**Chapter I**

**INTRODUCTION**

This chapter relays on the different essential elements: Background of the Study, Theoretical Framework, Conceptual Framework, Statement of the Problem, Hypothesis of the Study, Significance of the Study, Scope and Delimitations and Definition of Terms.

**Background of the Study**

Physical Science is the study of the inorganic world. That is, it does not study living things. (Those are studied in biological, or life, science.) The four main branches of physical science are astronomy, physics, chemistry, and the Earth sciences, which include meteorology and geology.

Physical Science is one of the most difficult subjects that students encounter, according to the study of Alfredo Sipho Hlabane, 2006 their study investigated learning difficulties experienced by grade 12 learners in learning Physical Sciences. Diagnostic and examination reports of the past five years were scrutinized to identify common challenges experienced by learners. The result of their investigation revealed the most of the learning difficulties experienced by learners were related to Proficiency in the LoLT, conceptual understanding, questions that require explanations and higher order thinking skills, difficulties in comprehension and analysis of questions, and mathematical skills.

This study aims to determine the level of effectiveness of C.A.P.E. as an interactive website in learning physical science for STEM senior high school and BSIT college students in STI College Kalibo. The purpose of this study is not only to determine the effectiveness of having an interactive website for senior high school students and BSIT students but also to give students or curious learners some insight or information based on the four main branches of physical science without the hassle of buying a book or go to a library just to learn. This is to give our users information even at their own home with as much as much efficiency as if they were in a library or in a classroom.

**Theoretical Framework**

This study is supported by the theory of Constructivist Learning Theory of Piaget, J. (1950) in which the constructivist theory is based around the idea that learners are active participants in their learning journey; knowledge is constructed based on experiences. As events occur, each person reflects on their experience and incorporates the new ideas with their prior knowledge. Other theory that is supporting this study is the Experiential Learning Theory by David Kolb (1984) in also which Experiential learning theories build on social and constructivist theories of learning but situate experience at the core of the learning process. They aim to understand the manners in which experiences – whether first or second hand – motivate learners and promote their learning. Therefore, learning is about meaningful experiences – in everyday life – that lead to a change in an individual’s knowledge and behaviors.

The website shall be designed or programmed as a hand on experience or interactive for senior high school students and BSIT students of STI College, Kalibo, Aklan which will provide quizzes in order to feed students with information and knowledge in regards of the four main branches of physical science.

**Conceptual Framework**

Output

* An Interactive Website about Learning the four main branches Physical Science.

Process

* Descriptive Research
* Data Gathering
* Development of the Interactive website
* Observations

Input

* Response from the Respondents.
* Demographic Profile of the Respondents
* Information about the four main branches of Physical Science.

*Figure 1, Schematic diagram showing the conceptual framework of the study.*

The IPO method was used in making the conceptual framework for this study. The Input includes information about the four main branches of physical science, demographic profile of the respondents, and the response from the respondents; the Process includes, descriptive research, data gathering, development of the interactive website, and observations; and the Output is the interactive website about learning the four main branches of physical science for STEM senior high school and BSIT students of STI College, Kalibo, Aklan.

**Statement of the Problem**

This study aims to determine the effectiveness of C.A.P.E as an Interactive Website in Learning Physical Science for STEM Senior High School and BSIT College Students in STI College, Kalibo, Aklan, Senior High School and BSIT College Department, Academic Year 2021-2022.

More specifically, this study sought to answer the following questions:

1. What is the demographic profile of the respondent in terms of sex, age, and grade/year level?
2. What is the level of effectiveness of C.A.P.E. as an interactive website in learning physical science for STEM senior high school and BSIT college students in STI College Kalibo, when they are classified according to their features, interface, content and interactive learning?
3. Is there a relationship between the level of effectiveness of C.A.P.E. website as an interactive website when they are categorized in terms of in terms of its; features, interface, content, and interactive learning?

**Hypothesis of the Study**

Based on the aforementioned specific objective of the study, the following hypothesis were drawn.

1. There is no relationship between the level of effectiveness of C.A.P.E. website as an interactive website when they are categorized in terms of its; Features, Interface, Content, and Interactive Learning.

**Significance of the Study**

The results of this study could be beneficial to the following:

*Teachers.* The result of this study could potentially lead to the creation of interactive platforms for teaching and learning that improve conceptual understanding and information retention for students while giving teachers more control over the learning process by providing a more streamlined and efficient way of presenting material to their students. Additionally, by utilizing these platforms, teachers could learn more about their students' thought processes, develop more effective methods for involving them in their learning, and give each student individualized feedback to assist them in comprehending challenging concepts and advancing through the course material.

*Parents.* The findings of this study may be beneficial to parents, as they can provide their children with more convenient access to physical science concepts by using interactive platforms. Moreover, the results of this study would be beneficial to the parents of students studying physical science, who could greatly benefit from the development of interactive learning methods that provide students with an opportunity to understand these concepts.

