**Chapter 1**

**THE PROBLEM AND ITS SCOPE**

**INTRODUCTION**

**Rationale**

The rise of online education is reshaping the landscape of learning across all educational tiers, including early childhood, primary, secondary,tertiary, adult, and distance education. Web-based learning has become a pivotal resource available to learners, offering accessible and quality education regardless of geographical location, age, or time constraints, as long as learners have internet connectivity and a compatible device. With a plethora of powerful tools at its disposal, such as sharing features, virtual discussions, forums, self-assessment quizzes, and surveys, web-based education fosters an engaging and interactive learning environment conducive to effective learning outcomes (Dangwal, 2020).

Over the next several decades, the increasingly complex and interconnected global environment, facilitated by technology, will demand proficiency in information and communication technologies across various human endeavors. As a result, the necessity to embed technology into the school curriculum and foster digital literacy skills from kindergarten through sixth grade is gaining prominence among educators and school administrators. Digital literacy encompasses the ability to utilize the Internet and various information and communication technologies to retrieve, organize, evaluate, and generate information. This integration of technology into education is expected to yield positive effects on student attitudes, learning outcomes, and collaboration, particularly for today's digitally-native generation. Early exposure to technology may better prepare students for its use in secondary and post-secondary education. Consequently, there is a renewed emphasis on technology as a fundamental aspect of modern pedagogy in elementary education, necessitating the bridging of the digital gap between teachers and students. Educational web portals, customized with a suite of digital resources and tools for teachers, students, and families, present numerous opportunities to infuse technology into the educational and communication processes within school classrooms. These educational web portals, designed specifically for school classrooms, serve as specialized vertical portals offering a targeted collection of grade-level educational resources and communication tools.

In educating the students of the 21st century, being able to interact with technology is an important factor in learning (Ignacio, 2021). Technology is advancing, as such, other sectors are also maximizing the use of it. Electronic educational resources are currently an important component of the modern educational process at all levels (Ivannikov and Tumkovskiy, 2016). However, this digital evolution has simultaneously highlighted the compelling need to address various gaps and challenges inherent to educational institutions.

One of the primary challenges faced by academic institutions is the efficient dissemination of news and announcements. Efficient dissemination of news and announcements is a critical challenge for institutions globally. Inadequate communication can lead to missed opportunities and diminished engagement within the academic community (Z. M. Al-Qaysi & S. M. Al-Qaysi, 2019). Furthermore, Administrative processes, such as enrollment, often suffer from inefficiencies that cause frustration and delays that might not be desirable for students and faculty alike.These issues not only disrupt the academic experience but can also lead to decreased satisfaction among stakeholders (Orbeta and Paqueo, 2022).

Lastly, Access to educational resources is another critical aspect of education. The lack of physical books can hinder education in general. A study conducted in 2017 by Results for Development (R4D) cites lack of awareness of the value of reading books in supporting literacy, financing shortages, unpredictability and unsustainability; poor procurement and book management as some of the reasons for low book availability and usage of books.

Textbooks and instructional materials are widely recognized as essential tools for education (Tuimur, 2015). Typically, textbooks play a crucial role in supporting teachers' instruction and serve as the primary educational resource through which students acquire knowledge and skills. Nevertheless, in recent years, there has been a global shortage of physical books and printed learning materials. According to Cadden (2021), the current challenges in the book industry's supply chain include issues such as labor shortages, paper scarcities, and shipping delays. Consequently, due to these supply chain constraints, publishing industries have raised the prices of published books. This, in turn, has led to a scarcity of books, adversely impacting educational sectors and hindering the quality of students' learning experiences and educational progress in various countries.

In Cebu Province, many schools continue to face a shortage of learning resources. According to Isaiah Wagas, an official from the Department of Education (DepEd) VII, there will not be a sufficient number of books available for all students (Sun Star News, 2019). At Argao National High School, the senior high school department, in particular, grapples with a severe scarcity of textbooks and instructional materials. Students lack adequate access to textbooks, relying primarily on their teachers' PowerPoint presentations. They often resort to using their phones to capture images of each slide, creating a cumbersome process. This reliance on images not only consumes time but also leads to inconvenience when students need to refer back to specific lessons stored in their phone galleries. Consequently, this habitual practice of taking pictures fosters dependency among students, leading to decreased motivation and productivity when tasked with assignments.

With the aforementioned concern, the researchers in Argao National High School adapted solutions with Web Technology. In relation to this, the researchers aimed to help lessen the gap in dissemination of updates, the lack of physical books for students, and lastly the community involvement between students. This study aims to evaluate the User Experience, Acceptability, and Reliability of such integrated platforms, focusing particularly on one developed specifically for Argao National High School (ANHS), known as "ANHSLINK", ANHSLINK endeavors to provide a comprehensive approach to modern school administration by integrating essential components such as school updates, forums, and a digital library of educational resources into a unified, student-friendly interface. Through a systematic research approach, the study will collect and analyze data from Argao National High School’s Science Class Program, students and teachers, ensuring a comprehensive perspective about this technology. This research will contribute to the ongoing conversation on the integration of technology in education, offering valuable recommendations for future enhancements and implementations.

