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OF SCIENCES AND LITERATURE

OPTIMIZATION AND INNOVATIVE UTILIZATION OF VIRTUAL CONFERENCING APPLICATIONS: BASIS FOR NEW TECHNOLOGICAL MANAGEMENT APPROACH

A **DISSERTATION**

Presented to the Department of
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In Partial Fulfillment
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by

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The Researcher

Dedication

This humble work is dedicated to:

The Almighty God from whom all wisdom and blessings flow.

All my young brothers – who are my inspirations to strive more to achieve my goals in life.

Everyone in the engineering field who is constantly looking for new ways to assist current generations in achieving their goals through the use of technology and high-quality aided-instruction materials, making them fully equipped with the appropriate wisdom, knowledge, abilities, and skills they require as to face and compete in today's global challenges.

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K.R.D.M.

Abstract

Dissertation Title	:	**OPTIMIZATION AND INNOVATIVE UTILIZATION OF VIRTUAL CONFERENCING APPLICATIONS: BASIS FOR NEW TECHNOLOGICAL MANAGEMENT APPROACH**
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On this fourth industrial revolution of technologies, video conferencing applications are now utilized for online business meetings, online classes, and for scientific and experimental purposes engaged in a virtual meeting room due to rigorous cases of corona virus disease 2019. Several difficulties and technical disruptions were encountered in using the said apps especially during online classes and business conferences. In connection thereto, this Optimization and Innovative Utilization of Virtual Conferencing Applications dissertation was developed to have a new basis for technological management approach based on the most common used video conferencing applications. The encountered problems, considered factors, and optimization processes were also determined. Descriptive quantitative research was used as methodology, and initial closed-ended questionnaires, evaluation forms with 4-point Likert scale, interviews, consultations, and testing were the instruments and sources of data. Three hundred one (301) respondents were randomly selected around the Province of Laguna, Philippines, which composed of 203 respondents from schools, 78 respondents from companies, and 20 professional evaluators. The developed strategic model was evaluated using the 6 out of 8 general characteristics of ISO/IEC 25010: 2011 system quality model, which includes usability, reliability, performance efficiency, maintainability, compatibility, and security. All data gathered were validated as well as the statistical treatments such as percentage, weighted and composite means, and t-test, which was used to determine the significant difference of the normal and optimized utilization of video conferencing applications. Obtained results revealed that utilizing the developed strategic model was significantly acceptable and effective rather than the normal utilization of the common apps. The teachers and students and as well as the workers of business enterprises are the beneficiaries of this study to optimized and utilized the said applications for better learning and optimal workflow.

Keywords: The new normal environment, video streaming, online distance learning, business meetings, work-from-home, fourth industrial revolution, remote collaboration.

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Chapter 1
The Problem and Its Setting

Introduction

Nowadays, the fourth industrial revolution of technologies (i4.0) developed different multimedia application (app) platforms using laptops, smartphones, and tablet devices, which build a communication between two or more people from different parts of the world through Internet. These devices contain applications that can be use for communications by social media platforms, and online messaging and video conferencing platforms as well. Likewise, Arellano, de Mesa and Desuasido (2018) highlighted that most of the people now are using application-enabled computers and personal devices with embedded web cameras, which the said apps can easily download through Play Store and Apple Store depending on the operating system (OS) used by the users as long as it has an Internet connectivity. Besides, application platforms are set of services that application programs use to do routine tasks. It provides development tools, execution services, data services, operating systems (OS), and cloud services, among other things. (Gillis, 2018). One of most widely used applications are the video conferencing platforms also known as videotelephony and video teleconference. In video conferencing, data is transmitted via live video stream between two or more video-enabled devices from different locations. It provides people with the ability to meet face to face long distance, and collaborating transmission of audio text, video, and presentations in real-time. (Video Conferencing, 2021). These video conferencing apps are now utilized for online business meetings, online

classes, and for scientific and experimental purposes engaged in a virtual meeting room especially in the last quarter of 2019 due to initial cases of corona virus disease (COVID-19) from Wuhan, China.

In connection thereto, the World Health Organization (WHO) declared a Public Health Emergency of International Concern (PHEIC) last January 2020 as the COVID-19 had an increased number of human transmissions across the Philippines and other countries (Department of Health [DOH], 2020). As we are now experiencing globally a pandemic, schools and universities implemented a blended learning approach to holding classes, particularly favoring online and modular approaches to instructional delivery. Even big and small companies advised their employees in making sure that they will stay at home to fend off the widespread of such virus. Furthermore, St. George, Strauss, Meckler, and Nathanson (2021) emphasized that COVID-19 pandemic has transformed the teaching and learning processes, testing basic ideas, and reshaping the way students learn and teachers interact through computers and other devices.

As mentioned above regarding the use of video conferencing platforms before and during the pandemic crisis in which the said business conferences and online classes continue to operate, fast Internet connectivity is the most important requirement in virtual meetings. Schembri (2019) stressed the space equipment. and the fast and stable quality of the network, which can handle high-quality audio and video without any lagging and disturbances. Additionally, several online presentations tools such as Prezi and Keynote require a stable Internet connection to operate at their best, which provide a rich multimedia capability during virtual meetings. Unexpected uneven loading disruption of presentations

can result to frustrations of the attendees, waste of time, and hinder of productivity. Moreover, video conferencing meetings also involves cooperation between the attendees by adding, editing, and reviewing necessary document contents in real-time basis otherwise overwriting or deleting by mistake can be made for having a poor network connection.

Relationally, Ahmed (2020) emphasized the role and functions of technology management, which can be categorized by effective managing resources, maintaining open communications, developing customer relationships, and data-driven decision-making using technologies, which can be applied in schools and most especially by companies. With the mentioned roles of technology management, developing a strategic model of innovative technological management advancements have the potentials to solve the problems for online learning especially in using the video conferencing application platforms. Technology advancements in online education are made possible by mobile computing, computer and mobile application platforms, and transformative technologies, which could lead to the development of innovative technological management models aimed at better understanding technology changes for computers and personal gadgets or even other devices and know how those things can be maximized for new innovative way of online learning. The previous, present, and succeeding technology trends in terms of online distance learning systems or blended learning systems are the main foundation for identifying the suitable methodologies and techniques that can be used in determining the things needed to be improved, physical attributes (hardware) and program (software) evolutions, scrutiny, and deciding the appropriate criteria or evaluation requirements in developing the said model (Cook & Sonnenberg, 2014). All destiny on line coaching and

mastering groups will be motivated and benefited by seamless era integration and without boundary lines networks for proper and innovative technological management awareness.

Likewise, when analyzing distinctive traits of a system or an application platform, the International Organization for Standardization/International Electrotechnical Commission 25010 of 2011 (ISO/IEC 25010: 2011) system quality model establishes which quality attributes were examined. To deliver its quality value, a system must please the cited and important needs of its customers. General as well as sub-characteristics were used to categorize the system quality model such as functional sustainability, usability, reliability, performance efficiency, maintainability, compatibility, security, and portability (International Organization for Standardization, 2021). Kijesbu (2014) also added additional two key factors aside from reliability and security in evaluating video conferencing applications and these are the scalability and simplicity, which are also considered as maintainability and usability based on the ISO/IEC 25010: 2011.

The setting and research locale of this dissertation were the several schools, colleges, and universities around the Province of Laguna, Philippines, which implemented the online distance learning. Likewise, several companies, which implemented the work-from-home environment are also considered as research locale since this dissertation can be used as basis for both education and business sectors, respectively. In connection thereto, the implementation of online classes should have a clearance to operate blended learning approach issued the Department of Education (DepEd) and granted an autonomous status by the Commission on Higher Education (CHED), respectively. During the online and modular classes, there are problems encountered while using the different

video conferencing apps such as disruption of Internet and mobile data connectivity, improper use of battery life operation and charging of laptop computers and personal devices, inapplicable computer hardware specifications, maximize consumption memory storage, and multi-tasking utilization of different applications. These said problems greatly affects the lecture and laboratory classes of different degree programs of the several schools, colleges, and universities, and most especially the engineering students and faculty.

The developed strategic model approach in utilizing video conferencing applications platforms can also be applied in all schools, colleges, and universities during their online classes. With the said model, the teachers and students will seek solutions to the common problems encountered and use the previous time consumption for catching up to their lectures and school activities. Likewise, the companies and small enterprises can also benefit to this dissertation to minimize laggings and other unexpected disturbances during their meetings for efficient flow of workforce and business transactions. The overall benefits of using the aforementioned platforms include the ability to set up virtual video and audio conferencing, webinars, live chats, screen-sharing, and other collaborative features to make collaboration simple for small to midsize businesses (Antonelli, 2020).

The purpose, goal and objective of this dissertation was to establish a new technological management approach based on the innovative ways of optimization and utilization of different video conferencing application platforms used most especially during online classes. This benefited mostly by the students, teachers, and big and small businesses in which the main communication now is through video conferencing.

Furthermore, the different technological management aspects were also included in the newly developed strategic model. These include the laptop and mobile device battery optimizations, optimization of multi-tasking utilization of other applications, optimization of Internet and mobile data connectivity and its security, minimizing the consumption of computer hardware memory storage, and other technological properties such as usability (simplicity), reliability, performance efficiency, maintainability (scalability), compatibility, and security using the six (6) out of eight (8) of the ISO/IEC 25010: 2011 system quality model general characteristics.

This dissertation mainly focused on the development of an innovative approach strategies, which can be used with the said different video conferencing apps through different computer and personal devices. Besides, new normal education and business sectors must keep up with new technologies in the same manner as they must stay on top of online learning advances. While utilizing existing technologies to their advantage, schools, colleges, and universities as well as small to midsized companies must also keep an eye on new developing technologies to adopt those that improve efficiency and maximizing the learning experience of the students, and workforce of the employees.

Theoretical/Conceptual Framework

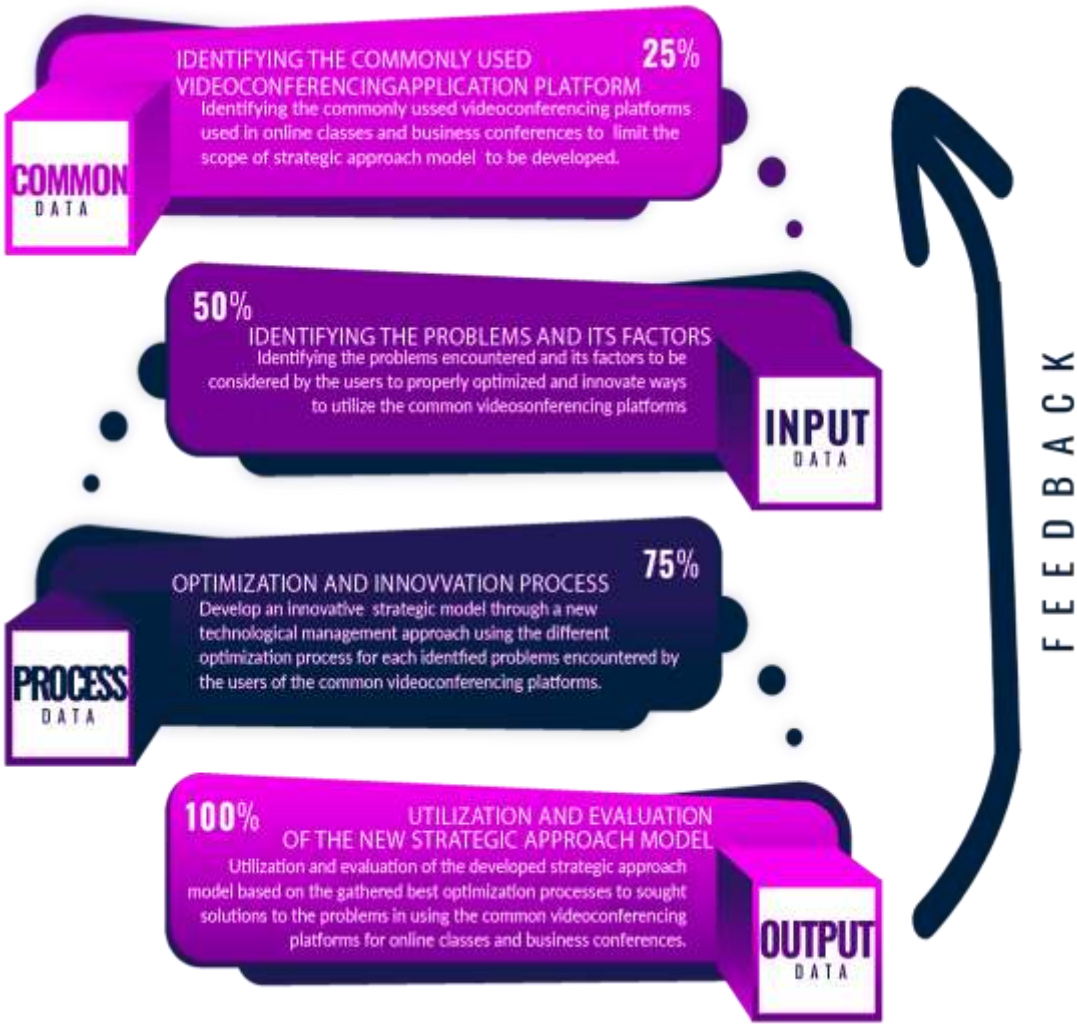

Figure 1. The Conceptual Model of the Dissertation

Figure 1 shows the conceptual model of this dissertation, which composed of four (4) phases. Identifying the commonly used video conferencing application platforms for online classes and business conferences to sort and limit the broadness of the strategic

model to be developed. It was only evolved to the identified platforms to be easily understand by the users. These sorting phase served as the common data to initialize the input phase. Input data were the problems encountered and factors to be considered in using the said platforms, which were identified and sorted in the common phase. After determining the input data, these underwent different optimization processes to determine and develop a new strategic innovative model also known as the process data through technological management approach as basis in utilizing the common data. Upon the development of the process data, it underwent a series of evaluation to determine its usability (simplicity), reliability, performance efficiency, maintainability, compatibility, and security. Output data served as the developed strategic model approach in using the common video conferencing application platforms by the users following the series of evaluation using the six (6) out of eight (8) general characteristics of the ISO/IEC 25010: 2011 system quality model in terms of usability, reliability, performance efficiency, maintainability, compatibility, and security to meet the required specific requirements.

Statement of the Problem

This Optimization and Innovative Utilization of Virtual Video Conferencing Applications dissertation was developed to have a basis for new technological management approach to determine the different innovative strategies utilizing different video conferencing application platforms especially during online classes and business conferences. Particularly, this dissertation sought answers to the following specific problems:

1. What are the most common video conferencing application platforms used for online classes and business conferences?
2. What are the problems encountered in using the different video conferencing application platforms used for online classes and business conferences?
3. What are the factors to be considered in using the different video conferencing application platforms?
4. What are the optimization and innovative technological management approach in using the most common video conferencing application platforms for online classes and business conferences?
5. What is the strategic model to be developed in using the most common video conferencing application platforms?
6. Is there any significant difference between the normal utilization and the developed optimized innovative technological management approach model in using the most common video conferencing application platforms used for online classes and business conferences in terms of usability, reliability, performance efficiency, maintainability, compatibility, and security?

Statement of the Hypothesis

There was no significant difference between the normal utilization and the developed innovative technological management approach model in using the most common video conferencing application platforms used for online classes and business conferences in terms of usability, reliability, performance efficiency, maintainability,

compatibility, and security.

