TRICOMP

A Thesis Proposal
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STI College Ortigas Cainta

In Partial Fulfilment
of the Requirements for the Degree
Bachelor of Science in Computer Science

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December 16, 2022

ENDORSEMENT FORM FOR PROPOSAL DEFENSE

TITLE OF RESEARCH: **TriComp**

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INTRODUCTION

Technology is the application of scientific knowledge for practical purposes, such as in industry, agriculture, healthcare, and communication. It encompasses a wide range of disciplines, including information technology, engineering, and the natural sciences (Ramey, 2022). In its continued development, advancements have brought innovations in the field of computing. One of the most significant developments is the invention of the modern computer, which has revolutionized the way individuals communicate, access information, and perform a wide range of tasks (Admin, 2022).

There are many various sorts of technology, varied in historical development and use, as well as by the type of issue they address. Mechanical technology, medical technology, communications technology, electronic technology, and industrial and manufacturing technologies are all examples of technology. Though these many sorts of technology serve diverse objectives, have distinct designs, and are used in various ways, they all have one thing in common: they help individuals generally solve a problem (Ford, 2021).

The current era is based on the technology that humanity has developed over thousands of years. The rapid advancement of technology has made life now essentially unchanged from a century ago. The observation of Brown (2020) indicates that people are highly reliant on technology, which enables them to save more time on tasks that can be readily completed with its aid. It is now possible for people to send documents, images, and share information instantly with their loved ones or office colleagues. Rather than having to wait days, they can communicate in real time, and even see the person they are communicating with (Bredy, 2020)

Mobile phones are highly convenient for users due to their ability to perform a range of tasks easily. One such activity is mobile gaming, which has become the most popular type of gaming worldwide, surpassing both console and PC gaming (Ten Pixel Studio, 2022). Mobile gaming is popular due to its accessibility; nearly everyone has a mobile phone that can run gaming apps (Edney, 2022).

Mobile gaming not only provides entertainment but also serves as an educational tool, providing information on diverse topics. According to (Liu, 2022), The use of mobile technology to support learning in higher education is on the rise due to advancements in technology. If used correctly, mobile games can even be employed to educate people about important topics.

As gaming becomes a viable way for education purposes while the issue about a chunk of the secondary level population still struggle of having basic ICT knowledge in computers, the proponents agreed to create an solution for the issue by incorporating mobile gaming as a vessel in educating individuals about the subject of assembling computer parts.

Background of the problem

Computer devices have been part of education since its early introduction. Almost all industries to this date utilizes its capability to achieve maximum efficiency. Having a decent computer literacy rate is very important especially on today's standards where employers want their workers to have basic computer skills because companies becomes more dependent on computers as it helps to run the company faster and cheaper, Laplant (2015). Despite how the use of computers has become mainstream to the lives of the current civilization; many people still cannot get a good education about computers.

With a study conducted in Luzon Island, 50 km north from Manila, Philippines, problems with teaching Information Communication Technologies (ICT) have been observed. The issue of students not learning effectively was caused by lack of funds for operations such as maintenance of the computers and for affording internet connection. Lack of enough technical support to operate and maintain ICT resources was also being observed, which causes the computers on the facility to break regularly, Kubota and Yamamoto (2018). As the article concluded, the lack of proper education in ICT (Information Communications Technology) in the Philippines causes problem where many individuals still don't rightfully know the basic parts of computers. The deficiency that can be observed with the student's computer literacy will be impossible to solve if repercussions will not be made.

Looking to the survey that the proponents conducted, out of 80 respondents participated, 27 individuals stated that they are not familiar with looking to computer parts while 32 persons said they are familiar and the rest 21 people are somehow familiar. The study of Kubota and Yamamoto concluded the same topic that the proponent's studying which by incorporating the conclusion can be somehow near the same to what is currently happening to the Senior High school students that's been surveyed.

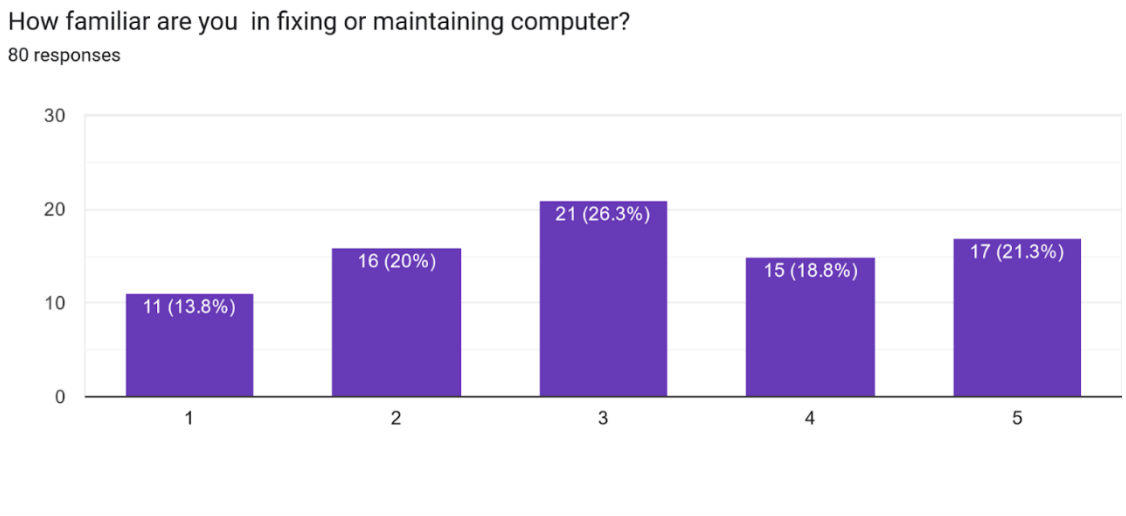

Figure 1. Survey Question about how familiar the respondents about fixing a computer

Considering that the Basic Education Curriculum encourages integrating ICT into Technology and Home Economics in the secondary level, this was not integrated properly as many factors affect the situation such as lack of funds and insufficient skill or knowledge of management with computers. As the causes of the problem can be identified as valid due to the circumstances, the proponents decided to choose the issue to formulate ways of how the problem of insufficient ICT knowledge to the secondary education level here in the Philippines can be solved.

Overview of the current state of the technology

Simple Computer Anatomy

Figure 2. Example gameplay of The Computer Puzzle

Design

Simple Computer Anatomy is a free Online Computer Structure knowledge-level game. A puzzle game for assembling Desktop Computers, Laptops, and Tablets, that can be played in a web browser. In the mechanics of the game, the player needs to drag and drop the computer components into their respective locations in the computer box. The game has a Knowledge Board that includes ten (10) hardware components to experiment with.

Game Description

The objective of the game is to identify the computer anatomy and analyze where the different hardware components should be placed.

Gameplay

The game has trivia and helping descriptions to help the players match the parts of the computer and be familiar with the use or purpose of each individual component.

Similarities to the Game

The similarity of TRICOMP with Simple Computer Anatomy is that the two games are focused on different parts of the computer. Each component should be understood individually for the different devices to work properly.

Parts of Computer

Figure 3. Example gameplay of Parts of a Computer

Design

Parts of Computer is a Competitive Online Game where parts of a computer are designed to have an Icon, Printable, and Interactive Word Wall that is used to create different exercises. The templates are accessible in both interactive and printable formats.

Game Description

Parts of Computer is a multiplayer type of game where the player competes to be the first to assemble a computer with all of its components. The player that is able to complete the task will get the highest score.

Gameplay

At the beginning of the game, the player needs to press the "Start" button to begin the time. The player needs to match the labels on the left and right side of the game window, to the illustrated computer in the middle. The leadership board on the lower part of the game displays the score of the players.

Similarities to the Game

TRICOMP is similar to Parts of Computer in that it features computer basic components that allow players to learn how to build the CPU.

PC BUILD SIMULATOR

Figure 4. Example gameplay of PC Build Simulator

Design

PC Building Simulator is a simulation-strategy video game produced by The Irregular Corporation and Romanian independent developer Claudiu Kiss. The game is centered around owning and running a workshop that builds and maintains PCs, mainly gaming-oriented ones.

Game Description

PC Building Simulator aims to teach PC users how the machine is put together with step-by-step instructions explaining the order parts should be assembled and providing useful information on what each part is and its function. Using real-world licensed components and comprehensive hardware and software simulation, players can plan and bring the ultimate PC to life.

Gameplay

The career mode in PC Building Simulator put players in control of a small business that specializes in servicing and building PCs. From the workshop, the player must use all the technical skills they have to complete the various jobs that may come their way.

Similarities to the Game

The similarity of PC Building Simulator to TRICOMP is that both games' objective is to teach players how to create computer bits and components.

Objectives of the study

General Objective

To propose a 3D low polygon adventure game that will cover the topics of computer parts and its functions with the goal of teaching players about the subject.

Propose a game which will cover the 8 important parts of a desktop computer such as the motherboard, the RAM (random access memory), Central processing unit, graphics processing unit, input unit, output unit, storage unit, and the power unit which focuses the functions, uses, and assembling process of the given components throughout the whole computer operation. The game will cover computers for home and office basic use only. The proponents will create a game that will show each part of a computer which is important for the system to operate. The player will be able to accomplish levels that will be based on the specified component capabilities and technicality which increases the difficulty as the player progresses. Every level that's been cleared will reward players power ups and required items to unlock the next level.

Specific Objective

To propose a game that will cover the importance being knowledgeable in a computer hardware.

The proponents aim to create a game that will show the required components for a computer to work as this will be their initial guide to be knowledgeable about what are the component need to build the computer system unit. The game will have an almanac that showcases the different components the player will obtain, as well as explaining the importance and uses of these parts. The environment of the game will change as the level progresses and as the player obtains more computer components.

