.28	25	18.80	28	21.05	16	12.03	10	7.52	14	10.53
Never	0	0.00	3	2.26	13	9.77	58	43.61	64	48.12	46	34.59

Frequency of surfing the internet. Table 14 shows the frequency of surfing the internet by the subject of the study. It was revealed that out 133 students, 43 of them were using face book every day, 12 or 9.02 percent utilized

Google, 9 or 6.77 percent utilized YouTube, while 2 or 1.5 percent utilized yahoo in surfing the internet every day. The rest of the subjects utilized the identified websites below six times a week.

Duration in surfing the internet. As shown in Table 15 in terms of duration of surfing the internet, the subjects usually spent an average of 145. 3 or equivalent to 2.42 hours a day in using face book, 108.9 or equivalent to 1.89 hours in using Google, 2.1 hours in accessing YouTube, 1.04 hours in browsing twitter, while 1.15 hours spent by the subjects in using yahoo and instagram.

Table 15

Duration in Surfing the Internet by the Subjects

	Facebook		Google		Youtube		Twitter		Instagram		Yahoo	
Frequency	f	%	f	%	f	%	f	%	f	%	f	%
above 300	6	4.51	2	1.50	0	0.00	0	0.00	0	0.00	0	0.00
300	3	2.26	1	0.75	5	3.76	0	0.00	0	0.00	0	0.00
240	2	1.50	0	0.00	0	0.00	0	0.00	1	0.75	1	0.75
180	7	5.26	9	6.77	4	3.01	1	0.75	0	0.00	2	1.50
160	1	0.75	0	0.00	1	0.75	0	0.00	2	1.50	1	0.75
120	8	6.02	8	6.02	0	0.00	1	0.75	0	0.00	6	4.51
100	0	0.00	1	0.75	4	3.01	0	0.00	0	0.00	0	0.00
90	2	1.50	0	0.00	1	0.75	0	0.00	0	0.00	0	0.00
60	20	15.04	16	12.03	15	11.28	6	4.51	4	3.01	0	0.00
50	1	0.75	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
40	2	1.50	1	0.75	1	0.75	0	0.00	0	0.00	1	0.75
30 & below	4	3.01	10	7.52	6	4.51	5	3.76	4	3.01	3	2.26
Total	**56**	**42.11**	**48**	**36.09**	**37**	**27.82**	**13**	**9.77**	**11**	**8.27**	**14**	**10.53**
Mean	**145.3**		**108.9**		**123.1**		**62.31**		**68.08**		**68.21**	
SD	**135.3**		**89.58**		**94.36**		**43.31**		**61.43**		**38.71**	

Table 16

Internet Literacy of the Subjects

	Indicators	Xw	Interpretation
1.	I can save /download copies of web pages and graphics on my hard drive, flashdrive, and compact disk.	3.07	K
2.	I can communicating family, relatives, friends and classmates by using any of following; skype, viber,twitter, instagram, and facebook.	3.16	K
3.	I know how to send files such as documents, pictures, and videos through e-mail.	2.74	K
4.	I know how to upload files as email attachments.	2.68	K
6.	Can upload files from different internet resources	2.64	K
7.	Can Create account on any of the following social medias such as skype, viber,twitter, instagram, and facebook	2.85	K
8.	Can post, share, and comment ideas on line.	3.31	K
9.	Can access information through online resources including encyclopedia, libraries, education, and government websites and electronic catalogs to gather information.	2.73	K
13.	I can assist my classmates and friends on surfing the web.	2.51	K
5.	I know how to integrate email with other technologies such as voicemail, phone and fax.	2.14	LK
10.	I know how to hyperlink to access other web pages.	2.34	LK
11.	I know how to download new programs or software such as virus protection software, science based software, and etc.	2.30	LK
12.	I know how to trouble shoot minor internet social media problem like retrieving forgot password accounts.	2.15	LK
	Grand Total	**34.62**	
	Grand Mean	**2.66**	**Knowledgeable**

Legend:

3.51 - 4.00 Very Knowledgeable (VK)
2.51 - 3.50 Knowledgeable (K)
1.51 - 2.50 Little Knowledge (LK)
0.51 - 1.50 Very Little Knowledge (VLK)
0.00 - 1.50 No Knowledge (NK)

Internet literacy of the subjects. Table 16 illustrates the students' internet literacy. The top three highest means were, 3.31, 3.16, and 3.07 which corresponds to the following internet literacy indicator: "Can post, share, and comment ideas on line, "I can communicating family, relatives, friends and classmates by using any of following; skype, viber,twitter, instagram, and facebook, and "I can save /download copies of web pages and graphics on my hard drive, flash drive, and compact disk" which basically means they have done the task before and they were knowledgeable enough. On the other hand, the top four lowest means were 2.34, 2.30, 2.15, and 2.14 which corresponds to the internet literacy indicators: "I know how to download new programs or software such as virus protection software, science based software, and etc, "I know how to hyperlink to access other web pages, "I know how to integrate email with other technologies such as voicemail, phone and fax, and "I know how to hyperlink to access other web pages "probably they have not encountered this aspects yet while browsing the internet.

Generally, the subjects were knowledgeable in using the internet as evidenced by the grand mean posted at 2.66.

Average Scores of Pretest and Posttest of the Study

Table 17 presents the pretest score and posttest scores of the subjects after the treatment. On the pretest the subjects obtained a mean of 14.75 and after the treatment, during the posttest the subjects a mean 22.11. The mean difference of

7. 36 was significant as reflected on table 18. Thus, the first null hypothesis which states that there is no significant difference between the pretest scores and the posttest scores of the students after the treatment was applied was rejected.

Table 17

Average Scores of Pretest and Posttest Results of the Subjects

Scores	Pretest		Post Test	
	f	Percent	f	Percent
33 - 35	0	0.00	2	1.50
30 - 32	0	0.00	6	4.51
27 - 29	0	0.00	17	12.78
24 - 26	2	1.50	25	18.80
21 - 23	4	3.01	27	20.30
18 - 20	26	19.55	36	27.07
15 - 17	37	27.82	15	11.28
12 - 14	39	29.32	4	3.01
9 - 11	18	13.53	1	0.75
6 - 8	7	5.26	0	0.00
Total	**133**	**100.00**	**133**	**100.00**
Mean	**14.75**	**-**	**22.11**	**-**
SD	**3.77**	**-**	**4.52**	**-**

Comparison Between the Pretest and Posttest Scores Using the Blended Learning Instruction in Physical Science

Table 18 discloses the comparison of the pretest and posttest scores using the blended learning instruction in Physical Science concepts. The result revealed that there was an increase of 7.35 from the scores of the students. To test whether the increase is significant, z-test was used. The result shows that the z-value of -20.18 with the p-value of 0.00E+00 indicates that there is a significant difference between the pretest and posttest scores of the blended learning

instruction. It implies that blended learning approach in physical science concepts have a positive effect on the performance of the students.

Table 18

Comparison of Pretest and Posttest Results of the Subjects

Parameters	Category	
	Pretest	Posttest
Mean	14.752	22.105
SD	3.77	4.52
N	133	
z-value	-20.18	
p-value (two-tailed)	0.00E+00	
Evaluation	Significant	

Relationship Between the Students' Average Scores in the Pretest and Posttest Scores of the Blended Learning Approach in Physical Science Concepts and their Profile

Tables 19 and 20 present the relationships between the students' average scores in the pretest and posttest using the blended learning instruction in the physical Science concepts and their profile variates.

Pretest. Shown in Table 19 the results of the correlational analysis between the students' average scores in the pretest in Physical Science concepts with the blended learning approach and their profile variates.