*Students.* Students. The result of this study would serve as another invention that is more convenient and beneficial compared to the other interactive websites that we are using today. By utilizing these interactive platforms, students will be able to access materials quickly and easily while also having a greater sense of engagement and ownership over their learning, which offers an enhanced level of engagement in their learning process. Moreover, the outcome of this study would help the students to comprehend the idea of the four major fields of physical science. This would provide students with an opportunity to understand the four major fields of physical science in a more convenient way as compared to other interactive websites that are currently available. These platforms would also offer a more personal experience, allowing students to interact with the materials they are studying in a way that best suits their learning style and allows them to develop a better understanding of the concepts.

*Future Researchers.* The findings of this study, and the methodology employed to reach these findings would provide future researchers with a basis for conducting similar studies or studies with much broader coverage. This study would give suggestions and be their source of ideas and knowledge on how they would provide different information to support their study. This would serve as their guide to further develop the research with the connection to the variables used.

**Scope and Delimitation**

The study was conducted to find out the level of effectiveness of C.A.P.E. as an interactive website in learning physical science for STEM senior high school and BSIT college students at STI College Kalibo, for the academic year 2022-2023.

The study employed a descriptive research design. The data were gathered using a researcher-prepared questionnaire that was validated by Ms. Reinne B. Villanueva, Practical Research 2 Adviser. The survey instrument was pretested on 10 respondents who were not STI College Kalibo students to determine its reliability. The questionnaire was personally administered to 112 respondents from a total population of 157 STEM senior high school and BSIT students at STI College Kalibo. The statistical tools used in data analyses included the frequency count, mean, and percentage.

The researchers chose the Grade 12 STEM and BSIT students of STI College Kalibo for the academic year 2022-2023. There are two grade levels in the strand STEM: Grade 11 and Grade 12, while there are four grade levels in BSIT: the first year, the second year, the third year, and the fourth year.

The major limitation of this paper is that the researchers did not conduct in-person interviews for the purpose of collecting data. Only mobile phones and desktop or laptop computers with an internet connection will be supported. The study will only cover one semester of the academic year; after that point, it cannot be continued or delivered any longer. The costs associated with this study will be constrained by the financial resources of the student researchers. Since the majority of these will only be accessible online, access to further information and techniques will also be restricted. Only a computer, smartphone, and the internet can be used to access the interactive website.

**Definition of Terms**

To avoid any confusion and possible misunderstanding as to the content of this study, the following key terms used in the study are conceptually and operationally defined.

*C.A.P.E Website* – in this study, the C.A.P.E. website is used as an interactive learning website that allows students to engage in activities that facilitate their understanding of the topics discussed in physical science. The C.A.P.E. website features lessons and quizzes that help students explore concepts in physical science more deeply and gain a better understanding of the content.

*Physical Science* - is a branch of natural science that studies the physical world and its phenomena It covers topics such as chemistry, astronomy, physics, earth science, and other related disciplines (<https://www.britannica.com/science/physical-science>).

In this study, "physical science" refers to the main topic that would be discussed on the C.A.P.E. website, where it covers a wide range of topics related to the physical world, such as the study of matter and energy, the structure and behavior of materials, and the forces at work in our universe.

*Interactive Learning* - Interactive learning is any sort of schoolwork or academic plan that uses computer technology in order to emphasize or teach specific material (<https://www.practicaladultinsights.com/what-is-interactive>.)

*STI College Kalibo* – This is a private college located in 1440 M Laserna, Kalibo, 5600, Aklan. It was in the early ‘80s when four entrepreneurs — Augusto C. Lagman, Herman T. Gamboa, Benjamin A. Santos, and Edgar H. Sarte — came together to set up Systems Technology Institute (STI), a training center that delivers basic programming education to professionals and students who want to learn this new skill.

In this study, STI College Kalibo, is a tertiary higher education wherein the respondents are enrolled. This school was operated under the supervision of Commission on Higher Education (CHED).

*Age* – It is defined as a span of years during which some event occurred (<https://www.yourdictionary.com/age>).

In this study, the term “age” refers to the age of the student-respondents during the conduct of this study.

*Sex* – It refers to a set of biological attributes in humans and animals. It is primarily associated with physical and physiological features and sex is usually categorized as male and female (<https://cihr-irsc.gc.ca/e/48642.html>).

In this study, it refers to the sex of the student-respondents either male or female.

*Senior High School* - This term defined the last phase in the implementation of the K-12 program. It covers Grades 11 and 12 (<https://www.edukasyon.ph/blog/senior-highunderstanding-senior-high-school>).

In this study, it refers to the added grade levels in high school by the Department of Education which are Grades 11 and 12.

*STEM* - This acronym pertains to a strand of study for students interested in pursuing college degrees relating to the Science, Technology, Engineering, and Mathematics (STEM) (<https://mcm.edu.ph/programs/senior-high-school-shs/science-technology-engineering-and-mathematics-stem/>).

