CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter contains a review of related literature, studies, the outlines of the conceptual model, and operational definitions of terms.

Review of Related Literature and Studies

Part of each review of literature and studies that are relevant and considered important to this study are included in this section.

Knowledge

Over the last two decades, knowledge has evolved into an essential and an asset for every individual organization. At this moment, it is regarded as a factor that is gradually altering our personal lives. Intelligent organizational and social performance (Agarwal, 2017). Because of recent advances in science and technology, knowledge has become an essential compo
nent of every organization. In organizations, knowledge is regarded as a repository of intelligence for the advancement of the organization (Mohajan, 2016).

Definition of Knowledge

Knowledge is defined as a collection of experience, relevant information, and expert insight that provides a framework for estimating and integrating new experiences and information. The fact or condition of knowing something with familiarity gained through experience or association is referred to as knowledge (Knowledge, 2021).

One commonly used definition of knowledge is "justified true belief." That definition includes three basic conditions, which some authors refer to as the tripartite account of knowledge (Bolisani & Bratianu, 2018).

In organizations, knowledge is regarded as a repository of intelligence for the advancement of the organization. The acquisition of new knowledge is one of the most difficult challenges in the development of intelligent systems in any organization.

Sources of Knowledge

There are numerous methods for acquiring knowledge. Only in relation to its sources can knowledge be adequately explained. Therefore perception, intuition, and other widely accepted sources of knowledge exist.

Superstition and Intuition

Obtaining knowledge through superstition entails acquiring knowledge that is false. Interpreting random events as nonrandom based on subjective feelings, events, or believing in supernatural occurrences. Acquiring knowledge intuitively means having knowledge without being aware of where it came from.

Authority

Authority is a quick and simple source of information. However, as a source of information, authority has flaws that must be considered. For starters, authorities can be mistaken. People frequently claim to be experts in a field when they lack the knowledge to back up their claims. Second, authorities may disagree on issues, indicating that their authoritative statements are often more opinion than fact.

Experience

Experience is a well-known and well-utilized source of information and some of your questions are answerable through experience. Experience has resulted in a great deal of wisdom being passed down from generation to generation. People's ability to benefit from experience would be severely hampered if they were unable to do so. Indeed, the ability to learn from experience is a key feature of intelligent behavior. As a source of knowledge, experience has limitations. The way an event affects you is determined by who you are.

Scientific Approach

The scientific method is commonly described as a method of acquiring knowledge in which investigators move inductively from their observations to hypotheses and then deductively from the hypotheses to the logical implications of the hypotheses. They deduce the consequences of a hypothesized relationship if it were true. If the deduced implications are consistent with the organized body of accepted knowledge, researchers will put them to the test again by collecting empirical data. They accept or reject the hypotheses based on the evidence.

Types of Knowledge

Understanding the various forms that knowledge can take and thus being able to distinguish between different types of knowledge is a necessary step in knowledge management (KM).

Explicit Knowledge

Explicit knowledge is knowledge that covers a topic that is easy to document and is widespread (in writing): structured information. Frequently Asked Questions, How-tos, Raw Data and Related Reports, Charts, One Sheets, and Strategy Slides are examples of explicit knowledge.

All of these types of explicit knowledge have traditionally been captured in a knowledge base or as part of a knowledge management strategy (n.d., 2021).

Implicit Knowledge

Implicit knowledge consists primarily of learned skills or know-how. It is obtained by applying explicit knowledge to a specific situation.

When you learn the best way to do something, you gain implicit knowledge. You can then apply what you've learned and combine it with what you've already learned to solve an entirely new problem (n.d., 2021). Because it is difficult to document and capture in a scalable manner, this type of knowledge has traditionally been excluded from formal knowledge bases.

Importance of Knowledge

The most important thing to learn is how to learn, that is, how to acquire true beliefs and be confident that they are true. Beliefs must be true in order to be knowledge, but knowledge entails more than just having true beliefs (Maecham, n.d.). Individual knowledge sharing is important because there are numerous ways in which knowledge sharing can benefit the organization. Furthermore, knowledge sharing can benefit organizations in less obvious ways.

First and foremost, the success of any knowledge management initiative is dependent on Workers' willingness to share their individual information and knowledge is critical. Knowledge management entails activities aimed at capturing knowledge and disseminating it to all those who require it in an accurate, consistent, concise, and timely manner. As a result, to be successful, employees must share their experiences and personal interpretations of information (Nasurddin & Pangil, 2016).

Knowledge Management

Today, all organizations require knowledge acquisition, enhancement, possession, and application as a determining factor in growth and development (Aujirapongpan et al, 2019). In the last two decades, a new phenomenon known as knowledge management has emerged as a result of an increased amount of information and the need to apply knowledge effectively (Piri & Assefzadeh, 2017).

Organizations in the modern world recognize that they will not survive unless they take a unique approach to management, placing a high value on their organizational knowledge. The process of identifying, organizing, storing, and disseminating information within an organization is known as knowledge management (KM). When knowledge is inaccessible within an organization, it can be extremely costly to the company because valuable time is spent looking for relevant information rather than completing outcome-focused tasks (IBM Cloud Education, 2020).

Concept of Knowledge Management

A knowledge management system (KMS) collects and organizes an organization's collective knowledge, resulting in increased operational efficiencies. A knowledge base is used to support these systems.They are typically crucial to effective knowledge management because they provide a centralized location for storing and easily accessing information (IBM Cloud Education, 2020).

Companies that use a knowledge management strategy achieve better business outcomes faster because increased organizational learning and collaboration among team members allows for faster decision-making across the board. It also streamlines more organizational processes, such as training and onboarding, resulting in higher employee satisfaction and retention, according to reports.