Assumptions of the Study

The video conferencing application is a new and modern way of connecting people across the globe in terms of business and educational purposes. This platform is also a part of the fourth industrial revolution of hardware and software technologies. Likewise, it also connected to the online technologies, network security, and cloud computing technologies, which bridges all the gaps in connecting people, building collaborations, and sharing of learning experiences.

In connection thereto, the functions of technology management in developing a strategic model approach served as the optimized planning and execution in utilizing the said platform for an enhanced way of communication and develop a better school and work relationships of the users. The said approach can be utilized by all schools and business enterprises, which are now dealing with the heights of the new normal education and working environments. This dissertation focused on the developed strategic model for innovative approach in utilizing the common video conferencing application platform not only during the pandemic crisis but also for the long-term use for online classes and, business meetings and conferences.

Scope and Delimitation

The main locale of this dissertation was at the College of Engineering, Architecture and Aviation of the University of Perpetual Help System Laguna (UPHSL) in the City of

Biñan, Laguna, Philippines, which have the major student population of the said university. Other colleges and departments of UPHSL, and other selected schools, colleges and universities around the Province of Laguna were also considered as the research locale of this dissertation. The students, college instructors, and administrators were the main respondents to evaluate the developed strategic model for technological management innovative approach in utilizing the most common virtual video conferencing application platforms used for online classes and business meetings. Employers and employees from selected companies in the Province of Laguna also served as the main respondents and evaluated the said strategic model.

This dissertation focused on the development of a strategic model for technological management innovative approach to sought solutions to the problems encountered and the factors to be considered in using the said platforms, The most common video conferencing application platforms used for online classes and business conferences were Zoom, Google Meet, GoToMeeting, Microsoft (MS) Teams, Cisco WebEx, and Skype applications. The optimization processes and solutions for hardware, software, network, and online technologies were included in the said developed strategic model.

The main optimization processes included in the newly developed strategic model were the laptop battery optimizations, optimization of multi-tasking utilization of other applications, optimization of Internet and mobile data connectivity and its security, minimizing the consumption of computer hardware memory storage, and other technological properties such as usability, reliability, performance efficiency, maintainability, compatibility, and security using the six (6) out of eight (8) general

characteristics of the ISO/IEC 25010: 2011 system quality model. This dissertation mainly focused on the development of an innovative approach strategies, which can be used with the said commonly used video conferencing apps through different computer and personal devices.

Other applications, which were not mentioned above as the commonly used video conferencing platforms could not be suitable for the developed strategic model. Likewise, other optimization processes and solutions could also not compatible with the commonly used platforms and vice versa. The said basis can be used not only during the pandemic crisis but also for the long-term use for online classes and, business meetings and conferences. The results of this dissertation were only focused on the comparative analysis between the developed innovative technological management approach model in using the most common video conferencing application platforms used for online classes and business conferences in terms of the said six (6) out of eight (8) general characteristics of the ISO/IEC 25010: 2011 system quality model.

Significance of the Study

The dissertation mainly benefited by the teachers and students and as well as the employers and employees of business enterprises to have a basis for new technological management approach to determine the different innovative strategies utilizing different video conferencing application platforms especially during online classes and business conferences. Particularly, the following were the specific beneficiaries of this dissertation:

1. The students and teachers at schools, colleges and universities implementing blended learning can maximize the time allotment in their lectures and activities by applying the developed strategic management approach in using the common video conferencing application platforms.
2. The employers and employees of small to midsized companies can be able to hold difference meetings without any disruptions.
3. The companies which are now using the common video conferencing application platforms as a new communication from other companies can collaborate and share business presentations without any lagging and other interruptions.
4. Computer engineers, and computer and information technology technicians of schools and companies can utilize this dissertation as basis on the improvement Internet and network security connectivity for better network coverage in using the common video conferencing application platforms.
5. The common users, professional associations, local government units and other non-profit and non-government organizations that organize different webinars and conferences can have the said basis to improve their seminars to be more innovative.
6. The studies that are linked to this research can be used as a reference for researchers and future researchers. They can also get information that will help them improve and modify this dissertation in the future.

Definition of Terms

The following terms were defined both conceptually and operationally for a better understanding of this dissertation.

Optimization process. It is to decrease or eliminate time and resource waste, needless expenses, bottlenecks, and errors while achieving the process goal. (Heflo, 2020). It is process of eliminating the unnecessary problems encountered in using the common video conferencing application platforms.

Innovative utilization. It is the way in making new process by showing unique plans or suggestions, tools, techniques and even procedures to attain a completion (Merriam-Webster, n.d.). It is an approach of using the developed strategic model in using the common video conferencing application platforms.

Virtual. It is a process of simulation on a computer or computer network (Merriam-Webster, n.d.). Video conferencing application platforms are for virtual meetings and conferences.

Video conferencing. It is a way of communication transmitted via live video stream between two or more video-enabled devices from different locations. It provides people with the ability to meet face to face long distance, and collaborating transmission of audio text, video, and presentations in a systematic and a current time manner (Video Conferencing, 2021). This is now the way of communication during online clauses and business meetings.

Application platform. It is a set of services that application programs use to do routine tasks. It provides development tools, execution services, data services, operating

systems (OS), and cloud services, among other things. (Gillis, 2018). Video conferencing is a type of application platform, which the users can communicate through livestream video over the Internet.

Technology management. It is described as a collection of duties that enable a firm to use technology efficiently to fulfil its goals. These responsibilities are separated into three categories: acquiring technology, using technology, and developing technology. (Gema, 2021). It is an approach of managing the video conferencing platform applications and other hardware, software, online and network technologies.

Chapter 2
Review of Related Literature

This chapter focused on related literatures and studies for both international and local researchers, which were gathered from books, journals and term papers including hypotheses, methodology, findings and conclusions, blogs, newspapers, electronic books, articles, and online materials, which were used as references and additional information for the progression of this dissertation.

This chapter also included the synthesis of the state-of-the-art review, as well as various comparisons and differences between the prior and current studies. Furthermore, the current study filled in the gaps by validating aspects that earlier researchers had overlooked, as well as addressing the gaps in growth creation in this dissertation.

State of the Art

The state of the art was split, and it included a variety of publications and research that employed a specific review method. These articles featured data from previous studies and a literature analysis on the online video conferencing and its advantages in business and online classrooms, hardware and software in online technologies, technology management, and optimization and use of technological tools for virtual meetings, all of which are useful in improving current studies.

In the twenty-first century, video conferencing is an important component of doing business. It allows for comprehensive visual communication with clients and coworkers at any time and place. In addition, a video conference may save money and minimize environmental impact in a variety of unexpected (but important) ways. With all the advantages, risk losing the competitive advantage as more firms use video conferencing as their primary means of communication.

In the past couple of years, video conferencing changed into hampered through excessive prices and community delay. But this is not the case, and more meetings are being held online in preference to in person. really placed, face-to-face encounters are step by step turning into obsolete. Initially, video conferencing was only utilized to save money on trip. The advantages of video conferencing are now numerous. Cooperation has never been easier, and as more people become aware of the benefits of collaboration, video conferencing is becoming more popular. Stepped forward communication, better enterprise connections, extra effective meetings, worker pride, and a competitive gain are all advantages of video conferencing. (The Business Benefits of Video Conferencing, 2020)

Progressive way of video conferencing software has to do more than just displaying face to the globe. whether or not trying to have a brief chat with a colleague or plan an all-hands presentation on the calendar of everybody, an excellent video conferencing gadget makes it simple to generate a meeting hyperlink or dial-in wide variety, proportion it with others, and upload greater

members to in-development meetings. It has to also include functions that permits to show facetime into collaboration time, along with display screen sharing, annotation or whiteboarding, and live chat. The best covered apps that have those features because they are crucial for making digital conferences as productive as in-individual conferences.

A good video conferencing application, according to Herman (2020), should be reliable, which implies that it ought to permit for constantly clean calls that don't drop or emerge as choppy. even as some of the apps on our list are better suitable for smaller companies, there are some standouts which can take care of big-group video conversations. Zoom for dependable, large video calls, Google Meet for Google Workspace (previously G Suite) customers, GoToMeeting for expert features, be a part of.me for a light-weight choice, WebEx for whiteboarding, and Slack for calls from your crew chat app are a few of the six exceptional video conferencing packages in 2020.

According to Figat (2021), using your computer, tablet, or smartphone, video conferencing software allows you to connect and meet with individuals all over the world. Video conferencing is depicted in classic films like Back to the Future as a far-off concept for the distant future, yet anybody with a good internet connection may use video conferencing software to quickly and simply video chat with friends, family, or business colleagues. Naturally, not all video conferencing software is created equal. Some applications are better for one-on-one calls, while others are better for small groups and large gatherings or webinars. Whatever the

case may be, the finest video conferencing software must have two qualities: dependability and ease of use. Because of that, the following are the best video conferencing software options for 2021: Best for Best Overall: Zoom, Freelancers and Solopreneurs: Whereby, Slack, for example, is best for in-house meetings. Skype is the best value. Google Meet is the best free option, and Microsoft Teams is the best for calendar integrations.

Governments and public fitness organizations all around the globe have developed social distancing and stay-at-home measures to cope with the COVID-19 outbreak. Being socially worried has grown extra challenging as there are much less opportunities to spend time collectively in individual. This paper examines how the pandemic has affected people's usage of digital conversation techniques, in addition to how disparities of their use may additionally have arisen. The researchers primarily based the findings on information obtained from 1,374 people inside the America between April four and 8, 2020, nearly weeks after lockdown measures were carried out in diverse regions of the USA. Researchers have a look at telephone calls, video calls, textual content messaging, social media, and on-line gaming to peer if individuals have changed their digital media utilization to talk with buddies and circle of relatives. Then, throughout the pandemic, show how characteristics like age, gender, residing alone, internet connection difficulties, and net talents effect adjustments in social interplay. take a look at how the people use of virtual media for social connection can be unequally dispensed all through a worldwide public health crisis, and how inequities might also stay lengthy after the

pandemic has surpassed. Given the feasible impact of the COVID-19 pandemic on humans' social well-being, such information is crucial. The researchers additionally pointed out how modifications in digital media utilization may want to outlive the epidemic and what these implications for future conversation and media studies (Nguyen et al., 2020).

According to the Influence The corporate world of COVID-19, as well as the economic sector, came to a halt due to the pandemic. Standard health precautions have been maintained, such as social distance, the requirement of wearing a facemask, and the avoidance of large gatherings. The researcher proposes that, in addition to the learning management system, a video conferencing platform be used, for the reason that this may update the face-to-face setup and actual-time enter from students to the trainer. For companies and different educational establishments wanting to engage with clients, distant workers, or even students, video conferencing has long been a vital component within the components for fulfillment (Beauford, 2020). because of the emergence of COVID-19, the findings mean that present regulations and educational strategies might be modified. In contrast to preceding research on videoconferencing in better training, Zoom and Google Video Conferencing meet the demands in a broader consideration of the relevant challenges that rise up while the use of sure video conferencing structures in learning and coaching situations, and that can be used inside the modern-day state of affairs. In instances like these, we actually want to undertake new technology systems that include the impacts of COVID-19 and may result in the

hole of the brand new normal in all sectors. using Video Conferencing will now not wreck any quarantine tactics and will assure the protection of each kid and instructors.

Technological Management Approach

Innovation is critical for companies to obtain a competitive advantage in quickly changing business landscape of today. In the current literature, there are a variety of aspects connected with technology management and innovation in businesses. As a result, there is a need to close these disparities in the amounts of appropriate innovation across companies. The primary intention of the study is to discover, give an explanation for, and understand the links among the observed technology-related elements that influence organizational creativity. The use of a literature takes a look at, six significant variables have been determined. The findings display that organizational innovation is encouraged by way of personnel technical capabilities, technological infrastructure, technological alliances, era switch, and top management help. The findings also display that senior management support and an organization's technical infrastructure have a stronger affect on creativity (Rajan et al., 2021). A literature analysis yielded a total of six significant variables. The findings show that technical skills in the workforce, technological infrastructure, technological alliances, technology transfer, and top management backing all influence organizational creativity. The findings also show that senior management support and technical infrastructure of the organization have a stronger influence on creativity.

The hard reality of COVID-19 and its influence on the economy, and livelihoods of the people has forced organisations and their workforces to make major adjustments, according to Caroll and Conboy (2020). The changing nature of work, for example, has made remote working an inescapable component, demanding the quick creation and deployment of new work models. With little steering on a way to mainstream new generation-driven work practises, chief information officials and IT managers ought to ensure the productiveness in their groups throughout companies as a key precedence. Because of the COVID-19 outbreak, the talk over new requirements has turn out to be a lot greater glaring in each day lives, appreciably altering society norms, and we've got all been aware of a new regular. As a result, it is pretty hard to devise for, deploy, embed, and integrate generation to guide new requirements. Worse, governments and politicians have offered no steering on a way to efficiently deal with those big alterations in paintings styles. This observe defined the application of Normalization method principle (NPT) and its software in presenting a novel theoretical perspective on the normalisation of recent technology-driven paintings practises, in addition to (ii) realistic insights on how NPT can better manual corporations to normalise generation-driven work practises at some point of pandemics. This paradigm targets to provide an explanation for the influences of pandemics and stimulate debate about the normalisation of recent tech-driven paintings practises and shifts. Leading corporations are an increasing number of expertise that a part of their enterprise stricken by era provides a danger to acquire

or lose accept as true with. They are viewing trust as a business-critical goal to be sought, rather than a compliance or public relations issue. In this view, ensuring that the various components of an organisation's generation, tactics, and those are functioning in concord to sustain the high stage of self assurance demanded with the aid of their many stakeholders will become a 360-degree project. Business leaders are rethinking how their goods, services, and decisions—such as data management, partner ecosystem development, and staff training, among other things—build trust. CIOs are stressing "ethical technology" and developing tools to assist individuals in recognizing ethical problems when deciding how to employ disruptive technologies (Tech Trends, 2020). Leaders that integrate organizational values and tech ethics throughout their business demonstrate a commitment to "doing good," which may help create long-term stakeholder trust.

According to Kutner (2021), change is tough, and integrating new technologies is much more so. People detest change unless they believe it will benefit them directly. Even when it is, new technology is rarely seen in this light. Change management is the process of embracing, controlling, and implementing change. Technology change management is the process of identifying new technology and putting it into practice to increase productivity and profitability. It lowers resistance, increases communication, and handles the difficulties that come with big change.

The seventy percent of digital transformations fail, according to McKinsey & Company. According to a recent BCG report, 75% of transformation projects fail

to provide the expected benefits. Why? Goals for technology projects are frequently misidentified, and inadequately conveyed. Employees are both frightened and frustrated by this. Instead of adoption, you will get opposition, departmental misalignment, and conflicting interests with no shared goals. As a result, there are five phases to successful technological change management, the first of which is to establish and convey clear goals. 2. Assemble a group. 3. Establish a strategy. 4. Prepare for opposition. 5. Maintain a culture of continual development.

Digitalization and the shrewd use of data and verbal exchange technologies (ICT) are critical elements of a hit innovation, competitiveness, and improvement, and they offer MSMEs numerous ways to beautify their market function and resilience to demand and deliver shocks. As big companies increasingly more take use of the advantages supplied by way of virtual era, MSMEs have to follow in shape to avoid being sidelined or excluded from rapidly changing marketplaces and supply networks. Innovation can refer to any novel method to enterprise structure, advertising method, or product distribution that aids within the improvement of recent or stepped forward merchandise (Lavilla, 2020).