In this study, the term "STEM" is the strand of our target respondents. Out of the six strand present in STI College Kalibo, the STEM strand is where we chose to focus conducting our survey research.

Bachelor of Science in Information Technology (BSIT) - program is a four-year degree program which focuses on the study of computer utilization and computer software to plan, install, customize, operate, manage, administer and maintain information technology infrastructure (<https://www.pup.edu.ph/ccis/bsit>.)

In this study, the term “BSIT” is a course of our target respondents.

*Effectiveness* - is the fact or quality of producing the intended or desired result (<https://www.dictionary.com/browse/effectiveness?fbclid=IwAR0EATNAa5HhYPd935jVNTsMk0lE8Xz4CHJSXylCb8AY28ty65XnoqHFyKI>.)

In this study, it refers to the found out the level of effectiveness of C.A.P.E. as an interactive website in learning physical science for STEM senior high school and BSIT college students in STI College Kalibo which was categorized into (5) very effective, (4) effective, (3) neutral/fair, (2) slightly effective, and (1) not effective at all.

*Language of learning and teaching (LOLT)* – refers to as medium of instruction or language of instruction. It is the language used in the classroom throughout the school day (<https://section27.org.za/wp-content/uploads/2017/02/Chapter-11.pdf>.)

**Chapter II**

**REVIEW OF RELATED LITERATURE**

This chapter presents the discussion of the review of related literature done by the researcher in relation to the study conducted. Topics on views and concepts about distance learning that is presented with the intention of providing necessary information for better understanding of the study. Moreover, this chapter is divided into four parts: (1) Features, (2) Interface, (3) Content, and (4) Interactive Learning.

**Features**

According to the study conducted by Haqiqi, et. al. (2021) entitled “The Effectiveness of Online Based Physics Learning in The Covid-19 Pandemic Period on The Material of Work and Energy,” it was revealed that online-based physics learning during the Covid-19 pandemic at SMA Negeri 2 Ponorogo on work and energy materials was effective. Online learning during the Covid-19 pandemic often uses the Whatsapp platform and school e-learning websites. By the use of several media such as books/modules, powerpoints, and videos to attract students to more easily understand the material. Moreover, it was found out that more than 50% of respondents participate in online learning because teachers use interesting teaching materials such as books/modules, Powerpoints, and exciting videos. However, more than 40% of respondents are not interested in participating in online learning because physics is considered boring for respondents. The obstacles faced by students in online learning were that 96.4% of students had difficulty understanding the material and questions related to statements, as well as limited data quotas and slow internet connections.

Moreover, in the research carried out by Febliza, A., and Oktariani (2020) entitled “The Development of Online Learning Media by Using Moodle for General Chemistry Subject,” their result showed that both experts decided online learning media by using moodle for basic chemistry subject was valid. They found that moodle is easy to use and to customize and also provides dedicated built-in features for learning. The results of media experts validation declared that software engineering and communication aspects of moodle were valid with the average figure reached higher than 91%. It was caused moodle is an open source platform which accessible, simple terms, users and administrators can freely run, share, and alter it to meet their particular commercial or noncommercial needs. Besides that, it is no license fee required, user friendly with some privilage features, namely: discussion forum, file exchange, email notification, notification dashboard, progress review, searching within course, dan module page as well as optimized architecture compared with other e-learning systems.

**Interface**

On the findings of Febliza, A., and Oktariani (2020), it was revealed that online learning media is eligible and can be used as online learning media for basic chemistry subject was valid. In addition, students’ response toward online learning media by using online learning media are positive in all aspects (interested design; color, picture and video preference; creativity and innovation; communication) with the average number of percentage stand in good criteria. So that, online learning media by using moodle for general chemistry subject can be used as learning media to give students experience in online learning. Others researcher can be developed similar media towards others subject.

The findings of the study by Al-Rahmi, et. al (2011) entitled “Use of E-Learning by University Students in Malaysian Higher Educational Institutions: A Case in Universiti Teknologi Malaysia,” the result shows that the interface of e-learning and the way it is designed motivates students, leading to better participation rates. E-learning interface makes it easy for the students to access and explore course content. It also enables them to easily use various functions and encourages them to make use of e-learning technology.

**Content**

The research conducted by Darmaji, et. at. (2019) entitled the “Mobile Learning in Higher Education for The Industrial Revolution 4.0: Perception and Response of Physics Practicum,” their study revealed that the students tend to be more independent information by using m-learning as a result of their motivation from within themselves to improve competence in the field of education. This is evident from the interview in which the student explains that they are interested in using mobile learning based practical guide. Moreover, physics education student acknowledges the use of smartphones increase their knowledge. M-learning is supported by students to help them access different resources to gain knowledge and increase of flexibility in learning the which shows that students realize that the use of smartphone a positive impact on students when used wisely. Some of the access they're doing is looking for information, browsing, downloading, reading e-books, listen to music, communications, streaming YouTube. Respondents prefer android because it is easier to carry, and can be used anytime and anywhere. The development of technology in education is the use of android will be the media for mobile learning based learning is more flexible and can be used anywhere.