The results revealed that the students' age, sex, entrance test score, IQ, study habits, Internet Access, technology literacy, average family monthly income per month, and attitude were not significantly correlated with their pretest average scores. On the other hand, students' emotional quotient (positive impression) was

Table 19

Relationship Between the Pretest Scores and the Profile Variates of the Subjects of the Study

Profile	r-value	p-value	Evaluation
Age	-0.009	0.914	Not Significant
Sex	0.095	0.278	Not Significant
Entrance Test Score	0.123	0.16	Not Significant
IQ	0.136	0.117	Not Significant
EQ			
EA	0.117	0.179	Not Significant
EB	0.14	0.108	Not Significant
EC	-0.074	0.397	Not Significant
ED	0.144	0.099	Not Significant
EE	0.056	0.521	Not Significant
EF	0.013	0.878	Not Significant
EG	.588*	0.03	Significant
Study Habits			
Frequency	-0.024	0.791	Not Significant
Duration	-0.028	0.774	Not Significant
Time of Study	0.03	0.74	Not Significant
Location	-0.174	0.055	Not Significant
Resources/Matrials	0.026	0.782	Not Significant
Study Practice	0.098	0.332	Not Significant
Internet Access Profile			
Duration	.069	.430	Not Significant
Frequency	.035	.690	Not Significant
Internet Literacy	-0.007	0.932	Not Significant
Technology literacy			
EOS	0.078	0.372	Not Significant
CDKCC	0.007	0.935	Not Significant
Ave. Family Income/Month	-0.058	0.504	Not Significant
Attitude	-0.056	0.522	Not Significant

Variable	Model Summary						
	r	*r2*	Beta	Standard Error	t	p-value	Evaluation
EG	0.588	0.346	0.048	0.022	2.188	0.03	Significant

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

significantly correlated with their average pretest score as evident of *r*-value of 0.588 and *p*-value of 0.030. It means that students with high positive impression tend to perform better in a test. In addition, the r^2 of 0.346 showed that emotional quotient (positive impression), explains 35.00 percent of the variation

in their posttest scores, leaving about 65.00 percent unexplained by the variation.

Posttest. Table 20 presents the correlational analysis between students' average posttest scores with the blended learning instruction.

The result revealed that the profile variates such as, age, sex, study habits, internet access, technology literacy, average family monthly income, and attitude were not significantly related with the average posttest scores using the blended learning instruction. It means that the aforementioned profile variates have nothing to do with the test scores having blended learning instruction in Physical Science concepts.

Further, students' entrance test scores, IQ, and emotional quotient (positive impression) were significantly correlated with their posttest scores having *r*-values of 0. 254, 0.252, and 0.235 with *p*-values of 0.003, 0.003, and 0.006 respectively. These means that the aforementioned variables have something to do with the students' test scores. These further implies that those students with high entrance test scores tend to perform better in their posttest scores and those who have low entrance test scores tend to have low posttest scores , students who have high IQ level tend to have high posttest scores, and students who have high emotional quotient (positive impression) tend to have high posttest scores likewise those who have low positive impression tend to

Table 20

Relationship Between the Posttest Scores and the Profile Variates of the Subjects of the Study

Profile	r-value	p-value	Evaluation
Age	-0.147	0.09	Not Significant
Sex	-0.052	0.554	Not Significant
Entrance Test Score	0.520**	0.003	Significant
IQ	0.470**	0.003	Significant
EQ			
EA	0.012	0.887	Not Significant
EB	0.162	0.062	Not Significant
EC	-0.118	0.178	Not Significant
ED	0.048	0.586	Not Significant
EE	-0.005	0.959	Not Significant
EF	-0.017	0.844	Not Significant
EG	0.610**	0.006	Significant
Study Habits			
Frequency	-0.063	0.487	Not Significant
Duration	0.012	0.899	Not Significant
Time of Study	0.164	0.069	Not Significant
Location of Study	-0.081	0.372	Not Significant
Resources/Materials	0.047	0.623	Not Significant
Study Practice	0.114	0.257	Not Significant
Internet Access Profile			
Duration	.128	.143	Not Significant
Frequency	.066	.450	Not Significant
Internet Literacy	0.076	0.383	Not Significant
Technology Literacy			
Essiantial Operational	0.044	0.611	Not Significant
CDKCC	0.126	0.151	Not Significant
Ave. Family Income/Month	-0.018	0.838	Not Significant
Attitude	0.073	0.404	Not Significant

Variable	Model Summary						
	r	*r2*	Beta	Standard Error	t	p-value	Evaluation
EG	0.610	0.374	-0.073	0.026	-2.766	0.006	Significant
IQ	0.470	0.220	0.067	0.023	2.976	0.003	Significant
Entrance Test	0.520	0.270	0.32	0.107	3.000	0.003	Significant

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

have low posttest scores in Physical Science concepts with the blended learning instruction

Further, students' entrance test scores, IQ, and emotional quotient (positive impression) were significantly correlated with their posttest scores having *r*-values of 0. 254, 0.252, and 0.235 with *p*-values of 0.003, 0.003, and 0.006 respectively. These means that the aforementioned variables have something to do with the students' test scores. These further implies that those students with high entrance test scores tend to perform better in their posttest scores and those who have low entrance test scores tend to have low posttest scores , students who have high IQ level tend to have high posttest scores, and students who have high emotional quotient (positive impression) tend to have high posttest scores likewise those who have low positive impression tend to have low posttest scores in Physical Science concepts with the blended learning instruction.

Further analysis showed: that the students' emotional quotient (positive impression), explains 37.21 percent of the variation in the students' posttest scores, leaving about 62.79 percent unexplained by the variation; students' IQ, explains 22.00 percent of the variation in their posttest scores, leaving about 78.00 percent unexplained by the variation, and students' entrance test scores, explains 27.00 percent in their posttest scores leaving about 72.00 percent unexplained by the variation.

Blended Approach and Implication from the Findings of the Study

The results of the analyses of the data showed that there is significant improvement on the scores of the subjects during the pretest and the posttest.

Table 21

Subjects' Evaluation on the Blended Learning Approach

Indicators	Xw	Interpretation
1. I find the approach enjoyable	4.09	A
2. concepts are easily learn using this approach	3.75	A
3. The approach develops the critical thinking of the students	3.87	A
4. Facebook is appropriate medium in using this approach	3.75	A
5. I can easily communicate if I have clarification/questions to verify.	3.82	A
6. The approach enables independent learning for students	3.77	A
7. Integration of technology in the classroom help students learn better.	3.96	A
8. learning materials utilized provides enough information for students to understand the concepts.	3.93	A
9. On line instruction provides meaningful learning experiences for students.	3.83	A
10. Submission of students output is systematic and organized.	3.85	A
Grand Total	**38.62**	
Grand Mean	**3.86**	**Agree**

Legend:
4.51 - 5.00 Strongly Agree (SA)
3.51 - 4.50 Agree (A)
2.51 - 3.50 Uncertain (U)
1.51 - 2.50 Disagree (D)
1.00 - 1.50 Strongly Disagree (SD)

This implied that blended learning approach was effective in helping the subjects learned physical science concepts.

Meanwhile, the age, sex, study habits, internet access profile, technology literacy index, average family income per month, and the attitude towards science did affect the performance of the students. However, emotional quotient along EG factor, intelligence quotient, and entrance test result showed a significant relationship in their performance. Thus, the identified variates should be considered in the blended learning approach implementation.

In addition, the students find the approach interesting, motivating, and enjoyable as evidenced by the favorable evaluation. It can be gleaned from the result of the evaluation that using the said approach develops the critical thinking of the students, concepts were easily learn, and integration of technology in the classroom helped them to learn better and has provided a meaningful learning experiences.

Chapter 5

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of major findings, the conclusions dawn and the conclusions drawn and the recommendations that were formulated based on the results of the study.