Technological Innovation: Strategy and Management examines technological innovation management from a strategic and integrated standpoint. The book covers the most important topics in the field of Innovation Management, such as the conceptual framework for innovation and technology, the study of innovation sources, strategic innovation and technology management, innovation enablers (organisation, leadership, culture, human capital, creativity, and learning),

innovation outcomes (product and process innovation), and innovation and technology evaluation. It highlights the significance of technology and innovation in building long-term competitive advantages (Manjon, 2020).

According to LSBF (2020), Strategic Technology Management Systems (STMS) effectively handle an essential challenge of the company, such as product or service process technology control. Creation, monitoring, appraisal, transfer, acceptability, utilization, maturity, and decline are typical stages of technology management. Technology strategic management is supported by several well-founded conceptual frameworks. It makes a speciality of management methods and tools and how they may be mixed to create novel practical packages.

The development of the organization's overarching mission and dreams is aided with the aid of commercial enterprise control tools. These tools are often used to investigate a progress utilizing systematic techniques of the company for gathering, analyzing, organizing, and communicating data. This feature aids organizations in developing and implementing strategies to achieve important objectives, as part of contributing factors to decision-making and management.

Instead of acquiring innovations from out of doors resources, early-level era acquisition and protection encourages corporations to use their personal internal studies and improvement. This trend of internal technology development enables firms to introduce new technologies. It allows the firm to produce novel goods and, eventually, expand into other markets. Making early decisions regarding

technology purchase and protection may offer firms with organized advice. This allows them to consider all their alternatives and weigh any trade-offs.

Online Class

Although computer-based totally generation has pervaded many aspects of life and industry, in keeping with Schindler et al. (2017), little is thought about how it could be used to improve student engagement, an idea this is gaining traction in higher schooling because of its link to a spread of advantageous academic effects. The purpose of this look at is to give an essential evaluation of recent studies on how web-conferencing software, blogs, wikis, social networking websites (fb and Twitter), and virtual video games effect student engagement. A detailed analysis of scholar participation definitions and indicators preceded the findings, which found out three kinds of engagement (behavioral, emotional, and cognitive) that affected how articles were categorised. in step with the study, virtual games, observed by means of net conferencing and fb, generally tend to have the finest have an effect on diverse styles of pupil participation. With only some studies posted within the preceding 5 years, wikis, blogs, and Twitter findings are less definitive. common, the findings imply that pc-based totally technology has an influence on scholar participation, but similarly studies are wanted to verify and make bigger on those findings.

Even though it changed into their first experience with online lessons for the duration of the COVID-19 pandemic, the student's idea that on line schooling changed into beneficial to them (Agarwal & Kaushik, 2020; Rajabalee & Santally, 2020). In line with previous research, era-assisted publications have a superb affect on performance of the scholars. Demographic variables, on the other hand, have a vast impact on how properly a web route succeeds. according to the APA paintings organization of the Board of educational Affairs (1997), learner-targeted thoughts imply that scholars need to be willing to make investments the time required to perform positive direction goals. on-line educators have to be enthusiastic about developing proper educational gear that actively connect college students and motivate them to reap their complete potential. For increased academic achievement, both teachers and students share equal responsibilities. If a student is having trouble grasping a concept, he should seek help from the instructor (Bangert, 2004). As a result, "instructor quality, student expectations, rapid feedback, and effective course design" all have a significant impact on students' online learning experiences. (Gopal et al., 2021).

According to Bui (2020), numerous individuals can recognize that EdTech is committing innovation to advance instruction. It is far proper, however now not adequate. The association for Instructive Communications and Innovation (AECT) has characterized EdTech as "facilitating mastering and moving forward execution by making, using, and overseeing becoming progressive bureaucracy and resources." then again, teachers who clearly utilize EdTech have a far easier

definition of the term. they are saying that it could be a concept of changing conventional e-book teaching and getting to know to advanced shape. For them, the maximum distinction lies inside the manner facts is conveyed (a lot obliged to innovation advancement) to form instructing extra possible.

In brief, EdTech is basically will be a take care of coordination innovation into practise to construct superior teaching/studying encounters that bring about higher getting to know outcomes. era is a development of human beings, so when an educator can apply innovation to teaching, it's far additionally inventive. EdTech lets in teachers to supply interactive media to cope with distinct gaining knowledge of patterns, which includes activity, stay video, and so forth. apart from, EdTech empowers instructors to make on-line guides where understudies can examine in their claim space and at their declare tempo. Innovation has made it potential for everyone to remain related. Understudies and interface of the instructors, talk approximately, share their suppositions, and act upon occasions collaboratively.

The maximum full-size gain of unconventional on-line gaining knowledge of is that it enables understudies to take part in gaining knowledge of conditions when distance and time constraints make on-ground learning difficult-to-impossible. Students can take part in training from everywhere within the globe in the event that they have a laptop and a web connection. moreover, the web arrangement gives physically challenged college students (and teachers) more freedom to take part in elegance. Individuals use their laptops to get admission to the virtual study room in preference to physically "going to magnificence." The

virtual study room is open 24 hours an afternoon, 7 days per week. any other gain provided by way of the web mastering enterprise is time effectiveness. Nonconcurrent conversation thru net conferencing answers enables experts balancing task, circle of relatives, and contemplation schedules to participate in educational discussions. there's no address for nearly performing the venture; honest do it when it is greater convenient. college students can attend their instructions at any time of day or night time. they've constantly gotten to deal with, path materials, and class debates earlier. that is often very useful for folks that might also need to review a speech or take extra time to contemplate on some topics earlier than occurring. the net shape permits for lively engagement among professors and students, as well as amongst students themselves. Property and ideas are shared, and long-time period cooperative energy will be generated due to the mastering preparation. anyone can make a contribution to the route lectures and provide remarks on other humans' efforts. one of the maximum exciting and essential elements of the web gaining knowledge of enterprise is the synergy that develops inside the scholar-targeted digital study room (University of Illinois Springfield, n.d.)

Technology Tools for Virtual Meetings

According to Zeuge et al. (2020), virtual and physical collaboration ought to in a perfect world be rotated and combined. Parts of measures depicted by writing to extend the victory of virtual groups basically include a return to a face-to-face

work environment. Virtual group pioneers are in this way compelled to present openings that empower most of the group individuals to be physically shown. A degree to compensate for the lost viewpoints of a face-to-face work environment may well be a group assembly on a non-regular premise. As a part of a virtual group, one might advantage from this research by realizing that work irrelevant communication is not considered as a terrible propensity. Due to lost experiences within the coffee kitchen as well as office grapevines, teambuilding is as a rule only upheld inside measures organized by the group pioneer. Hence, representatives ought to plan normal virtual snacks or coffee breaks to keep in touch with their co-workers and trade work disconnected data.

Whereas businesses within the advanced age have always used implies to put through and communicate with farther workers and clients, the COVID-19 widespread has been an extraordinary catalyst for the increment within the utilize of virtual assembly stages. In a time of social removing, businesses are depending on these stages to remain associated, trade data, and work together in arrange to keep operations running easily and reliably amid this questionable time.

An internet meeting, also called virtual conferencing, could be a method of communication that permits for numerous parties to meet and connected within the same space without physically being display. Through electronic gadget channels like web benefit, projectors (for huge groups), dependable sources of sound, portable workstations, tablets, webcams, and others, commerce representatives and

higher-ups can communicate back and forward with each other utilizing different virtual assembly stages.

The Best Virtual Assembly Platforms include the following Skype which a straightforward to use app that permits you to associate with a single individual or a gather of individuals. Slack makes a difference to associate group individuals with each other through informing devices, movable notices and is streamlined with many office highlights. In Zoom assembly, not as it were can businesses hold virtual gatherings on this stage, but they can moreover conduct preparing courses, webinars, etc. Amid Zoom gatherings, clients can at the same time share messages and reports with each other through Zoom's chat tool. Google Meet gives the client with a relegated dial number so that virtual gatherings can remain private inside the team, a clear get to line with no dropped calls, and compatibility with both Apple and Android gadgets. Microsoft Groups may be a sub-feature of the Microsoft Office 365 platform. GoToMeeting stage offers instruments that incorporate informing between group individuals, exchange translations for video, and flexible group settings. Also, Cisco WebEx Assembly Center offers its clients a free alternative to utilize its benefit. The highlights of this stage incorporate upgraded innovation to sound and video delay and can show 25 nourishes at the same time (TechFunnel Contributors, 2021).

There is little doubt, according to Liu (2020), virtual conferences during the current COVID-19 period provide problems for organisers, attendees, and presenters. Regardless, some startling positives emerge as to how virtual

conferences are not only overcoming these barriers, but also triggering a paradigm change in how long-term conferences may be perceived. The environment is undeniably one of the most visible beneficiaries of conference online relocation. According to a later audit, the whole amount of carbon dioxide emitted by means of every analyst all through convention travel is among 0.5 and a pair of metric tonnes. exceedingly, the full carbon footprint of the envisioned 7.8 million analysts of the world, every of whom attends one conference every 12 months, is equal to that of a few small nations. In contrast, organisers of entirely digital meetings inside the USA decided that their general carbon footprint become much less than 1% of that of a traditional "fly-in" occasion. transferring conferences on line has additionally made them open to a bigger and greater diverse institution of individuals. journeying and prolonged domestic absences have lengthy been a source of concern for those with children or disabilities. Basically, financial and visa constraints count on numerous financially distressed foundations and unique people.

Since the starting of the current emergency, lockdowns, quarantines, and stay-at-home orders have cleared over our regular lives – and at an unimaginable speed. To keep our social orders useful amid this time of worldwide widespread, we have turned progressively to advanced communication instruments and systems. Advanced innovations secure us from the social presence to the infection, with devices that encourage contactless conveyance of basic products, virtual gatherings, and cloud administrations that empower work from domestic and e-

learning conveyance. In interfacing with commerce, schools, or government. mechanized intelligence has in numerous cases supplanted indeed virtual human contact. Advanced advances presently know more almost us and the infection – from contact following that screens vectors of viral transmission, to huge information analytics that tracks viral spread. Here are a few of the key measurements of these changes, and central focuses for this investigate arrange: Innovation: Each reaction has been a viral mechanical "patch." Existing instruments are utilized and actualized not as they were in ordinary ways, but moreover in modern and inventive ways. Knowledge: Within the social meaning-making space, "data" has ended up viral. In wrangles about around the nature of the infection and techniques for social reaction, we see contestation and question around the logical prove, contrasting social approaches to community security, and vulnerabilities at the interface of culture with national administrative approaches – all based on contrasting interpretive outlines of knowledge. Society: We have rapidly created an unused shared language structure of "going viral." This spins around the geo-spatial nature of the viral stream. On one hand, this addresses the separate between place-based versus online (University of Melbourne, 2021).

In a not however far off past, going viral was a degree of victory within the computerized world. This mapped a kind of sociality in computerized environments. Now we are within the center of a distinctive kind of viral innovative minute. What might we have "let out of the bag" at these turn focuses of Innovation, Information, and Society? And looking towards a future evidently characterized by

the Fourth Mechanical Insurgency ruled by innovations of insights, what kind of world will be left?

According to Wolff (2021), virtual occasion makes locks in by continually giving your group of onlookers with things to do. For audience to be locked in, there should be something interesting and shocking to do. Give intuitively components so that the group of onlookers feels inconceivably included in the virtual event. Gathering of people engagement is completely key to virtual occasions. In fact, it will make or break the occasions. So, reason sufficient to require a see at 5 virtual occasions gathering of people engagement thoughts that can be connected to little or huge occasions.

Pre-event surveying makes the gathering of people feel that the substance displayed at the virtual occasion will be custom-made to their needs. Hiring performers may be an incredible technique for both little and huge virtual occasions. Performers are incredible at locks in the audience. An extraordinary way to guarantee virtual occasion engagement is to send the group of onlookers' occasion sacks. It is an awesome thought to fill the pack with something that can be utilized amid the event. Gamification continuously works well to lock in groups of onlookers. Whether it is in-person or virtual occasions. On any occasion, it must utilize an occasion hashtag. The group of onlookers will utilize this hashtag when posting something related to the occasion. Normally, it will be able to track this hashtag and run analyses and contests. always make beyond any doubt that it just delivers the group of onlookers the apparatuses to connect with other individuals.

This could be through chat, one-on-one gatherings, or live conversations. Giving the audience the option to choose what will be displayed, it will make a few benefits. By theming the event it will be able basically to take the gathering of people through an encounter - pre-event, amid the occasion, and post-event. It can make a test based on the company history if they have got a trustworthy brand. Then again, it can make tests based on the nations of the gathering of people or fair a few irregular subjects.

According to Ireland (n.d), A worldwide commercial center, increasingly companies have fawning workplaces, consultants and clients who cannot continuously be within the same room for technique, coordination, and introduction gatherings. Virtual gatherings and conference apparatuses permit key players to communicate utilizing sound, video and indeed chat tools. The innovation utilized to assist with virtual gatherings recoils the remove between companies and their representatives and clients for the foremost individual consideration conceivable. Audio-only gadgets, such as phone conferences, are the foremost prudent of the virtual assembly devices. Phone frameworks are set up to handle calls to a few members at once, at that point utilized with speakers and other highlights so several individuals can conversation and take an interest. Prepared with a web digital camera, it is a fundamental prepare to peer those you are assembly with, proportion visual introductions, and notice body dialect and facial expressions, all of which improve a digital assembly. Whereas it has its impediments, office-wide gatherings by means of moment informing combined with social organizing to permit

members to communicate rapidly. The instruments for virtual gatherings are regularly thought of as those which permit members to communicate with each other in real-time. But virtual gatherings often use nonconcurrent instruments to assist wrap up free closes and cement choices made amid the assembly. Social organizing, e-mail, and databases are required to guarantee all members are on the same page.

Hardware and Software in Online Technologies

According to Pan et. al (2018), optimization strategies for be part of algorithm, a warm research subject matter in latest years is to explore whether hardware-aware or for novel hardware settings, hardware-oblivious algorithm designs are appealing. The purpose of hardware-aware algorithms is to obtain the highest performance, with the guiding ideology being to fully recall the hardware-precise tendencies to optimise algorithm performance; then again, the intention of hardware-oblivious algorithms is to generalise and simplify, with the guiding precept being to layout the be part of set of rules primarily based on the common characteristics of the hardware. The opposition between the two duration paths has heated up in recent years, from the fundamental CPU platform to the NUMA platform, and it's going to almost simply be extended to the brand-new processor systems over the next few years. The underlying reason for this phenomenon is that it is miles difficult to quantify optimization techniques, as in the field of in-reminiscence database era, even though there are various hash systems and be part

of algorithms presently, the simple question of which is the first-class in-memory hash be part of set of rules remains unknown. within the destiny, as the brand-new hardware environment turns into greater sophisticated, performance ought to now not be the simplest metric used to assess the advantages and disadvantages of algorithms. greater emphasis ought to be placed on improving the ability and scalability of algorithms on heterogeneous structures.

The new hardware and its constructed environment could have a large effect on the layout of the complete computing device and will modify the preceding assumptions of the better-layer software program. at the same time as imparting progressed physical universal overall performance, software program architectures and accompanying generation for facts control and assessment must likewise enjoy and adapt to the brand-new hardware skills. the new hardware surroundings have made the alternate-off among statistics manage and analytics gadget layout region extra complicated, presenting multidimensional research demanding situations. there is an urgent need to break the oldness of traditional data management and evaluation software program in the destiny. It is also important to control and evaluate the center machine operations largely based totally on the features of hardware settings, in addition to expand and research novel information processing modes, architectures, and technology from the ground up.