Other than that, use android has become the primary requirement for students to help them search for information (such as the download activity books, listen to audio books and access to learning YouTube). Students recognize that the use of smartphones can be used for academic purposes such as obtaining information more instructive. Students take advantage of the android to access information that is education. In addition, also obtained information based on the response of media experts to guide books of basic physics lab II and science process skills assessment instrument based mobile learning that the use of these media fit for use. Mobile learning provides an opportunity for anyone to study anywhere comfortably. Media experts recognize the effectiveness of the use of media-based learning mobile learning is applied to the basic physics lab II. Need to develop quality media such as m-learning modules to encourage students in the use of a wider and more effective. Attempts to find out how effective the use of a guide book based practicum mobile learning in science process skills training is a necessary assessment of the science process skills of students. Evaluation is an activity to gather the information that will be used to decide on an accurate alternative to the make-decisions with certain criteria before the evaluation is identified Carried out.

Therefore, created science process skills assessment instruments based on mobile learning. Media expert also gave a positive response to the science process skills assessment instrument based mobile learning. Their assessment guidelines in this medium are described in a language easily understood.

**Interactive Learning**

On the study conducted by Alawamleh, et. al. (2020) entitled “The Effect of Online Learning on Communication between Instructors and Students During Covid-19 Pandemic,” it was found out that the vast majority agree with the questions of the study. Students still prefer classroom classes over online classes due to many problems they face when taking online classes, such as lack of motivation, understanding of the material, decrease in communication levels between the students and their instructors and their feeling of isolation caused by online classes.

Based on the research study conducted by Al-Rahmi, et. al (2011), the result of their study shows that e-learning enables students to share knowledge and interact with their peers and instructors. Self-efficacy, content of e-learning, student satisfaction and perceived usefulness are the four main factors that the current study investigates, and they proved to be the key predictors of learners’ intention to use e-learning.

**Synthesis**

In order to perform the study on "The Effectiveness of C.A.P.E as an Interactive Website for Learning Physical Science for STEM  Senior High  Students and BSIT in Kalibo, Aklan," the researchers acquired the sufficient amount of information and knowledge that is needed from the articles which are  "The Effectiveness of Online Based Physics Learning in The Covid-19 Pandemic Period on The Material of Work and Energy", "The Development of Online Learning Media by Using Moodle for General Chemistry Subject," ,"Use of E-Learning by University Students in Malaysian Higher Educational Institutions: A Case in Universiti Teknologi Malaysia", and "Mobile Learning in Higher Education for The Industrial Revolution 4.0 Perception and Response of Physics Practicum" these were the only recent studies and publications that were gathered and analyzed by the researchers in order to refine the information that is in the study. Additionally, it lists a few facts that demonstrate how successful, convenient, and helpful using technology specifically a website can be. Moreover, the recent articles and studies that were collected were focused on the effectiveness of using websites for academic purposes.

**Chapter III**

**RESEARCH METHODOLOGY**

This chapter presents the methods and procedure of the study. The discussion includes the research design, respondents of the study, sampling technique, data gathering procedure, validation of the data gathering instrument, data gathering procedure, and statistical data analysis.

**Research Design**

This study employed the descriptive research method that depicts the data collection from the survey. In this study, researchers utilized surveys as a technique to better understand or gather opinions on a specific concept or topic. This study focused on analyzing the level of effectiveness of C.A.P.E. as an interactive website in learning physical science for STEM senior high school and BSIT college students at STI College, Kalibo, Aklan.

**Respondents of the Study**

The researchers considered that the respondents in this research are the STEM senior high school students and BSIT college students of STI College Kalibo. There are forty-one (41) students in the senior high school department and one hundred sixteen (116) students in the college department. They were the chosen respondents because they have the personality of an observant student. The list and number of students enrolled in Academic Year 2022–2023 from STEM SHS and BSIT College students were taken from Ms. Precious Naabay, Mr. James Masinda, and Ms. Jorlyn Molas for Grade 11 STEM students; Grade 12 and BSIT first-year students; and BSIT second, third, and fourth-year students, respectively.

**Sampling Technique**

The target population in this study were the one hundred fifty-seven (157) from STEM SHS and BSIT students at STI College Kalibo, Aklan for the academic year 2022 – 2023. The students are enrolled in different grade and year levels: Grade 11, Grade 12, First Year, Second Year, Third Year, and Fourth Year. From the given population, one hundred fifty-seven (157), one hundred twelve (112) are selected as sample size.

In this study, the researchers used multi-stage sampling procedure which consists of stratified random sampling and systematic random sampling with a random start in identifying and selecting the respondents of the study.

Stratified Random Sampling involves the process of dividing the population into different strata before sampling (Cristobal & Cristobal, 2017).

Systematic Random Sampling is a method of selecting the nth element of the population (Cristobal & Cristobal 2017). In addition, Dudoskiy (2016) stated that systematic random sampling requires an approximated frame for a priority but not a full list.