Summary of findings

Based on the analyses and interpretation of the data gathered, the following results were obtained:

1. Majority of the subjects were females with an average age of 17 years old.

2. The oldest student- respondent was a female with an age of 25 years old and the oldest male was 20 years old. The youngest were 16 years old comprising eight male students and ten female students, respectively.

4. Most of the parents of the subjects have income below PhP 10,000.00 per month.

5. Most of the students owned android cell phones, 61 or 15. 35 of them depend on the school's internet café as their technology resource for learning, and 64 or 17.16 percent of them depend at the internet cafés located outside the school.

6. On the entrance test results, majority of the students obtained a score between 70 -77.

7. The subjects had a low average intelligent quotient with a mean of 83. 62 and a standard deviation of 16.97.

8. The grand mean of 85.42 indicated that the students had a low emotional quotient.

9. It was noted that the subjects were studying only once to three times a week and the average time spent in studying was 150. 42 minutes or equivalent to 2.5 hours in a week. This implies that they spent less time in studying their lesson.

10. In terms of time of study, generally students preferred studying their lessons in the evening at home.

11. The students usually used of memorization, internet, made brief and organized notes, problem exercises, and comprehending the lesson while studying. They usually utilized text books, internet, modules, handouts, and lectures notes written during the discussion as their learning resource.

12. The frequency of surfing the internet by the subjects of the study revealed that most of them were using face book, Google, YouTube, and Yahoo every day.

13. In terms of duration of surfing the internet, the subjects usually spent an average of 145. 3 or equivalent to 2.42 hours a day in using face book, 108.9 or equivalent to 1.89 hours in using Google, 2.1 hours in accessing YouTube, 1.04 hours in browsing twitter, while 1.15 hours spent by the subjects in using Yahoo.

14. Generally, the subjects were knowledgeable enough in using the internet as evidenced by the grand mean posted at 2.66.

15. The internet access profile of the students indicated that the subjects were knowledgeable enough in manipulating gadgets, and other technology resources as pegged with a mean of 2.70.

16. The students had a favorable attitude towards science subject as evidenced by the grand mean posted at 3.63.

17. The grand mean of 3.86 indicated favorable evaluation on the use blended learning approach in instruction specifically in teaching physical science concepts.

Conclusions

Based on the salient findings derived from this study, the following conclusions were made:

1. Based on the regression analysis the entrance test scores obtained by the subjects found to be significant with regards to the performance of the students in using blended learning approach.

2. The intelligence quotient of the subjects found to be low average. Based from the analysis, it is one of the factors to be considered also that affects the performances of the students in using blended learning approach.

3. Emotional quotient of the subjects found to be low along intrapersonal, interpersonal, stress scale, adaptability, general mood, and total

emotional factors. On the other hand, along the positive expression emotional factor, students obtained an average mean of 108 rated as "Average EQ". Based on the regression analysis, this factor found to have a positive effect on the performance of the student in the blended learning instruction.

4. The profile variates of the students such as; age, sex, average family income, study habits, internet access profile, technology literacy, and their attitude towards science were insignificant factors with regards to the performance of the students in blended learning environment.

5. In terms of internet access profile and technology literacy, the result showed that students were knowledgeable enough.

6. Using the blended learning in teaching physical science concepts was effective as there was a significant difference between their scores during the pretest and after the posttest.

7. Blended learning instruction was effective in teaching physical sciences concepts.

8. Technology integration in teaching helps motivate students learned better and it also provide meaning learning experiences.

Recommendations

Based on the foregoing findings and conclusions, the following recommendations are made:

1. In selecting appropriate approaches, methods, and strategies in the delivery of instructions, teachers should consider the individual differences of their students, especially with regards to the IQ and EQ level.

2. Science teachers should upgrade themselves in the recent innovations in classroom teaching. They should be sent to seminars, trainings, as well as workshops where they will be taught how to develop and design innovative strategies, techniques and methods of teaching appropriate to the level of their students.

3. Teachers are encouraged to use blended learning approach to invoke greater enthusiasm and interest among the learners and to change the monotonous mode in the classroom environment.

4. Another study with regards to factors affecting blended approach could be done to other subject areas to substantiate the validity of the researcher' findings.

BIBLIOGRAPHY

A. BOOKS

Graham, C., Blended Learning Systems: definition, Current Trands, and Future Directions. In: Bonk, C., and Graham, C. (Eds.). The Handbook of Blended Learning: Global Perspectives, Local Designs, San Francisco, CA: John Wiley & Sons, Inc., 3-21, 2006.

Ross, B., & Gage, K., Global Perspectives on Blending Learning: Insight from WebCT and Our Customers in Higher Education. In: Bonk, C., and Graham, C. (Eds.). The Handbook of Blended Learning: Global Perspectives, Local Designs, San Francisco, CA: John Wiley & Sons, Inc., 155-168, 2006.

Random House Unabridged Dictionary, 2nd ed., USA: 1993.

Webster Third New International Dictionary, USA: Merriam-Webster Inc. Publisher, 1986.

B. PUBLISHED MATERIALS

Allen, I.E., Seaman, J., &Garrett, R., Blending In: The Extent and Promise of Blended Education in the United States, Needham, mA: Sloan-C, 2007.

Alwan, A. A. Misconception of Heat and Temperature Among Physics Students. International Conference on Education and Educational Psychology (ICEEPSY 2010, Procedia Social and Behavioral Sciences 12 (2011) 600-614.

Akkoyunlu, B., & Soylu, M. Y. "A Study of Student's Perceptions in a Blended Learning Environment based on Different Learning Styles". Department of Computer Education and Instructional Technology, Hacettepe University, Turkey, 2008.

Bawaneh, S. S. "The Effects of Blended Learning Approach on Studnets' Performance: Evidence from a Computerized Accounting Course". Department of Business Administration. The King Talal School for Business Princess Sumaya University for Technology. Aman, Jordan, 2011.

Boyle, T., Bradley, C., Chalk, P., Jones, R., & Pickard, P. (2003). Using Blended Learning to Improve Student Success Rates in Learning to Program. *Journal of Educational Media,* 28, 2-3.

Chandra, V., & Watters, J. J. (2012). Re-thinking Physics Teaching with Web-based Learning. *Computers & Education,* 58(1), 631-640.

Cassandra, Hinkhouse, Holly. "Investigating blended learning in the high school science classroom" (2013). *Electronic Theses and Dissertations*. Paper 75.

Collopy, R.M.B., & Arnold, J.M. To Blend or Not to Blend: Online and Blended Learning Environments in Undergraduate Teacher Education. *Issues in Teacher Education* 18(2): 85-101(2009).

Gardiner, L. (1994). *Redesigning higher education: Producing dramatic gains in student learning*. ASHE-ERIC Higher Education Report 7. Washington, DC.: George Washington University.

Ghassan Omar Shahin1, Diljit Singh2, The Ying Wah3. Factors In Blended Learning In Higher Education

Harris, P., Connolly, J., & Feeney, L. (2009). Blended Learning: Overview and recommendations for successful implementation. *Industrial and Commercial Training,* 41(3), 155-163.

Jen-Her Wu, Robert D. Tennyson, Tzyh-LihHsi. A study of Student Satisfaction in a Blended E-learning System Environment Computers & Education 55 (2010) 155-164.

Larsen, Lars Jacob Ege, "Teacher and student perspectives on a blended learning intensive English program writing course" (2012). *Graduate Theses and Dissertations*. Paper 12375.

Nada Aldoobie. American International Journal of Contemporary Research Vol. 5, No. 6; December 2015 Technology Integration and Learning Theory. University of Northern Colorado.