According to a McKinsey Global Institute report, a strong knowledge management system can cut information search time by up to 35% and increase organizational productivity by 20 to 25%. International Data Corp findings bolster the value of a knowledge management system, highlighting that Fortune 500 companies lose approximately $31.5 billion per year by failing to share knowledge (Guru Technologies, n.d.).

Difference Between Knowledge Management and Information Management

Knowledge Management	Information Management
The KM framework includes "Knowledge creation" as part of the KM process. Knowledge is created through interactions between different individuals and different types of knowledge, according to (Nonaka, Umemoto, & Senoo, 1996).	The IM process, according to (Choo, 1999), does not include knowledge creation. It is limited to information capture, processing, preservation, storage, and distribution. (Choo, 1999).
KM is more concerned with managing experiences, know-how, and skills in order to create a learning cycle. Predictions can be made using the knowledge gained (Ocholla, 2011).	Information management (IM) is concerned with the management of information about a specific context, as well as the storage of information in repositories for easy retrieval and distribution (Knoco, 2014).
KM entails managing information (inform explicit knowledge), managing processes and people, creating innovation, and managing intellectual assets (KNOCO, 2014).	Information management is solely concerned with the management of information (this includes the entire process of gathering and disseminating information) (Ocholla, 2011).

Table 1. Difference between KM and IM

Table 1 represents the differences between Knowledge Management and Information Management. Because IM and KM use similar methodologies, processes, paradigms, and technologies, it is difficult to tell them apart. The definitions of knowledge management and information management also appear to be very similar. Capturing and managing information from a single or multiple sources, as well as disseminating this information to an audience, is what IM and KM are all about. Human sources, electronic sources, and paper sources are all possible sources of information. "Knowledge Creation," on the other hand, is a distinct feature of the knowledge management framework that distinguishes IM from KM (Ocholla, 2011).

Knowledge management goes beyond information management in that it creates and manages both tacit and external knowledge. KM is more than just information sharing and analysis; it is a combination of experiences, skills, intangible tacit knowledge, and information that can guide decision making (Edosio, 2014).

Benefits of KM in an Organization

The benefit of knowledge management is to create a learning organization and participation by connecting the data reserves created by people in various parts of the company (financially, performance, competitive intelligence, etc.) and relating them to one another (Talebian, 2018). Being responsive to consumers in the management process allows a person to establish interaction with clients and customers. Operating effectiveness and task concentration: a comprehensive management approach without any structure, it is possible to develop operational effectiveness by encouraging participation among people and organizational units and assisting workers in directing operations.

When businesses implement knowledge management strategies, they gain a number of advantages. Among the many advantages are:

Identification of skill gaps

When teams create relevant documentation around implicit or tacit knowledge or consolidate explicit knowledge, gaps in core competencies across teams can be highlighted. This information is useful to management in forming new organizational structures or hiring additional resources.

Make more informed decisions

Knowledge management systems provide knowledge to individuals and departments. Your teams can upskill and make more data-driven decisions that support business goals by improving access to current and historical enterprise knowledge.

Maintains enterprise knowledge

Internal knowledge management allows businesses to develop an organizational memory. Make knowledge held by long-term employees and other experts available to your entire team.

Operational efficiencies

Knowledge management systems create a central location where knowledge workers can quickly find relevant information. As a result, less time is spent on research, resulting in faster decision-making and cost savings through operational efficiencies. Increased productivity not only saves time but also money.

Increased collaboration and communication

Knowledge management systems and organizational cultures work in tandem to foster team trust. These information systems increase worker transparency, resulting in greater understanding and alignment around common goals. Engaged leadership and open communication foster an environment in which teams are encouraged to embrace innovation and feedback.

Data Security

Knowledge management systems allow organizations to customize permission control, viewership control, and document security to ensure that information is shared only through the appropriate channels or with specific individuals. Allow your employees the freedom to access knowledge in a secure and confident manner.

Knowledge Management Strategies

A Knowledge Management Strategy (KMS) is a detailed plan designed to provide the company with assistance in managing information, data, and knowledge for the benefit of the company and all parties involved. A successful knowledge management strategy is in line with the organization's overall strategy and goals, and the knowledge management team focuses on business priorities and needs.

Figure 1. Knowledge Strategy Model

Figure 1 shows the knowledge strategy model. A knowledge management strategy is an action plan that describes how to manage and centralize corporate information, data, and knowledge to improve productivity and efficiency.These strategies that are closely aligned with individual department and company-wide goals are the most effective.

Businesses can empower their teams to tap into shared knowledge and make informed decisions that impact revenue, retention, and innovation by investing in an organization-wide knowledge management strategy.

Knowledge Management System

Knowledge Management is a concept and a term that emerged roughly two decades ago, around 1990. In Simple terms, it means organizing an organization's information and knowledge holistically, but surprisingly, despite sounding overbroad, it is not the entire picture. With the implementation of free trade and an open economy in India, since the early 1990s, there has been

a massive increase in interest in knowledge management (Hussein, T., & Khan, S., 2015, April). As a result of accelerating technological and market growth changes that have resulted in the growth of innovation and learning increasing importance for business success, as evidenced by rapid technological advancements in information and communication (ICT) provides more opportunities for exploitation of the organizations that have knowledge available to them.

The systematic management of an organization's knowledge is known as knowledge management assets with the goal of adding value and satisfying tactical and strategic goals. It includes the procedures, tactics, and systems that help to maintain and improve the production. Knowledge storage and sharing The cost of data has risen by an extraordinary amount. It is projected to increase even more in the future. Big Data is undeniably going to change the way we live. In the future, business will be completed. In addition, data collecting and analysis have the ability to help organizations make more strategic and smarter decisions.