Sample Size. The overall sample size of 157 STEM and BSIT students from senior high school and college department was determined using the following formula by Lynch et al. as cited by Ardales, 1994:

=

=

= 111.45979

= 112

where:

n = sample size

N = population

d = degree of accuracy (0.05)

z = the value of normal variable (1.96) for a reliability level of 0.95

p = the largest possible proportion (0.50)

A total of one hundred twelve (112) respondents was derived from the above formula by Lynch et al., as cited by Ardales, 1994. The total population of student by grade and year level and sample size is given in table 1.

Table 1. Sample Size of Senior High School STEM Students and BSIT Students at STI College Kalibo According to Grade and Year Level

|  |  |  |  |
| --- | --- | --- | --- |
| Grade Level / Year Level | Population (N) | Sample Size (n) | Percentage (%) |
| Grade 11 | 25 | 18 | 16 |
| Grade 12 | 16 | 11 | 10 |
| First Year | 35 | 25 | 22 |
| Second Year | 30 | 21 | 19 |
| Third Year | 32 | 23 | 21 |
| Fourth Year | 19 | 14 | 12 |
| TOTAL | 157 | 112 | 100 |

After the number of student-respondents was determined, identification of actual respondent was done using sampling interval. The researchers borrowed list of students from the advisers which as serve as source in selecting the respondents. Using the list, the researcher marked numbers from one to twenty-five (1-25) for Grade 11 students, one to sixteen (1-16) for Grade 12 students, one to thirty-five (1-35) for first year students, one to thirty (1-30) for second year students, one to thirty-two (1-32) for third year students, and one to nineteen (1-19) for fourth year students. After that the researcher computed for the sampling interval (k).

Sampling interval. The sampling interval can be calculated by this formula:

k =

=

= 1.40

where:

k = Sampling interval

N = Population

n = Sample size

The desired sampling interval is one (1). Next is to know the random start. The researcher chose a number from 1-157, in Grade 11 (1 - 25), in Grade 12 (1 – 16), in First Year (1 – 35), in Second Year (1 – 30), in Third Year (1 – 32) and in Fourth Year (1 – 19). The random starts in Grade 11 is nineteen (19), Grade 12 is thirteen (13), First Year is thirty (30), Second Year is twenty-six (26), Third Year is thirty-one (31) and Fourth Year is fifteen (15).

**Research Instrument**

In this study, the research instrument used was an e-questionnaire to gather the data needed to answer the specific objectives of the study, "The Effectiveness of C.A.P.E. as an Interactive Website in Learning Physical Science for STEM Senior High School and BSIT College Students in STI College, Kalibo, Aklan." The questionnaire was chosen by the researcher because it can be personally administered, and by doing, so, the researcher can establish rapport with the student respondents. This process also gave the researcher an opportunity to clarify and explain items found by the researcher students to be vague or confusing.

The researcher-made questionnaire which was the instrument used in this study consist of two part. The first part of the questionnaire asks about personal information such as name, age, sex, and grade level or year level. The second section of the questionnaire consists of four four-item questions about the effectiveness of C.A.P.E. as an interactive website for learning physical science. These questions were answerable by "very effective," "effective," "neutral/fair," "slightly effective," and "not effective at all."

To interpret the results, the Likert scale of means was used.

|  |  |
| --- | --- |
| **Scale**  4.21 - 5.00  3.41 – 4.20  2.61 – 3.40  1.81 – 2.60  1.00 – 1.80 | **Description**  Very Effective  Effective  Neutral / Fair  Slightly Effective  Not Effective at all |

**Validation of the Data Gathering Instrument**

Before the questionnaires were distributed, they were checked through face and content validation by the researcher's adviser, Ms. Reinne B. Villanueva, to ensure the consistency of the respondents' responses on all of the questionnaire's items. The questionnaire was replicated using Google Forms once the validity and reliability of the study instrument were verified. The administration of the actual conduct of the study was approved by the school administrators. Following validation, it was pretested among 10 students of non-STI College Kalibo who were not actual study participants to determine its validity.

**Data Gathering Procedure**

Before the survey was distributed, the research instruments were subjected to face and content validity testing by the research adviser in order to conform to their required purpose in data collection and for adequate validation. The questionnaire was replicated using Google Forms once the validity and reliability of the study instrument were verified. The administration of the actual conduct of the study was approved by the school administrators.

The data gathered through google forms were gathered once respondents completed the questionnaire. The collected data was properly interpreted using appropriate statistical tools. The questionnaires were collected immediately after administration.

**Data Gathering Procedure**

Before distributing the instrument to the respondents, the researchers requested approval from the STI College Kalibo School Principal for the distributed of the instrument to the respondents (see Annex A).

After the research instrument's validity and reliability were validated, the e-questionnaire was distributed to student-respondents using Google Forms and different group chats in Messenger. The student-respondents were given a face-to-face demonstration and testing of the C.A.P.E. Interactive website.