With the aid of the quit of 2024, 75% of businesses may have moved from piloting to operationalizing AI, using a 5X increase in streaming records and analytics infrastructures. in the modern-day pandemic setting, AI gear such as

machine learning (ML), optimization, and natural language processing (NLP) are giving critical insights and predictions concerning viral transmission in addition to the effectiveness and impact of interventions. AI and device studies are crucial in realigning deliver and the supply chain to converting call for patterns.AI techniques consisting of reinforcement gaining knowledge of and distributed gaining knowledge of are resulting in more adaptable and bendy structures to address complicated enterprise conditions; as an example, agent-primarily based systems can model and stimulate complex systems - despite the fact that pre-COVID models primarily based entirely on ancient statistics may additionally now not be legitimate.

Big investments in new chip designs, as well as neuromorphic technology that can be deployed on factor devices, are rushing up AI and ML calculations and workloads whilst reducing dependency on centralised systems that demand excessive bandwidths. this could sooner or later cause extra scalable AI answers with greater commercial enterprise impact. responsible AI that allows for model transparency is critical for keeping off awful judgments. It has a stronger impact on human-system collaboration and should be considered for increased adoption and alignment of choices throughout the organisation (Goasduff, 2020).

According to Mustapha et. al (2020), as a riding pressure of gigantic transformation, technology has opened the contemporary understanding by helping the lecturers and rookies to achieve the first-rate in its utilization and adoption in education. these alterations can have a momentous ripple result on schooling. Over

the subsequent length of 10 years, fantastically evolved technology will put schooling within the reach of many more people in the world over and will allow large hobby in teaching methodologies. As this chapter suggests, these far-achieving technological changes will in impact exchange the talent-sets of the upcoming employees. therefore, the majority round the arena will need to reflect on how to make the apt use of these novel potentialities and accordingly assure to facilitate competition in education global.

The fact of most compute and garage deployments is that everyone sorts of PC memory are restrained via a top restriction. No resource on a current machine is possibly as restrained as memory, that's usually needed by running structures, programs, and garage. Without unlimited reminiscence, sooner or later memory is fully consumed, which leads to machine instability or statistics loss. because the start of contemporary IT, the assignment of memory exhaustion has been dealt with by a various set of abilities, typically grouped below the heading of reminiscence control.

Memory management is all approximately making sure there is as much to be had memory space as feasible for brand spanking new packages, information, and techniques to execute. As reminiscence is used by a couple of elements of a modern gadget, memory allocation and memory management can take on extraordinary forms. reminiscence control techniques inside a running machine or application usually involve an expertise of what physical address area is to be had

in RAM and acting reminiscence allocation to properly region, circulate and put off tactics from reminiscence deal with area.

Reminiscence management is a critical detail of all modern-day computing structures. With the continued used of virtualization and the need to optimize useful resource utilization, memory is constantly being allotted, eliminated, segmented, used, and re-used. With memory control strategies, reminiscence management mistakes, that can lead to machine and alertness instability and failures may be mitigated (Kerner, 2019).

According to IvyPanda (2020), memory administration is one of the key responsibilities of the functioning gadget. The running machine separates reminiscence into number one and secondary reminiscence and guarantees that rules are in vicinity to correctly manipulate and regulate diverse memory types. Primary memory is often volatile since it stores the data and programmes required for CPU execution, whereas secondary memory provides long-term data and application storage.

The operating system delegated the responsibility of dealing with remembrance to the memory control unit (MMU), also known as the reminiscence supervisor, to properly regulate programmes and records in primary reminiscence. The OS takes on supervisory duties and guarantees that packages and statistics are assigned and transferred out of memory during programme execution via the MMU, a crucial component of the OS.

The MMU is located within the kernel of the operating system. While programmes must operate within the CPU, strategies must be switched in and out of main memory. The swapping method produces gaps, which have the potential to reduce the device's throughput. This is because swapping may result in internal or external fragmentation of the primary memory. Several memory placement methods are employed to achieve compaction to improve device performance and reduce the effects of fragmentation.

According to Hassine (2017), shortening the advertising cycle of the product and accelerating its improvement efficiency have come to be a critical subject within the discipline of embedded device layout. Consequently, hardware/software partitioning has emerged as one of the mainstream technologies of embedded tool improvement since it impacts the overall device overall performance. Given nowadays' biggest requirement for incredible overall performance necessarily determined through manner of immoderate pace, our new algorithm provides the first-rate model which can meet such unpreceded stages. Given requirements of these days for an awful lot fewer ingesting structures located via immoderate tempo, the need of making more green forms of embedded structures has been continued. one of the maximum stylish solutions that offers system's optimizations is the HW/SW partitioning. For that, the researchers have advanced a logo-new set of regulations based totally on HW/SW partitioning to advantage the brilliant exchange-off among energy and latency contemplating the dark silicon problem. The set of rules has been applied and tested to Simulated

Annealing, Tabu seek, and Genetic algorithms and because the research has illustrated, the researchers admit that the set of guidelines is exceptional appropriate for the urgent fulfillment of the preferred mixture of high pace and lots much less power in center based embedded systems.

Within the previous couple of years, era has come a long way and propels agencies to maintain operations at ultimate degrees. However, many corporations often determine to prioritize software renovation and overlook hardware upkeep. Periodic hardware preservation was amazed and could make a huge difference on the business. As an agency, productiveness and operations depend on IT infrastructure. So, the ultimate component is defective, previous, or gradual hardware. At its middle, recurring hardware renovation allows agencies to avoid potential hardware screw ups and downtime. One of the blessings of hardware upkeep is that it optimizes the paintings efficiency for companies. Fast and effective computers permit companies to complete arduous tasks in a brief time and obtain lengthy-term dreams. In truth, periodic hardware upkeep optimizes the overall performance. It is the reason many organizations now comply with a calendar for hardware preservation. Without regular hardware renovation, physical additives and issues of the servers are bound to get extra overwhelming and complex. Hardware maintenance also allows agencies spot latent issues that can spiral out of manipulate through the years. It permits organizations to cope with the issue before they end up severe. No longer to mention, it reduces the effect on the overall performance and allows personnel prepare for device troubles in advance. In quick,

the greater regularly your behavior hardware protection, the greater overall performance boost organizations can revel in.

Proactive hardware renovation by using a professional permits corporation to carry out instant repairs. professional hardware upkeep also boosts productivity and reduced potential downtime. experienced IT technicians understand the complicated dynamics of hardware additives and can enhance the life span of devices and limit the hazard of records loss altogether. Furthermore, professional, and skilled hardware protection saves companies thousands of greenbacks through the years. In maximum instances, ordinary hardware protection facilitates businesses avoid unforeseeable troubles like hardware damage and sizeable statistics loss. recurring hardware upkeep of physical additives and servers lets in businesses to uphold their operational integrity and maintain a reliable IT infrastructure. except, hiring experienced hardware preservation experts has emerge as an inexpensive service. The agencies can avail low-cost hardware and technical assist to at ease PC structures at a viable fee (VAST, 2021).

Software utility performance optimization is often a disregarded stage within the development lifecycle. It is no longer particularly thrilling, despite everything. It is way more a laugh to shop for a brand-new automobile than it is to pay for the oil exchange! but like ordinary song-united states the mechanic, performance optimization is clearly vital to ensuring which it guards the software investment and keep it jogging successfully for years to come. It is so crucial that

it is been given numerous names: application optimization, software program optimization, code optimization, and alertness performance control (APM).

Software optimization is the set of best practices and requirements that developers use to maintain a software running optimally. preserving velocity is truly an essential part of utility overall performance, however, so is doing it effectively: eating fewer assets and heading off luxurious technical debt. Optimization is a business enterprise's strongest weapon against poor software program performance and unwanted deprecation. intricate software may have any quantity of reasons. Poorly written code is the maximum obvious, but it is also possible that the code is just previous and might not keep up with tech improvements or it could be that code that labored in a check surroundings or with a small extent of users cannot take care of a heavier load.

Throughout nearly every enterprise, groups, and the human beings they rent in project-orientated roles live in project-crucial packages. That software is sort of constantly open, and it is in which crucial enterprise approaches occur. If a software of that stage of importance is performing inefficiently, it starts off evolved to impact users. they might have a hard time staying inside the glide of the assignment. they may lose the opportunity to apply facts in time-touchy situations like the customer service instance above. In customer-facing programs, bad overall performance can result in even larger problems. In preference to helping the customers do commercial enterprise with the organization and creating a competitive benefit, the software leaves them frustrated and irritated. they might attempt reloading the page,

which cause even extra troubles and delays for the software. application overall performance can immediately effect organization metrics like worker performance and productiveness. That impact can easily amplify to key operational goals across departments, consisting of patron pride and revenue. it can additionally result in customer defections. And add to that the direct prices of making highly priced workarounds for a utility that crashes all the time or risking each commercial enterprise manner grinding to a halt to fix a vital error. It will become increasingly more apparent that overall performance is not a choice for organizations that depend on custom programs; it is a need (MERCURYWORKS, 2021).

According to Kim (2020), latest trends within the deep neural network want the usage of thousands and thousands of parameters to deal with and require the high-basic performance computing assets with better overall performance. The crossbar array structure has been identified as one of the capability deep learning architectures that means a full-size computational benefit over standard CPUs. To assess the viability of the structure, it appears at non-idealities and their impact on overall performance. Especially, it examines the effect of failed cells as a result of the resistive memory-based completely cross-bar initialization method of array. in evaluation to the conference. It classifies the viable mistakes and endorse for hardware implementation that reduces catastrophic failures. Such hardware optimization limits the possible logical rate of failing cells and lets in us to compensate for the lack of accuracy thru off-line schooling. by using incorporating random weight mistakes at some stage in schooling, we show that the version turns

into more robust to tool initialization errors, and consequently a long way much less probably to impair inference overall performance due to failed devices. Our investigation gives mild at the hardware and software program co-optimization approach for handling probably catastrophic failures within the bypass-bar array.

Both hardware and software systems are an increasing number of configurable, which poses a mission to locating the best overall performance configuration because of the amazing search space. earlier scheduling and resource management paintings uses system gaining knowledge of ML to locate high-performance configurations for both the hardware and software configurations alone whilst assuming the opposite is constant. Such separate optimization is problematic due to the fact a software program configuration that is rapid on one hardware structure can be up to 50% slower on some other. the principal difficulty of co-optimization is the massive search area over each hardware and software program configurations due to the fact accurate mastering models require huge quantities of categorized education statistics, and accordingly lengthy periods of data series and configuration seek. To obtain co-optimization with drastically smaller training units, a scheduler that simultaneously selects hardware and software program configurations using a Bayesian learning approach. Paprika augments software configuration parameters with hardware functions seamlessly and successfully through one-warm encoding and parameter selection. To lessen the impact of the search area, Paprika actively queries configurations primarily based on a novel ensemble optimization objective. The intuition of this ensemble

is to combine three previous optimizers to implicitly negotiate the exploration–exploitation trade-off. It compares Paprika with ten Spark workloads on 3 hardware architectures and find that, compared to previous paintings, Paprika produces runtimes that are 12 to 38% towards the most advantageous (Ding, 2020).

Network Technology and Emerging Technologies

Networking and information technology (NIT), which includes everything from networked smart phones to on-board navigation systems to commercial robotics, has emerge as ingrained in extraordinary culture and underlies of the nation and its financial success and security. Latest NIT traits, which includes records and generation democratization, ongoing automation of conventional commercial practices, the net of factors, and clever machines that augment or complement human abilities, have had significant results on trade, entertainment, group of workers development, markets, industries, interpersonal communications, and subculture. The pervasiveness of NIT in regular lifestyles—and its use in nearly each enterprise and vocational area—has accelerated the demand for era information, schooling, and training several the current and future personnel (PCAST, 2021). Throughout this era, technology like reliable broadband networks, cellular telephones, videoconferencing systems, and collaboration software program have enabled many human beings to live in contact with own family, pals, and coworkers at the same time as additionally reading and working remotely.

As stated by Hopkins (2021), the use of social media, mobile devices, big data, and the cloud has become commonplace. These technologies aided the growth of start-ups into multibillion-dollar businesses, resulting in an AI renaissance. However, only around a quarter of AI projects make it past the pilot stage today.

In the 2020s, getting value out of AI will undoubtedly be critical. Many other developing technology advancements, in my opinion, are happening silently and under the radar of many clients. While we wait for quantum computers to eventually accomplish something, for example, everyone is losing out on the quantum revolution in location, timekeeping, and sensing. Software is silently teaching itself how to code. Blockchain, artificial intelligence, and edge computing, all hot technology on their own, are slowly beginning to operate together. Finally, infrastructure is undergoing a transformation.

The Philippines' embrace of digital era, then again, remains falling short of its promise, with the nation lagging at the back of lots of its local pals. The "digital hole" among those who have get entry to the internet and those who do no longer results in uneven get entry to government socio-services together with life-converting financial possibilities. The net get entry to - the bedrock of most promising web economy – is scarce in agrestic places, and whilst it is far available, offerings are costly and of terrible first-rate. Modernizing the virtual infrastructure of the country could herald essential upgrades to improve social provider delivery, increase resilience to shocks, and extend financial opportunities for all Filipinos.

Wherein net offerings are to be had, Filipino clients revel in gradual download speeds. At 16.76 megabytes in keeping with two Megabits per second, the Philippines's cellular information service velocity is tons decrease than the global common of approximately thirty-two Megabits per second. As for the locale, third generation and fourth generation cell mean download velocity shows at thirteen. Twenty-six Megabits per second in comparison to best of approximately seven Megabits per second within the vicinity area of the Philippines. The endeavors to strengthen the progressing cyber fundament in the Philippines are hampered with the help of lacking competition together with certain regulations on funding within the telecom marketplaces, consistent with regards to credible news. Those regulations encompass to the overall public service choices for cyber transfer of information, that enables to limit the overseas possession as well as the locations specifically for a rate of return.

Not so expensive arrangement of account property, the deficit of a countrywide identification, embryonic settlement scheme, as well as something to do with the anticipated hazard which pertains about the virtual activities are all recognized to be the obstacles to greater use of digital payments. The greatest way to encourage more human beings to use digital bills is for authority entities to adopt digital as well. Using e-signatures expansion amongst administration organizations and mandating them in terms of using the services that e-invoices and e-receipts can provide in authority activities are two enormous entry points referred to within the research. In step with Kevin Chua, by taking initiatives from a supportive

government can make differences leading to a society-huge digital evolution by fast tracking e-governance initiatives such as the building an ID system and the innovation through digitizing of its strategies as well as the methods, to help sell extra inclusion, efficiency, and protection. similarly, the government might also play a key role in selling guidelines that bridge the digital hole and create a greater favorable commercial enterprise weather for the virtual economy to thrive (Llorito, 2020).

As specified by Ekudden (2020), with its precise potential to traverse large distances and allow sturdy new answers to an extensive range of social, environmental, and monetary worries, the virtual infrastructure offers infinite opportunities to individuals, companies, and governments for the duration of the sector. health care, schooling, banking, commerce, government, and agriculture are only a handful of the industries that may make the most of digital infrastructure's fantastic efficiency enhancements. The network platform is supposed to be the spinal cord of virtual infrastructure, carrying vital messages, instructions, reasoning, insights, intelligence, and all sensory information required to allow the continual progress of enterprise and society. It is also the perfect platform for all kinds of innovation, because to its capacity to facilitate interactions that help to create a more intelligent, sustainable, and connected society.