Types of Knowledge Management System

According to Monucubed (2021), There are three types of Knowledge Management System. Below are the main types of KMS that have dissimilarities depending on its purpose and its goals.

Enterprise-wide Knowledge Management System

An enterprise-wide knowledge management system, when used properly, assists businesses in developing better collaborations among various divisions in order to increase organizational productivity and efficiency. A detailed knowledge management system provides the critical benefit of sustaining organizational productivity and

streamlining work. One significant benefit of such a system is that it allows the organization to focus on business processes rather than data. This, in turn, contributes to increased productivity and effectiveness. Furthermore, it assists businesses in lowering production costs. The enterprise knowledge management system is a program that aids in the simplification of access points from various sources and databases. Certain communities may refer to it as knowledge community management software because it operates by utilizing data gathered.

Knowledge Work System

The knowledge work system is the system that provides KM across the enterprise. It focuses on various systems. This section of the systems may include a knowledge database, knowledge repository, and knowledge graph. However, KM systems can be modified to become more flexible. It enables you to integrate various elements required for the business's success. You must select a system with sufficient features to meet the needs of your business. Also, keep in mind that a knowledge work system must function well in terms of enterprise-wide KM. As a result, it must also be adaptable to change. Otherwise, if the knowledge work system is not scalable, the company may become stagnant and will be unable to compete.

Intelligent Techniques

Artificial intelligence can be used by businesses to capture and preserve tacit knowledge. It can also be useful for knowledge discovery, generating solutions to specific issues that are too complex and large for humans to analyze on their own, and assisting businesses in searching and filtering data. Despite lacking the full scope, generality, and flexibility of human intelligence, artificial intelligence can be used to define, extend, and capture organizational

knowledge.Case-oriented reasoning denotes structural knowledge as a database of cases that can be refined and expanded indefinitely. When users encounter a new case, the knowledge management system searches for similar cases, finds the closest match, and applies the answers from the previous case to the new case. This novel case is stored in the database along with effective solutions.

Importance of Knowledge Management System

Knowledge Management Systems are important to have an organized process in a very accessible way. Every decision made within your organization is powered by knowledge. Product development, service improvement, customer engagement, and the overall operation of the company would be impossible without the knowledge your team possesses (Horda, T. 2021). The next logical step is to ensure that the knowledge available at your organization is distributed through it. This is where knowledge management comes into effect. Moreover, according to Valamis (2021), knowledge management is important because it improves an organization's decision-making efficiency. Having access to all of your company's expertise creates a smarter workforce and allows you to make informed and quick decisions that benefit your company. Employee turnover is reduced, customers benefit from increased access to best practices, and innovation is easier to foster within the organization.

An effective Knowledge Management System allows users to have an access to have these organized process that will enable to:

- Maintain knowledge that is documented, structured, and easily accessible.
- Across the organization, standardize processes.
- Ensure that training materials are easily accessible and well-organized.

Knowledge Management Process

A seven-step knowledge management process can be used to organize knowledge management for an organization.

Figure 2: Knowledge Management Process

Figure 2 shows the Knowledge Management Process. A knowledge management process is how a business handles knowledge, including the Acquire, Apply, Assess, Create, Identify, Refine, and Disseminate. This process can identify if the beneficial decision-making is accurate, encourages collaboration and innovation across the organization, and improves internal and external communication and efficiency.

Knowledge Management in Business

In today's business environment, where the industry is flourishing, under pressure, it could be due to the neglect of the approach for keeping retail marketing content up to date,

relevant and enthused. It is critical for retail stakeholders to understand to obtain and manage consistent, accurate, and timely data. Despite this, online marketing is a significant source of revenue. Despite this, the majority of people do not trust the information they find on the internet. Humans, as social animals, prefer to interact within their social circle (Hussein, T., & Khan, S., 2015). As a result, word of mouth is the most effective value in retail marketing and marketing in general personnel should have up-to-date Knowledge because it is important to improve an organization's decision-making efficiency. By ensuring that all employees have access to the organization's overall expertise, a smarter workforce is created that is capable of making quick, informed decisions that benefit the company.

Every year, the importance of knowledge management grows. As the market becomes more competitive, one of the best ways to stay ahead of the competition is to build your organization in a smart, flexible way. You must be able to detect problems from afar and respond quickly to new information and innovations. Knowledge Management Systems started by companies for reasons like merger or acquisition may increase the need for knowledge codification and encourage teams to share their expertise. Second, the impending retirement of key employees may highlight the need to capture their knowledge. Finally, an upcoming job fair demonstrates the ability to use knowledge management to aid in the training of new employees.

As stated, a knowledge management system includes processes that need to be identified in order to provide an accurate outcome of information. Furthermore, knowledge management is a discipline that promotes an integrated approach to acquiring, applying, assessing, creating, identifying, refining, and disseminating an enterprise's information assets, in which may include

databases, documents, policies, procedures, and previously unseen expertise and experience in individual workers (Koenig , M. E. D. K. E., 2018).

Knowledge Management in Education

KMS has become a useful tool for knowledge management because most knowledge exists in the form of a digital document. today. KMS has achieved success in a number of well-known businesses, including Siemens, one of the most successful international corporations worldwide. However, the importance of KMS has yet to be recognized in the educational domain. There are only a few universities that have their own KMS. Despite the fact that profit institutions construct a wide range of KMS, the server's efficiency, safety, and dependability cannot be guaranteed.

According to Peng, Jinyue; Jiang, Dongxing; Zhang, Xinyu (2013), KMS was applied to Tsinghua University, one of China's top universities. Tsinghua, its web-based learning system called Tsinghua Web School (THU-WS) has been in development for over 20 years, ever since the information system flourished. Like most university e-learning systems, such as the well-known teaching platform Blackboard, from the United States THU-WS, which is widely used in universities, serves as a platform for courseware display and homework submission. publication as well as course discussion It's your standard course-based learning system. More than 80% of teachers and THU-WS is used by nearly all Tsinghua students.