To propose a 3D Low-Poly adventure game that will showcase quiz games to test if the players become informed about the different portions of a computer.

The game will have a mini-quiz before advancing to the next level. The questions will tackle anything related to the computer components that are shown in the game. This mini-quiz contains questions that the player will answer, and the reward relies on how many questions the player answered correctly. This will stand as an assessment of the player's learning about the different computer parts of the game. The reward consists of coins which are a special currency of the game, as well as other items such as assist tokens that can be used in levels.

To propose a game with interactive assessment levels to determine the player's knowledge after experiencing the stages.

The game objective is for the player to achieve all the components of a computer by clearing the levels of challenges present on each stage. Information about the components function, uses, and trivia can be observed throughout the gameplay and story. Collecting all the parts will unlock the final stage of the game that will serve as an assessment for the player's knowledge. The final stage will be implemented to be interactive in a form of simulation of computer building in real life. Accomplishing this stage will mark as the end of the game and the victory for the player.

Scope and limitations of the study

Scope

Player Perspective

The game will have a third-person perspective. The player will have a fixed camera that views all the map's layout on each level.

Components

TriComp will feature 8 important components on each level that will showcase their functions, uses and assembling procedure such as:

Motherboard - The motherboard is the main board that is screwed directly inside the computer case. All other cards and everything else plugs directly into the motherboard, hence its name. There are different models of the component present in the market which some variation will be featured in the game such as;

Intel Z790 motherboard variant;

Intel B660 motherboard variant;

AMD X670 motherboard variant;

AMD B550 motherboard variant.

CPU - The CPU or central processing unit is basically like the brain of computer systems. It processes all the information on a computational level. There are different models of the component present in the market which some variation will be featured in the game such as;

Intel Core i9-13900k Processor;

Intel Core i9-12900 Processor;

AMD Ryzen 9 7900X Processor;

AMD Ryzen 9 5900X Processor.

RAM - a data storage device that can provide fast read and write access. RAM is volatile memory, meaning it loses all the stored data when power is lost. There are different models of the component present in the market which some variation will be featured in the game such as;

GDDR5 RAM variant;

GDDR4 RAM variant.

GPU - processes the data from the motherboard and sends the appropriate information to the computer's screen for display. There are different models of the component present in the market which some variation will be featured in the game such as;

NVIDIA RTX 4090 Graphics Card variant;

NVIDIA RTX 3050 Graphics Card variant;

AMD Radeon RX 7900 XTX Graphics Card variant;

AMD Radeon RX 6500 XT Graphics Card variant.

Input Unit - processes and converts human input to computer language. Basic input units will be featured in the game including;

Mouse Pointer;

Computer Keyboard.

Output Unit - the result of the command we provide the computer with through the input device will provide by this component. Basic out units will be featured in the game including;

Computer Monitor;

Speakers.

Storage Unit – the one in charge of storing all data from the computer. Different iteration of the component is available on the market which can be observe its appearance in the game such as;

NVME SSD storage variant;

SSD SATA storage variant;

HDD SATA storage variant.

Power Unit - converts the AC mains supply from the power cord from a wall socket and supplies the correct DC voltages to all the components inside the computer. TriComp will showcase few models available to the market such as;

1000watts PSU variant;

500watts PSU variant.

Main Menu

This is the interface that the player will encounter at the very beginning of the game. This contains buttons such as:

- **Start Button**

  New Game Function

  This acts as a function in the game that will be implemented to a start button in the main menu. This function creates new progress in the game.

  Load Game Function

  This acts as a function in the game that will replace the new game function and be implemented as a start button in the main menu. If the game detects old progress in the device, this function will load the old progress created

by the player through auto-save or manual save in the game.

Exit Button

This acts as a function in the game that will be implemented to an exit button. This function will exit the game.

Game Menu

This acts as an interface and will appear when the player is in the actual game and clicks the game menu button. It contains sections such as;

- **Return** – let the player hide the game menu and return back to the game.
- **Save & Exit -** let the player save the progress of the game and return to the main menu.

Map

This section will allow the player to look at the levels of the game. This also informs the location of the following:

- **Player** – This will be visible on the map. This concludes the player's progress in the game.
- **Levels** – This includes the stages that the game will offer.

Settings

This section will allow the player to adjust the available options in the game. This section contains these sub-sections such as;

- **Audio** – the player can have the ability to adjust the audio volume of the game.
- **View** – the player can have the ability to modify the view of the game.

- **Interface** – The player will have the ability to customize the position of the User Interface (UI) elements of the game.
- **Controls** – the player can have the ability to adjust the controls of the game
- **Data** – the player can have the ability to manage the progress of the game.

Leveling System

This system will be the basis of the level of the game. This system requires players to accomplish the current level in order to proceed into the next one and acquire all the necessary items for the game to complete.

Rewards System

The reward system manages the rewards of the game that will be given to the player.

The list of rewards that can be obtained by finishing the levels and quiz:

Coins – this is the main economy of the game, which can be obtained by finishing levels and answering quizzes and it can be used to buy assist tokens and lifelines.

Assist token – this currency can be used on every level to assist the player in the game.

AI System

The A. I system is the basis of every A. I in the game, this composes behaviors of the following:

Level generation – This will be applied to every level. This A.I will be in charge of generating random-level layouts.

3D Low Polygon

The world and the environment of the game are designed to be low poly. The graphics and designs are minimal to make the game stable on most devices. User interface will be

designed simply, clean, and organized that will be compatible with the screen orientation.

Story

The game begins from the perspective of the player thinking about getting a desktop computer for personal use. The player is doubting the idea for they lack knowledge about computers so the player asks for assistance from a relative named Bob who works with computers. Bob understands the player's concern but instead of providing a computer unit, Bob decided to teach the player about the different parts of a computer and its function for he believes that owning a computer is a responsibility and so an individual must be oriented about the components that lie within a computer. Bob told the player that in order to build a working computer, acquiring the important components is necessary. The player will now be tasked to get the components listed by Bob on paper. Solving and finishing puzzles and challenges related to the component will make the player know more about the item. After the player collected all the components, Bob now assigned the player to build the computer with his guidance. With the building of the computer now complete, the player will realize the importance of being knowledgeable in computers. The player thanked Bob for not just only helping on building the computer but also teaching a moral lesson that every property is a responsibility and so being informed on components function, uses, and its maintenance is vital.

Audio, Music, Sound Effect

The audio of the game consists of a collection of sounds that can be heard on computer components and the game itself. The game music will be obtained in different artist playlists while accounting the fair use policy. The sounds can be generated depending on usage.

Saving System

- **Auto-Save** - The game will save its progress every time the player finishes a level without the player's interaction.

- **Manual Save** - The game will save its progress through the player's interaction. This is implemented in the "Save & Exit" button in the game menu.

Mini-Quizzes

The game contains mini-quizzes before advancing to the next stage to test the player's knowledge of different computer components.

Components Almanac

The game will feature a components almanac that contains a collection of different parts of a computer with their description, benefits, features, and trivia.

Limitations

The game is offline - The game can be played offline. The game doesn't require an internet connection to play.

Availability - The game is available only on android platform handheld devices.

Critical Components - The components that are showcased in the game are the critical parts in order for a computer to work.

Character Customization - The game will set a predetermined character for the player to use along the game's coverage.

LITERATURE REVIEW

Review of related literature, studies or systems

Computer Components Are Important

It is critical that people understand how computers function in order to be acquainted with what we should do in the event that they cease operating. The computer's equipment is known as the most important since it will not operate without it. In other words, knowing how to deal with the computer's equipment and understanding all of their functions for that device, it is easy to know what the item is just in case the unit stops working. To understand basic computer troubleshooting, you must first be familiar with computing equipment. Memory is required by all programs and apps that run on a PC. By inspecting and comprehending each component of computer equipment, you will learn about its importance and be able to do the necessary troubleshooting procedures if it fails. Every hardware component is required for the computer to function (CPU Museum, 2021).

Understanding Computer Terminology helps with other Technology

A person with a basic understanding of computers and software can more easily solve problems they may have run into. Having a good understanding of the terminology and jargon used with computers makes you more effective when using other types of technology. Someone more knowledgeable about how computers operate is less likely to be tricked, scammed, or infected by viruses (Computer Hope, 2021).

The effect of games and simulations on higher education: a systematic literature review

The impact of game-based learning on learning performance has been observed by numerous researchers across diverse subjects according to the studies that Vlachopoulos & Makri (2017) have compiled, in the paper that Divjak and Tomić (2011) provide evidence that computer games impact mathematical learning, revealing the positive effect of games on student learning outcomes. Reviews by Young et al. (2012) confirm the effectiveness of using video games in History, Languages, and Physical Education. The analysis of four

experimental virtual conditions in pre-and post-test assessments reveal that virtual experimentation promotes conceptual understanding in Physics students (Zacharia & Olympiou, 2011). A 3D visualization and simulation laboratory activity on protein structure is more effective than traditional instruction modules, as described in White, (2010), research resulting in students preferring to work with visualized simulations.

Components of Computer

According to the Team Leverage Edu (2022), there are 8 components inside a computer. A motherboard is a circuit board through which all the different components of a computer communicate to each other and it keeps everything together. The input and output devices are plugged into the motherboard for function. Input Units are the one responsible for converting human inputs into computer language that a system can read. The result of the command we provide the computer with through the input device is called the output which is being handled by the Output unit. The CPU is called the brain of the computer since no action can take place without its permission and execution as the main processing unit. The Graphics Processing Unit or the video card helps generate high-end visuals like the ones in video games. The RAM stores the data regarding the programs which are frequently accessed programs and processes. Storage units are the one in charge of storing data that the computer produced throughout its operation. Lastly the Power unit whose main purpose is to convert electric current from a source to the correct voltage, current, and frequency to power the load.