The network platform's main benefit is that it will be available from everywhere, always, and with assured performance. It will have nomadic distributed processing and storage to support sophisticated applications. It will be

dependable and robust from the start, meeting all the criteria for secure communication. The community's and services' cognitive operations and upkeep will provide the most cost-powerful and long-time period answer to meet all communication demands. Considering this, it's miles obvious that the most essential destiny network traits to preserve a watch on in 2020 can be those that pertain to the increase and unfold of intelligent virtual infrastructure on the community platform. The emergence of a collaborative automatic bodily environment, linked, sensible machines, and the net of senses are the first three of the seven topics this 12 months which are riding network platform evolution. All three emphasize the rising need to connect the physical and digital worlds.

In times like those, the telecom industry performs a key position in maintaining organization continuity and household sustainability because the need for dependable net gets right of entry to grows. internet connectivity might be one of the maximum important foundations in allowing the Philippines' overall virtual infrastructure improvement.

After an increase in mobile information traffic became cited as greater humans work at home and getting to know movements online, telecommunication companies’ confident customers of good enough community capacity. Clever Telecom completed a national LTE rollout by means of taking it to the next level the Second Generation primarily as the fundamental concept to Fourth Generation for the entire services of the country, extending their Long Term Evolution fundamental terminals by somehow ten percent in the first six months of the year

2020, whereas about over 1 billion in terms of US dollars as an addition enhance community offerings by partnering with tower companies to construct extra 900 mobile websites as a part of their expansion plans for the primary half of 2020. in line with facts from IDC, more than fifty five percent of Philippine businesses have selected to preserve make money working from home regulations thru June 2021. The extension's wondering has aided companies in planning for the destiny, and as a result, IDC expects an increase in demand for no longer just telecoms and cloud-based totally services, however also gadgets and laptops/desktops with a purpose to allow employees to work successfully from home. Because of huge procurements from the department of education and several different LGUs in coaching for distance month-to-month via presenting tablets and lap month-to-months with a complimentary statistics allocation month-to-month public school college students and instructors, a surge in call for gadgets has been determined as early as Q22020. A nicely-incorporated month-to-month device, similarly monthly hardware devices, is important in supplying a greater elevated fee of studying in the on-line schooling vicinity (Medez et al., 2020).

Peopleware

As stated by Techopedia (2017), the human involvement in an IT system is referred to as peopleware. Peopleware frequently forms a conceptual triangle with hardware and software. Human talent is referred to as a commodified component of an IT process and a critical component of offering various technological business

models and other planning resources. Various employment functions that are generally perceived as aspects of an IT process are examples of peopleware. Computer engineers, website designers, technicians, and other IT experts including database administrators and networking specialists fall under this category. Those who fall within the broad category of peopleware are likely to have important certifications in these and other areas of IT specialty.

The phrase "peopleware" has sparked a lively discussion about how businesses value human potential. Many individual IT professionals, bloggers, and others contend that human employees are not resources but independent elements of a team organization, and that this description is insulting. As a result, labeling professionals as peopleware encourages simplicity, which may be detrimental to business relationships. This problem is expected to grow increasingly prominent in IT, since corporate cultures frequently collide with the interests of independent knowledge workers who possess the skills that organizations require to succeed.

Anyone who has even scratched the surface of engineering management understands that you cannot quickly ramp up software developers, and that the most productive engineers will likely do tenfold more work of higher quality than a fresh graduate just getting his feet wet. You cannot burn people out by forcing them to perform work they do not want to do, even if you recruit all expert level programmers. The truth of software projects is that the job is difficult and always changing, therefore you must recruit and keep individuals who are eager to learn.

> People are knowledge more than anything else; not just knowledge of technology, but knowledge of one another. The longer a team works together, the more natural and fluid their work becomes. The purpose of the engineering manager becomes the act of keeping high-quality teams together. While the techniques for doing so vary based on the firm and the individuals involved, Peopleware provides enough examples to be useful in virtually every circumstance (Hughes, 2017).

Synthesis of the Reviewed Literature

The governments and public health agencies all around the globe have enacted social distancing and stay-at-home measures in response to the COVID-19 outbreak., which changes the digital media usage could outlive the epidemic and what these implications for future communication and media studies (Nguyen et al., 2020). Digitalization and the intelligent application of information and communication technology (ICT) are essential drivers of effective innovation, competitiveness, and growth (Lavilla, 2020). Adopting to a new technology platform embrace the impacts of COVID-19 and may lead to the opening of the New Normal in all sectors. According to Caroll and Conboy (2020), remote working has become an unavoidable aspect of the changing nature of work, necessitating the rapid development and deployment of new work models. In connection thereto, change management is the process of embracing, controlling, and implementing change. Technology change management is the process of identifying new technology and putting it into practice to increase productivity and profitability (Kutmer, 2021).

In connection thereto, video conferencing is an important component of doing business. It allows for comprehensive visual communication with clients and coworkers at any time and place. Cooperation has never been easier, and as more people become aware of the benefits of collaboration, video conferencing is becoming more popular. Improved communication, better business connections, more productive meetings, employee satisfaction, and a competitive advantage are all benefits of video conferencing ("The Business Benefits of Video Conferencing", 2020). Furthermore, the six best video conferencing apps in 2020 include Zoom for dependable, large-scale video calls, Google Meet for Google Workspace (formerly G Suite) users, GoToMeeting for professional features, join.me for a lightweight option, Cisco WebEx for whiteboarding, and Slack for calls from your team chat app (Figat, 2021). Zoom for dependable, big video conversations, Google Meet for Google Workspace (previously G Suite) customers, GoToMeeting for professional capabilities, join.me for a lightweight alternative, Cisco WebEx for whiteboarding, and Slack for calls from your team chat app are the six best video conferencing software in 2020 (Herman, 2020).

Furthermore, computer-based technology has permeated many aspects of life and industry, and it may be used to improve student engagement, a concept that is gaining popularity in higher education due to its relation to a range of positive academic outcomes (Schindler et al., 2017). Furthermore, technology-assisted courses improve student performance (Rajabalee & Santally, 2020). Developing genuine teaching tools for online classrooms that actively link students (Bangert, 2004) can improve instructor quality, student expectations, quick feedback, and successful course design and all have a

substantial impact on students' online learning experiences (Gopal et al., 2021). Also, advanced innovations secure us from the social presence to the infection, with devices that encourage contactless conveyance of basic products, virtual gatherings, and cloud administrations that empower work from domestic and e-learning conveyance (University of Melbourne, 2021).

Optimization investigating whether hardware-aware or hardware-oblivious algorithm designs are preferable for new hardware settings, according to Pan et al (2018). The goal of hardware-aware algorithms is to achieve the highest performance, with the guiding ideology being to fully consider the hardware-specific traits to optimise algorithm performance; on the other hand, the goal of hardware-oblivious algorithms is to generalise and simplify, with the guiding principle being to design the join set of rules based on the common characteristics of the hardware. Moreover, software optimization is the set of best practices and requirements that developers use to maintain a software running optimally. preserving velocity is truly an essential part of utility overall performance (Mercury Works, 2021). Additionally, Memory management is all approximately making sure there is as much to be had memory space as feasible for brand spanking new packages, information, and techniques to execute. With memory control strategies, reminiscence management mistakes, that can lead to machine and alertness instability and failures may be mitigated (Kerner, 2019). Likewise, technologies like reliable broadband networks, cellular telephones, videoconferencing systems, and collaboration software program have enabled through third generation (3G) up to fourth generation (4G) also known as LTE (Long Term

Evolution), and fifth generation (5G) wireless communications standards with its recommended bandwidth requirements and specifications.

The main purpose of this dissertation was to develop a new strategic basis for new technological management approach to determine the different innovative strategies utilizing different video conferencing application platforms. Using these cited related literatures and studies, it made the application platforms faster, and it could also lessen the time consuming, and disturbances of online classes and business conferences.

Gaps Bridged by the Present Study

Based on the aforementioned examination of linked literatures and research, the identified gaps revealed that no international or local studies had been undertaken on establishing a new technological management approach and its strategic model based on the innovative ways of optimization and utilization of different video conferencing application platforms used. Furthermore, there were no foreign and local studies conducted about the different technological management aspects such as the laptop battery optimizations, optimization of multi-tasking utilization of other applications, optimization of Internet and mobile data connectivity and its security, minimizing the consumption of computer hardware memory storage, and other technological properties. In addition, there were no foreign and local studies conducted the performance evaluation of using an enhanced technological management approach using the six (6) out of eight (8) general characteristics of the ISO/IEC 25010: 2011 system quality model such as usability (simplicity), reliability, performance efficiency, maintainability (scalability),

compatibility, and security.

In view of the identified gaps, implementing the newly developed new strategic basis for new technological management approach to determine the different innovative strategies utilizing different video conferencing application platforms for online classes and business conferences benefited mostly by the students, teachers, and big and small businesses in which the main communication now is through video conferencing. Based on this literature review, the results of this dissertation could be an indication that the developed strategic model was effective, which can be used at “The New Normal” environment and after the pandemic crisis happening right now. It could be used as basis for modifications and future enhancement for more effective and reliable outcomes especially in using utilizing different video conferencing application platforms for online classes and business conferences.

Chapter 3
Research Methodology

The development and technological management approach of the strategic model in using the different video conferencing application platforms were discussed in this chapter. It also describes how to find a solution to the procedural implementation of the research problem. In addition, this chapter outlines the locale, population, and identification samples, instrumentation and validation, administration, and data exploration statistical methodologies.

Research Design

Descriptive research methods are ones that describe the characteristics of the variables being researched. The primary objective of descriptive research is to simply explain the nature of the demographics under consideration. Because no variables in the study are changed throughout the research process, descriptive research is classified as an observational research approach (Voxco, 2021). This was used to answer the main problem of this dissertation, which is to develop the best strategic model in using the video conferencing application platforms through innovative technological management approach.

Likewise, quantitative research is the process of collecting and analysing numerical data. It may be used to search for patterns and averages, make predictions, assess causal relationships, and extrapolate results to bigger groups (Bhandari, 2021). Quantitative

research was used since it inspects the connection among variables about the different independent aspects of the said strategic model approach and its characteristic properties through numerical evaluation to produce an appropriate collection of data.

Sources of Data

The data sources of this study were primarily coming from the initial survey, evaluations (final survey) through testing, and interviews, which were given and conducted to the respondents. Articles from the Internet and library books, theses, journals, and related studies about online video conferencing and its advantages in business and online classrooms, hardware and software in online technologies, technology management, and optimization and use of technological tools for virtual meetings.

Population of the Study

The total population of the selected schools, colleges, universities and, small to midsized companies were came from 1,121 samples. Specifically, cluster sampling was used in selecting the respondents by designations. The total number of samples was computed using the Stovin's formula with a 5% marginal error. Three hundred one (301) samples of the total population were randomly selected, which composed of two hundred three (203) respondents from schools, seventy-eight (78) respondents from companies, and twenty (20) computer engineers and technicians, and information technologists (IT) served as professional evaluators.

Instrumentation and Validation

Initial closed-ended questionnaires, evaluation forms (final survey) with a 4-point Likert scale, interviews, consultations, and series of testing were the main research instruments for the performance evaluation of this dissertation. The said evaluation was for the developed optimized innovative technological management approach model in using the most common video conferencing application platforms to measure its performance.

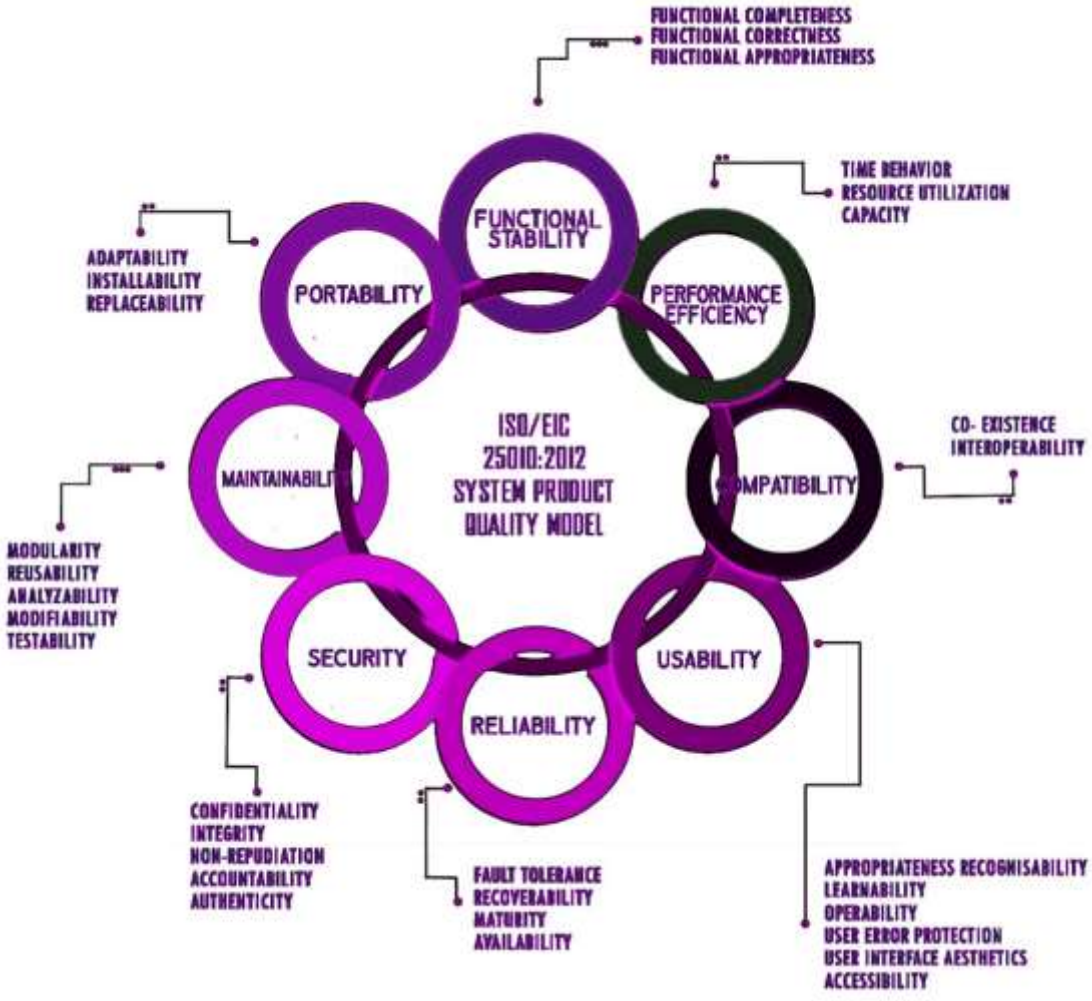

Figure 2. The ISO/IEC 25010: 2011 System Quality Model

Figure 2 shows the International Organization for Standardization/International Electrotechnical Commission 25010 of 2011 (ISO/IEC 25010: 2011) system quality model, which was used for analyzing distinctive traits and examined quality attributes of a system or an application platform. To deliver the quality value of the developed optimal innovative technology management approach model, it must satisfy the stated and implicit needs of its users. General and sub-characteristics were used to categorize the system quality model such as functional sustainability, usability, reliability, performance efficiency, maintainability, compatibility, security, and portability (International Organization for Standardization, 2021).

In connection thereto, the developed optimal innovative technology management approach model was evaluated through its usability (simplicity), reliability, performance efficiency, maintainability (scalability), compatibility, and security using the six (6) out of eight (8) general characteristics of the ISO/IEC 25010: 2011 system quality model. The said system quality model was included in the final survey conducted to acquire the necessary information regarding this dissertation.