Attached to the survey questionnaire is a researcher’s letter to the respondents, which contains an explanation of the importance of the study so that the respondents understand and have an idea of why the researchers are conducting this study. The respondents answered the e-questionnaire by clicking the circle of their choice from the given choices.

Once respondents finished the questionnaire, the data was collected using Google Forms. Using appropriate statistical tools, the acquired data was properly evaluated. The questionnaires were collected as soon as they were administered.

**Statistical Data Analysis**

The collected data was tabulated and tallied directly in Microsoft Excel software for easy data consolidation, filtering, processing, and analysis. The data gathered was properly interpreted using appropriate descriptive statistical tests, which are frequency count, percentage, and mean.

The following descriptive statistical tests were employed in the analyses of the data gathered.

*Frequency* is simply the number of participants which indicate the certain category F (Korb, 2013).  In this study, frequency counts were used to ascertain the number of responses on the survey questionnaire given to the respondents as to their demographic profile in terms of age, sex, and grade level or year level.

*Percentage.* This was used to describe if the student-respondents number comparison in terms of age, sex, grade or year level.   According to Korb (2013), the percentage is calculated by taking the frequency divided by the total number of respondents and multiplying it by 100% = F/N x 100%.

*Mean.* This was used to determine the level effectiveness of C.A.P.E. as an interactive website for learning physical science.

**Chapter IV**

**RESULTS AND DISCUSSION**

This chapter presents the results and the findings of this study. The data was analyzed and interpreted in accordance with what was required by each statement of the problem.

Demographic Profile of Student-Respondents

*Table 2. Distribution Respondents According to Their Demographic Profile*

|  |  |  |
| --- | --- | --- |
| Demographic Profile | Frequency (f) | Percentage (%) |
| Gender | | |
| Female | 36 | 32 |
| Male | 76 | 68 |
|  |  |  |
| Age | | |
| 16 years old | 9 | 8 |
| 17 years old | 10 | 9 |
| 18 years old | 11 | 10 |
| 19 years old | 12 | 11 |
| 20 years old | 11 | 10 |
| 21 years old | 8 | 7 |
| 22 years old | 27 | 24 |
| 23 years old | 16 | 14 |
| 24 years old | 8 | 7 |
| **Mean Age** | 20.37 | 20 years old |
|  |  |  |
| Grade Level and Year Level | | |
| Grade 11 | 18 | 16 |
| Grade 12 | 11 | 10 |
| First Year | 25 | 22 |
| Second Year | 21 | 19 |
| Third Year | 23 | 21 |
| Fourth Year | 14 | 13 |
| Total | 112 | 100 |

Table 2 presents demographic profile of the student-respondents in terms of gender, age and grade or year level.

*Sex.* The data shows that a little more than two thirds, 76 or 68% of them are male while there were 36 or 32% female.

*Age.* As shown in the table, less than one-fourth, 27 or 24%, of the student-respondents are 22 years old; there are 16 or 14% who are 23 years old; there are 12 or 11% are 19 years old; there are 11 or 10% are 18 years old and 20 years old; there are 10 or 9% are 17 years old; and the least respondents were ages 21 and 24, and 20 years, with only 7 and 8 respondents, or 8% and 9%, respectively. The data revealed that the mean age of the student-respondents is 20 years old. This means that they student-respondents enrolled their high school in their right age as prescribed by the Department of Education (DepEd) and have completely passed their school requirements on time.

*Grade and Year Level.* In Table 2 reflects the distribution of the student-respondents according to their grade and year level. It revealed that the first year and third year had the highest number of respondents with more than one-fifth respondents, 25 or 22% and 23 or 21%, respectively, while there are 18 or 16% of respondents from Grade 11; there are 21 or 19% respondents from the second year; and there are 14 or 13% respondents from the fourth year; however, the grade level with the least number of respondents is Grade 12, comprising of 11 or 10% respondents.

Assessment of the Effectiveness of the C.A.P.E Website in terms of its;

Features, Interface, Content, and Interactive Learning.

*Table 3. Assessment of the Effectiveness of the C.A.P.E Website in terms of its Features*

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Measurement Scale** | **f** | **%** |
| 5 | Very Effective | 34 | 30.36 |
| 4 | Effective | 49 | 43.75 |
| 3 | Neutral / Fair | 17 | 15.18 |
| 2 | Slightly Effective | 8 | 7.14 |
| 1 | Not Effective at all | 4 | 3.57 |
|  | **Mean** | 3.90 | Effective |

"**Assessment of the Effectiveness of the C.A.P.E Website in terms of its Features."** On the table 3, it was found out that 49 or 43.75%, were effective in their perception of the "effectiveness of the C.A.P.E. website in terms of its features." It means that the student-respondents believe that the C.A.P.E. website is effective in terms of its features.

Moreover, 34 or 30.36%, answered "very effective" for the C.A.P.E. website. However, only four respondents or 3.57%, perceived that the C.A.P.E. website is not effective at all in terms of its features.