**Theoretical Background of the Study**

This study is centered on the development and innovation of a digital library mobile application to aid students on their learning struggle. With the argument of utilizing digital learning through innovation of a mobile application, there were many interrelated theoretical perspectives established. Thus, this study is being anchored by two directly pertinent theories that will be discussed on this paper. Generally, these theories expound the role of technology in learning and its acceptance as a vital part of acquiring knowledge. **paraphrase**

**Technology Acceptance Model Theory**

The TAM model is a widely used theoretical framework to understand the factors that influence users’ acceptance and use of technology (Davis, 1989). It is based on the theory of reasoned action, which assumes that users’ behavior is determined by their intention, which is influenced by their attitude and subjective norms (Venkatesh & Davis, 2000). The TAM model proposes that users’ intention to use a technology is affected by two main beliefs: perceived usefulness and perceived ease of use (Davis, 1989). Perceived usefulness refers to the degree to which a user believes that using a technology will enhance his or her performance or productivity. Perceived ease of use refers to the degree to which a user believes that using a technology will be free of effort or difficulty (Davis, 1989).

In the context of this research, this model is highly relevant. ANHSLINK, as an integrated educational web portal, aims to improve communication, streamline administrative processes, and provide easier access to educational resources. By examining the perceived usefulness and perceived ease of use of ANHSLINK, we can gain insights into its suitability and user satisfaction, particularly in addressing the identified issues of communication gaps, administrative inefficiencies, and resource accessibility within this academic institution. This study seeks to explore the extent to which ANHSLINK aligns with the principles of the TAM, and how these alignment factors contribute to its adoption and effectiveness within this academic institution.

Lee et al. (2020) described a project that developed a smart campus platform based on cloud computing, big data, and Internet of Things technologies. The platform integrated various campus services, such as learning management, library, administration, security, and energy management, into a single system that could be accessed through web and mobile devices. The platform also provided data analytic and visualization tools to support decision making and innovation.

While university information systems are commonly associated with providing diverse applications in education, library, and administration, current campus portals serve as information gateways and user interfaces, connecting with distinct user groups. This allows both internal and external campus users to access a multitude of information and applications tailored to their individual needs through the internet. Consequently, these systems encompass not only educational functions like enrollment, registration, grading, scholarships, and online class connections but also features related to web searches, information sharing, B2B applications, and customized search services (Zhou, 2003).

A number of opportunities have been addressed by previous studies from using different cloud computing tools in higher education1. The common opportunity from using these tools was mainly to facilitate students’ interactions in real-time by offering a series of participative learning activities, which center on reflection and dialogue among students” (Al-Samarraie & Saeed, 2018). However, these systems also pose some challenges, such as user acceptance, usability, security, privacy, interoperability, and scalability. Therefore, it is important to evaluate the reliability and satisfaction of these systems from the users’ perspective.

In conclusion, the TAM model provides a valuable framework for assessing technology acceptance within educational contexts like the ANHSLINK portal. While modern platforms offer opportunities for enhancing student interactions, challenges such as user acceptance and security must be carefully addressed to ensure reliability and satisfaction.

**Siemens’ and Downes’ Connectivism Learning Theory**

In 2005, George Siemens and Stephen Downes published separate articles, resulting to the development of a theory utilized for digital age, Connectivism Learning Theory. An emerging thought that seeks to close the gap between traditional learning and the use of technology which warrants looking at learning through a new lens (Insider, 2017).

In Downes’ 2005 article, An Introduction to Connective Knowledge, he simply stated that Connectivism is a networked social learning. According to Underwood (2016), Downes described it as: *“… the thesis that knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks.”* This theory is denoted as a reflection of our rapidly changing society. With the mediation of progressive advancements of technology, the current society became more complex, and socially and globally connected. It became the orchestration of networked complicated disheveled ideas to form specific information sets (Western Governors University, 2021).

Western Governors University (2021) asserted that in this theory, the diversity of notions, beliefs, and perspectives paved way to various ways of knowing and learning wherefore an individual has no control; rather it is a collaboration of prevailing ideas from various sources seen from a current reality. Connectivism “is the thesis that knowledge is distributed across a network of connections, into its nodes, and therefore, learning consists of the ability to construct and traverse those nodes connected into networks” (Downes, 2012, p. 9). The ability of perceiving relations among various information sources and sustaining that relation to enable continuous learning is the core skill. As new information is promptly amalgamated to create a new climate of thinking, decisions are then being supported by rapidly amending fundamentals. This constant update and shift of knowledge can also be incorporated outside the learner, such as in a database or other specialized information source. Being connected to this outside knowledge is more necessary than the learner’s state of learning.

On the other hand, in his 2004 article, Connectivism: Learning as a Network Creation, Semiens claimed that in any defined social network, there is a focus for groups of people who share a common goal. Through this, they can promote and sustain a well-organized flow of knowledge (Pressbooks, 2017). He stated that: *“Exponentially developing knowledge and complexification of society requires nonlinear models of learning (process) and knowing (state). We cannot sustain ourselves as learning/knowing beings in the current climate with our current approaches”*. With increasing technological connection through the Internet, digital cities that concur on extensive topics have become a collective network that links both local and global communities. This paradigm shift and expansion of social networks have engendered educators to embrace this new option for learning to use in their teaching undertakings (Shrivastava, 2018).