As mentioned, the university pays attention more to the course than to the person Teaching is a human-to-human process that primarily aims to transmit knowledge from teacher to students, as well as feedback from students to teacher Course is just a medium to link participants Teachers must collect interactive information, while students must choose the most

useful. Students can simply take and browse content from a course, consume it, and reorganize it on their own. In this regard, the course-based mode is superior. It was not possible to cover the entire teaching process. In addition, It introduces a widespread learning style to improve the learning experience and to illustrate the design of a knowledge service and the framework of a KMS for web-based learning.

Technological University of the Philippines - Manila

Overview of the Institution

The Philippine Commission established the Technological University of the Philippines in 1901, following the passage of Act No. 74. The aim of the Philippine Technological University is to supply advanced line of work, technical, industrial, technological, and skilled education and coaching in industries and technology, furthermore as sensible arts. Its mission is to supply advanced line of work, technical, industrial, technological, and skilled education and coaching in industries and technology, furthermore as sensible arts, resulting in certificates, diplomas, and degrees; and to supply progressive leadership in applied analysis and biological process studies in technical, industrial, and technological fields (TUP, 2021).

College of Science

The University Board of Regents approved the division of the school of Arts and Sciences into the school of Science and therefore the faculty of humanities on Gregorian calendar month fifteen, 1995. Graduate programs in arithmetic, chemistry, physics, and general

science were enclosed within the new faculty of Science's framework. Bachelor of Applied Science, Bachelor of Science in Computer Science, Bachelor of Science in Information Technology, Bachelor of Science in Information Systems, Bachelor of Science in Environmental Science, and Bachelor of Science in Environmental Science (TUP, 2021).

Knowledge Management System Features

An Application or commonly known as “App” is a type of software that is designed to perform a specific task for users where it can be used either as a tool or a form for entertainment purposes. There are millions or even billions of applications created and being created to date as the approximate numbers of software developers of 2021 were around 26.9 million (Warren,2021). These applications can be categorized into 3 types which are desktop, mobile, and web-based applications. A Desktop application is installed in a desktop computer or laptop which can be accessed through its start menu or launchpad. Mobile apps are made available specifically for handheld devices where apps can be installed through a marketplace such as Google Play Store, Apple App Store, and Windows Store. Web Apps on the other hand doesn’t need to be installed because it is accessible to anyone with an internet service via a web browser such as Google Chrome, Safari, Firefox, etc. (Boterhoven,2018).

With the help of the internet, accessibility to information has been drastically changed by the World Wide Web (WWW). The web is an information system that contains documents and web resources that are placed in Uniform Resource Locators (URL) which can then be accessed through hyperlinks. The rise of WWW constantly transforms web applications enriched with new services, navigations, and interface features. When a website provides easy navigational

access to enormous data assets which prevent users from being lost in cyberspace and provides consistent navigation operations even when there's an involvement with other transactional behavior is considered to be a good web application (Rossi et al., 2007). There are various kinds of websites for instance, blogs, E-Commerce, Forums, Social media, Corporate sites, web portals, and many more where most of them have a common goal and purpose which is to fill in the gap or solve a certain problem. One example is an open-source web application developed for assessing groundwater sustainability, developed using python programming where it allows quantification and visualization of groundwater resources through showing both spatial and temporal interpolation (Evans et al., 2020). Another web application is about the management of historical building through Building Information Modelling (BIM) technology where it will be a supporting tool to the conservation and maintenance of heritage buildings as it can show automated and digitized information needed to carry out tasks together with its 3D BIM model of the building (Rodrigues et. al 2019). Web applications are not just used and beneficial to the technological area, but they are also in the field of agriculture, heritage, business, health care, science, and in other areas which helps a lot on their respective maintenance, processing, data analyzing, etc.

In the semantic web, Knowledge Management is one of the very promising application areas and identified as a key in maintaining competitiveness among organizations (Fensel et al.,2002). Higher Education Institutions (HEI) play a vital part in managing their scholarly resources and are tasked to disseminate knowledge and collections. According to Aulawi et. al (2017), one key solution will be the implementation of KMS because it aims to design a good learning environment and to effectively provide the exact information to the user's needs. KMS's most frequent process is knowledge sharing followed by knowledge acquisition and

knowledge application which also provide positive impacts on various Information systems (Al-Emran et al., 2018). To effectively disseminate knowledge and information, KMS must integrate useful features to help process data tactically for the competitive development of an organization (Jayakrishnan et al., 2018).

Information retrieval or extraction is a field concerned with structure, organization, searching, analysis, storage, and retrieval of information (Croft et al., 2010). Its primary focus has been on the text documents such as web pages, email, books, online catalogs, structured, and semi-structured records wherein Information extraction will organize these documents and help users access the information of their interest with ease (Neto & Baeza-Yates, 2010). It is like arranging books in the library where each book was organized by its topic, date, genre, classification, and other types of categories (Manning et al., 2018). Same with the basic principle of library classification, it aims to order the fields of knowledge in a systematic way bringing related items together in a helpful sequence helps users find items as easy as possible (Dittmann & Hardy, 2007). Search and filtering features are essential functionality to retrieve data from a system. At times we are faced with more data than we can truly utilize, and it may be wisest to neglect and to destroy the majority of it; but on other occasions, it is important to organize and retain the given facts in such a way that quick retrieval is possible (Knuth, 2014). According to Min (2018), Data must be efficiently stored and managed in a Database Management System for the users to efficiently search and use the database through search queries. SQL queries form is the heart of database-centric systems and its SQL commands can go from exceptionally simple selections to queries that involve a few tables, subqueries, and grouping operations (Castelein et al., 2018). The performance of open-source databases varies and is generally impacted by the presence or absence of indexes but when indexes are utilized, the performance of open-source

databases often outperforms those commercial databases depending on the type of search query (Min,2018).