Maintaining, reviewing, and validating all data gathered was part of the instrument validation process. It offered useful information about the performance issues that were being considered, as well as the acceptability and quality of the established optimal innovative technological management approach model when employing the most prevalent video conferencing application platforms.

Evaluation and Scoring

The developed optimal innovative technology management approach model was evaluated on a four-point scale in terms of acceptability through the survey conducted in utilizing the most prevalent video conferencing application platforms:

Table 1

Likert scale of the level of acceptability of the developed optimized innovative technological management approach model

Numerical Point	Assigned Range	Verbal Interpretation	
4	3.25 – 4.00	Strongly Agree	Strongly Acceptable
3	2.50 – 3.24	Agree	Acceptable
2	1.75 – 2.49	Disagree	Unacceptable
1	1.00 – 1.74	Strongly Disagree	Strongly Unacceptable

Table 1 shows the Likert scale used and have a 4-point numerical values from 3.25 – 4.0 with a categorical response of strongly agree and interpretation of strongly acceptable; 2.50 – 3.24 for agreeable response with acceptable interpretation; 1.75 – 2.49 for disagree with unacceptable interpretation; and 1.00 – 1.74 for strongly disagree with strongly unacceptable interpretation.

Furthermore, this Likert scale for the evolved degree of acceptance of evaluation for the developed optimized innovative technological management approach model in using the most common video conferencing application platforms. This was created for system quality characteristics evaluation such as portability, maintainability, security,

reliability, performance efficiency, and compatibility, all of which were tested by the respondents, computer engineers and technicians, and IT professionals.

Data Gathering Procedure

Survey was conducted by delivering initial closed-ended questionnaires and as well as evaluation forms (final survey) with a 4-point Likert scale to the teachers, students, administrators, employers and employees of schools and companies to acquire needed the evolved degree of acceptance of evaluation for the developed optimized innovative technological management approach model in using the most common video conferencing application platforms. This survey was also used to obtain the performance evaluation through series of testing of the said strategic model.

On the other hand, interviews were also conducted with the teachers, students, and administrators, as well as the employers and employees for the purpose of acquiring the problems encountered of using the most common video conferencing application platforms. Similarly, consultations were conducted from different college instructors, colleagues, and professionals in the field of compute engineering, computer networks, hardware and software online technologies, and information technology, to acquire information in developing the solutions to the said encountered problems of using the most common video conferencing application platforms.

Statistical Treatment of Data

This dissertation employed the following statistical approaches after obtaining all the information required to assess the data:

1. **Weighted Mean** values from the conducted final survey were determined to check the developed strategic model performance evaluation on utilizing the common video conferencing application platforms. It was also used to measure the weighted mean values of the ISO/IEC 25010:2012 System Quality Evaluation based on the data gathered from respondents and evaluators.
2. **Composite Mean or Average** was calculated from the gathered data of the respondents and competent evaluators to check the overall mean and assess the level of acceptance of the ISO/IEC 25010:2012 System Quality Evaluation.
3. **Percentage** was calculated to verify the magnitude equivalent frequency of data collected from the respondents and their demographics.
4. **t-Test** was used to verify the significant difference between two variables, which were the normal utilization and the developed optimized innovative technological management approach model in using the most common video conferencing application platforms.

Chapter 4
Presentation, Analysis and Interpretation of Data

The presentation of results, data analysis, and interpretations, as well as the evaluation of this dissertation, are covered in this chapter. The data was collected, reviewed, processed, and interpreted to solve the problems indicated in Chapter 1 of this dissertation. Charts, graphs, and tables were utilized to illustrate the outcomes of the observations, survey, and testing in a thorough manner.

The major goal of this chapter is to differentiate the data collected from real testing for the sake of this analysis of the dissertation. This was to determine that the developed strategic model for new technological management approach was credible and convenient, which consist of the different innovative strategies utilizing the most common video conferencing application platforms especially during online classes and business conferences. The developed strategic model underwent a series of evaluation by the users by means of the six (6) out of eight (8) general characteristics of the ISO/IEC 25010: 2011 system quality model in terms of usability (simplicity), reliability, performance efficiency, maintainability, compatibility, and security to meet the required specific requirements.

Additionally, this dissertation also highlighted the factors to be considered in the most used video conferencing application platforms, and the encountered problems by the users in schools and companies. The significant difference between the normal utilization and the developed optimized innovative technological management approach model were also covered. These specific problems served as basis and guidelines in developing the

strategic model for new technological management approach for the different innovative strategies utilizing the said most common video conferencing application platforms.

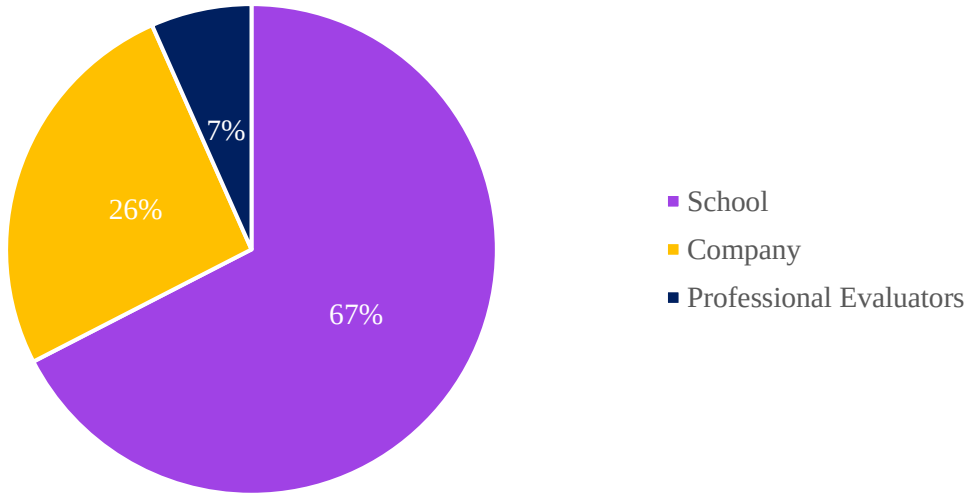

Figure 3. The Demographics Profile of the Respondents

Two hundred three (203) randomly selected students, instructors, administrators of schools, colleges, and institutions (67.4%), as well as seventy-eight (78) selected employers and workers of small to medium-sized businesses, did the evaluations as shown in Figure 3. Furthermore, twenty (20) computer engineers and technicians, as well as IT specialists (6.7%), made ideas for future enhancements to the created strategic model. Significantly, the following obtained findings, data analyses, and interpretations below addressed the mentioned problems and issues in using the most common video conferencing application platforms during online classes and business conferences.

1. **The most common video conferencing application platforms used for online classes and business conferences.**

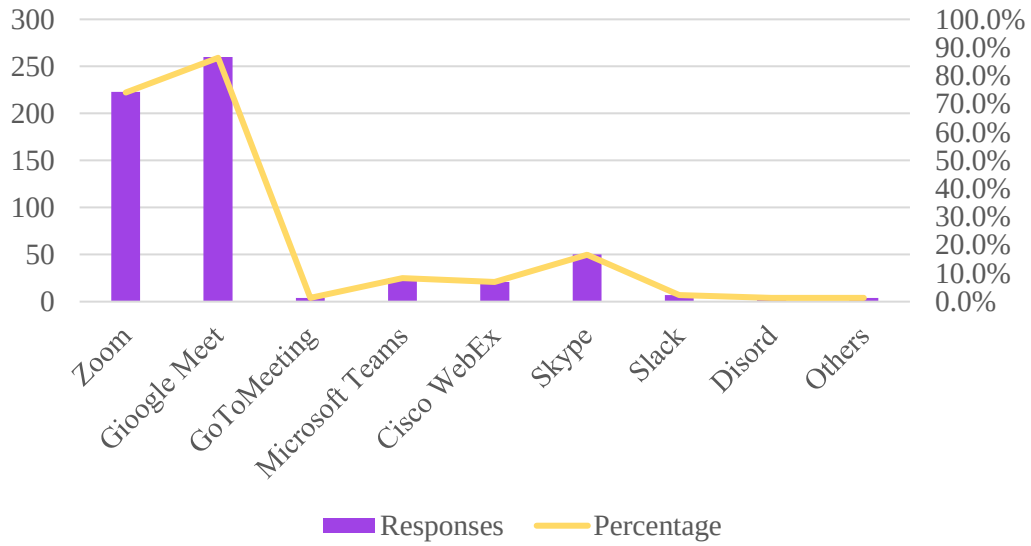

Figure 4. The Bar Graph with Percentage Presentation of the Most Common Video Conferencing Application Platforms Used for Online Classes and Business Conferences

Figure 4 shows the result of the initial survey administered to respondents via multiple responses; there are five (5) most popular video conferencing application platforms for online classes and business conferences, including Google Meet, which received 260 responses (86.4%) of the total population, and Zoom, which received 73.4% (233) of the total responses. Microsoft Teams placed in third with 75 responses (24.9%), Skype received 16.6% (50 responses), and Cisco WebEx received 6.9% (21 responses). Other application platforms such as Slack,

GoToMeeting, Discord, Facebook Messenger Room, ClassIn, Gather, and Schoology, accounted for the remaining 6.1%.

With the obsolete and inefficient communication systems across a variety of sectord, Skype adopted a simplified communication platform embracing cloud-based technologies (5 Real Benefits of Skype for Business, 2021), which video conferencing platform services have evolved into the beating heart of both online collaboration and personal interactions via the web (Brame, 2021c). In connection thereto, the finest business for enterprise conferencing is WebEx by Cisco because of its highly full-featured platform with integration and security capabilities geared directly at mid-sized to big corporations and enterprises (Brame, 2021a). Similarly, Google Meet is fully capable of standing on its own, and there are no burdensome programs to download, with the exception of the Google Chrome browser, which is optional. It is compatible with all operating systems and has a robust set of collaborative tools (Brame, 2021b). Moreover, Duffy (2021b) labelled the Microsoft Teams app as a user-friendly remote-work collaboration tool because of its ease navigation and self-service system arrangements. Furthermore, Zoom Meetings has taken root and has become a top choice among video conferencing programs for business, education, government, healthcare, and personal usage, with increasingly strict security and privacy standards (Duffy, 2021a). According to the different research gathered, Google Meet and Microsoft Teams are the most suited for education, while Skype and Cisco WebEx are the most utilized platforms for business. Zoom, on the other hand, is regarded as the most versatile software since

it can be used for both online education and corporate meetings. This reveals that each of the most popular video conferencing application platforms identified in this study has a distinct and appropriate use.

2. The problems encountered in using the different video conferencing application platforms for online classes and business conferences.

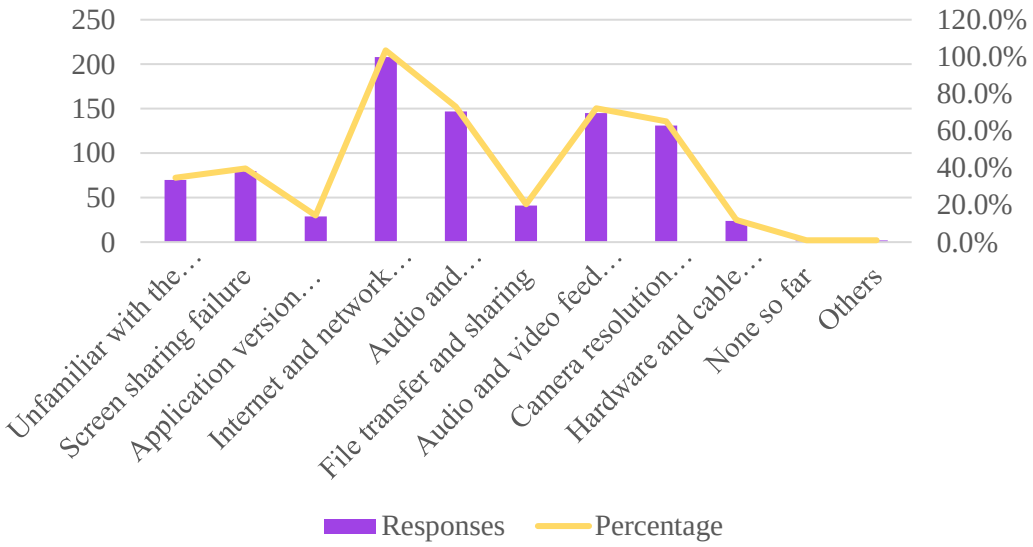

Figure 5. The Bar Graph with Percentage Presentation of the Problems Encountered in using the Different Video Conferencing Application Platforms for Online Classes and Business Conferences

Figure 5 shows the findings of the initial survey administered to respondents via multiple responses, revealing six significant issues experienced while utilizing video conferencing application platforms for online classrooms and business conferences. Two hundred eight (208 or 69.1%) said that Internet and network

connectivity was the most difficult problem they had encountered, followed by audio background noise (147 responses) and audio and video feed lagging (145 responses), which received 48.8% and 48.2% of the total responses, respectively. Furthermore, camera resolution and camera connection failure received 43.5% (131 responses), followed by minor issues such as file transfer and sharing, which received 13.6% (41 responses), application version compatibility, which received 29 responses (9.6%), and hardware and cable connection (peripherals) issues, which received 8% (24 responses). According to the respondents, the time management and remote activities are included to the remaining 1.2% (4 responses).

Video conferencing platforms are available in different formats and required to have a stable local area network through telecommunication lines with network traffic protocols and codecs for handling traffic streaming. The said codecs encode audio and video feed into digital bits and bytes on the broadcasting side and then back to video and audio on the receiving side. Better broadcasts need compatible cameras, microphones, dedicated servers, and client-side apps (Brame, 2021c). In connection with the quoted findings and gathered results of this study, this signifies that the Internet and network connectivity is the main problem to be solved from the encountered difficulties in using the different video conferencing application platforms. Having a stable Internet and network connection will decrease the audio background noise and video feed lagging as well as the camera resolution; and file transfer and sharing features of the platforms used will be

improved and consistent. On the other hand, using a compatible hardware peripherals and updated software versions are also the major solutions to the problems encountered since hardware peripherals, software version, network connection and its users (peopleware) are the vital components of virtual conferencing.