Siemens coined the term “connectivism” to describe learning networks and according to the new learning paradigm, “knowledge is created beyond the level of individual human participants, and is constantly shifting and changing. Knowledge in networks is not controlled or created by any formal organization, although organizations can and should “plug in” to this world of constant information flow, and draw meaning from it” (Bates, 2015, p.56). He stressed the notion that knowledge is a chain of interrelated webs gained not only from social interactions, but also from experiences, digital observations (commercials, websites), or even organizations. Hence, this interconnectedness of all the knowledge leads to learning.

Connectivism defines learning as a networked group effort where learning is a process of connecting people and information sources. Duke et al. (2013) explain that “stated simply, connectivism is social learning that is networked.” As such, “connectivism is therefore considered to represent a successor to theories such as cognitivism, constructivism and behaviorism” (Garcia et al., 2015, p. 880). Furthermore, the focal point of the theory of Connectivism Learning is the individual. In Connectivism Learning Theory, an individual is seen as “nodes” in a network which refers to any object that can be linked to another object, like a book, webpage, person, etc. Into a network, there are a lot of connections, links between entities, entities which can be named nodes and each node has or has to have information as forms of knowledge. A node could be any entity such as: a person, a group of people, a computer or ideas and communities. A change of data in a node makes data's change in another node. Being connected into a network, the nodes play their role in sharing the information which can be transformed, by understanding, in true knowledge (Herlo et al., 2017). In addition, personal knowledge is embodied with a systematic series of networks that supplies an organization which sequentially renders back to the system. Through his or her access back into the system, the individual is able to continue the cycle of knowledge growth. In other words, maintaining the connections the learners have created with the system (information source) allows them to learn and advance their knowledge. As mentioned earlier, in this theory, learning is more than our own internal construction of knowledge; rather, what we can reach in our external networks is also considered to be learning. From this theory, two terms—nodes and links—have been commonly used to describe how we acquire and connect information in a network.

In a nutshell, this theory builds on entrenched theories to propose that technology is altering the means of learning. It seeks to be the 21st-century solution to perceived gaps that exist in traditional ideas about learning, particularly those concerned with the use of technology (Huezo, 2018). Siemens and Downes were able to simplify this theory through their eight established main principles namely: (1) learning and knowledge rests in the diversity of opinions, (2) learning is a process of connecting, (3) learning may reside in non-human appliances, (4) learning is more critical than knowing, (5) nurturing and maintaining connections are needed for continual learning, (6) the ability to see connections between fields, ideas, and concepts is a core skill, (7) accurate recent knowledge is the aim of all Connectivist Learning, (8) and decision-making is a learning process. The span of knowledge we have might change at any time due to the constantly changing information climate. Hence, Connectivism Learning Theory supports that knowledge is distributed across networks where connections and connectedness inform learning. As per Huezo (2018), Connectivism promotes learning that happens outside of an individual, such as through social networks and knowledge that occurs or is stored by technology. It builds upon established theories to propose that technology is changing what, how, and where we learn.

This theory is pertinent to the study since the objective of the researchers is to utilize the advent of technology by developing a digital library mobile application, wherefore learners will be aided on their challenges of learning. As discussed above, this theory allows students to incorporate external forces such as electronic devices, digital platforms for the “off-site” storage of information. With Connectivism Learning Theory, technology is permitted to become part of the student’s internal learning process. It offers certain technological opportunities for the learner to be actively involved in their own learning processes which is aligned on our objectives. Hence, this study will shed light of embracing the connectedness of an individual to various external forces or networking systems and maintaining that connection for continual learning. As this theory explained, connectedness to the system allows an individual to undergo much learning. Hence, with the researchers’ pursuit of developing a digital library mobile application, learners will be able to stay connected and acquire accurate updated information for their learning, since this theory is characterized as the enhancement of how a learner gained knowledge and perception through the addition of a personal network (Siemens, 2004). And since it is impossible to experience everything, the learner can share and learn through collaborations (different digital platforms). Being able to instantly access into huge databases of knowledge empowers a learner to seek further knowledge. Paraphrase

**Theoretical Framework of the Study**

**SIEMENS’ AND DOWNES’ CONNECTIVISM LEARNING THEORY**

**DAVIS’ TECHNOLOGY ACCEPTANCE MODEL THEORY**

**ASSESSING THE SUITABILITY, AND SATISFACTION LEVEL OF AN INTEGRATED EDUCATIONAL WEB PORTAL, "ANHSLINK"**

**RECOMMENDATIONS**

**Figure 1. Schematic Diagram of Theoretical Framework**

**Statement of the Problem**

This study evaluates the Integrated Educational Web Portal’s (ANHSLINK) suitability and acceptability among Science Class students of Argao National High School. Specifically, it addresses the following questions:

1. What is the quantitative level of acceptability of 'ANHSLINK' among Science Class students in terms of:

1.1 Practicality:

1.2 Usefulness: and

1.3 Reliability?

1. How do users quantitatively rate their satisfaction with 'ANHSLINK' concerning:

2.1 Application features;

2.2 User experience; and

2.3 Usefulness?

1. What challenges do Science Class students encounter while using the Integrated Educational Web Portal, “ANHSLINK”?
2. What recommendations can be made based on the result of the study?