For years, Schools and Universities had strict policies banning handheld mobile devices such as tablets, laptops, and smartphones because of their pervasive nature and characteristic (Cetner, 2015). The coronavirus pandemic negatively affects school activities, yet the adoption of cutting-edge technology increases the global demand for online learning, and it serves as an aid to the learners and educators to be educationally engaged (Onyema et al.,2020). QR technology can be used to help students engage more in educational activities through scanning QR codes that contain educational resources (Ramsden,2008). QR code allows 4000 characters to encode within a two-dimensional barcode that can be used to display text, open URL, save contacts, compose text messages, etc., and is readable by a smartphone scanner (Patel et al., 2019). The QR-based learning system is designed to resolve issues encountered when using labor-extensive and time-consuming conventional outdoor teaching approaches with its low technical barrier, connecting the users to information quickly and easily (Chin et al., 2015).

Tools for Developing Web Applications

Computer programming is the process of creating an executable computer program to achieve a given computational result or to execute a specified activity. Programming entails duties such as analysis, algorithm generation, algorithm accuracy and resource usage assessment, and algorithm implementation in a selected programming language (commonly referred to as coding). The source code of a program is written in one or more programming languages rather than machine code, which is directly executed by the central processing unit.

The goal of programming is to develop a sequence of directions which will alter the completion of a task (which are often as sophisticated in an operating system) on a computer, usually for the aim of solving a particular issue. Thus, skilful programming often necessitates information of the many areas, like the applying domain, specialised algorithms, and logical system.

Front-end web development, conjointly called client-side development, is the observation of manufacturing hypertext markup language, CSS and JavaScript for an internet site or internet Application in order that a user will see and act with them directly. The challenge related to face development is that the tools and techniques accustomed produce the face of an internet site amendment perpetually then the developer must perpetually bear in mind however the sector is developing.

The objective of planning a web site is to make sure that once the users open up the location, they see the data in an exceedingly format that's simple to browse and relevant. This can be additionally difficult by the very fact that users currently use an oversized form of devices with variable screen sizes and resolutions therefore forcing the designer to consider these aspects once planning the location. They have to make sure that their web site comes up properly in several browsers (cross-browser), different operating systems (cross-platform) and different devices (cross-device), which needs careful thinking on the aspect of the developer.

HTML. The most fundamental component of the internet is hypertext mark-up language (Hypertext Markup Language). It defines the structure and context of the web page. The goal of programming is to create a set of instructions that automate the execution of tasks (which can be as complex as an operating system) on a computer, usually to solve a particular problem.

Therefore, skilled programming often requires knowledge in several areas, such as application domains, specialized algorithms, and formal logic.

The word "hypertext" refers to connections that connect web pages at regular intervals inside a single website or between websites. Links are an important aspect of the internet. By posting content to the web and connecting it to other people's sites, you become an active participant in the World Wide Web. HTML uses "markup" to annotate text, images, and different content for show during an application programmed. hypertext mark-up language markup includes special "elements “like <head>, <title>, <body>, <header>, <footer>, <article>, <section>, <p>, , , <img>, <aside>, <audio>, <canvas>, <data list>, <details>, <embed>, <nav>, <output>, <progress>, <video>, <ul>, <ol>, <li> and many others.

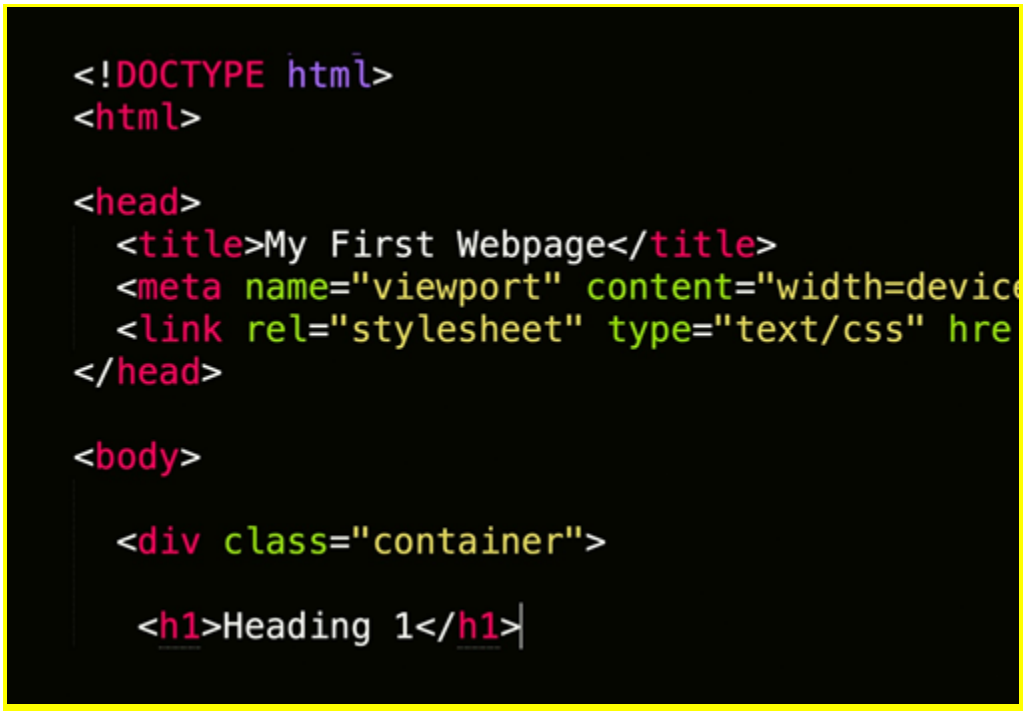

Figure 3. Hyper Text Markup Language

CSS is the abbreviation for "Cascading Style Sheet." The architecture of Web pages is formatted using Cascading Style Sheets. They can be used to describe text types, table sizes, and other elements of Web pages that were previously only specified in the HTML of the website.