Why Computer Skills Are Important in Achieving Academic Success and Improving Retention

Computer literacy is considered a very important skill to possess. Employers want their workers to have basic computer skills because their company becomes ever more dependent on computers. Many employers try to use computers to help run their company faster and cheaper. Computers are just as common as pen and paper for writing and for many applications – especially communicating – computers are preferred over pen and paper because of their ability to duplicate and retain information and ease of editing. At Hennepin Technical College, we have seen the need for computer skills increase not only

in the general education courses but also in many of the technical courses. Without basic computer skills, the ability to be successful in these courses is greatly reduced. This speaks to the need for early assessment of these skills to ensure students' success in subsequent courses. Underprepared students are entering college with multiple barriers such as lack of basic skills, lack of language skills, and lack of computer skills, along with transportation, child care and money issues. How do we address the lack of computer skills? At Hennepin Technical College, General Education faculty (especially in the English and Communication areas) along with Technical College faculty have been increasingly frustrated with the lack of computer skills needed for writing college papers and for completing other written assignments. The intent of administering any computer literacy testing is to assist students in becoming successful learners, LaPlant (2015).

Rise of Mobile Gaming

Most games played on portable devices such as Smartphones, tablets, or handheld consoles are referred to as mobile gaming. The most common platforms for developing these games are iOS and Android. With the introduction of smartphones, mobile gaming has grown more popular than ever. In fact, the mobile gaming industry has surpassed that of PC and console gaming combined. There are many reasons for this, the most notable of which being that mobile gaming is far more accessible than conventional gaming. In this essay, we will go through each of these criteria one by one. Mobile games may be played at any time and from any location, and they do not need any costly technology or software. All you need is a smartphone or tablet with internet access. This implies that those who would not ordinarily play video games may do so during their commute, lunch break, or even while at work or school (Pixel Studio, 2022).

Impacts of Mobile Game on K12 Students and Trend Exploration for Future Educational Mobile Games

Mobile games have already become valuable instruments for big tech platforms as a result of the popularity and expansion of 4G/5G networks. These games have even been improved to encompass practically all age groups of the population, rather than only children. The successful mobile game is always interesting due to the great sensation of accomplishment that teenagers might experience in the game again and again. Consider how individuals who are not regarded in real life might be appreciated in the game for their virtual successes, whether by greed (paying money to improve fighting strength) or talent in playing the game. Even if you don't reach the top of the leaderboards, you may establish a presence in a number of ways (Yueazhe et. al., 2022).

Mobile Games Are Entertaining and Convenient.

These are some of the key reasons is that it is an enjoyable experience. When people are bored or have some spare time, they may play mobile games. They may also interact with their friends and family by playing games. Another reason for the popularity of mobile gaming is its convenience. People may play mobile games whenever and wherever they wish, even while traveling. To play mobile games, you do not need to go to a certain area or carry about a lot of equipment. All you need is your phone to begin playing (Edney, 2022).

Building a Gaming PC for the First Time? Don't Panic, This Guide Can Help You Out

Start by unlocking the CPU bar. Then, open the CPU door, place the CPU in the right direction, (arrows marked on both will help you line it up), close the door, and lock the bar down. Mounting the heatsink is also dependent of your hardware, but it generally connects through the four holes closest to the CPU socket. Usually this is done through screws or locking/twisting plastic pins. Remember to use a sensible portion of thermal paste when mounting the heatsink; an amount roughly the size of a pea is a good reference. Also, be sure to plug the CPU cooler into the motherboard so it will have the power it needs to

function. The exact process should be clearly articulated in the instructions that come with your cooler. Again, installing the CPU and CPU cooler is best done before the motherboard is placed in the case to keep things as simple as possible. In installing RAM, start by pushing open the two tabs on either side of the RAM slot on the motherboard slot. Look to the memory guide to check that you're installing with the right orientation. Once the RAM module is lined up with the slot, simply push down until you hear a click, then make sure the tabs are closed. Repeat those steps for any additional memory. Depending on your case, it might be easier to do this before you install the motherboard into the case. With the installation of the motherboard to the case, It's important to be careful as you line up the holes and add screws to all of the standoffs you placed inside your case. You want the motherboard to be secure and not loose, but you also don't want to over-tighten the screws. If the board is bending at all, you've over-tightened. You may need to push the motherboard slightly back towards the expansion slot cover before screwing it in, but as long as you line up all the screws, you should be good to go. Once your motherboard is mounted, everything else is fairly straightforward.

The GPU will live in the PCIe slot. Make sure you remove any expansion coverings, and be sure it clicks into place properly and is secured with screws once installed. If you have an M.2 drive, carefully install it into the appropriate slot on your motherboard, and use the small screw to keep it secure. Again, do not over-tighten. A good rule when installing components is to use a bit of force, but if you feel like something isn't fitting, it's good to double check that it's in the correct place. This stuff is designed to fit together, so you shouldn't have to push too hard. Your video card, storage devices, and motherboard will all need power from the power supply. The proper cables should be included with your PSU. If not, use the adapter provided with the video card box. Your hard drive or SSD will also need a power cable, as well as a SATA or data cable, unless you're using an M.2 as described above. All of these cables should be included with your devices. The right cable to use from the power supply to the components that need that power should be fairly obvious. Simply match the plug to the connection the component needs, and check any manuals if it isn't super clear. Installing fans will vary on your cooling setup, but again, it should be fairly clear what goes where. Simply match the cable to the input on your motherboard, and check your manual if you run into any issues. Once everything is wired

up and looks the way you want it to, it’s time to plug in the power supply, hit that power button, and turn on your new computer. If everything is connected properly, you should see your motherboard’s BIOS screen. The final step is to install your operating system of choice, and start using your new PC, Parrill (2022).

Synthesis

Game-based Learning is becoming a popular method of teaching various target audiences to build computer components and functions, from senior high to tertiary education, with or without prior experience in building. This makes sense given that gamification's main benefit is its ability to increase student confidence, which is one of the most prevalent barriers to learning computer components.

Every article chosen for this study supports the concept and goals that the proponents hope to implement in TRICOMP in order to improve student knowledge and confidence while building computer components. Expect the implementation of the proposed game to be user-friendly and robust for years to come, for it has been studied and designed with today's latest information.

The collection of studies above is related to the importance of computer components and functions. It will give assurance that these games are informative and educational for the improvement of the players when it comes to computer components. It also guarantees that the players will learn the main purpose of each component of the computer while enjoying the game.

METHODOLOGY

Methodology

In designing and developing of TRICOMP, the proponents will use the Prototyping Model for its ability to involve user's feedback while the game is still under the designing phase. As the Prototyping Model is suitable for developing game programs, the method also eliminates possible misunderstandings and miscommunication during the process. With the goal of delivering the game regarding the audience standard and demand, the use of Prototyping Method stands as the perfect reference for this project.

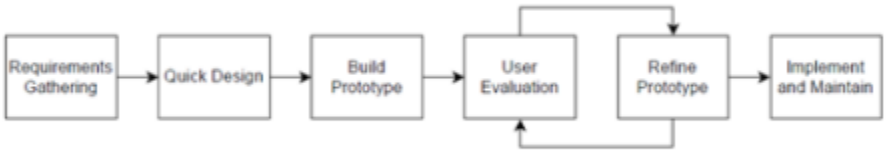

Figure 5. Prototyping Method Flowchart

The prototype model's main advantage is flexibility in that when missing functions are found or new requirements are added, the project can easily accommodate them during the prototype refinement phase.

Requirements Gathering - the requirements of the system are defined in detail in this phase. During the process, the proponents gather relevant data from target users of the system and experts by conducting interviews to distinguish possible expectations from the system. Getting the side of individuals with experience in fields related to computers will be conducted considering the game aims to be educational and informative about the maintenance and composition of a working computer.

Quick Design - Expect a simple design of the system will be created in this phase. The created design will be considered unofficial for it is not complete. The design's purpose was to provide a brief idea of what the system can possibly become to the user.

Build Prototype - an actual prototype is designed based on the information gathered from quick design. This phase aims to create a small working model of the required system. All the acquired data from the previous phase will be implemented to build the envisioned program.

User Evaluation - the proposed game will be presented to the target audience for an initial evaluation. This phase will help to identify strengths and weaknesses of the working model. all the comments and suggestions are collected from the user and to be provided to the developer.

Refine Prototype – In the event that the trialed model didn't achieve the user's expectation or standard, a refinement to the prototype will be established according to the user's feedback and suggestions.

Implement and Maintain - Once the final system is developed based on the final prototype, the project will be thoroughly tested and deployed for production. The project will undergo routine maintenance for minimizing bugs and glitch and prevent game-breaking failures.

Depth First Search Algorithm

TRICOMP will use Depth First Search Algorithm, a recursive algorithm that uses the backtracking principle, capable of visiting every node in the space in the process. To visit the next node, pop the top node from the stack and push all its nearby nodes into one. As the game will feature maze level, generating random maze layout is necessary to make every session of gameplay unique and fresh. Figure 6 highlights the flow of the algorithm in generating a maze layout.

Figure 6. DFS flowchart implementation in maze layout generation

Hardware/Software

Hardware

· Operating System: Windows 10 Pro

· Processor: Intel® Core™ i7-2700K Processor @3.50GHz

· Memory: 8 GB

Software

· **Paint 3D** is a raster graphics and 3D computer graphics application which is a refresh of Microsoft Paint. It is one of several 3D modeling and printing applications (formatted under 3MF) introduced or improved with the Windows 10 Creators Update, including View 3D, Windows Mixed Reality, Holograms, along with the CAD programs 3D Builder and 2D Builder.