Osguthorpe, R. T., & Graham, C. R. (2003). Blended learning environments: Definitions and directions. *Quarterly Review of Distance Education,* 4(3), 227-233.

Odabasi, F., Coklar, A. N., Kiyici, M., & Akdogan, E.P. (2007). Ilkogretim birinci kademede Web uzerinden ders islenebilirligi. *The Trikish Online Journal of Educationa; Technology*, 4(4), 182-190.

Pesman, H. & Ozdemir, O.F. (2012). Approach-Method Interaction: The role of teaching method on the effect of context-based approach in physics instruction, *International Journal of Science Education* (IJSE) 14 (34), 2127-2145.

Pereira, J., Pleguezuelos, E., Meri, A., Molina-Ros, A., Molina-Tomas, M. C., & Masdeu, C. (2007). Effectiveness of Using Blended Learning Strategies for Teaching and Learning Human Anatomy. *Medical Education*, 41, 189-195.

Sahan, H. H. (2007). Internet temelli ogrenme. Demirel, O. (Ed.), *Egotimde Yeni Yonelimler Icinde,* (223-234). Ankara: Pegem A Yayincilik.

Siemen, G. Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learni*ng. 2(1). 3-10, 2005.

Smyth, S., Houghton, C., Cooney, A., & Casey, D. Students' experiences of blended learning across a range of postgraduate programmes. *Nurse Education Today,* 32(4), 464-468, 2012.

Thorne, K. (2003). *Blended Learning: How to Integrate Online and Traditional Learning,* London.

Vaughan, N. D. Perspectives on blended learning in higher education. *International Journal on E-Learning,* 2007.

Webb, H. W., Gill, G. & Poe, G. Teaching with the Case Method Online: Pure versus Hybrid Approaches. *Decision Sciences Journal of Innovative Education*, 3, 223-250, 2005.

Yapici, I. U., & Akbayin, H. (2012). The Effect of Blended Learning Model on High School students' Biology Achievement and on their Attitudes Towards the Internet. *The Turkish Online Journal of Educational Technology*. 11(2).

Yasemin, Kirkgoz. A Blended Learning Study On Implementing Video Recorded Speaking task In Task-Based Classroom Instruction.

C. ARTICLES

Allen, I. E., Seaman, J., & Garrett, R. (2007). Blending in: The Extent and Promise of Blended Education in the United States. Needham, mA: Sloan Center for Online Education.

Aycock, A., Garnham, C., & Kaleta, R. Lessons Learned from the Hybrid Course Project. *Teaching with Technology Today* 8(6), 2002.

Garnham, C., & Kaleta, R. Introduction to Hybrid Courses (2002).

Isman, A. *Ogretim teknolojileri ve material gelistirme*, Istanbul: Degisim Yayinlari, 2008.

Tabor, S. Narrowing the Distance. Implementing a Hybrid Learning Model for Information Security Education. *The Quarterly Review of Distance Education* 8(1): 47-57 (2007). University of Calgary, Teaching and Learning Centre, Retrieved March 3, 2008.

D. UNPUBLISHED MATERIALS

Baco, T.A, "The effect of simulation and computer Instruction on the Performance in Trigonometry of Third Year High School Students of Samar State University". Unpublished Master's Thesis, Samar State University, Catbalogan City, 2006.

Tenedero, E. Q. "Extent of Technology Integration in Teaching Statistics: Its Implication to Students' Achievement". Unpublished Master's Thesis, Samar State University, Catbalogan City, 2015.

Dziuban, C. D., Hartman, J. L., & Moskal, P. D. (2004). Blended Learning, Educause Center for Applied research, Research Bulletin, 7, Retrieved January 15, 2008.

E. OTHER ELECTRONIC RESOURCES

http://www.dictionary.com/browse/intelligence-quotient

(http://www.diffen.com/difference/EQ_vs_IQ)

https://www.merriam-webster.com/dictionary/Internet

http://www.montgomeryschoolsmd.org/departments/techlit/docs/Definition%20of%20Technology%20Literacy.pdf

https://www.merriam-webster.com/dictionary/physical%20science

https://www.merriam-webster.com/dictionary/attitude

www.howardsei.org/uploads/QuasiExperimental.pdf

APPENDICES

APPENDIX A

Republic of the Philippines
SAMAR STATE UNIVERSITY
Catbalogan, Samar

Request for Final Oral Defense

January 27, 2016

MARILYN D. CARDOSO, Ph.D.
Dean, CGS/VP Academic Affairs
Samar State University
Catbalogan City

Madam:

May I have the honor to apply for Pre-Oral Defense of my thesis entitled Factors Affecting Blended Learning Approach in Teaching Physical Sciences Concepts on the date convenient for your office.

Thank you very much.

Very truly yours,

NECASIO D. ABUDA
MAT Student

Recommending Approval:

ELMER A. IRENE
Adviser

APPROVED:

MARILYN D. CARDOSO, Ph.D.
Dean, CGS/VP Academic Affairs

Date of Oral Defense: February 05, 2016
Time: 8:00: AM

APPENDIX B

Republic of the Philippines
SAMAR STATE UNIVERSITY
Catbalogan, Samar

Request for Final Oral Defense

January 30, 2017

VICTORIA M. TAFALLA, Ph. D.
Dean, College of Graduate Studies
Samar State University
Catbalogan City

Madam:

May I have the honor to apply for Final Oral Defense of my thesis entitled Factors Affecting Blended Learning Approach in Teaching Physical Sciences Concepts on the date convenient for your office.

Thank you very much.

Very truly yours,

NECASIO D. ABUDA
MAT Student

Recommending Approval:

ELMER A. IRENE
Adviser

APPROVED:

VICTORIA M. TAFALLA, Ph.D.
Dean, College of Graduate Studies

Date of oral Defense: February 17, 2017
Time: 8:00:AM

APPENDIX C

Letter Request to Access the Entrance Test Results of the Students

Republic of the Philippines
SAMAR STATE UNIVERSITY
College of Arts and Sciences
Catbalogan City

February 10, 2016

PROF. MAE V. CANAL
Head, Guidance & Counseling
This University

Ma'am,

Greetings!

The undersigned is currently conducting a research study entitled ***"Factors Affecting Blended Learning Approach in Teaching Physical Science Concepts"***.

In connection with this, I would like to ask permission from your good office if I may be allowed to access the entrance exam results of the following freshmen students; namely: BS Information Technology 1-A, 1-B, 1-C, and Bs Architecture 1-A. The undersigned has already asked the consent of the said respondents.

Rest assured that the data that will be gathered will be treated with outmost confidentiality. Attach herewith are the lists of freshmen students who serves as the respondents of this undertakings.

I am hoping for positive response on this regard. Thank you very much and God bless.

Sincerely yours,

NECASIO D. ABUDA
Researcher

Noted:

MARILYN D. CARDOSO, Ph.D.
Vice President for Academic Affairs

Approved:

EUSEBIO T. PACOLOR, Ph.D.
OIC, Office of the President

APPENDIX D

Letter Request to Students to Access their Entrance Test Results

February 10, 2016

Dear students,

The undersigned is currently conducting a research study entitled ***"Factors Affecting the Learning of Students in Thermodynamics Using a Blended Learning Approach".***

In this respect, you have been selected as valued respondent in this study. Hence, I would like to ask permission if you will allow the researcher to get your entrance examination result and conduct an IQ and EQ test to be conducted by the office of Guidance Testing Staff.

Your accurate and honest answer will be a big help in coming with a reliable result. Rest assured that your answers and results will be treated with outmost confidentiality.

Thank you for your cooperation.