CSS enables Web designers to create a consistent look across several pages of a website. Commonly used styles only need to be specified once in a CSS document, rather than specifying the style of each table and each block of text within the HTML of a page. Once a style is specified in a cascading style sheet, any page that references the CSS file can use it. CSS also makes it easy to adjust the design of several pages at once.

Although CSS is best known for creating text styles, it can also be used to format other aspects of a Web page's layout. CSS is also accustomed to describe table cell artifacts, the style, thickness, and color of a table's border, and also the artifact around pictures and different things, as an example. CSS allows Web designers more precise control over the appearance of Web pages than HTML does. As a result, most Web pages now use cascading style sheets.

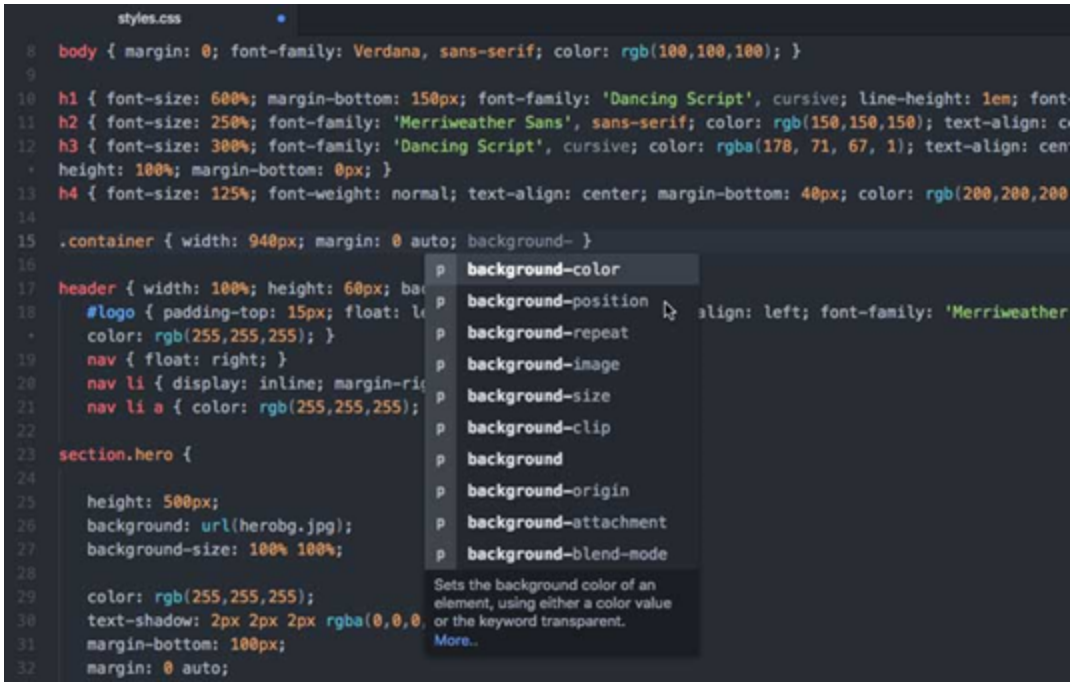

Figure 4. Cascading Style Sheet

JavaScript is a scripting or programming language that enables you to implement complex features on web pages. When an internet page will over simply sit there and show static info for you to appear at, like showing timely content changes, interactive charts, animated 2D/3D graphics, scrolling video jukeboxes, and so on.

The Document Object Model API is a popular way to use JavaScript to dynamically change HTML and CSS to update a user interface (as mentioned above). Remember that the code in your web documents is usually loaded and executed in the order that it appears on the website. If the JavaScript loads and attempts to run before the HTML and CSS it affects have been loaded, errors will occur. You'll learn how to get around this in the section on script loading techniques later in the post.