· **Unity** is a cross-platform game engine developed by Unity Technologies that was initially unveiled and distributed as a Mac OS X-exclusive game engine in June 2005 at Apple Inc.'s World Worldwide Developers Conference. The engine had been expanded to serve more than 25 platforms as of 2018. The engine can generate three-dimensional, two-dimensional, virtual reality, and augmented reality games, as well as simulations and other interactive experiences.

· **Microsoft Visual Studio** is a Microsoft-integrated development environment. It is used to create computer programs, websites, web apps, online services, and mobile applications. Visual Studio makes use of Microsoft software development platforms such as Window API, Windows Forms, Windows Presentation Foundation, Windows Store, and Microsoft Silverlight. It can generate both native and managed code.

Game Design Document

1. **Title Page**

   1.1. Game Name

   "TRICOMP: Computer Components Composition"

   TRICOMP is a game created to educate players about the critical components of a computer, the function and role that each parts plays while the system operates, while encouraging the target audience to be knowledgeable in maintaining and using a computer device.

2. **Games Overview**

   2.1. Game Concept

   The game will follow the story of the player who's planning on building a computer but lacks knowledge about the subject. This is followed by the appearance of a character named Bob who's knowledgeable about technology and so offers his guidance to the player to start building a working computer. The player adventure will start its journey by collecting the necessary parts of a computer before proceeding on assembling the unit.

   2.2.Genre

   The game is educational, puzzle-adventure, platformer, real time strategy, offline single-player.

   2.3.Target Audience

   The target audience of this game will be 18 to 22 years old STEM Senior High school students.

   2.4.Game Flow Summary

   The player will be tasked to collect all the important components of a computer in order to build a desktop computer. Each component will require the player to accomplish puzzle games related to its function, use, and process of operation before obtaining the said module. There will be mini-quizzes that are required to be answered correctly overall in order to proceed to the next component. Obtaining all the necessary items will bring the game to the final stage of assembling the computer.

2.5.Look and Feel

TRICOMP is a 3D puzzle-adventure that shows a 3D puzzles problems inspired by the components functions and uses. The game consists of levels that reference each 8 components of a computer. The setting of the game will be placed on today's generation where having a device is considered necessary. Every level will discuss the components functions, uses and its procedures along the stage. The game aims to bring learning of computers to the enjoyable and interactive medium such as gaming.

3. Gameplay Mechanics

3.1. Gameplay

3.1.1. Game Progression

When the player clicks the start button, the game will find a saved file to continue the progression, if the game doesn't find any saved file, then the game will create a new progression and the game will begin.

3.1.2. Mission/Challenge Structure

The game requires the player to solve the puzzle that are unique on each levels and achieve a passing mark in answering mini-quizzes afterwards to obtain mastery on current component level to proceed to the next stage. Every accomplished level will reward the player the certain component which is required in to access the final act where requires the player to build the computer step by step.

3.1.3. Puzzle Structure

The game has puzzle games, which stands as one of the main obstacle the player need to clear for a selected level. The list of puzzle-games in the game that the player will encounter:

- **Maze puzzle –** the player will be given a random-generated map consisting of an origin and goals. Walls will serve as the limitation of the player to traverse the space. The goal is to connect the origin to different goals while traversing the labyrinth of walls. Accomplishing the maze will reward the player an item and the permission to proceed on to the next stage.

- **Word guessing puzzle –** the player will be given a set of different images that are related to one another. The player will need to guess what specific word fits with the theme of the photos presented. Accomplishing the puzzle will reward the player an item and the permission to proceed on to the next stage.
- **Sliding puzzle** – the player will be given random tiles, and the task of the player is to slide the tiles until a portrait of the component emerges. Accomplishing the portrait will reward the player an item and the permission to proceed on to the next stage.
- **Pairing puzzle** – the player will be given a set of hidden cards with the goal of finding pairs of identical cards. The player reveals two cards at a time. If the flipped cards are the same they are removed from the board, if not, the cards will be flipped back. Revealing all the cards will reward the player an item and the permission to proceed on to the next stage.

3.1.4. Strategy Game

The game has strategy game-like levels, which stands as one of the main obstacle the player need to clear for a selected level. The list of puzzle-games.

- **Tower defense –** the player will be given an objective to stop incoming entities from reaching a specific location by strategically placing towers who will intercept the horde. Keeping the location away from entities for a specific time will reward the player an item and the permission to proceed on to the next stage.
- Organizing game – the player will be given an objective to organize scattered items on the screen and bring the item to their perspective place. Accomplishing the level will reward the player an item and the permission to proceed on to the next stage.
- **Simulation strategy –** the player will be tasked to assemble all the collected components into a computer. Each component has a unique

way of attaching it to the system. Completing the build will mark as the completion of the game story.

3.1.5. Platformer

The game has platformer levels, which stands as one of the main obstacles the player need to clear for a selected level. The list of puzzle-games in the game that the player will encounter:

- **3d running game –** the player will be placed in 3d space with the goal of arriving the finish line. The path will be filled with different obstacle for the player to traverse and specific parts of the level will require the player to acquire a specific item that can be found on the field. Reaching the finish line will reward the player an item and the permission to proceed on to the next stage.
- **Catching game –** the player will be given an objective to catch specific falling objects from the top. The game will let the player to control a basket to catch falling objects. Collecting required objects will finish the level which will reward the player an item and the permission to proceed on to the next stage.

3.1.6. Objectives

The objective of the game is to collect all the necessary components to build a computer. This can be accomplished by completing each stages puzzles or challenges and getting a passing score on all the min-quizzes. Acquiring all the components will bring the game to the final act where the assembling of the computer will occur. Building the computer successfully will mark as the completion of the game overall.

3.1.7. Play Flow

The game will have 9 levels that features each component on a computer such as the motherboard, CPU, RAM, GPU, Input Unit, Output Unit, Storage unit, Power unit, and the PC assembling stage. The game flow consists of the player completing the stages of a level and acquiring important information about the component of topic. The player will only

be able to move to the next level when achieving a passing mark in answering mini-quizzes.

3.2. Mechanics

The player will be introduced to the first level with variety of stages that needs to should be completed. Completed stages will reward the player life points that can be used when the player fails to accomplish the objectives to avoid on restarting the game from the very start. Coins can also be receiving in completing the level and the amount will vary on how efficiently the player completed the level. Coins can be used in buying hint tokens or life points to the shop.

3.3. Game Options

The game has a lot of section in the game option that the player can manage, it has an audio section for generating sound and background music and ambient. The data settings will be available for managing of the player's game progression.

3.4. Replaying and Saving

The game has a saving and loading system, the game progression will save every five game minutes, if the player made some actions, or if the game is out of focus by the player. In replaying, the player can repeat some game progression such as side quests and patrol quests.

4. Story, Setting, and Characters

4.1. Story and Narrative

Introduction

The game begins on the perspective of the player thinking about getting a desktop computer for personal use. The player is doubting the idea for they lack the knowledge about computers so the player ask assistance to a relative named Bob who works with computers. Bob understands the player's concern but instead of providing a computer unit, Bob decided to teach the player about the different parts of a computer and its function for he believes that owning a computer is a responsibility and so an individual must be oriented about the components that lies within a computer.

Climax

Bob told the player that in order to build a working computer, acquiring the important components is necessary. The player will now be tasked to get the components listed by Bob on paper. Solving and finishing puzzles and challenges related to the component will make the player know more about the item. After the player collected all the components, Bob now assigned the player to build the computer with his guidance.

Ending

With the building of the computer is now complete, the player will realize the importance of being knowledgeable in computers. The player thanked Bob for not just only helping on building the computer but also teaching a moral lesson that every property is a responsibility and so being informed on components function, uses, and maintenance is vital.

4.2.Game World

4.2.1. General Look and Feel of the World

The world and the environment of the game are designed to low poly. The graphics and design are minimal for making the game stable in most devices. User interface will be designed simply, clean, and organized that will be compatible with the screen orientation.

4.2.2. Areas

The game has different computer components that will be tackled and so will be provided with individual exclusive levels with different aesthetics.

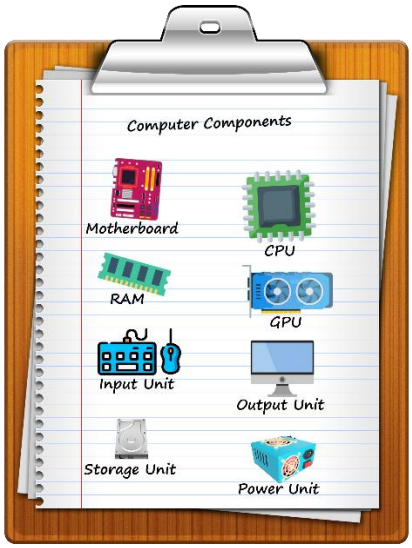

Figure 7. List of levels in TRICOMP game

Motherboard – is a circuit board which all the different components of a computer communicate and keeps everything together.

CPU – it directs the whole system procedure since no action can take place without its permission and execution as the main processing unit. It communicates with all the other components of the computer.

RAM – It stores the data regarding of the programs which are frequently accessed programs and processed.

GPU – helps in generating high-end visuals to display.

Input Unit – converts inputs from the user to the computer language that the system can read and respond to.

Output Unit – converts computer language into the instructed form such as image, audio, and etc.

Storage Unit – Stores all the data that the computer accumulated and receives.

Power Unit - convert electric current from a source to the correct voltage, current, and frequency to power the load.

4.3. Characters

The Player - The game contains one playable character. This character is the protagonist of the game and its physical appearance and personality can't be

customized. The name of the playable character will be unknown for the game aims to let the player relate to the character. The character will stand as the vessel for the story to progress as the player completes challenges and collect computer components in the game.