Very truly yours,

NECASIO D. ABUDA
Researcher

CONFORMED:

_____
Student's Signature over printed name

_____
Date

APPENDIX E

Table Of Specifications

TOPICS	COGNITIVE SKILLS						TOTAL
	K	C	AP	AN	SYN	EV	
A. Temperature	1,2,6,4, 9	4,5,26, 37, 38, 39, 40	3,7	10, 41			15
B. Ideal Gas Laws		24,51,52,5 3,54,55	8,9,11, 19, 33	16,17, 18, 12, 23			16
C. Heat	27,30,3 4,43,44	22,25,28,2 9,32,35, 50	15, 33, 20,31, 42	13,14,2 1,45,46 ,47,48			24
Total	**9**	**15**	**12**	**15**			**55**

APPENDIX F

Achievement Test in Physical Science Concepts

Name:_____**Date:**_____
Course and Year:_____**Score:**_____
Direction: Read each item carefully. Select the best answer from the given choices.

Write your answer on the space provided before each number.

_____1. Which of the following refers to a change in dimensions or volume of a substance that occurs when temperature changes?

a. thermal expansion b. thermal contact
c. thermal equilibrium d. heated condition

_____2 .- Which of the following is the thermal coefficient value of copper?

a. $1.7X10^{-5}$ b. $7.0X10^{-5}$ c. $2.7X10^{-5}$ d. $3.7X10^{-5}$

_____3. The normal human body temperature is said to be 37.0^0C. What is its value in degree Fahrenheit?

a. 97.8^0F b. 96.8^0F c. 98.8^0F d. 98.6^0F

_____4. When heat is transferred between two objects, whether or not they are touching, they are said to be in_____.

a. thermal equilibrium b. thermal contact
c. thermal expansion d. thermal constant

_____5. The boiling point of alcohol is 172^0F. What is this temperature on the Celsius scale?

a. 78.8^0F b. 76.8^0F c. 77.8^0F d. 88.8^0F

_____6. The air in a balloon of volume $0.10m^3$ exerts a pressure of 1.4×10^5 Pa. If the volume of the balloon increases to $0.12m^3$ at a constant temperature. What is the final pressure?

a. 2.2×10^5 Pa b. 3.2×10^5 Pa c. 4.2×10^5 Pa d. 1.2×10^5 Pa

_____7. What is the volume occupied by 4.00g of hydrogen under a pressure of 2.00 atm and a temperature of 300K?

a. $0.0427\ m^3$ b. $0.247\ m^3$ c. $0.472\ m^3$ d.$0.0742\ m^3$

_____8. What happens to a volume of water if it is cooled from 4^0C to 2^0C?

a. water expands when cooled from 4^0C to 2^0C
b. water compresses when cooled from 4^0C to 2^0C
c. there is no change in volume of water when it is cooled down from 4^0C to 2^0C
d. none of the above

_____9.Which of the following statement is true when the temperature of a quantity of gas is
increased?
a. the pressure must increase
b. the volume must increase
c. both the pressure and volume must increases
d. none of the preceding

_____10. The temperature of a quantity of gas is decreased. How is the density affected if the pressure
is held constant?
a. decreases
b. increases
c. remains the same
d. none of the preceding

_____11. A man's gold wedding ring has an inner diameter of 2.4 cm at 20^0C. If the ring is dropped intoboiling water, what will be the change in the inner diameter of the ring?
a. 0.0027 cm b. 0.0017 c. 0.0037 d. 0.0047

_____12. A piece of copper tubing used in plumbing has a length of 60.0 cm and an inner diameter of 1.50 cm at 20^0C. When hot water at 85^0C flows through the tube, what is the change in its cross sectional area?
a. $3.91X10^{-3}$ cm^2 b. $4.91X10^{-3}$ cm^2 c. $2.91X10^{-3}$ cm^2 d. $1.91X10^{-3}$ cm^2

_____13. The density of mercury is $1.36X10^4 kg/cm^3$ at 0^0C. What is its density at 100^0C?
a. $2.34X10^4$ kg/cm^3 b. $1.34X10^4$ kg/cm^3
c. . $3.34X10^4$ kg/cm^3 d. $4.34X10^4$ kg/cm^3

_____14. A copper wire0.500 m long is at 20^0C is increased to 100^0C, what is the change in the wire's length?
a. $7.8 X10^{-4}$ m b. $8.8 X10^{-4}$ m c. $9.8 X10^{-4}$ m d. $6.8 X10^{-4}$ m

_____15. The temperature of a quantity of gas is decreased. How is the density affected if the volume
is held constant?
a. decreases
b. increases
c. remains the same
d. none of the preceding

_____16. In a mathematical equation $pV=Nk_BT$, $k_B$is a number known as Boltzmann's constant which has a value of_____
a. $1.38X10^{-23}J/K$ b. $1.48X10^{-23}J/K$ c. $1.28X10^{-23}J/K$ d. $1.18X10^{-23}J/K$

_____17. Which of following is the specific heat of iron at 20^0C in 1 atm?
a. 0.12 kcal/kg.^{0}C b. 0.13 kcal/kg.^{0}C c. 0.11 kcal/kg.^{0}C d. 0.14 kcal/kg.^{0}C

_____18 Which of the following is the thermal conductivity of steel?
a. $1.2X10^{-2}$ kcal/(m.s.^{0}C) b. $1.3X10^{-2}$ kcal/(m.s.^{0}C)
c. $1.4X10^{-2}$ kcal/(m.s.^{0}C) d. $1.1X10^{-2}$ kcal/(m.s.^{0}C)
_____19. The SI unit of heat energy is_____
a. calorie b. kilocalorie c. Btu d. joule
_____20. Natural convection cycles usually occur in____.
a. liquid b. gases c. solid d. both liquid and gases only
_____21. Which of the following mechanism of heat transfer require no medium?
a. natural convection b. forced convectionc. conductiond. radiation
_____22. A heater supplies 240 Btu of energy. What is this in joules?
a. $2.34X10^5$J b. $2.54X10^5$J c. $2.44X10^5$J d. $2.24X10^5$J
_____23. The amount of heat necessary to change the temperature of 1 kg of a substance by 1^0Cis called the substance's_____
a. specific heat b. latent heat c. heat of combustion d. mechanical equivalent of heat
_____24. Latent heat is always_____
a. part of specific heat b. related to the specific heat
c. the same as the equivalent of heat d. involved in the phase change
_____25.The warming of the atmosphere involves____.
a. conduction b. convection c. radiation d. b & c only
_____26. Which of the following refers to the process by which solid directly changes to gaseous phase?
a. evaporation b. condensation c. sublimation
d. melting point
_____27. How much ice (at ^{0}C) must be added to 1.0 kg of water at 100^{0}C so as to end up with a liquid at 20^{0}C?
a. 0.81 kg b. 0.71 kg c. 0.61 kg d. 0.91kg
_____28. Which of the following is commonly known as heat rays?
a. Infrared radiationb. ultraviolet radiation c. visible light d. none of these
_____27. Which of the following terms describe the characteristics of heat-conducting ability of a material?
a. thermal conductivity b. thermal gradient c. heat transfer d. none of these
_____28. Which of the following describes the latent heat for a liquid-gas phase change?
a. Latent heat of fusion b. Latent heat of vaporization
c. latent heat of sublimation d. none of these
_____29. Which of the following is the SI unit of temperature?
a. Celsius b. Fahrenheit c. Kelvin d. Rankin