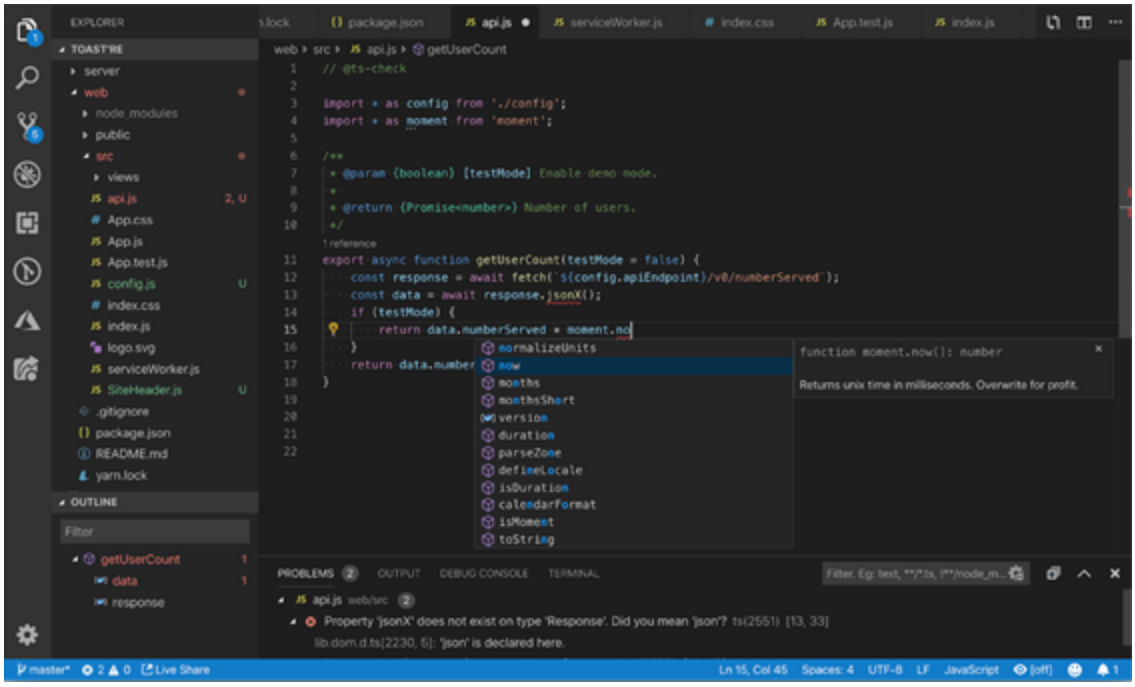

Figure 5. JavaScript

PHP (recursive abbreviation for PHP: Hypertext Preprocessor) is a popular open-source general-purpose scripting language that is ideal for web development and can be incorporated in HTML.

```
<!DOCTYPE html>
<html>
    <head>
        <title>Example</title>
    </head>
    <body>

        <?php
            echo "Hi, I'm a PHP script!";
        ?>

    </body>
</html>
```

Figure 6. PHP

Rather than a protracted list of directions to come up with hypertext markup language (as in C or Perl), PHP sites embody hypertext markup language with embedded code that will "something" (in this example, output "Hi, I'm a PHP script!"). The PHP code is encircled by special begin and finish process directions that enable you to toggle between "PHP mode" and "normal mode."

In contrast to client-side JavaScript, PHP code is executed on the server, resulting in HTML that is then sent to the client. The client would receive the script's execution results but have no idea what the underlying code was. You can even configure your web server to use PHP to handle all of your HTML files, in which case users will have no idea what you're up to.

SQL may be a programming language employed in relative information bases and data stream management systems. IBM ddeveloped it within the early Nineteen Seventies, and it's currently recognized as a political candidate commonplace by the Yankee National Standards Institute (ANSI) and also the alignment for Standardization (ISO) (ISO).

Web design is a large umbrella topic that encompasses everything related to the appearance and usability of a website. Web design encompasses both UI and UX design, as well as many other topics. Web development is the technical aspect of creating a website that focuses on coding. Web development is further subdivided into "front-end" and "back-end," which will be discussed more below.

Figma is a graphics editing and user interface design program that runs on the web. It can be used for everything from wireframing websites to building mobile app interfaces, prototyping designs, composing social media posts, and everything in between.

It is not like other graphics editing software. Mostly because it operates completely within your browser. This means you can access your projects and begin designing from any computer or platform without purchasing numerous licenses or installing software.

Conceptual Model of the Study

The Input-Process-Output diagram was used to show the conceptual model of the study as depicted in Figure 7.