Bob – this character will serve as the guide of the player in finishing the game. Bob is known to be very knowledgeable with computers for he works in selling and building a computer for a living. Bob's main goal is to teach the player about the parts of the computer and how to maintain or take care of them. Bob will give the player tips and factual information throughout the game related to computer components and he will be the one discussing the mechanics of each level.

5. Levels

5.1. Levels

There are 9 levels that will be tackled if, including the PC building part, eight components must be retrieved, which means that the game has eight different stages with different aesthetics and looks. The eight levels contain puzzles and challenges that the player needs to complete. This depends on what component is the player trying get retrieve. The difficulty of the levels was near identical to one another and slightly increases as the level progresses. The game contains nine levels and features the following;

- **Motherboard –** the first level of the game, featuring 3 maze puzzle game stages and mini-quizzes in the last part.
- **CPU –** the second level of the game featuring 3 tower defense stages and a mini-quizzes on the last part.
- **RAM –** the third level of the game featuring 3 catching game stages and a mini-quizzes on the last part.
- **GPU -** the fourth level of the game featuring 3 running game stages with obstacles and a mini-quizzes on the last part.

- **Input Unit -** the fifth level of the game featuring 3 word guessing game stages and a mini-quizzes on the last part.
- **Output Unit -** the sixth level of the game featuring 3 slider puzzle game stages and a mini-quizzes on the last part.
- **Storage Unit –** the seventh level of the game featuring 3 organizing game stages and a mini-quizzes on the last part.
- **Power Unit –** the eighth level of the game featuring 3 pairing games stages and a mini-quizzes on the last part.
- **Assembling phase –** the ninth level of the game featuring the simulation strategy game of building a computer.

6. Interface

6.1. Visual System

Main Menu

This is the interface that the player will encounter at the very beginning of the game. This contains buttons such as:

- **Start Button**

  New Game Function

  This acts as a function in the game that will be implemented to a start button in the main menu. This function creates new progress in the game.

  Load Game Function

  This acts as a function in the game that will replace the new game function and be implemented as a start button in the main menu. If the game detects old progress in the device, this function will load the old progress created by the player through auto-save or manual save in the game.

  Exit Button

This acts as a function in the game that will be implemented to an exit button. This function will exit the game.

Game Menu

This acts as an interface and will appear when the player is in the actual game and clicks the game menu button. It contains sections such as;

- **Return** – let the player hide the game menu and return back to the game.
- **Save & Exit -** let the player save the progress of the game and return to the main menu.

Map

This section will allow the player to look at the levels of the game. This also informs the location of the following:

- **Player** – This will be visible on the map. This concludes the player's progress in the game.
- **Levels** – This includes the stages that the game will offer.

Settings

This section will allow the player to adjust the available options in the game. This section contains these sub-sections such as;

- **Audio** – the player can have the ability to adjust the audio volume of the game.
- **View** – the player can have the ability to modify the view of the game.
- **Interface** – The player will have the ability to customize the position of the User Interface (UI) elements of the game.
- **Controls** – the player can have the ability to adjust the controls of the game

- **Data** – the player can have the ability to manage the progress of the game.

Leveling System

This system will be the basis of the level of the game. This system requires players to accomplish the current level in order to proceed into the next one and acquire all the necessary items for the game to complete.

Rewards System

The reward system manages the rewards of the game that will be given to the player.

The list of rewards that can be obtained by finishing the levels and quiz:

Coins – this is the main economy of the game, which can be obtained by finishing levels and answering quizzes and it can be used to buy assist tokens and lifelines.

Assist token – this currency can be used on every level to assist the player in the game.

AI System

The A. I system is the basis of every A. I in the game, this composes behaviors of the following:

Level generation – This will be applied to every level. This A.I will be in charge of generating random-level layouts.

3D Low Polygon

The world and the environment of the game are designed to be low poly. The graphics and designs are minimal to make the game stable on most devices. User interface will be designed simply, clean, and organized that will be compatible with the screen orientation.

Saving System

- **Auto-Save** - The game will save its progress every time the player finishes a level without the player's interaction.

- **Manual Save** - The game will save its progress through the player's interaction. This is implemented in the "Save & Exit" button in the game menu.

Mini-Quizzes

The game contains mini-quizzes before advancing to the next stage to test the player's knowledge of different computer components.

Components Almanac

The game will feature a components almanac that contains a collection of different parts of a computer with their description, benefits, features, and trivia.

6.2. Audio, Music, Sound Effect

The audio of the game consists of a collection of sounds that can be heard on computer components and the game itself. The game music will be obtained in different artist playlists while accounting the fair use policy. The sounds can be generated depending on usage.

7. Artificial Intelligence

7.1. Level generator - This will be applied to every levels. This A.I will be the one in charge of generating random level layouts.

8. Technical

8.1. Target Hardware

Android Version	Android 6.0 Marshmallow
CPU:	Exynos 7570 – 8 Cores or Equivalent
GPU:	Mali-T720 or Equivalent
Memory:	1GB Ram, 32 GB ROM
Screen Resolution:	1920 x 1080

8.2. Development hardware and software, including Game Engine

Paint 3D/ - This software was used by the proponents to create the game's User Interface (UI), Head Up Display (HUD), Model Wrappers (Model Skins), Icons, Backgrounds, and Textures. This software will process the creation of 3D models for the game.

Unity - This software is a game engine that is used by the proponents to create the game.

Visual Studio - This software is used by the proponents to write codes to the game engine to the mobile game using C# language.

Gantt chart of Activities

Thesis 0

MONTH / ACTIVITY	SEPTEMBER				OCTOBER				NOVEMBER				DECEMBER			
Coming up with Ideas																
Researching the Topic																
Making Title Proposal																
Making Initial Documents																
Consulting with professionals																
Data Gathering																
Chapter 1 to 3 Revisions																
Title Defense																

Thesis 1

MONTH / ACTIVITY	FEBRUARY				MARCH				APRIL				MAY			
Studying the game concept																
Familiarizing development equipment and tools																
Creating a single level layout and mechanics																
Testing phase																
Game prototype revisions																
Thesis Defense																

Thesis 2

MONTH / ACTIVITY	SEPTEMPBER				OCTOBER				NOVEMBER				DECEMBER			
Making 3d models for the game																
Polishing the game mechanics																
Arrangement of game flow																
Compiling the whole game																
Looking for bugs in the game																
Fixing bugs																
Publishing the game																
Final defense																

Budgetary Estimate

Thesis 0

Item	Cost	Total cost
Documents (441pages)	3 to 5 pesos per page	1,349php
Jeep fare (4x)(6x)	20 – per head	480php
Tricycle fare(4x)(2x)	20 – per head	160php
Foods and drinks (4x)(3x)	100php	1,200php
Internet (4x)	1500php	6,000php
Electricity bills (4x)(4x)	from 400 to 600php	9,000php
Total: 18,189php		

Thesis 1

Item	Cost	Total cost
Documents (90x)	3 to 5 pesos per page	305php
Jeep fare (4x)(6x)	20 – per head	480php
Tricycle fare(4x)(2x)	20 – per head	160php

Foods and drinks (4x)(2x)	100php	800php
Internet (4x)	1500php	6,000php
Electricity bills (4x)(4x)	from 400 to 600php	9,000php
Total: 16,745php		

Thesis 2

Item	Cost	Total cost
Documents (90x)	3 to 5 pesos per page	305php
Jeep fare (4x)(6x)	20 – per head	480php
Tricycle fare(4x)(2x)	20 – per head	160php
Foods and drinks (4x)(3x)	100php	1,200php
Internet (4x)	1500php	6,000php
Electricity bills (4x)(4x)	from 400 to 600php	8,000php
Total: 16,145php		

Prepared and Noted by:

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Skills

- PHP
- HTML & CSS
- JAVA
- Leadership

Education

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June 2019 - Present

MAPUA Institute of Technology
June 2018 - October 2018

Cainta Catholic College
June 2012 - March 2018

- **Elementary Level:**

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June 2009 - March 2012

Scholastica De San Alfonzo
June 2004 - March 2009

On-the-job training

Cainta Police Station
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Office and Desk Assistant

- Supports in organizing paper works and assisting people inquiring at the information desk.

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On-the-job training

Municipality of Pasig City
2017-2018
Department of Finance

- Assist with the papers that are sent to me in each department that need to be signed and the input of the taxpayers of the entire pasig.

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June 2018 - March 2020

Manggahan Highschool
June 2014 - March 2018

- **Elementary Level:**

San Lorenzo Elementary School
June 2007 - March 2014

On-the-job training

Municipality of Angono, Rizal
2019-2020
Administrative Assistants

- .Responsible for organizational task like organizing, scheduling appointments, and drafting correspondences or message.

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Skills

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STI College Ortigas-Cainta
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Francisco P. Felix Memorial National Highschool
June 2013 - March 2017

- **Elementary Level:**

Benito Nieto Elementary School
June 2009 - March 2013

On-the-job training

Municipality of Cainta, Rizal
2018-2019
Administrative Assistants

- Responsible for organizational task like organizing, scheduling appointments, and drafting correspondences or message.

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Nhel Heinz A. Cabilisa
Juan Marie S. Odi
Limuel Trangia

APPROVED RESEARCHE TITLE: **TriComp**

AREA OF STUDY: **Game Development**

CONFORME:

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APPROVED BY:

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Thesis Coordinator

NOTED BY:

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APPENDICES A

Transcript of Interview with Mr. Niño Anthony Galanida

Interviewee: Niño Anthony Galanida

Interviewer: James Alfreid A. Balbido
Nhel Heinz A. Cabilisa
Juan Marie S. Odi
Limuel Trangia

[Interview Starts]

[00:04] Odi: Do you have interest in computer po?

[00:07] Mr. Galanida: Yes, it's my job. Highly course sa college.

[00:13] Odi: Nakabuild na po ba kayo ng computer po?