**Statement of the Hypothesis**

**Null Hypothesis (H0**): ANHSLINK does not achieve a high level of perceived suitability, acceptability, and user satisfaction among Science Class students of Argao National High School, in terms of practicality, usefulness, reliability, application features, and user experience.

**Alternative Hypothesis (H1**): ANHSLINK achieves a high level of perceived suitability, acceptability, and user satisfaction among Science Class students of Argao National High School, in terms of practicality, usefulness, reliability, application features, and user experience.

**Significance of the Study**

This study evaluates the Integrated Educational Web Portal’s (ANHSLINK) suitability and acceptability among Science Class students of Argao National High School. The findings provide valuable insights to the following:

**Students**: The study addresses the needs of students by evaluating the acceptability and satisfaction levels of the ANHSLINK integrated educational web portal. Positive outcomes may contribute to improved learning experiences, access to educational resources, and enhanced digital literacy skills, aligning with the imperative for technology integration in 21st-century education.

**Parents**: Parents benefit indirectly from the study as it assesses the suitability of ANHSLINK in addressing communication gaps and administrative inefficiencies. An effective educational portal may provide parents with transparent access to information about their child's academic progress, school updates, and other relevant details, fostering increased parental engagement.

**Teachers:** The study offers insights into the experiences of Science Class teachers with ANHSLINK, focusing on practicality, usefulness, and reliability. Positive findings may lead to more efficient administrative processes, streamlined communication, and enhanced collaboration among teachers. This, in turn, can contribute to a more conducive teaching environment.

**Future Researchers**: The research contributes to the ongoing discourse on the integration of technology in education, particularly in the context of an integrated educational web portal. Future researchers can build upon the findings and recommendations of this study to further explore the impact of similar platforms in diverse educational settings. It provides a foundation for understanding the challenges and opportunities associated with such technologies.

**Scope and Delimitations**

This study focuses on evaluating the acceptability, usability, and reliability of the ANHSLINK integrated educational web portal among Science Class students and teachers at Argao National High School (ANHS). Utilizing quantitative methods, the research examines practicality, usefulness, reliability, application features, user experience, and challenges associated with ANHSLINK, within the educational context of ANHS. The scope encompasses the current state of ANHSLINK, its impact on communication gaps, administrative inefficiencies, and access to educational resources. However, the study is delimited to Science Class participants within ANHS, excluding other grade levels and academic programs. Additionally, qualitative data collection methods are not employed, limiting the depth of understanding regarding participants' experiences. The evaluation focuses solely on ANHSLINK, omitting other educational technology platforms or initiatives implemented within ANHS, and its findings may not be generalizable to institutions beyond the geographical context of ANHS or those with differing socio-cultural backgrounds.

**Definition of Terms**

**ANHSLINK**: ANHSLINK refers to the integrated educational web portal developed for Argao National High School (ANHS), aiming to streamline communication, administrative processes, and access to educational resources within the institution.

**Integrated Educational Web Portal**:  Integrated Educational Web Portal is a centralized online platform that consolidates educational resources, administrative functions, and communication tools within an educational institution.

**Acceptability**: Acceptability pertains to the degree to which Science Class students and teachers at ANHS perceive ANHSLINK as suitable, practical, and reliable for their educational needs and goals.

**Usability**: Usability refers to the ease with which Science Class students and teachers can navigate and utilize the features and functionalities of ANHSLINK to accomplish their tasks and objectives effectively.

**Reliability**: Reliability denotes the consistency and dependability of ANHSLINK in providing accurate information, timely updates, and uninterrupted access to educational resources for Science Class students and teachers at ANHS.

**Application Features**: Application features encompass the specific tools, functions, and capabilities available within ANHSLINK, such as communication channels, administrative modules, digital library resources, and interactive learning materials.

**User Experience (UX):** User Experience (UX) pertains to the overall satisfaction and usability of ANHSLINK as perceived by Science Class students and teachers, including factors such as interface design, responsiveness, and ease of interaction.

**Challenges**: Challenges refer to the obstacles, difficulties, or shortcomings encountered by Science Class students and teachers in utilizing ANHSLINK, which may include technical issues, usability concerns, or resistance to change.

**Science Class**: Science Class refers to the program of Argao National High School wherein the students are given specialized subjects that have a high level of load compared to a regular class, comprising the targeted participants of the study.

**Chapter 2**

**REVIEW OF RELATED LITERATURES AND STUDIES**

**Educational Web Portals**

The use of internet technology in educational activities has significantly changed and improved the education sector during the past 20 years. In the mid-1990s, American colleges and academic groups launched their first websites. These websites have evolved, improved, and grown over time with the addition of complex technical features, superior design graphics, and interactive elements. Most universities have created their own websites by now. These online portals provide as entry points to a variety of data and offerings from different providers. These websites often consist of a number of interconnected pages with academic information, departmental and college details, school email, admissions, registration, payment processing, a library system, and news from the campus, among other things. These web portals serve the primary function of digitally informing university staff, instructors, and students of pertinent information while also giving them the opportunity to engage in academic and associated activities online.