3. **The factors to be considered in using the different video conferencing application platforms.**

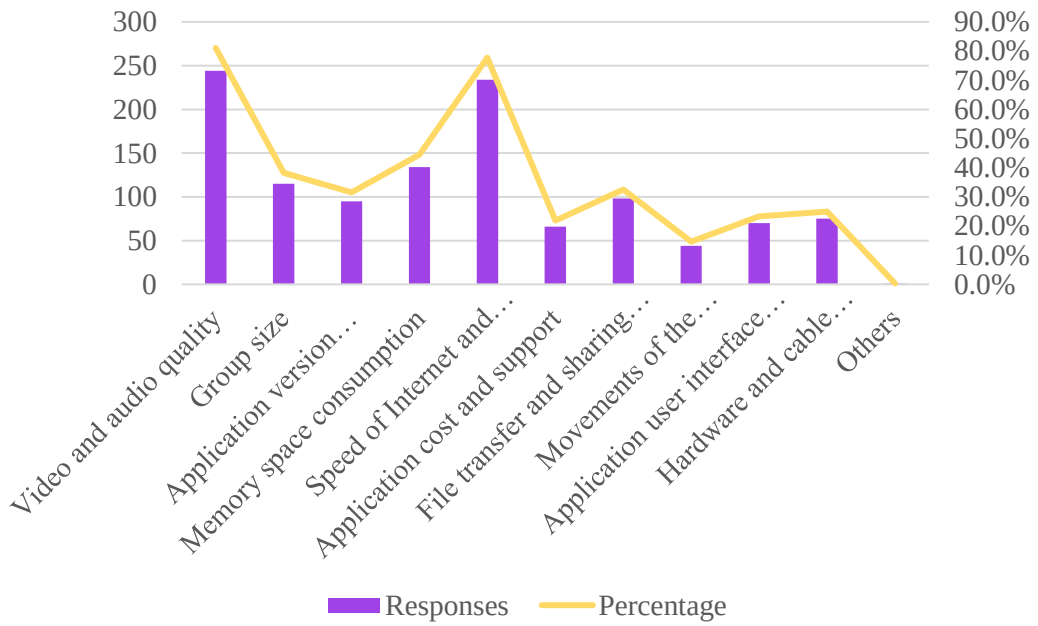

Figure 6. The Bar Graph with Percentage Presentation of the Factors to be Considered in using the Different Video Conferencing Application Platforms

Figure 6 shows the result of the initial survey administered to respondents via multiple responses regarding the factors to be considered in using the common video conferencing app platforms. According to the respondents, visual and audio quality obtained 244 responses (81.1%), followed by Internet and network speed connectivity with 77.7% (234) of the responses, memory space usage received 44.5% (134) responses, and group size received 38.2% (115 responses). Additionally, file transfer and sharing features (98 responses) and application version compatibility (95 responses) earned 31.6% and 31.6%, respectively. In terms of hardware and software compatibilities, these include hardware and cable connection peripherals with 24.9% (95 responses) and application user interface (UI) features, which received 70 responses (23.3%). For the remaining respondents, the application cost and assistance received 66 responses (21.9%), participant movements received 14.6% (44) of the responses, and other variables received 0.3%, respectively.

Gittlen (2021) emphasized key factor adjustments of home school and home office environments using video conferencing platforms, such as improved application performance, appropriate video and audio peripherals for video quality and on-camera appearance, high-speed connectivity and optimal workflow, and comfort of the users. Optimizing procedures such as avoid uploading and downloading big files, modifying default settings, and other optimizations listed in Table 2 of this chapter might reduce CPU and memory use by 30 to 40%. As the gathered result for considered factors indicates that maintaining a stable Internet

and network connection, applying optimization processes, and changing and adjusting default settings are key factors to be considered when using video conferencing apps, which could improve audio and video quality as well as file transfer and sharing, update application version, and reduce CPU and memory usage. Furthermore, diverse demands exist for video conferencing, and appropriate practice procedures must be improved; and successful participation is dependent on people, group dynamics, and organizational outcomes.

4. **The optimization process and innovative technological management approach in using the most common video conferencing application platforms for online classes and business conferences.**

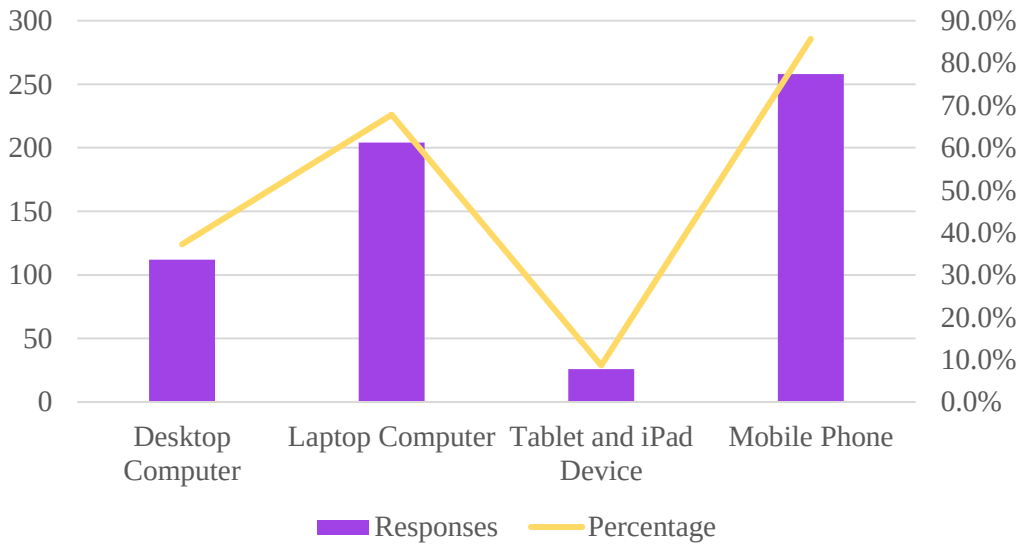

Figure 7. The Bar Graph with Percentage Presentation of the Computers and Devices Used by the Respondents for the Different Video Conferencing Application Platforms

Figure 7 shows the result of the initial survey administered to respondents via multiple responses regarding their devices used for the different video conferencing app platforms. Because of their portability, mobile phones received 85.7% (257) of the total responses, and laptop computers also received a higher response of 204 (67.8%). Similarly, desktop computers had a favorable response of 112 (37.2%) while tablet and iPad devices received 8.6% (26 responses), which was the least preferred device to be used for different video conferencing app platforms.

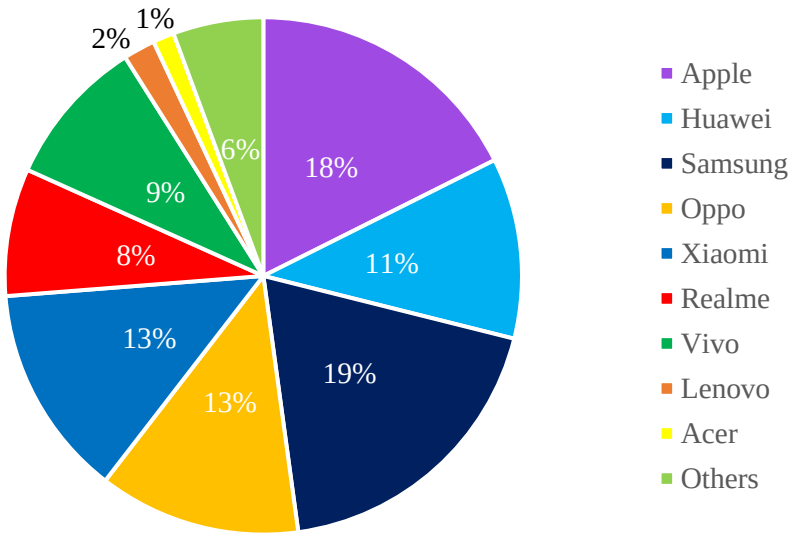

Figure 8. The Brands of the Mobile Phones and Tablets of the Respondents in using the Different Video Conferencing Application Platforms

Figure 8 shows the result of the initial survey administered to respondents based on the brands of their mobile phones and tablet devices in using the different video conferencing application platforms, which revealed that Samsung are the most used mobile phones with 18.9% (57 users) followed by 53 users (17.6%) of the Apple's iPhone and iPad, and Xiaomi had 40 users (13.3%). Thirty-eight (38) respondents (12.6%) are using Oppo mobile phones while 11.3% (34 users) are using Huawei, followed by Vivo with 28 users (9.3%). Meanwhile, Lenovo and Acer mobile phones and tablets are the least used devices with 2% and 1.3%, respectively. Regarding the remaining 17% of respondents, they are using other brands such as LG, Hewlett-Packard (HP), Asus, Redmi, Cherry Mobile, and Nokia mobile phones and tablet devices.

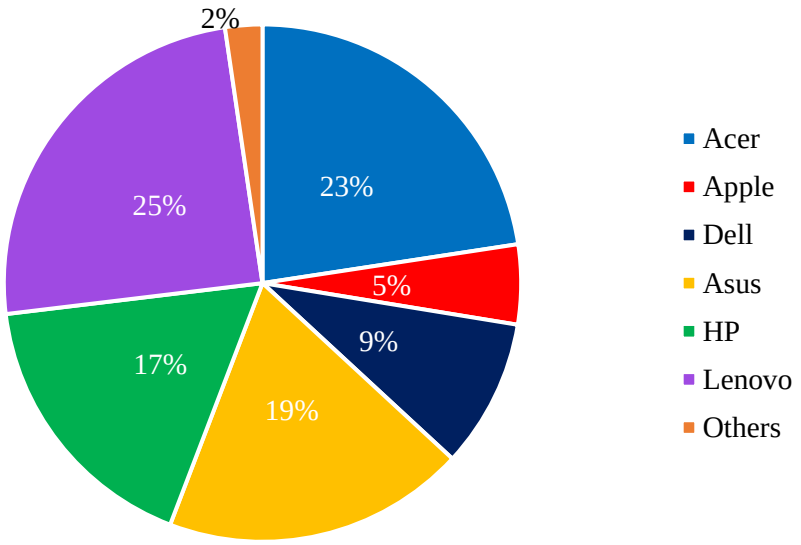

Figure 9. The Brands of Desktop and Laptop Computers of the Respondents in using the Different Video Conferencing Application Platforms

Figure 9 shows the result of the initial survey administered to respondents based on the brands of their desktop and laptop computers in using the different video conferencing application platforms, which revealed that Lenovo was the most used laptops with 24.6% (74 users) followed by 68 Acer users (22.6%), and Asus had 57 users (18.9%). Fifty-two (52) respondents (17.3%) are using HP laptops while 9.3% (28 users) are using Dell. Meanwhile, Apple's MacBook series are the least used laptops with 15 users (5%). Other brands, such as MSI and Chrome laptop computers, are used by the remaining 2.3% of respondents.

Table 2

The Optimization Processes and Innovative Technological Management Approach in using the Most Common Video Conferencing Application Platforms Based on the Most Preferred Computers and Mobile Devices Used by the Respondents for Online Classes and Business Conferences

Common Video Conferencing Application Platforms	Common Desktop and Laptop Brands	Common Mobile Phone Brands	Common Tablet Brands
Google Meet Zoom Microsoft Teams Skype Cisco WebEx	Lenovo Acer Asus HP Dell Apple's MacBook	Samsung Apple's iPhone Xiaomi Oppo Huawei Vivo	Samsung Apple's iPad Xiaomi Huawei Lenovo Acer

Optimization and Innovative Utilization Processes	Applications of Optimization and Innovative Utilization Processes to Common Video Conferencing Application Platforms Used			
	Desktops and Laptops	iPhones, iPads and MacBooks	Common Mobile Phones	Common Tablets
Decrease display brightness	✓	✓	✓	✓

Table 2, continued

Optimization and Innovative Utilization Processes	Applications of Optimization and Innovative Utilization Processes to Common Video Conferencing Application Platforms Used			
	Desktops and Laptops	iPhones, iPads and MacBooks	Common Mobile Phones	Common Tablets
Use a plain (not bright) desktop and home screen background	✓	✓	✓	✓
Decrease keyboard backlight	✓	✕	✕	✕
Disabled Bluetooth and Wi-Fi connection when not in use	✓	✓	✓	✓
Disabled the use of virtual backgrounds	✓	✓	✓	✓
Disabled e-mail and Internet sync settings	✓	✓	✓	✓
Avoid uploading and downloading of large files	✓	✓	✓	✓
Keep Bandwidth-hogging Processes to a Minimum	✓	✓ MacBook ✕ iPhone ✕ iPad	✕	✕
Monitoring the temperature of laptops and mobile devices	✓	✓	✓	✓
Battery optimization	✓	✓	✓	✓
Turning off, hibernate mode, and sleep mode laptops while charging	✓	✕	✕	✕
Monitoring charging patters	✓	✓	✓	✓
Not in use mobile phones and tablets while charging	✕	✓	✓	✓
Use equipment with appropriate USB HID connections	✓	✓	✓	✓
Use appropriate camera, microphones, headsets, and other hardware peripherals	✓	✓	✓	✓

Table 2, continued

Optimization and Innovative Utilization Processes	Applications of Optimization and Innovative Utilization Processes to Common Video Conferencing Application Platforms Used			
	Desktops and Laptops	iPhones, iPads and MacBooks	Common Mobile Phones	Common Tablets
Use appropriate Bluetooth connection devices	✓	✓	✓	✓
Audio and camera testing	✓	✓	✓	✓
Audio, video, share screen, and local and cloud recording pairings	✗	✓	✗	✗
Always upgrading the applications to the latest version	✓	✓	✓	✓

Legend: ✓ - Applicable ✗ - Not Applicable

Note: Retrieved from "Network Optimization for Video Conferencing" by C. Craven, 2021. SDxCentral.com; "Cisco WebEx Business Review" by D. Brame, 2021a. PCMAG.com; "Google Meet Review" by D. Brame, 2021b. PCMAG.com; "The Best Video Conferencing Software for 2021" by D. Brame, 2021c. PCMAG.com; "Microsoft Teams Review" by J. Duffy, 2021b. PCMAG.com; "Is Zoom Hogging Your PC's Resources? Try These Tips and Tricks" by Rahi System, 2021. Rahi; "Supported USB HID devices for the Zoom desktop client", 2021. Zoom; "System requirements for iOS, iPadOS, and Android", 2021. Zoom; "System requirements for Windows, MacOS, and Linux", 2021. Zoom; "What are the System Requirements for Cisco WebEx Video Platform?", (2021). WebEx & "5 ways to optimize your PC for video conferencing" by E. Weiss, 2021. UniversityBusinessMagazine.com.

Based on the above results regarding the most preferred computers and devices of the respondents as shown in Figure 8 and Figure 9, and its brands as shown in Figure 10, Table 2 shows the common optimization and utilization processes to be applied in using the most used video conferencing application platforms. Table 2 also shows optimized solutions to the major problems encountered as shown in Figure 5, which were based on the main factors to be considered in using the common video conferencing application platforms as

shown in Figure 6 of this chapter. Likewise, these optimization and innovative utilization processes and solutions, which serves as a new technological management approach are applicable only for the said most used video conferencing app platforms as shown in Figure 4, namely: Google Meet, Zoom, Microsoft Teams, Skype, and Cisco WebEx, respectively.