As a whole, the students' insight on the assessment of the "effectiveness of the C.A.P.E. website in terms of its features" was effective with a mean rating of 3.90.

The similar results of the study conducted by Haqiqi, et. al. (2021) entitled “The Effectiveness of Online Based Physics Learning in The Covid-19 Pandemic Period on The Material of Work and Energy.” They found out that online-based physics learning during the Covid-19 pandemic at SMA Negeri 2 Ponorogo on work and energy materials was effective. Online learning during the Covid-19 pandemic often uses the Whatsapp platform and school e-learning websites. By the use of several media such as books/modules, powerpoints, and videos to attract students to more easily understand the material.

Moreover, in the research carried out by Febliza, A., and Oktariani (2020) entitled “The Development of Online Learning Media by Using Moodle for General Chemistry Subject,” they found that moodle is easy to use and to customize and also provides dedicated built-in features for learning. It was caused moodle is an open source platform which accessible, simple terms, users and administrators can freely run, share, and alter it to meet their particular commercial or noncommercial needs.

*Table 4. Assessment of the Effectiveness of the C.A.P.E Website in terms of its Interface*

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Measurement Scale** | **f** | **%** |
| 5 | Very Effective | 38 | 33.93 |
| 4 | Effective | 37 | 33.03 |
| 3 | Neutral / Fair | 23 | 20.54 |
| 2 | Slightly Effective | 12 | 10.71 |
| 1 | Not Effective at all | 2 | 1.79 |
|  | **Mean** | 3.87 | Effective |

**"Assessment of the Effectiveness of the C.A.P.E. Website in terms of its Interface."** Table 4 displays the data on the respondents’ perception on the effectiveness of the C.A.P.E. website in terms of its interface. The data shows that more than one-third, 38 or 33.98%, are very effective, while 37 or 33.03%, are effective, while 2 or 1.79% respondents perceived that the website is not effective at all.

         Generally, the student-respondents perceived that the C.A.P.E. website is effective in terms of its interface, with a mean rating of 3.87.

         The similar results were found on the findings of Febliza, A., and Oktariani (2020), it was revealed that online learning media are eligible and can be used as online learning media for basic chemistry subjects. In addition, students’ responses toward online learning media by using online learning media are positive in all aspects (interested design; color, picture, and video preference; creativity and innovation; communication), with the average percentage standing in good stead.

Moreover, the findings of the study by Al-Rahmi, et. al (2011) entitled "Use of E-Learning by University Students in Malaysian Higher Educational Institutions: A Case in Universiti Teknologi Malaysia," showed a similar result. The result shows that the interface of e-learning and the way it is designed motivates students, leading to better participation rates. The e-learning interface makes it easy for the students to access and explore course content. It also enables them to easily use various functions and encourages them to make use of e-learning technology.

*Table 5. Assessment of the Effectiveness of the C.A.P.E Website in terms of its Content*

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Measurement Scale** | **f** | **%** |
| 5 | Very Effective | 35 | 31.25 |
| 4 | Effective | 51 | 45.54 |
| 3 | Neutral / Fair | 21 | 18.75 |
| 2 | Slightly Effective | 5 | 4.46 |
| 1 | Not Effective at all | 0 | 0.00 |
|  | **Mean** | 4.04 | Effective |

*"***Assessment of the Effectiveness of the C.A.P.E. Website in terms of its Content.***"* Displayed in Table 5 is the data on the effectiveness of the C.A.P.E. website in terms of its content. The data shows that almost one-half of the respondents, 51 or 45.54%, answered "effective," while 35 or 31.25%, are very effective, and only five (5) or 4.46 percent, perceive the C.A.P.E. website as slightly effective in terms of its content.

         As a whole, the student-respondents perceived that the C.A.P.E. website is effective in terms of its content, with a mean rating of 4.04.

A similar study was conducted by Darmaji, et. al. (2019) entitled "Mobile Learning in Higher Education for the Industrial Revolution 4.0: Perception and Response of Physics Practicum." Their research found that students who use m-learning are more independent learners as a result of their internal motivation to improve their educational competence. Moreover, physics education students acknowledge that the use of smartphones increases their knowledge. M-learning is supported by students to help them access different resources to gain knowledge and increase flexibility in learning, which shows that students realize that the use of smartphones has a positive impact on them when used wisely. Some of the things they're doing with access are looking for information, browsing, downloading, reading e-books, listening to music, communicating, streaming YouTube. It was revealed that the students recognize that the use of smartphones can be used for academic purposes, such as obtaining more instructive information. Students use the android to gain access to educational resources.