Web portal creation and upkeep are typically costly and time-consuming tasks. It is essential that the features and layout of web portals meet user expectations in order to maximize their potential. This also applies to university web portals. University online portals primarily target youthful, computer literate, and creative students from the Internet generation. These students' demands and expectations for university web portals are expanding. Often, the layout, features, and content of standard university web portals are insufficient to meet their needs. Meeting the demands of students from the Internet generation and providing for all of their information needs through university web portals can be challenging, especially if the portals are not sophisticated and current enough to fulfill the students need. Students typically have an interest in things like look, design, accessibility of information, ease of discovering specific information, technical system quality, speed, connectedness, and linkages between pages. Universities spend millions redesigning and maintaining their websites, which students complain are unsatisfactory and missing essential features, in an effort to meet their expectations. These highlight the significance of finding out how students view their university websites, what they like and don't like about them, and what, in the end, makes a university website more appealing and acceptable to its users (Fathema et al., 2014).

Due to increasing globalization and internationalization, Higher Education Institutions (HEIs) must adopt effective information management tools. HEIs are increasingly incorporating technologies to enhance information management, making them more competitive.

In this context, the World Wide Web (WWW), particularly web portals or websites, plays a central role in facilitating the exchange of information between lecturers and students, thereby enhancing the teaching/learning process. All higher education staff, both teaching and non-teaching, recognize the significance of these tools for cooperation and knowledge exchange among different HEIs. A web portal consolidates an institution’s information resources and applications in a single site, making a well-implemented web portal crucial for competitiveness in higher education.

In the European HEI context, web-based communication channels are widely implemented, enabling remote communication and interaction within academia. Web portals have significantly transformed teaching/learning methods and societal interactions by reducing distances. Web portals also facilitate e-learning, providing an innovative and flexible teaching/learning approach accessible to a larger student population. Communication between lecturers and students occurs through web mechanisms supporting remote interaction. However, the success of web services depends on individuals' acceptance of technology, emphasizing the importance of perceived suitability and usefulness of web portals by these actors (Pinho et al., 2018).

Portals serve as gateways to various internet sites, organizing information from different sources in a coherent and logical manner. Users access education, news, weather, or stock information through portals, which are among the most frequently visited sites on the internet. Portals offer standardized methods to aggregate information, enabling campus developers and information providers to deliver applications and data to end users across multiple platforms, including mobile devices. To enhance software design and service offerings, portals aim for repeated use of their services, striving to build a loyal user base that visits frequently and spends ample time per visit.

E-learning portals offer various services such as search engines, email, links to related sites, personalized content, member lists, free downloads, and chat functionalities. They also list e-learning courses, providing details on course offerings, teaching methods, duration, fees, and certifications. Learners can search for courses based on their interests and compare different providers available through the portal. While e-learning portals have their advantages and limitations, they offer accessibility from anywhere with an internet connection and flexibility for users to access them at their convenience round the clock (Imran & Malik, 2017).

Web Portals are one of the major innovations of the Emerald digital age. Technology, in the modern world, has improved in a way that services are now provided in higher education. The development of web applications such as web portals has introduced students to new functionalities that enhance customization and interaction. Higher education institutions have a strong presence on portals, which have matured into useful tools. This serves as a platform for service delivery and communication among academic staff, administrative personnel, and most significantly, students (Shaltoni et al., 2015).

**User Experience and Satisfaction in Educational Technology**

Secreto and Pamulaklakin conducted a study on learners' satisfaction with an online student portal, focusing on its functionality, efficacy, look, ease of usage, and safety. The study found that if the portal is enhanced, it could be used as a tool to improve the retention of learners in their courses of study. The portal serves as a support system that delivers instant feedback to learners regarding their transactions with the university. The study surveyed continuing undergraduate and graduate students who had experienced both manual and online processes, and found that about 85% of participants were satisfied with their overall experience of the portal. The study identified the portal as a convenient and effective venue for getting accurate and immediate information about learners' performance, school activities, academic schedules, and other information relevant to their learning transactions. The study recommended that the portal be improved based on learners' needs and demands to enhance their learning experience (Secreto & Pamulaklakin, 2015).

According to Secreto & Pamulaklakin (2015), the utilization of an online student portal has become an integral aspect of learning in an Open and Distance e-Learning (ODeL) environment. Consequently, it is essential to continually assess learner satisfaction to determine the effectiveness of this support system in providing students with meaningful learning experiences at the university. The redefinition and systematic implementation of the portal are crucial to ensuring satisfaction and success among all students, emphasizing a learner-centered and user-friendly approach.

During the development of the Online Student Portal (OSP), significant consideration was given to the learners, taking into account their needs, expectations, and uniqueness. Ongoing improvements are made based on the experiences of students and other users. The study highlights the importance of a phased approach to portal implementation, adding features as users' experiences grow, rather than overwhelming them with a full implementation. In the implementation of a student portal, it is not only vital to meet process requirements but also to conduct usability testing to identify errors and bugs during development. Continuous efforts to enhance services are necessary to ensure the portal adapts to the changing needs of learners. In summary, learners play a central role in an ODeL environment, being the primary users of the student portal. Therefore, prioritizing their welfare is imperative. Involving both learners and staff in the portal's development ensures that all elements are genuinely crucial and beneficial to users. Recognizing the significance of a learner-centered support system is essential for providing students with opportunities to succeed in an ODeL environment.