_____30. A pepperoni pizza is baked at 455 °F. What temperature is needed on the Celsius scale?

a. 423°C b. 235 °C C. 221 °C d. 224 °C

_____31. Who introduces the Fahrenheit scale?

a. Gabriel Daniel Fahrenheit b. Gilbert Daniel Fahrenheit

c. Daniel Gabriel Fahrenheit d. Daniel Gilbert Fahrenheit

_____32. Which of the following is not true about heat?

a. heat is the energy that flows between objects because of their difference in temperatures

b. Heat is thermal energy on the move

c. Technically: objects don't *contain* heat

d. none of the above

_____33. Which of the following instrument measures the exact temperature?

a. barometer b. thermometer c. ammeter d.ohmeter

_____34.Suppose you place water in a freezer. The water particles move_____

a. faster b. slower c. the same d. higher

_____35. A balloon is filled with 1 gram of hydrogen at STP, what is its volume?

a. 11.1 L b. 12.1L c. 13.1L d.14.1L

_____36. What is the constant value of Avogadro's number (N_A)?

a. 6.022×10^{23} b. -6.022×10^{2} c. 6.022×10^{-23} d. -6.022×10^{-23}

_____37. On a cold winter day, the temperature is -15 °C. What is that temperature in °F?

a. 19°Fb. 59 °F c. 5 °F d. -5 °F

_____38. The mathematical expression can be stated as_____

a. The pressure of a gas is inversely proportional to its volume.

b. The pressure of a gas is directly proportional to its volume.

c. The pressure of a gas increases as the volume increases

d. none of the above is true

_____39. Which of the following statement is true about Charles law?

a. As the temperature increases the volume also increases at constant pressure.

b. As the temperature increases the volume decreases at constant pressure

c. As the temperature decreases the volume increases at constant pressure

d. At constant pressure, the temperature and volume of a gas remains the same

_____40. Which of the following statement is true about Gay-Lussac's Law?

a. As the temperature increases the pressure also increases at constant volume

b. As the temperature decreases the pressure also increases at constant volume

c. As the temperature increases the pressure also decreases at constant

volume

d. At constant volume, the temperature and pressure of a gas remains the

_____41. Boyles' law state that_____

a. at constant temperature as the pressure increases the volume decreases

b. at constant temperature as the pressure increases the volume increases also

c. at constant temperature as the pressure decreases the volume decreases also

d. at constant temperature, pressure and the volume remains the same

_____42.Which of *the* device changes its electrical resistance as the temperature changes?

a. thermistor b. capacitor c. inductor d. none of the above

_____43. Hypothermia may occur when_____

a. body temperature drops below 35 °C

b. body temperature rises above 35 °C

c. body temperature drops below 45 °C

d. body temperature rises above 45 °C

_____44. Which of the following describes the latent heat for a liquid-gas phase change?

a. Latent heat of fusion b. Latent heat of vaporization

c. latent heat of sublimation d. none of these

_____45. Which of the following describes the latent heat for a solid-liquid phase change?

a. Latent heat of fusion b. Latent heat of vaporization

c. latent heat of sublimation d. none of these

_____46. Which of the following is good thermal conductor?

a. non-metalsb. metals c. metalloids d. all of these

_____47. Which of the following is good thermal insulator?

a. non-metalsb. metals c. metalloids d. all of these

_____48. The SI unit of latent heat are___

a. $1/^0C$ b. $J/(kg.^0C)$ c. $J/^0C$ d. J/Kg

_____49. Heat transfer by infrared radiation is also important in maintaining our planet's warmth by a mechanism known as _____.

a. greenhouse effect b. global warming c. forced convection d. none of the above

____ 50. What is the coefficient of volume expansion of water at 20^0C?

a. $1.1X10^{-4}$ b. $2.1X10^{-4}$ c. $3.1X10^{-4}$ d. $4.1X10^{-4}$

____51. A quantity of an ideal gas is at 0^0C. An equal quantity of another ideal gas is twice as hot. What is its temperature?

a. 373^0C b. 372^0C c. 237^0C d. 273^0C

_____52. If the kinetic energy of an average ideal gas molecule in a sample at 20^0C doubles, its final temperature must be_____

a. 10^0C b. 40^0C c. 313^0C d. none of the preceding

_____53.The Kelvin temperature of an ideal gas is doubled and its volume is halved. How is the pressure affected?

a. decrease by 4 times b. increase by 4 times c. remains the same

d. none of these

_____54. If the kinetic energy of an average ideal gas molecule in a sample at 20^0C doubles, its final temperature must be_____

a. 10^0C b. 40^0C c. 313^0C d. none of the preceding

_____55. Which of the following statement best describes an ideal gas?

a. An ideal gas has no chemistry. That is, the particles (atoms or molecules) have no tendency to "stick" to other particles through chemical bonds.

b. An ideal gas was one whose particles are well-behaved, in terms of the Newtonian theory of collisions: elastic collisions and the impulse-momentum theorem.

c. An ideal gas is one in which the particles have no interaction, except for perfectly-elastic collisions with each other, and with the walls of their container.

d. all of the above

APPENDIX G

SURVEY INSTRUMENT FOR STUDENT- RESPONDENTS

I – Profile

A. Demographic Characteristics

Direction: Please check or write your answer on the space provided.

Name of Respondent: _____Date: _____
Year and Section: _____Gender: _____Male_____Female
Age: _____Average Family income/month: _____

B. Availability of Students' Technology Resources. What are the technology resources that you utilized in studying? (Please Check)

_____ android cell phone
_____tablet
_____netbook
_____laptop
_____desktop computer
_____pocket wifi
_____landline internet connections
_____ School's internet café
_____out of the campus internet café
_____others (please specify)_____

C. Technology Literacy Profile

Directions: This is composed of thirty (30) items that will determine your technology literacy. Please indicate how you perceive your possession of technology literacy by using the scales below:

4 - Very Knowledgeable
3 - Knowledgeable
2 – Little knowledge
1 – Very little knowledge
0 – No knowledge (NK)

Statements	Responses				
	VK (4)	K (3)	LK (2)	VLK (1)	NK (0)
ESSENTIAL OPERATIONAL SKILLS					
1. I know how to use computer for research and do homework and other purposes.					
3. I can copy and paste documents from different applications.					

4. I know how to check computer, monitor, and wall outlet for power connections.					
5. I can use Microsoft word and power point presentation in making school reports and projects.					
6. I know how to install new programs or software such as virus protection software, science based software, and etc.					
7. I know how uninstall programs and software from different website.					
8. I know how to trouble shoots minor problems in technology devices such as android phones, tablet, and computers.					
9. I know how to save and back up data /or software to a removable storage device.					
10. I can trouble local printer problems.					
11. I can adjust the appearance of desktop and create shortcuts; re-name icons And identify different kinds of icons.					
12. Can apply font, change font size and use features bold or underline.					
13. I regularly use spell checker.					
14. Can set margins and page properties.					
15. I know how to print a file.					
16. Can insert page breaks, create columns, create headers and footers and add automatic page numbers.					
17. Can make power point presentation.					
18. Can add multimedia effects like animations, videos, and sounds on the power point for my reports and school task.					
19. I can change the format of the spreadsheets to anything I need.					
20.I regularly update and use a virus checker and know when it is time to call a technology specialist.					
CONSTRUCTING AND DEMONSTRATING KNOWLEDGE ON COMMUNICATION AND COLLABORATION					
1. I regularly use a cellular phone for chatting and calling.					
2. I can use other applications in my android					

cellular phone like camera, video player, calculator, calendar, office suite for opening documents such as pdf and Microsoft documents.					
3. I can connect social networking sites using my android cellular phone.					
4. I can do researches related to my lesson using my android phone.					
5. I have tablet and I use it for sending messages and calling.					
6. I can use other applications in my tablet camera, video player, calculator, calendar, office suite for opening documents such as pdf and Microsoft documents.					
7. I know how to use my tablet to connect on social networking sites and do researches related my lessons and studies.					
8. I can assist my classmates and friends on using different application in the tablet.					
9. I can transfer files such as documents, and videos to other gadgets using a bluetooth device.					
10. I can assist classmates and friends in using technology in school.					