[00:18] Mr. Galanida: Noong highschool. I'm in able kase sa highschool ko may major kami.

[01:27] Odi: Ano po ba yong sa Motherboard po?

[01:31] Mr. Galanida: Yong Motherboard, mostly nandyan yong mga parts or chips na nagfufunction sa computer.

[01:55] Odi: Sa CPU po ba ano insight ninyo po?

[02:31] Mr. Galanida: Ah yong CPU yon yong brain na naproprocess sa lahat ng information

[02:45] Odi: Ano po pinagkaiba ng Motherboard sa CPU po?

[03:10] Mr. Galanida: yong CPU nakikita mo siya sa motherboard, yong nilalagyan ng themal case tapos yong cpu yan yong brain ng computer lahat ng information sa mga processes dumaan lahat kay CPU.

[03:30] Odi: Kumbaga siya po yong utak sa computer po.

[03:38] Mr. Galanida: Yes, pero yong RAM pinaprocess niya yong data na nirerequired ng computer system.

[04:03] Odi: Yong GPU naman po ito na po ba yong visual na po?

[04:32] Mr. Galanida: Oo sa graphics.

[04:59] Odi: Sa input unit naman po ito po ba yong mga keyboard or mouse po?

[05:23] Mr. Galanida: Oo, mouse, keyboard yong mga sinasaksak sa port.

[05:45] Odi: Sa output unit naman po?

[06:34] Mr. Galanida: Sa output unit ito yong sa sound or audio.

[06:55] Odi: Sa storage unit po ano po pinagkaiba niya sa RAM po?

07: 15] Mr. Galanida: Yon ROM, read only lang siya at temporary. Ang Ram yan yon ginagamit pangprocess sa data. Kung higher and RAM mas mabilis siya magprocess.

[07:55] Odi: Sa power unit naman po?

[08:01] Mr. Galanida: Ah yong power supply. Ito yong cinoconvert yong AC kung ano lang yong nirerequired ng computer. For example, yong motherboard 5volts or yong nirerequired ng motherboard, yon lang ang sinusupply ng power supply. Yong voltage na need ng motherboard at other components 12volts ganyan. Yan yong task ng power supply

[09:55] Odi: Sige po sir yan lang po ang tanong namin

[10:03] Odi, Cabillisa, Trangia: Thank you po sir!

Transcript of Interview with Mr. Julius Balbido

Interviewee: Julius Balbido

Interviewer: James Alfreid A. Balbido
Nhel Heinz A. Cabilisa
Juan Marie S. Odi
Limuel Trangia

[00:04] Mr. Balbido: pangalan, Julius Balbido, electrical engineer board passer, nakapagtrabaho sa acer Philippine customer repair at Panasonic noong 1990s to 2010.

[00:46] James: ano pong masasbi nyo sa mga computer ngayon at sa ngayon?

[00:53] Mr. Balbido: Malaki ang ininmprove nila di lang sa computing power pati narin sa gaano sila kapitid sa kuryente kaysa dati kasi kahit di ganun kalakas ang specs noon eh halos parehas lang kumain ng kuryente.Pati sa size ng mga computer kasi dati di mo mabubuhat ng magisa lang ang computer dapat marami kayo, ngayon kahit laptop nlng. nagiging compact lahat ng devices na.

[02:16] James: Gusto lang naming humingi ng side views tungkol sa mga components ng isang computer, ano pong masasbi nyo sa motherboard?

[02:38] Mr. Balbido: nung nandun ako sa acer, madalas kong hawak ay laptop, ako tagaayos dun sa mga sirang laptop na galing sa mga customer na nagpapaayos so madalas na components na inaayos ko is motherboard. Madalas sa hinang yan o papalitan ng pyesa o chip, pero sa ibang bagay, yang motherboard talaga ang dikitan ng lahat ng components sa computer. Kung wala yan, dimo masasabi na may computer. Main purpose talaga ng mother is to ipasa ang nararapat na kuryente sa ibat ibang components. halimbawa kung a ng cpu humingi ng kuryente, ibibigay lang ng motherboard yung tamang kuryente.

[05:17] James: Ano naman po ang masasabi nyo sa cpu or Central Processing Unit?

[05:25] Mr. Balbido: sa experience ko noon, kung ito talaga yung sira, malamang sa malamang hindi na naming ginagalaw to, pinapalitan na naming agad ito, tinatanngal yung chip tapos lalagay ng bago pero bihira naman yun kasi sobrang higpit iproduce yang mga processor, kung masira man yan eh madalas sa may ari na ang kasalanan. Ang processor ay gumagana is bale ito yung nagbibigay utos sa mismong computer kasi ang motherboard, kuryente lang yan eh pero sa pagcompute o mga arithmethic, logic, ang processor ang humahandle nyan. Nakabase yun gaano kaupdated processor mo sa kung gaano kabilis sila

magcompute dahil lumiliit yung mga pagitan ng mga diode o transistor nila mas mababa na kuryente ang kailangan para magcompute kaya nagiging power efficient mga bagong cpu ngayon.

[08:63] James: Next naman po ay RAM, ano naman po mga naiisip nyo sa RAM>

[09:05] Mr. Balbido: ito ang isa sa mga components na madalas masira di lang dahil sa katagalan pati narin sa maling lagay or natanggal habang nakaandar pa ang computer. Pwede syang maayos, hihinangin tapos papalitan yung chip pero bihira ko yun magawa, madalas ang raw pinapalitan lang. Ang pagdikit ng ram ay 2nd at 4th slot mula sa processor socket kasi napakasensitive ng bios. May Gddr5 na RAM pero naabutan ko is Gddr3, depende yun sa bilis read and write ng data. Dapat kung gddr5 ang RAM mo dapat ang motherboard morin. Kung gagamitin molang ang computer sa mga normal na bagay, ok pa gumamit ng mga gddr3 or 4 na RAM. Mas maganda pag dalawang RAM ang ilagay mo sa computer para magka dual channeling, ang mangyayre dito ay imbes na isa lang ang tumatrabaho sa mga data ng stinostore, matutulungan ng ia at mapapadali ang proseso.

[14:14] James: Ano naman po ang masasabi nya sa graphics card o yung graphics processing unit?

[14:24] Mr. Balbido: video card, eto malaki pinagbago nito, maliit lang to dati eh pero mahina lang rin to dati magrun ng mga 3d application. Halos parehas lang sila ng processor pero ang pinagkaiba ay para sa rendering ng 3d models o videos. Pansin nyo may ibang computer na walang graphics card, dahil yan sa may processor na ginawa para magprocess rin ng display. Gaya ng ryzen 5600x at 5600u, yung 5600x ay para lang talaga magprocess ng computer computation hindi pwede magprocess ng mga display, sa 5600u, pwedeng magprocess ng computation pati graphics. Kaya ginawa nila to para yung mga office pc o tight budget ay di na kailangan bumili pa ng graphics card.

[18:18] James: Paano naman po ang mga input unit o mga keyboard at mouse.

[18:28] Mr. Balbido: eto yung mga ginagamit natin para makipagusap o maintindihan ng computer. Bali cinoconvert nila yung gusto nating sabihin sa computer language parang sa keyboard pag may gusto kang itype, ano man ang pinindot natin icoconvert nya yun sa data na mababasa ng computer. Di lang mouse at keyboard ang input unit pwede rin syang ibang bagay gaya ng controller o mga pen tablet. Meron ding latency na matatawag ang mga input unit, ito yung delay ng pindot mo papunta sa computer, nasususkat sya sa ms o

milliseconds. Nakadepende yun sa lakas ng specs ng computer, mas mabilis magprocess ang computer, mas mababa ang latency pero ang limitation is 1 ms.

[21:12] James: Ano naman po ang output unit?

[21:19] Mr. Balbido: eto yung mga monitor o radio/speaker. Bale kabaligtaran ito ng input, kung anong gusting sabihin ng computer or nakaprogram na gustong sabihin, lalabas to depende sa file, kung mp3 ang ioutput, lalabas to sa speaker. Malki ang pinagbago ng mga output unit noon dilang sa size pati sa specs gaya ng monitor na malalki, ngayon LED na mga screen ang ginagamit na mas efficient at matagal masira.

[23:19] James: Sa mga storage unit, ano po ang masassabi nyo?

[23:26] Mr. Balbido: ito yung mga nagtatago ng mga data na ginagawa ng computer. Dati maliit lang ang storage mga 1gb sa isang kalaking hard drive ngayon, ngayon ang pinakamaliit na hard drive ngayon is 60gb o 120gb, dati mahal na mga ganitong size. Sa mga iterations, dito na pumapasok ang SSD na sobrang ganda lalo na sa windows 10. Pansin nyo may ibang computer na mabagal mag booth, isa sa dahilan ay naka hard drive padin sila. Ang pinagkaiba ng hard drive at ssd eh may disc pa yung hard drive samantala ang ssd eh parang board nlng ang nasa loob, parang memory card pero mas matibay at mas secure sa pagkacorrupt. Dapat ang pipiliin na pang storage ng os is ssd na para mabilis magboot.

[25:51] James: Ano naman po ang masasbi nyo sa power unit?

[25:54] Mr. Balbido: Eto sa tingin ko lang, sa lahat ng component ito yung dapat ingatan kasi oras na ito ang bumigay, madadamay lahat ng components mo kasi ang gingawa nito ay nagcoconvert ng kuryente sa pader sa sa kuryente para sa computer. Kung bibili kayo ng computer, ito ang di nyo tipirin kasi napakadelikado pag pumalya ang power supply, pwedeng madamay ang ibang parts.

[28:20] James: Paano po kayo magbuild ng computer?