According to Chen and Chengalur-Smith (2015), web portals have a positive correlation between current use and user. As technology acceptance and information systems success models were used to examine the direct effects of voluntariness, user satisfaction, and competing resources on web portal usage, as well as the relationships between current use. Following the intervention, the detrimental influence of voluntariness of usage became non-significant, this is where the beneficial effect of user satisfaction on use rose.

**Importance of Suitability in Educational Technology**

University portals are websites tailored to meet the specific needs of university staff, students, and visitors. They serve as centralized hubs, offering access to a wide array of university services, thereby enhancing user experience and fostering stronger relationships among stakeholders, particularly students. These portals facilitate access to various services such as online registration, academic records, library resources, learning management systems, social interaction, and financial services. Their significance has grown exponentially due to their perceived role in gaining competitive advantage, potentially attracting more students to universities. The success of these portals hinges on user satisfaction, predominantly among students, as it drives their widespread adoption within the university community.

Currently, electronic learning, or "eLearning," is widely used in educational institutions of all sizes. One of the various eLearning modes is web-based education. (Poulová & Klimova, 2018) Information technologies are pivotal in the development and application of digital educational resources, providing a platform for the creation, dissemination, and access to a plethora of educational content. This extends far beyond the digitization of traditional educational materials, leveraging the unique capabilities of digital tools to enhance learning outcomes. The use of web resources in education is not merely about providing information; it's about strengthening intellectual capabilities in our increasingly digital society. The objective of using these web resources is to ameliorate the quality of education at all levels of the educational system, providing engaging and interactive learning experiences, and personalized learning opportunities. In essence, information technologies and web resources are revolutionizing education delivery and learning methods, fostering the skills necessary to thrive in the information society, and holding the potential to enhance the quality of education for learners of all ages (Honcharuk & Maksiutov, 2023).

User satisfaction with internet applications like portals has been extensively studied, serving as a surrogate measure of system effectiveness. Studies analyzing user satisfaction with web portals have identified factors such as empathy, ease of use, information quality, and accessibility as critical influencers. Additionally, factors like competition pressure, government support, and technology vendor assistance have been found to impact the adoption of portals in universities. Other studies have highlighted the importance of user ability, service availability, and system quality in determining user satisfaction with university portals. These findings underscore the pivotal role of university portals in enhancing the educational experience and their contribution to the broader landscape of educational technology (Shaltoni et al., 2015).

**Challenges and Opportunities in Implementing Educational Web Portals**

According to Suliman T Alatawi et al. (2020) the utilization of university portals is critical for enhancing higher education services, particularly in Saudi Arabia, where there is a concerted effort to align graduates' skills with international standards and job market demands. Despite significant investments in ICT infrastructure, student engagement with university portals remains low due to various factors, including resource planning challenges. Portals have emerged as indispensable tools for universities, facilitating communication and service delivery among administrative staff, faculty, and students. Understanding user needs and ensuring portal functionality and reliability are paramount for improving user satisfaction and overall effectiveness. Studies evaluating portal usage at institutions such as King Abdul Aziz University have identified issues related to design, content, user support, and navigation. Addressing these issues is crucial for enhancing the suitability and satisfaction levels of educational web portals like "ANHSLINK."

In the realm of educational technology, the implementation of Students and Alumni Web Portals (SAWP) presents both challenges and opportunities. With the rapid advancement of Information and Communication Technology (ICT), universities face the imperative to modernize their systems to meet the evolving needs of students, staff, and alumni. Traditional paper-based student information systems have proven cumbersome and inefficient, leading to delays in information dissemination and difficulty in data retrieval and management. Recognizing the limitations of these traditional methods, there is a pressing need for an integrative and flexible approach that can streamline processes and enhance communication between stakeholders. The development of SAWP aims to address these challenges by providing a robust portal system designed to facilitate seamless interaction between students, academic staff, and alumni. Through the utilization of MySQL, HTML, CSS, JavaScript, jQuery, PHP, and AJAX techniques, SAWP offers two subsystems: one for students and another for alumni. The implementation of SAWP undergoes rigorous testing, including gathering student feedback and assessing usability using the System Usability Scale (SUS) method. Initial testing results indicate a high level of satisfaction among users, with compatibility between system requirements and available data. The significance of SAWP lies in its ability to enhance data integrity, increase operational efficiency, and promote optimal utilization of ICT resources within the university environment, ultimately contributing to the advancement of academic processes and the transition towards E-government initiatives (Sabri et al., 2017).

The study conducted by Bashir (2019) discusses the challenges of web portal access in emerging regions where internet connectivity is limited. It introduces a technology called contextual information portals (CIP) that provides offline searchable and browse-able information portals. However, one of the main issues faced by users of CIP is broken links. This is because the process of crawling the web to construct CIP only catures a portion of webpages, resulting in broken links.