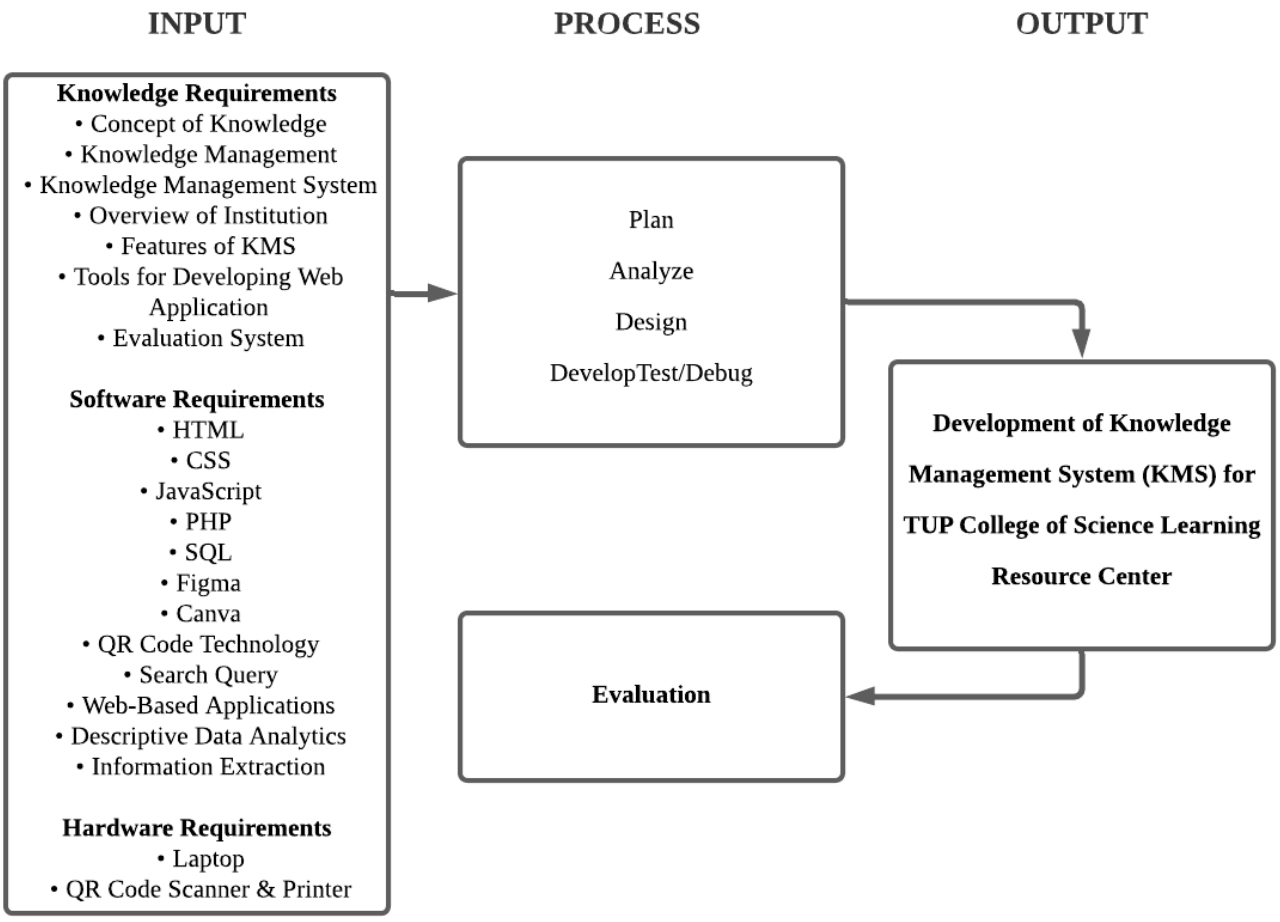

Figure 7. Conceptual Model of the Study

Input

The “Input” block consists of the knowledge requirements, software requirements, and hardware requirements needed to develop an inventory management system of animal cells. The knowledge requirements contain the details on how to build and start the study itself. It includes the overview about the system, how it is established, the processes on how to create this kind of system, and even the process of evaluating the system itself. The software requirements include all the necessary software and applications used in creating the system (both for frontend and backend), testing the system, its compiler, the IDE used and even the browser it is compatible with. Lastly, the hardware requirement will be any kind of laptop or personal computer that will be used to execute the coding and debugging.

Process

The “Process” block includes the following activities: plan, scrutinize, design, develop, assess/debug. These actions were done in order to produce the Knowledge Management System of the TUPM COS Learning Resource Center.

Plan. During this phase, the researcher will think of the plans of creating a system depending on the problems to be addressed. This is the part where the researcher will think of a breakthrough to stop the problems arising. For this study, the problem needs to be addressed is the having no database for all of the references and previous thesis and capstone in the college’s learning resource center which degrades efficiency and reliability.

Analyze. In this phase, factors affecting the problem are being determined and analyzed. In order to mitigate the problem, the researchers must know the background and all of the similar

cases related to it. The studies related to the topic can be of help to avoid the errors of the past research and improve in a way that is much beneficial for the users of the system.

Design. In this phase, the focus is to design the frontend of the system itself. It includes the theme, the features, the buttons and even the functions given by the client. There are certain characteristics that need to be included to produce the system the client wants. The inventory management system is an application that has a user-friendly interface and has a basic yet smooth navigation used to get easy access to the previous references provided by the COS alumni that are beneficial for future researchers.

Develop. The coding and programming part of the research. It involves the SQL DBMS as well since the knowledge management system is connected to the database itself for the recording of data gathered, particularly the number of capstone projects and even the stored information about the said study. The data used in the software application will directly reflect on the database. And the application can generate the data coming from the database. Added feature is a QR Technology to create unique codes that will generate in order to search for a specific reference.

Assess/Debug. The last phase in the process block. In order to know if the system really works and functions well, it must be tested and debugged to assess the possible extremities while using the application. The system will be subjected for evaluation as well to determine if it passes all the requirements needed based on the ISO 9126, now called as ISO 25010.

Output

The “Output” block contains the developed Inventory Management System of the Animal Cells. The system will be subjected for final evaluation to determine its capacity and capabilities and assess if it can be approved and introduced to the public.

Operational Definition of Terms

Algorithm - A procedure or set of rules that must be followed in calculations or other problem-solving operations, particularly by a computer.

Authority - The power or right to give orders, make decisions, and enforce obedience.

Analysis- Detailed examination of the elements or structure of something.

Application Domain- Is a mechanism used within the Common Language Infrastructure to isolate executed software applications from one another so that they do not affect each other.

Back-end - The part of a computer system or application that is not directly accessed by the user, typically responsible for storing and manipulating data.

Data - is a facts and statistics gathered for reference or analysis.

Database - A structured set of data held in a computer, especially one that is accessible in various ways.

Data Security - is a strategic digital data, such as those in a database, against destructive forces and the unwanted actions of unauthorized users, such as a cyberattack or data breach.

Debug -Identify and eliminate errors from (computer hardware or software).

Enterprise - A project or undertaking, typically one that is difficult or requires effort.

Frontend - the process of converting data to a graphical interface using HTML, CSS, and JavaScript so that users can view and interact with the data.

Index- A method of sorting data by creating keywords or a listing of the data.

Information Extraction- The process of extracting specific (pre-specified) information from textual sources is known as information extraction.

Information Retrieval- Is the process of obtaining relevant information system resources from a collection of those resources to meet an information need.

Implementation- is the process of putting a decision or plan into action; it is also known as execution.

Knowledge- Facts, information, and skills acquired by a person through experience or education are referred to as knowledge.

Knowledge management- is the efficient management of information and resources within a commercial setting.

Knowledge Management System - Is any kind of IT system that stores and retrieves knowledge to improve understanding, collaboration, and process alignment.

Management- The process of dealing with or controlling things or people is known as management.

System - Set of things working together as parts of a mechanism or an interconnecting network

Web - A set of related web pages located under a single domain name, typically produced by a single person or organization.

Web Search Query - A search term that a user enters into a web search engine to find information.

UI - Is the series of screens, pages, and visual elements like buttons and icons that enable a person to interact with a product or service.

UX - Is the process design teams use to create products that provide meaningful and relevant experiences to users.

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