[28:30] Mr. Balbido: Huli kong nagbuild ng computer, kasama ko anak ko, una muna ay ikabit ang processor sa motherboard. May tamang orientation yun tsaka dapat di mabaliko ang pin sa processor. Di lahat ng processor ay compatible sa motherboard kaya dapat alam nyo na magkaugnay yung bibilhin nyong magkaibang pyesa. Sususnog ay yung thermal fan pero bago ilagay sa processor, dapat lalagyan muna ng thermal paste ang taas para ito yung magtatanggal ng hangin sa pagitan ng processor at ng fan heatsink.Sunod na ilalagay

ay RAM, dapat dalawa mas maganda pero pwede ring isa. Kailangan lang unang isaksak sa pinakamalaong slot ang Ram parang yung sabi ko kanina na sa 2nd at 4th na slot muna isaksak ang mga RAM. Dapat same speed para mas maganda pero naadjust naman yung ng bios. Pagtapos ng RAM ay ipapasok na ang motherboard sa case, ididikit ang mga screw para di malaglag ang motherboard. Pag nadikit na ang motherboard tsaka na ikakabit ang mga cable ng power supply. Idikit dapat muna yung cable para sa cpu power sunod yung sa 24 pin para sa motherboard. Isusunod yung mga cable ng case na ikakabit sa motherboar gaya ng usb port at power on button. Pagkatapos ng iyon, ididikit mon a ang wiring ng fan sa motherboard, yung mga 3pin o 4pin fan may kanya kanyang saksakan yan sa motherboard. Ilalagay mon a sunod yung storage unit, ikakabit molang yung sata cable sa component papunta sa motherboard, meron ding na cable sa power unit ang dapat mong ikabit sa storage component yung itsurang letter L. Sususnod mo na ang graphic card, meron syang exclusive na saksakan sa motherboard madalas nasa ilalim ng processor socket makikita yun, ang tawag dun ay pci express. pagkakabit ng graphics card kung may external power na kailangan ang graphics card, meron kang makikita na cable sa power supply na pwede mong ilagay dun madalas mga 8pin cable yun or 6 pin. Pag nagawa mo nayun bale tapos kana magbuild ng computer, idikit mo nlng ang mouse at keyboard pati ang monitor at pagkatapos, need mo nalang mag install ng OS. Pag maglilinis kayo ng computer hanggat maari gumamit kayo ng blower kesa vacuum para maiwasan magkastatic yung loob at soft brush lang dapat ang gamitin sa pagwalis. Iwasan nyo rin gumamit ng mga basang panglinis para di madaplisan ng tubig ang mga components. Wag madaliin ang pag ayos ng computer. Kung hindi alam ang gagawin, mas mabuti na isearch nyo muna sa internet para makaiwas kayong makasira.

[37:17] END.

APPENDICES B

Survey Questionnaire

Name:

Age:

What is your strand?

1. Where do you prefer to play video games?
    1. Mobile
    2. Computer

2. Do you have a desktop computer?
    1. Yes
    2. No

3. How familiar are you with Computer parts?
    1. Not at all familiar
    2. Least familiar
    3. Somehow familiar
    4. Very familiar
    5. Extremely familiar

4. How knowledgeable are you about the process and functions of the computer parts?
    1. Not at all knowledgeable
    2. Least knowledgeable
    3. Somehow knowledgeable
    4. Very knowledgeable
    5. Extremely knowledgeable

5. How curious are you to learn the basic concepts of the structure and function of a computer?
    1. Not at all curious
    2. Least curious
    3. Somehow curious
    4. Very curious
    5. Extremely curious

6. How often do you use a Computer?
    1. Not at all
    2. Rarely
    3. Sometimes
    4. Often
    5. Always

7. Do you think that creating a game in line with the computer parts and its functions will help individuals to learn about the subject?
    1. Strongly Disagree
    2. Disagree
    3. Neutral
    4. Agree
    5. Strongly Agree

8. How do you find using a computer to your experience?
    1. Very Difficult

2. Difficult
3. Neither
4. Easy
5. Very Easy

9. How familiar are you in fixing or maintaining computer?
    1. Not at all familiar
    2. Least familiar
    3. Somehow familiar
    4. Very familiar
    5. Extremely familiar

10. How important do you think to learn the computer and its parts?
    1. Not at all important
    2. Least important
    3. Somehow important
    4. Very important
    5. Extremely important

11. How confident are you in fixing a computer yourself?
    1. Not at all confident
    2. Least confident
    3. Somehow confident
    4. Very confident

5. Extremely confident

12. How often do you encounter problems on your computer?
    1. Never
    2. Rarely
    3. Sometimes
    4. Often
    5. Always

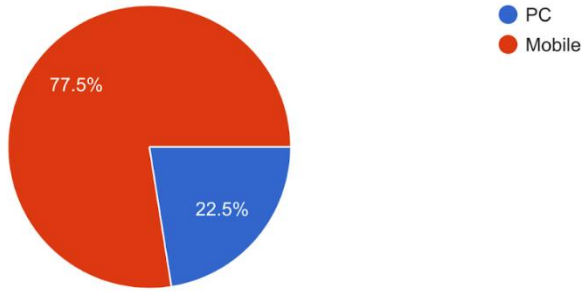
13. Do you find fixing problems on computer difficult?
    1. Strongly Disagree
    2. Disagree
    3. Neutral
    4. Agree
    5. Strongly Agree

APPENDICES C

(Survey Results)

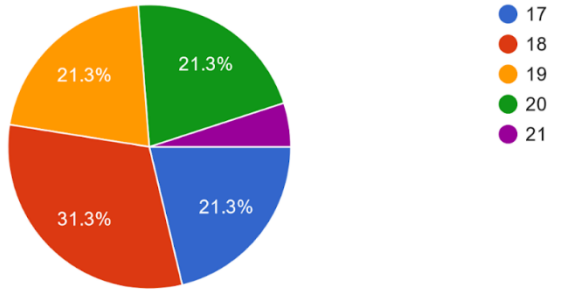
Which do you prefer to play a game PC or Mobile?

80 responses



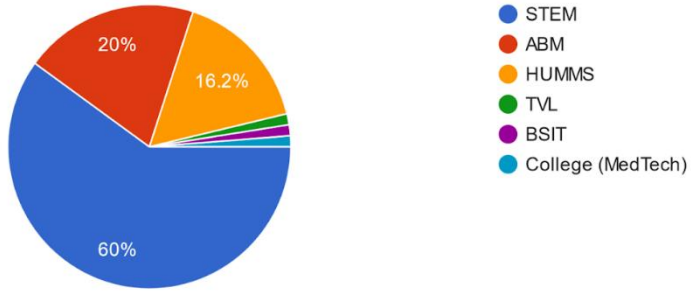
Age:

80 responses



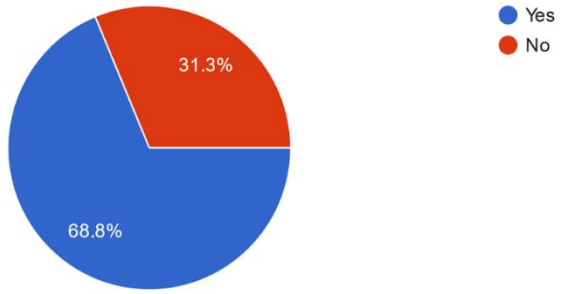
What is your Strand?

80 responses



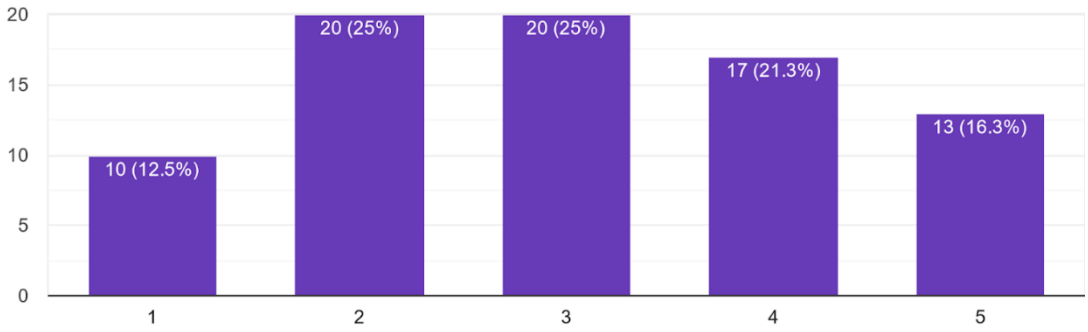
Do you have PC computer?

80 responses



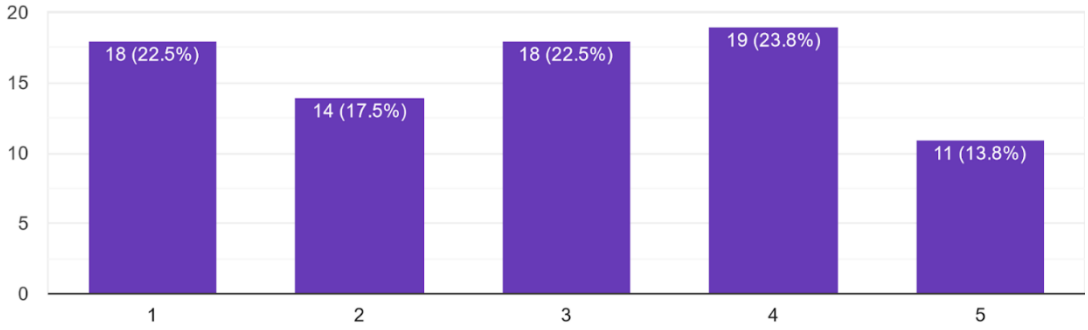
How familiar are you with Computer parts

80 responses



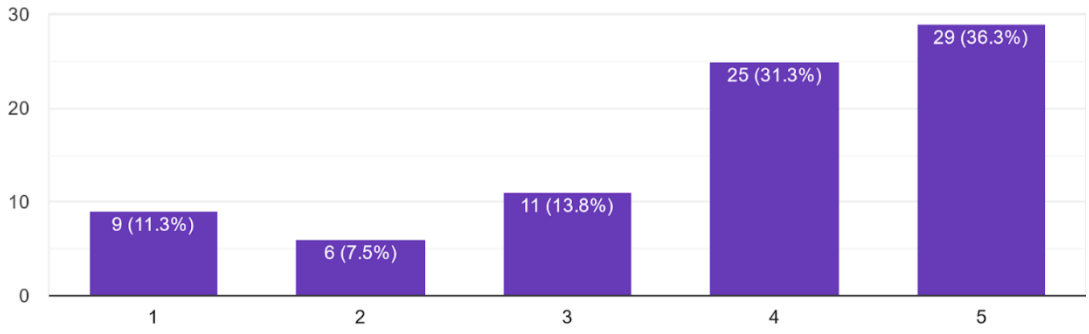
How knowledgeable are you about the process and functions of the computer parts?