Educational websites have provided great opportunities for the establishments in higher education sectors to supply users with their services. Typically, educational websites act as entry points toinformation and services that can be of many different kinds and are relevant to teaching or learning. Portals are becoming a more crucial component of colleges' information technology infrastructure as they work to combine the enormous amount of intellectual resources into a single, easily accessible virtual environment through a web interface (Yalagi & Dangare, 2015).

**Academic Web Portal Usability**

Usability plays a crucial role in the development of web portals, especially those tailored for educational institutions. It acts as a fundamental criterion to assess how effectively the portal achieves its goals and to gauge the impact of planned enhancements. Specifically within academic web portals, usability is essential for facilitating interactions between lecturers and students, ensuring that the portal remains useful and continuously used by prioritizing user-friendly interfaces. Usability testing is one approach to evaluate these interfaces. Evaluating the usability of deployed web portals can be accomplished using various standard post-task measurement tools such as the Software Usability Measurement Inventory (SUMI), Post-Study System Usability Questionnaire (PSSUQ), System Usability Scale (SUS), Questionnaire for User Interaction Satisfaction (QUIS), and the Computer System Usability Questionnaire (CSUQ) (Oliha, 2020).

The usability of an academic web portal is a critical aspect of its user interface, measuring the ease with which users can interact with it. Usability, defined as the quality of a user's experience when engaging with a product or system, encompasses various evaluation methods aimed at identifying areas for improvement in user interactions to enhance overall usability.

Usability evaluation methods fall into three main categories based on how usability problems are identified. User-based methods, involving users in the process, focus on recording performance and satisfaction through observations, questionnaires, and interviews. Evaluator-based methods engage evaluators in identifying problems, with heuristic evaluation being a common example. This method assesses whether the interface aligns with predefined usability principles. Tool-based methods utilize software tools to automatically assess whether a website conforms to specific usability guidelines, often examining HTML code quality.

Heuristic evaluation and user testing are frequently employed methods for assessing website usability, offering insights into potential enhancements. Addressing usability concerns in websites, especially in an educational context, has been linked to various advantages, such as reducing errors, improving accuracy, fostering positive attitudes, enhancing the learning experience, increasing student confidence, and encouraging website usage (Hasan , 2014).

According to Oliha (2021) conducted a study about the usability evaluation of web portals in fostering social learning. A platform has been evaluated via a standard post-task usability assessment scaling metric – System Usability Scale (SUS), to examine the portal’s usability via the post-system usability assessment tool. The outcome of the post-system evaluation noted empirically that, the system perceived learnability was 70.9% and the usability scale score was 83.9% with excellent usability at the 90th-95th percentile range. The findings of the study suggests that the web portal is adaptable, usable, and can be used to foster social academic interactions between lecturers between lecturers and students in learning institutions, and therefore, increase the web portal’s usage

**Chapter 3**

**RESEARCH METHODOLOGIES**

This chapter describes all of the research processes that was employed to obtain the essential data and information for the study's success, including the research design, research environment, research respondent, sampling technique, research instrument, and specific research procedures taken all throughout the data collection process.

**Research Design**

The research design of this study is a descriptive survey, because it best served to answer the research questions and the study objectives namely, to ascertain the degree of satisfaction and acceptance of the web portal, ANHSLINK. In this research design, researchers use descriptive survey as its main means of data collecting. The researchers use it to learn more about individual or group viewpoints on a certain idea or topic of interest.