D. Internet Literacy Profile

Directions: This is composed of thirteen (13) items that will determine your internet literacy. Please indicate how you perceive your possession of internet literacy by using the scales below:

4 - Very Knowledgeable
3 - Knowledgeable
2 – Little knowledge
1 – Very little knowledge
0 – No knowledge (NK)

Statement	Responses				
	VK (4)	K (3)	LK (2)	VLK (1)	NK (0)
1. I can save /download copies of web pages and graphics on my hard drive, flashdrive, and compact disk.					
2. I can communicating family, relatives, friends and classmates by using any of following; skype, viber,twitter, instagram, and facebook.					
3 I know how to send files such as documents,					

pictures, and videos through e-mail.					
4. I know how to upload files as email attachments.					
5. I know how to integrate email with other technologies such as voicemail, phone and fax.					
6. Can upload files from different internet resources					
7. Can Create account on any of the following social medias such as skype, viber,twitter, instagram, and facebook					
8. Can post, share, and comment ideas on line.					
9. Can access information through online resources including encyclopedia, libraries, education, and government websites and electronic catalogs to gather information.					
10. I know how to hyperlink to access other web pages.					
11. I know how to download new programs or software such as virus protection software, science based software, and etc.					
12. I know how to trouble shoot minor internet social media problem like retrieving forgot password accounts.					
13. I can assist my classmates and friends on surfing the web.					

E. Frequently Visited Website and Duration in Surfing the Internet

Directions: Please indicate your frequently visited website, frequency, and duration in surfing the internet by putting a check mark on the space given in each scale.

8 - Everyday	4 - thrice a week
7 - Six times per week	3 - twice a week
6 - Five times per week	2 - once a week
5 - Four times per week	1 – never

	Everyday 8)	6x/week (7)	5x/week (6)	4x/week (5)	3x/week (4)	2x/week (3)	once/week (2)	Never (1)	Duration (No. hrs./day)		
Facebook	____	____	____	____	____	____	____	____	____	____	____
Google	____	____	____	____	____	____	____	____	____	____	____
Youtube	____	____	____	____	____	____	____	____	____	____	____
Twitter	____	____	____	____	____	____	____	____	____	____	____
Instagram	____	____	____	____	____	____	____	____	____	____	____
Yahoo	____	____	____	____	____	____	____	____	____	____	____
Others	____	____	____	____	____	____	____	____	____	____	____

(please specify)_____

F. Study Habits

F.1.Frequency (Per week/Duration (No. of minutes/hours)

Direction: Please check how many times you study and indicate the duration.

	Duration (in minutes)
_____ Once a week	_____
_____ Twice a week	_____
_____Thrice a week	_____
_____Four times a week	_____
_____Five times a week	_____
_____ Six time a week	_____
_____ Everyday	_____

F.2. Time of Study: What time of the day you usually study?

_____ Early morning
_____ Mid morning
_____ Noon time
_____ Late afternoon
_____ Evening
_____ Midnight
_____ Others (Specify)

F.3 Location of the Study: Where do you usually study: (Please check.)
_____ Internet cafes
_____ Library
_____ Outside the classroom
_____ School grounds
_____ at home
_____ Available/Vacant classrooms
_____ Classmate's house
_____ Others (Specify)

F.4 Materials/Resources Use: What are the materials that you use in studying? (Please check.)
_____ Internet (Computers)
_____ Reference books
_____ Magazines
_____ Textbooks
_____ Modules
_____ Journals
_____ Hand-outs
_____ Newspapers
_____ Lecture notebooks
_____ Others(Specify)

F. 5. Study Practices: What are practices that you use to facilitate your studying? (Please check)
_____ Memorization
_____ Making brief and organized notes for studying
_____ Make use of internet
_____ Comprehension (Understanding)
_____ Paraphrasing (telling ideas using other words)
_____Mnemonics(used in remembering a group of list of words, names, places or items through their acronym)
_____ Concept mapping
_____ Problem solving exercise
_____ Others (Specify)

II - Students' Attitude towards Physical Science

Direction: On each item, kindly check on the space provided your honest feeling about each statement as:

5	Strongly Agree (SA)	**2**	Disagree (D)
4	Agree (A)	**1**	Strongly Disagree (SD)
3	Uncertain (U)		

Statements	SA	A	U	D	SD
1. I find the subject enjoyable.					
2. I find the terms, theories and concepts interesting and easy to understand					
3. I like to discuss the subject with my classmate.					
4. I love memorizing the formulas, theories, and principles regarding on the subject.					
5. I like dealing with problem solving regarding on the subject.					
6. I enjoy answering the exercises given by the teacher.					
7. I like the subject because they are interesting and easy.					
8. I am free to discover some principles in physical science.					
9. I am enthusiastic to participate in the discussion of the subject.					
10. I find the illustrations and solutions to solving problems in physical science understandable and meaningful.					
11. I can relate the concepts of the subject to my friends and classmates.					
12. I always feel excited coming to our physical science class.					
13. I can express my ideas freely in the discussion of the lessons.					
14. I am grateful of the teaching made by my teacher about physical sciences.					
15. I am interested in knowing more related concepts in physical science.					
16. I enjoy dealing with solving problems in physical science					
17. I find it easy to solve word problems in physical science.					
18. I find the subject useful in everyday activities.					
19. I appreciate the significance of knowing concepts, theories, and principles in physical science.					
20. I can relate the significance and importance of the subject in explaining certain environmental phenomena.					

Thank You Very Much for Your Cooperation.

The Researcher

APPENDIX H

EVALUATION RATING SHEET (BLENDED LEARNING APPROACH)

Name:_____ Year & Section:_____

Direction: Please rate the blended learning approach on the basis of your agreement or disagreement with the criteria below using the following scale:

5 Strongly agree (SA)
4 Agree (A)
3 Uncertain (U)
2 Disagree (DA)
1 Strongly (SD)

Statement	5 (SA)	4 (A)	3 (U)	2 (DA)	1 (SD)
1. I find the approach enjoyable					
2. concepts are easily learn using this approach					
3. The approach develops the critical thinking of the students					
4. Facebook is appropriate medium in using this approach					
5. I can easily communicate if I have clarification/questions to verify.					
6. The approach enables independent learning for students					
7. Integration of technology in the classroom help students learn better.					
8. learning materials utilized provides enough information for students to understand the concepts.					
9. On line instruction provides meaningful learning experiences for students.					
10. Submission of students output is systematic and organized.					

Thank you very Much!

APPENDIX I

Detailed Lesson Plan

I. OBJECTIVES

By the end of the lesson, the students shall be able to:

1. Define what temperature is.
2. Identify different temperature scales.
3. Convert temperature form one scale to another.

II. SUBJECT MATTER

A. Topic: Temperature

B. Reference:

https://www.google.com.ph/search?q=temperature.ppt&newwindow=1&ei=7gDDVrCLDoS60ATAg7XwCg&start=10&sa=N&biw=1366&bih=643
https://www.google.com.ph/search?q=temperature.ppt&newwindow=1&ei=7gDDVrCLDoS60ATAg7XwCg&start=10&sa=N&biw=1366&bih=643
https://www.google.com.ph/search?q=temperature.ppt&newwindow=1&ei=7gDDVrCLDoS60ATAg7XwCg&start=10&sa=N&biw=1366&bih=643.
https://www.youtube.com/watch?v=GUCPg3CRFd4&spfreload=10

C. Materials: PowerPoint presentation and video clips

III. PROCEDURE

A. On-line discussion

Teacher's Activity	Students Activity
A.1 Motivation	
Good morning class.	Good morning sir.
Welcome to our online discussion today.	
Are you excited?	Yes sir!

Is everybody online? Yes sir!