*Table 6.* *Assessment of the Effectiveness of the C.A.P.E Website in terms of its Interactive Learning*

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Measurement Scale** | **f** | **%** |
| 5 | Very Effective | 43 | 38.39 |
| 4 | Effective | 45 | 40.18 |
| 3 | Neutral / Fair | 13 | 11.61 |
| 2 | Slightly Effective | 11 | 9.82 |
| 1 | Not Effective at all | 0 | 0.0 |
|  | **Mean** | 4.07 | Effective |

**"Assessment of the Effectiveness of the C.A.P.E Website in terms of its Interactive Learning."** The data shown in table 6 on the assessment of the effectiveness of the C.A.P.E. website in terms of its interactive learning. It was discovered that more than two-fifths of the respondents, 45 or 40.18%, believe the C.A.P.E. website is slightly effective in terms of interactive learning, while the remaining 11 or 9.82% believe it is not effective at all.

Generally, the student-respondents perceived that the C.A.P.E. website is effective in terms of its content, with a mean rating of 4.07.

The findings of this study are in contrast to the study conducted by Alawamleh, et. al. (2020) entitled "The Effect of Online Learning on Communication between Instructors and Students During the COVID-19 Pandemic," in which they found out that the students still prefer classroom classes over online classes due to many problems they face when taking online classes, such as lack of motivation, understanding of the material, a decrease in communication levels between the students and their instructors and a feeling of isolation caused by online classes.

However, the result of this study supports the study conducted by Al-Rahmi, et. al (2011) entitled "Use of E-Learning by University Students in Malaysian Higher Educational Institutions: A Case in Universiti Teknologi Malaysia," The result of their study reveals that e-learning enables students to share knowledge and interact with their peers and instructors.

**Chapter V**

**SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

  This chapter presents the summary of the findings, the conclusion derived from the findings and the recommendation based on the study results.

**Summary**

This study aimed to find out the level of effectiveness of C.A.P.E. as an interactive website in learning physical science for STEM senior high school and BSIT college students in STI College Kalibo.

More specifically, the study intended to determine the:

1. What is the level of effectiveness of C.A.P.E. as an interactive website in learning physical science for STEM senior high school and BSIT college students in STI College Kalibo, when they are classified according to their features, interface, content and interactive learning?

2. Is there a relationship between the level of effectiveness of C.A.P.E. website as an interactive website when they are categorized in terms of in terms of its; features, interface, content, and interactive learning?

The study employed a descriptive research design. The data were gathered using a researcher-prepared questionnaire that was validated by Ms. Reinne B. Villanueva, Practical Research 2 Adviser. The survey instrument was pretested on 10 respondents who were not STI College Kalibo students to determine its reliability.

The researcher personally administered the survey questionnaire to 112 respondents from a total population of 157 STEM senior high school and BSIT students at STI College Kalibo. The statistical tools used in data analyses included the frequency count, mean, and percentage.

The researchers have gathered the following findings based on the data gathered as follows:

1. On the demographic profile of student-respondents, little more than two thirds, 76 or 68% of them are male, less than one-fourth, 27 or 24%, of the student-respondents are 22 years old and first year and third year had the highest number of respondents with more than one-fifth respondents, 25 or 22% and 23 or 21%, respectively.
2. On the assessment of the effectiveness of the C.A.P.E website in terms of its; features, interface, content, and interactive learning.
3. The student-respondent perceived effective in the assessment of the effectiveness of the C.A.P.E. website in terms of its: features, content and interactive learning.
4. The student-respondent perceived very effective in the assessment of the effectiveness of the C.A.P.E. website in terms interface.

**Conclusions**

From the findings of the study, the following conclusions were made by the researchers:

1. There are little more than two thirds, 76 or 68% of them are male while there were 36 or 32% female, have a mean age of the student-respondents is 20 years old and the first year and third year had the highest number of respondents with more than one-fifth respondents, 25 or 22% and 23 or 21%, respectively.
2. The student-respondents perceived effective in the assessment of the effectiveness of the C.A.P.E. website in terms of its: features, interface, content and interactive learning.
3. There is no relationship between the level of effectiveness of C.A.P.E. website as an interactive website when they are categorized in terms of its; Features, Interface, Content, and Interactive Learning.

**Recommendations**

The researchers made the following recommendations based on their findings and conclusions regarding the effectiveness of C.A.P.E. as an interactive website for learning physical science:

*Teachers.* To give their students a more interesting and meaningful learning experience, teachers should be encouraged to supplement traditional classroom instruction with interactive websites like C.A.P.E. websites. The teachers should receive training on how to use these interactive websites effectively as well as advice on how to best integrate them into their lesson plans. In order to ensure that every student has the chance to benefit from an improved learning experience, teachers should also be assisted in using the websites to tailor learning to the specific needs of their students.

*Parents.* The educational advantages of C.A.P.E. websites should be made known to parents so they can better support their children's learning by interacting with the websites at home and helping them get used to them. Parents should be encouraged to participate as well, as they can provide additional support and encouragement to their children while they use interactive websites to further their educational development.

*Students.* Students should be allowed to explore the C.A.P.E. websites for learning physical science in a safe and supervised environment, such as in their classrooms or during free time at school, so they can learn how to use them correctly and understand how the websites can help them in their studies.

*Future Researchers.* Similar studies should be conducted by other researchers at other schools to validate the results of this study.