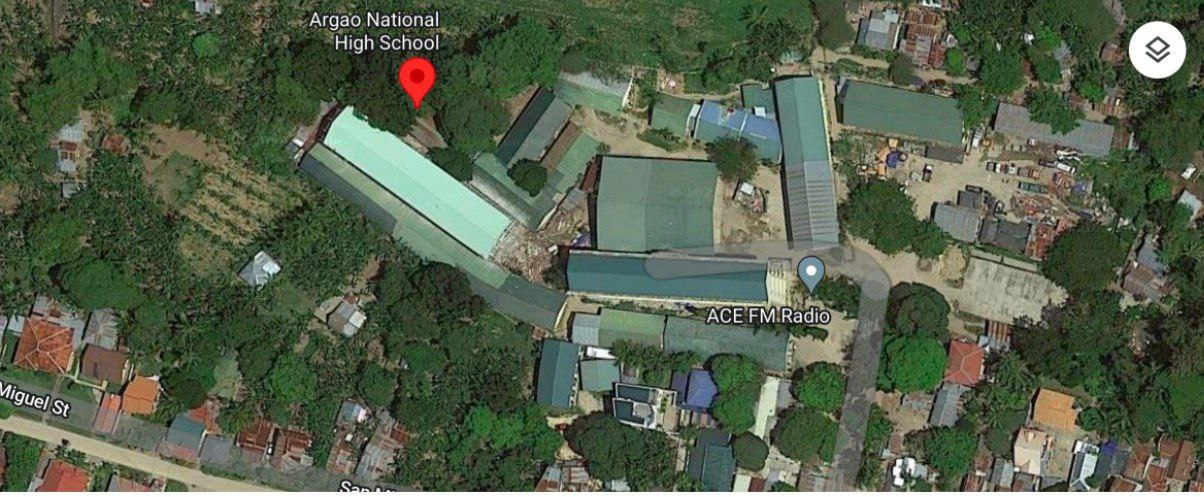
**Research Environment**

The study will be conducted at Argao National High School - Canbanua, Argao, Cebu. The premier municipality is a constituent town in the province of Cebu, Philippines. It is located in the southeast of Cebu Province, 68 kilometers from Cebu City. According to the 2020 Census, it has a land area of 191.50 square kilometers and is consist of 45 barangays. Canbanua is one of these barangays where Argao National High School is situated. Specifically, the said educational institution can be seen on San Miguel Street. It is one of the biggest secondary schools in Cebu Province. The school has established 88-90 classrooms, two of their buildings being four-story structures, and the other one being a two-story edifice. It also features two science labs, two computer labs, a library, a clinic, a TVL building, a faculty room, principal’s office, guidance office, SSG office, canteens, and a radio station.

**Figure 2. Municipality of Argao**



**Figure 3. Barangay Canbanua, Argao**

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**Figure 4. Argao National High School**

**Research Respondent**

This study will focus on students within the Municipality of Argao, specifically those enrolled at Argao National High School during the academic year 2023-2024. The researchers have opted to focus on students enrolled in the Special Science Class program as their target respondents.

There are a total of 165 students in the Special Science Class, and to ensure equitable representation due to varying class sizes, the researchers utilized percentages to determine participation opportunities. Employing Slovin's formula, the researchers computed the required number of respondents, which amounted to 116. To determine the proportion of the population, the researchers divided the number of students in each class by the total number of students across all classes (e.g., 35/162) and then multiplied the quotient by 116 (the required number of respondents). The resulting product represents the number of respondents in each class.

For the sampling method, the researchers will implement a simple random sampling lottery approach. In this method, students will draw rolled papers, and those who draw papers marked with a special designation will be selected as respondents. For instance, if a class requires 20 respondents out of a total of 32 students, 20/32 of the rolled papers will be marked. This process will be replicated in each class, and the chosen students will be invited to test the portal.

**Research Instrument**

This research employs a quantitative-qualitative survey approach to evaluate the acceptability and satisfaction levels regarding the integrated educational web portal. The primary tool utilized throughout the data collection process is an adapted standardized questionnaire.

The questionnaire used in this study is divided into two parts. The first part aims to gauge respondents' satisfaction levels, while the second part assesses the acceptability of the integrated educational web portal.

To measure satisfaction levels, researchers incorporated queries from a Customer Satisfaction (CSAT) Questionnaire. This type of questionnaire is commonly used to gauge satisfaction levels with a company's products, services, or experiences. It serves to identify consumer demands, pinpoint issues with products and services, and segment clients based on their ratings or scores (Qualtrics, 2022). The study prepared at least five queries pertaining to the features, functionalities, user experience, and overall performance of the integrated educational web portal. Each query is accompanied by a rating scale ranging from 1 to 4.

For assessing the acceptability of the mobile application, researchers utilized the acceptability questionnaire developed by Hirani et al. (2017), specifically the Service User Technology Acceptability Questionnaire (SUTAQ). The queries or items in the questionnaire were modified to ensure relevance to the study's context.

**Statistical Treatment**

In this study, the weighted mean statistical procedure was utilized to generate a more precise dataset. According to Ganti (2021), weighted averages are deemed the most effective method for conveying and presenting information derived from survey data. However, it's essential to acknowledge that the accuracy of data estimation in this study cannot be guaranteed due to the distribution of survey questionnaires among various respondent groups. Since these respondent groups differ in the number of individuals receiving the same questions, combining results from each group could potentially skew the data. To mitigate this, researchers applied different weights to the collected data, thereby enhancing the accuracy of the results. The formula for calculating the weighted mean is as follows:

**Research Procedure**

In this study, having enough knowledge and resources regarding programming, one of the researchers programmed the web portal. One of the researchers first programmed and developed the web portal which lasted two months in the making. The researchers then prepared and developed the ANHSLINK using Django Web Framework for back-end  while Vanilla JavaScript, HTML5, and Tailwind CSS for front-end as the tech stacks. The programming languages that were used were Python and Vanilla Javascript. The researchers then finalized it within two weeks. In this time frame, the researchers decided the selected features for the application which includes the background color, the web design, the typeface, the format, the specific functions, the theme, and the application logo. Once finalized, the researchers applied these features in the web portal and then deployed it to a free hosting cloud service called pythonanywhere. Before conducting the study, the researchers proposed the study to the principal. Once approved, the researchers started gathering the needed learning resources from the specific teachers who handle the subjects of all the grade levels under the science class program. The researchers also began posting announcements. After the learning resources have been gathered, the researchers uploaded the learning materials inside the web portal under the e-library feature and finalized the details adding finishing touches to all the features inside the web portal. Then, the researchers performed a beta test on the web portal to ensure its functionality and to be able to correct any technical errors that were overlooked during the development process. Afterwards, before the start of data collection, the researchers submitted a permission letter to the principal to allow the researchers to use the students as respondents. Once permitted, the researchers started printing enough hardcopies of the prepared standardized questionnaires. Once the researchers have successfully attained sufficient data, statistical tools were then utilized to analyze the data gathered.

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