Ok very good.

A.2 Lesson proper

Our topic for today is about temperature.

I have downloaded learning materials
for this topic in your group. Have you seen it? Yes sir!

Ok very good!

I want you to upload it and study the content
of the learning materials that you have uploaded.
Then later on I will post an exercise for you to answer.Okay sir.

Do you have any questions? Sir where are we going to write & submit our output?

You are going to encode it on the Microsoft
word then send your file to my gmail account. Okay sir.

Sir what is your gmail account?

Send your file to jaws5shrk@gmail.com Ok thank you sir.

Are there any questions? Sir when are we Going to submit our output?

Submit your output before the end of
our period. Okay sir!

We are going to study online, if you have Okay sir!
Any questions regarding on the topic don't
Hesitate to ask.

(Students studying on line)

A.3 Application

I have already uploaded the exercise
That you are going to answer. Have you seen it? Yes sir!

Ok very good. I want you to answer those givens
within 30 minutes then after that send your ouput
To my gmail account. Is that clear? Yes sir!

Ok very good.
(Students are answering the exercise given)

Okay time is up. Have you submitted your
Output to my gmail account? Yes sir!

Ok good . Let's call it a day see you next meeting
In the classroom for our post discussion.

Have a nice day everyone! Thank you sir. Have a nice day too.

B. Post discussion (Classroom)

B.1 Motivation

Good morning everyone! Good morning sir

Did you enjoy our on-line discussion
last meeting? Yes sir, we have enjoyed a lot.

Well, I am glad to hear that.

Did you learn something? Yes sir.

Ok lets see.

B.2 Post discussion

Anybody who can define what is Temperature?

Sir, temperature is a measure of

how

hot or cold an

object

is compared to another object

Ok very well said.

What is the fundamental unit of temperature?

Sir, the

fundamental

unit of temperature is Kelvin

Ok very good.

Temperature has four scales. What Are they?

Sir, Celsius, Fahrenheit, Kelvin, and Rankin

Ok very good

Celsius scale was developed by Anders Celsius, Kelvin scale was developed by William Thomson, Fahrenheit scale was developed by Daniel Gabriel, while Rankin scale was developed by William John. The name of the scales were taken from their respective surname

Okay then how do we convert temperature from one scale to another? Like for instance from Celsius to Fahrenheit?

Sir the formula for converting Celsius to Fahrenheit is $[°F] = [°C] \times 9/5 + 32$

Ok very good.

How about from Kelvin to Fahrenheit

Sir the formula for converting Kelvin to Fahrenheit is

[°F] = [K] × 9/5 − 459.67
Ok very good also.

How about from Celsius to Rankin?

Sir the formula for converting Celsius to Rankin is

([°C] + 273.15) × 9/5
Ok very well said.

Indeed you have learned during our On-line discussion.

Are there any questions so far?

None Sir.

If none please prepare ½ crosswise, We will have a short evaluation.

IV. EVALUATION

Answer the following problems and show your solutions. No solution no point. You are not allowed to use your phones.

1. "When the thermometer is held in the mouth or under the armpit of a living man in good health" it indicates 98 F.
   a) What is the temperature in Celsius (centigrade)?
   b) What is the temperature in Kelvin?
   c) What is the temperature in Rankin?

2. In your own words define what temperature is

3. Enumerate the four temperature scales including its proponents.

V. ASSIGNMENT

Study in advance about ideal gas and real gases.

CURRICULUMVITAE

CURRICULUM VITAE

Name	:	NECASIO DACALLOS ABUDA
Address	:	BRGY. BUNU-ANAN CATBALOGAN CITY
Date of Birth	:	MAY. 05, 1988
Place of Birth	:	BRGY. ASTORGA DARAM, SAMAR
Civil Status	:	MARRIED
Wife	:	CHARLOTTE MAE ABAIGAR ABUDA
Kids	:	ZYRENE, ZHAIJAN, and ZHIAN
Father	:	ROMEO CINCO ABUDA Sr. (Deceased)
Mother	:	MA. LUZ TAÑEGA DACALLOS
Brothers	:	RONALD, ROMEO, REYNANTTE, and CHRISTIAN PAUL
Sister:		MICHAELLA

EDUCATIONAL BACKGROUND

Elementary	:	Astorga Elementary School, Brgy.Astorga, Daram Samar 1995 to 2001
Secondary	:	Sisters of Mary School, Tunkop, Minglanilla Cebu 2001 to 2004
College	:	Samar State University Catbalogan City 2004 to 2009
Graduate Studies	:	Samar State University, Catbalogan City 2010 to 2017
Degree	:	Master of Arts in Teaching
Major	:	Chemistry

AWARDS AND DISTINCTIONS

Elementary	:	Achiever, Grades I to V Fourth Honorable Mention, Grade VI
Secondary	:	Class Honors, First Year to Third Year
Tertiary	:	Cum Laude

SEMINARS/TRAININGS ATTENDED

Seminar-Workshop on the Development of Instructional Materials (Module and Activity Workbook/Textbook), Samar State University, November 04, 2016.

Training -Workshop on Survey and Qualitative Research, Research Center for Culture and Social Issues, SSU, October 21-26, 2016.

AFNR Extension Policy Symposium, Philippine Extension and advisory Services Network, Inc., October 12-13, 2016.

In-House Training on the TESS Advanced Chemistry & Biology, PHYWE, October 7-8, 2015.

Seminar-Write shop on Data Mining and Theory Building , SSU, October 6-8, 2014.

Global Positioning System (GPS) and Geographic Information System (GIS) Training for SSU Researchers and Extension Service Providers, SSU, October 03, 2014.

Seminar- Writeshop on the Preparation of Scientific for Peer- Reviewed Journal, SSU, August 13-15, 2014.

Research Proposal Write shop, SSU, July 8-9, 2014.

2nd Innovation and Technology Fair, DLSU, March 26-27, 2014.

Hands-On Seminar workshop on Patent Drafting, SSU, June 17-18, 2013.

Project Development for Fund Sourcing in Agriculture, DCAAP, December 17-21, 2013.

24th Joint ViCARP and RRDEN Regional Research, Development and Extension Symposium, ViCARP, November 23, 2012.

Founder's Forum and Research Proposal Writing, EVCIERD, September 3-5, 2012.

Regional Seminar on Public Accountability and Integrity Forum, CSC, SSU, May 31- June 2, 2011

Disaster Emergency Assistance and Rescue Training, Naval Rescue Center Eastern Visayas, April 17, 2011.

Gender Issues and Sensitivity Seminar, SSU, November 25, 2010.

Seminar-workshop on Research and Development Measurements, SSU, October 29, 2010.

Updates of SUC Budgeting: Normative Financing Awareness, SSU, September 16, 2010.

1st RVM Regional Teachers' Congress of the Visayas Region, RVM, Education Ministry Commission, October 26-28, 2009

Teaching Innovations, Levels of Questions and Creative Thinking in the Classroom and Enhancing Communication skills of Teacher, St. Mary's College of Catbalogan, October 26, 2009.

Seminar on Classroom, Management on Effective and humane Holistic and Practical Technology, Phoenix Publishing House, August 22, 2009.

30th National Physics Seminar-Workshop Convention 21st National Physics Olympics 16th National Physics Fair, Philippine Physics Society, April 2-5, 2008

In service Training on the Use and Operation of Multimedia Equipment and Learning System Units , AVPC-Multimedia SSU, September 25, 2008.

ELIGIBILITY

Civil Service Eligibility (PD. 907), March 19, 2009

Licensure Examination for Teachers, Tacloban City, October 04, 2009 - 78.20%

LIST OF TABLES

LIST OF TABLES

LIST OF FIGURES

LIST OF FIGURES