80 responses



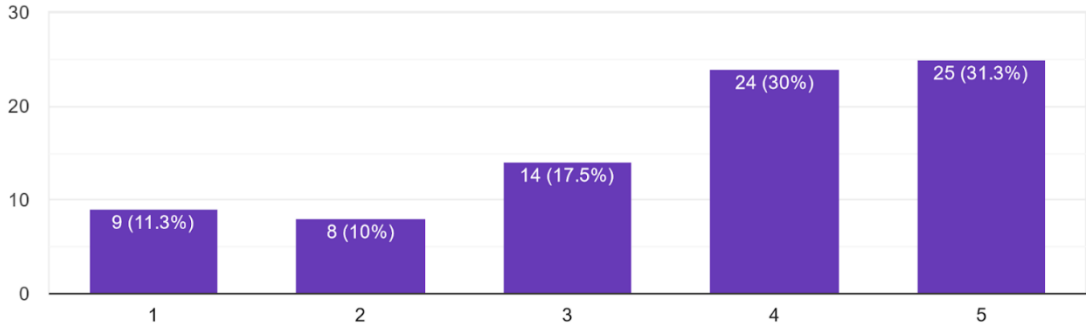
How curious are you to learn the basic concepts of the structure and function of a computer?

80 responses



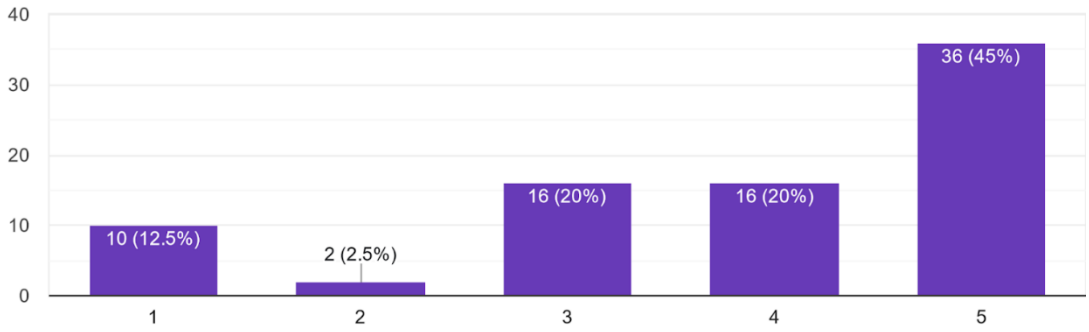
How often do you use a Computer?

80 responses



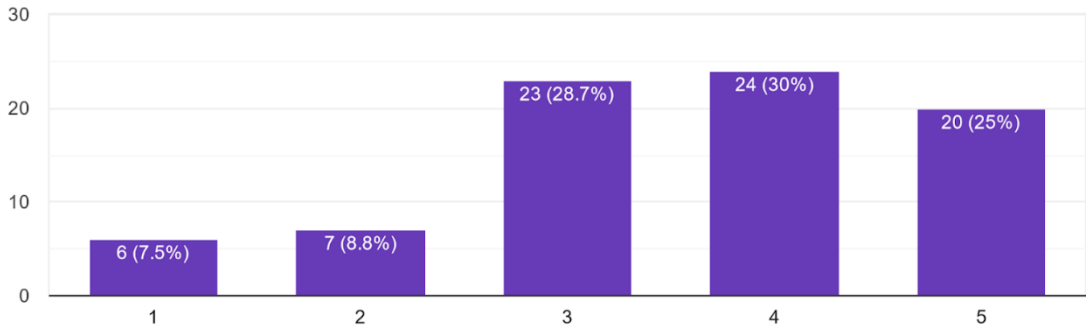
Do you agree that creating a game will help individuals to learn the functions of computer parts?

80 responses



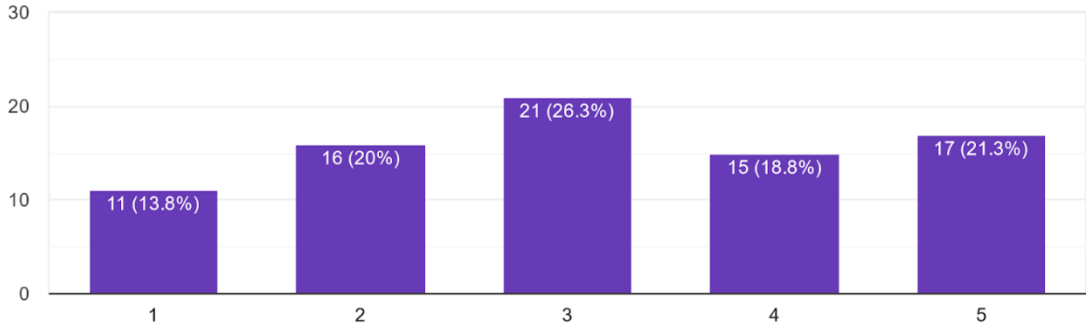
How do you find using a computer to your experience?

80 responses



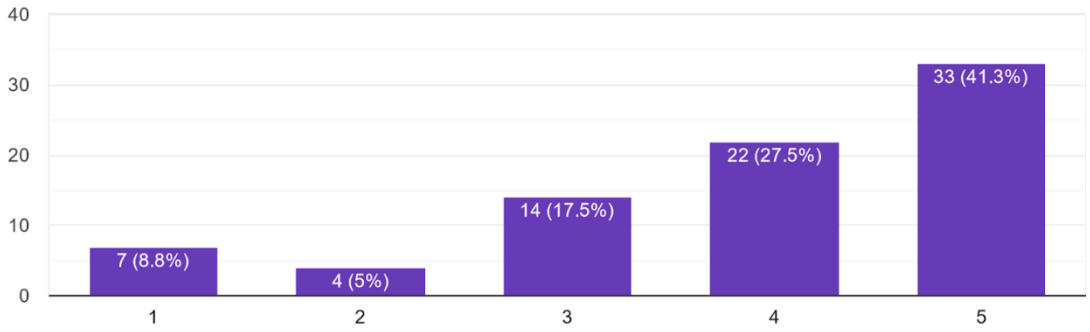
How familiar are you in fixing or maintaining computer?

80 responses



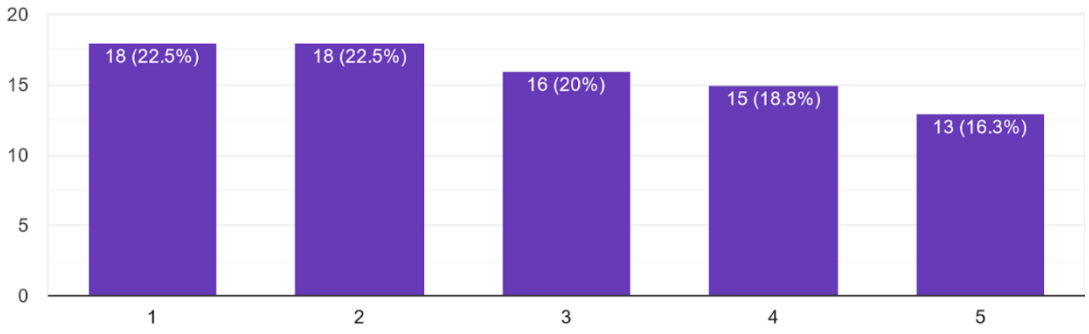
How important do you think to learn the computer and its part?

80 responses



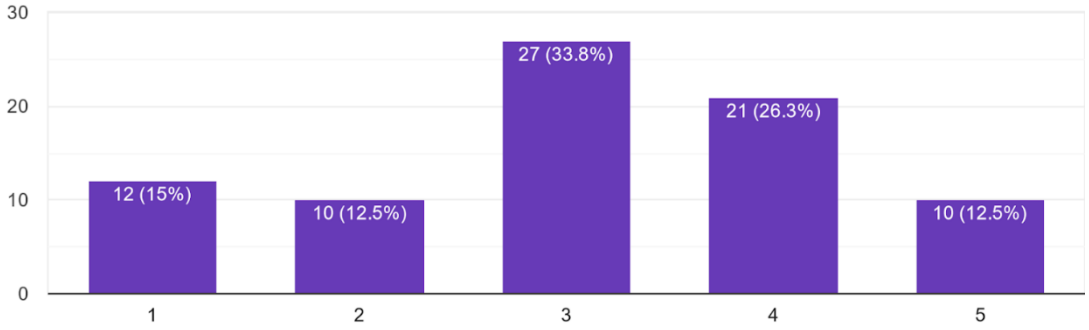
How confident are you fixing a computer yourself?

80 responses



How often do you encounter problems on your computer?

80 responses



Do you find fixing problems on computer difficult?

80 responses