Exploring the latest developing technologies and numerous ways that might reduce the observed concerns, particularly the quality challenges associated with Voice over IP, as well as video. Similarly, video conferencing necessitates careful consideration of delay, jitter, packet loss, and other technical interruptions. With the said technical interruptions, these optimization processes and solutions as shown in Table 2, came from different cited research, journals, web articles, and web blogs, which were applied, tested, and evaluated also by professionals to the most common video conferencing apps used by the selected schools and companies. These were compiled according to the laptop and mobile device battery optimizations, optimization of multi-tasking utilization of other applications, optimization of Internet and mobile data connectivity and its security, minimizing the consumption of computer hardware memory storage, and other technological properties. Likewise, the conducted evaluation results shown in Table 4 signifies that these optimization processes could serve as basis for innovative technological management and utilization approach for the most used and specific video conferencing, which can be applied for online education and business conferences

5. **The developed strategic model in using the most common video conferencing application platforms.**

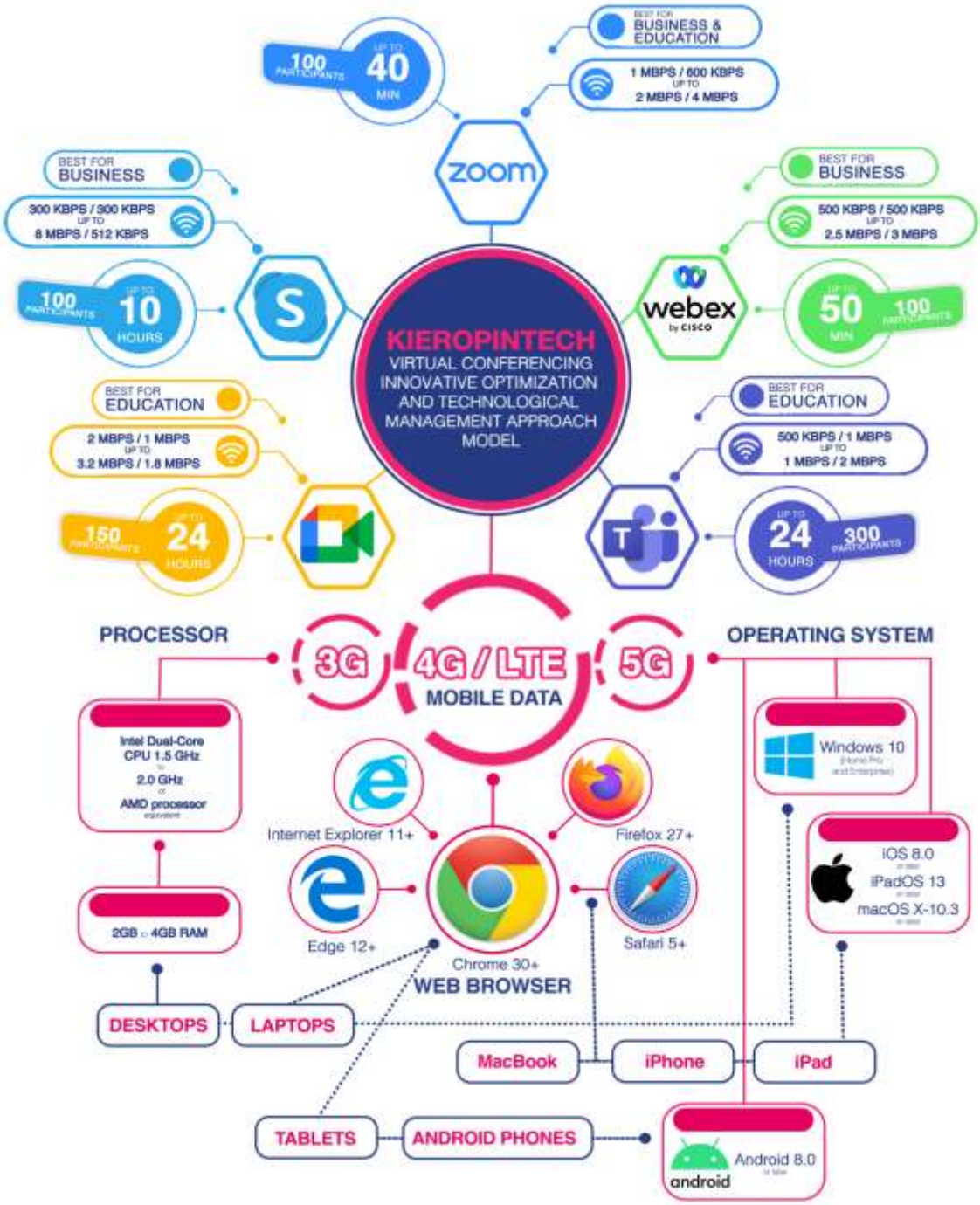

Figure 10. KIEROPINTECH: The Virtual Conferencing Innovative Optimization and Technological Management Approach Model

Figure 10 shows the developed virtual conferencing innovative optimization and technological management approach model personally named by the researcher as KIEROPINTECH, which stands for Keeping Integration Engagement Robust Optimizing Process for Innovative Notion of Technology. The developed strategic model is comprising of the five major video conferencing applications used for education and business meetings based on the gathered data shown in Figure 4 of this chapter, namely: Zoom, Google Meet, Microsoft Teams, Cisco WebEx, and Skype applications, respectively. Each application platforms were categorized whether they are best for education or business, or for both purposes. They were also tested and evaluated through their maximum participant capacity, Internet and network connectivity for bandwidth requirements from standard definition (SD) to high quality (HD) video quality for video conferencing, and its time limitation. The mobile data connectivity, compatible web browsers, operating systems, and required processors and RAM (Random Access Memory) memory specifications. Likewise, Zoom Video Communications, which is best for business and education can gathered 100 participants for a 40-minute video conferencing, with SD video quality of 1 MBps (megabytes per second) inbound to 600 kBps (kilobytes per second) outbound, while 2 MBps inbound to 4 MBps outbound bandwidth requirements for HD video quality. On the other hand, Google Meet was considered best for education, education can gather up to 150 participants for video conferencing of 24 hours, with SD video quality of 2 MBps inbound to 1

MBps outbound, while 3.2 MBps inbound to 1.8 MBps outbound bandwidth requirements for HD video quality. Similarly, Microsoft Teams can hold 300 participants for video conferencing of 24 hours, with SD video quality of 500 kBps inbound to 1 MBps outbound, amd 1 MBps inbound to 2MBps outbound bandwidth requirements for HD video quality. In addition, Cisco WebEx and Skype, the last two major video conferencing applications on the gathered data were both considered best for business meetings. Cisco WebEx had a bandwidth requirement of 500 kBps both inbound and outbound for SD video quality while 2.5 MBps inbound to 3 MBps outbound for HD video quality. Lastly, Skype of Microsoft can only hold a 10-hour video conferencing per day with a maximum of 100 participants, with a bandwidth requirement of 500 kBps both inbound and outbound for SD video quality while 2.5 MBps inbound to 3 MBps outbound for HD video quality.

On the latter part of Figure 10 also illustrates the minimum requirement of 3G (third generation) and maximum of 4G (fourth generation) also known as LTE (Long Term Evolution), and 5G (fifth generation) wireless communications standards for mobile data users depending on its signal proximity. Along with the signal proximity, the compatible web browsers for the most common used video conferencing platforms were also determined such as Microsoft Edge 12 or later, Internet Explorer 11 or later, and Mozilla Firefox 27 or later for Windows 10 Home Pro and Enterprise editions OS of desktops, laptops, and tablet devices. For Apple devices, Safari 5 or later web browser on behalf of iOS 8.0 or later for iPhone OS,

iPadOS 13 or later for iPad OS, and macOS X with macOS 10.3 or later for MacBook OS, respectively. Likewise, Google Chrome 30 or later versions is the most compatible web browser for all the mentioned video conferencing apps, which can be used for desktop and laptop computers, tablets, iPhone and iPad devices, as well as Android 8.0 or later OS of smartphones and other smart devices. Similarly, a high-performance processors and RAM specifications are also one of requirements for a smooth video conferencing, the said required processors are Intel Dual-Core CPU 1.5 GHz (gigahertz) to 2.0 GHz or later, and its AMD equivalent which 2 GB to 4 GB RAM are the required memory specifications.

Based on the developed strategic model, the users can identify which conferencing app is better for their online classes and business meetings especially the teachers and employers. The said users are usually the main hosts or organizers of the video conferencing and mainly benefit because they can choose the right platform based on the number of participants who will going to attend, the Internet and network specifications, and the time limitation of the video conferencing to be held. As for the students and employees, they can also determine to the developed model, the required or needed bandwidth and network as well as mobile data specifications so they can apply the optimization process on their Internet or mobile data connection, which is also depends on the chosen video conferencing platform by their host. The aforementioned circumstances signifies that the developed strategic model could serves as basis for an improved and robust utilization of the

common video conferencing application platforms for online classes and business conferences.

6. **The significant difference between the normal utilization and the developed optimized innovative technological management approach model in using the most common video conferencing application platforms used for online classes and business conferences in terms of usability, reliability, performance efficiency, maintainability, compatibility, and security.**

Table 3

The Summary Table of the Conducted Evaluation of the Respondents in using the Most Common Video Conferencing Application Platforms for Online Classes and Business Conferences Based on the General Characteristics and Sub-characteristics of the ISO/IEC 25010: 2011 System Quality Model (Normal Utilization)

General Characteristics	Sub-Characteristics	Weighted Mean	Average	Interpretation
Maintainability	Modularity	2.51	2.76	Acceptable
	Reusability	2.75		
	Analyzability	2.84		
	Modifiability	2.79		
	Testability	2.92		
Security	Confidentiality	2.34	2.50	Acceptable
	Integrity	2.62		
	Non-Repudiation	2.34		
	Accountability	2.71		
	Authenticity	2.48		
Reliability	Maturity	2.68	2.61	Acceptable
	Availability	2.75		
	Fault Tolerance	2.59		
	Recoverability	2.42		
Compatibility	Co-existence	2.72	2.68	Acceptable
	Interoperability	2.63		

Table 3, continued

General Characteristics	Sub-Characteristics	Weighted Mean	Average	Interpretation
Performance Efficiency	Time Behavior	2.86	2.67	Acceptable
	Resource Utilization	2.52		
	Capacity	2.63		
Usability	Appropriateness	2.95	2.87	Acceptable
	Recognizability	2.94		
	Learnability	3.03		
	Operability	2.78		
	User Error Protection	2.35		
	User Interface Aesthetics	3.09		
	Accessibility	2.93		
Composite Mean			2.68	Acceptable
Note: Legend:	3.25 - 4.00	Strongly Acceptable		
	2.50 - 3.24	Acceptable		
	1.75 - 2.49	Unacceptable		
	1.00 - 1.74	Strongly Unacceptable		

Table 3 shows the results from the evaluation form with a 4-point Likert scale as shown in Table 1 of Chapter 3 of this dissertation, which were distributed and responded by the respondents and professional evaluators on their normal utilization of the common video conferencing applications for online classes and business conferences based on the six out of eight general characteristics and sub-characteristics of the ISO/IEC 25010: 2011 system quality model, the first general characteristic is maintainability garnered an average weighted mean 2.76 with an acceptable interpretation, together with its five sub-characteristics such as modularity, which earned 2.51, reusability had 2.75, analyzability garnered 2.84, a weighted mean of 2.79 for its modifiability, and for testability, which earned 2.92. Similarly, the second one is security, which received an average weighted mean of

2.50 with an acceptable interpretation, together with its five sub-characteristics namely confidentiality earned 2.34, integrity had 2.62, non-repudiation received 2.34, accountability garnered 2.71, and authenticity with 2.48 weighted mean. As for reliability general characteristics, the average weighted mean was 2.61 with an acceptable interpretation along with its sub-characteristics such as maturity earned 2.68, availability had 2.75, fault tolerance received 2.59 and recoverability garnered 2.42 of the weighted mean. Likewise, the fourth general characteristic is compatibility, which received an average weighted mean of 2.68 along with an acceptable response, with co-existence and interoperability, which had 2.72 and 2.63, respectively as its sub-characteristics. In addition, performance efficiency received an acceptable response with a 2.67 average weighted mean with its sub-characteristics of time behavior, which received 2.86, resource utilization had 2.52, and capacity earned 2.63 of the gathered weighted mean. For the final general characteristic, usability with a 2.87 average weighted mean and an acceptable interpretation, accompanied by appropriateness, which earned 2.95, recognizability had 2.94, learnability garnered 3.03, operability received 2.78, user error protection received 2.35, and the last two sub-characteristics were user interface aesthetics and accessibility, which received 3.09 and 2.93, respectively. The overall evaluation was based on the composite mean of the all the average weighted mean of the six general characteristics of the ISO/IEC 25010: 2011 system quality model. The normal utilization of the common video conferencing application platforms received an overall composite mean of 2.68 with an agreeable level of acceptability.

Table 4

The Summary Table of the Conducted Evaluation of the Respondents in using the Most Common Video Conferencing Application Platforms for Online Classes and Business Conferences utilizing the Developed Optimized Innovative Technological Management Approach Model Based on the General Characteristics and Sub-characteristics of the ISO/IEC 25010: 2011 System Quality Model (Optimized Utilization)

General Characteristics	Sub-Characteristics	Weighted Mean	Average	Interpretation
Maintainability	Modularity	3.72	3.66	Strongly Acceptable
	Reusability	3.64		
	Analyzability	3.36		
	Modifiability	3.78		
	Testability	3.81		
Security	Confidentiality	3.65	3.74	Strongly Acceptable
	Integrity	3.73		
	Non-Repudiation	3.76		
	Accountability	3.88		
	Authenticity	3.70		
Reliability	Maturity	3.80	3.77	Strongly Acceptable
	Availability	3.88		
	Fault Tolerance	3.61		
	Recoverability	3.77		
Compatibility	Co-existence	3.83	3.72	Strongly Acceptable
	Interoperability	3.60		
Performance Efficiency	Time Behavior	3.81	3.80	Strongly Acceptable
	Resource Utilization	3.84		
	Capacity	3.75		
Usability	Appropriateness	3.77	3.85	Strongly Acceptable
	Recognisability	3.92		
	Learnability	3.79		
	Operability	3.85		
	User Error Protection	3.82		
	User Interface Aesthetics	3.88		
	Accessibility	3.89		
Composite Mean			3.76	Strongly Acceptable

Note: Legend:		
	3.25 - 4.00	Strongly Acceptable
	2.50 - 3.24	Acceptable
	1.75 - 2.49	Unacceptable
	1.00 - 1.74	Strongly Unacceptable

Table 4 shows the results from the evaluation form with a 4-point Likert scale as shown in Table 1 of Chapter 3 of this dissertation, which were distributed, responded and tested by the respondents and professional evaluators on their utilization of the common video conferencing applications for online classes and business conferences utilizing the developed optimized innovative technological management approach and its strategic model as shown in Table 2 and Figure 10 of this chapter. The said evaluations were based on the six out of eight general characteristics and sub-characteristics of the ISO/IEC 25010: 2011 system quality model, the first general characteristic is maintainability garnered an average weighted mean 3.66 with a strongly acceptable interpretation, together with its five sub-characteristics such as modularity, which earned 3.72, reusability had 3.64, analyzability garnered 3.36, a weighted mean of 3.78 for its modifiability, and for testability, which earned 3.81. Similarly, the second one is security, which received an average weighted mean of 3.74 with a strongly acceptable interpretation, together with its five sub-characteristics namely confidentiality earned 3.65, integrity had 3.73, non-repudiation received 3.76, accountability garnered 3.88, and authenticity with 3.70 weighted mean. As for reliability general characteristics, the average weighted mean was 3.77 with a strongly acceptable interpretation along with its sub-characteristics such as maturity earned 3.80, availability had 3.88, fault tolerance received 3.61 and recoverability garnered 3.77 of the weighted mean. Likewise, the fourth general characteristic is compatibility, which received an

average weighted mean of 3.72 along with a strongly acceptable response, with co-existence and interoperability, which had 3.83 and 3.60, respectively as its sub-characteristics. In addition, performance efficiency received a strongly acceptable response with a 3.80 average weighted mean with its sub-characteristics of time behavior, which received 3.81, resource utilization had 3.84, and capacity earned 3.75 of the gathered weighted mean. For the final general characteristic, usability with a 3.85 average weighted mean and a strongly acceptable interpretation, accompanied by appropriateness, which earned 3.77, recognizability had 3.92, learnability garnered 3.79, operability received 3.85, user error protection received 3.82, and the last two sub-characteristics were user interface aesthetics and accessibility, which received 3.88 and 3.89, respectively. The overall evaluation was based on the composite mean of the all the average weighted mean of the six general characteristics of the ISO/IEC 25010: 2011 system quality model. The utilization of the common video conferencing application platforms utilizing the developed optimized innovative technological management approach received an overall composite mean of 3.76 with a strongly agreeable level of acceptability.

Based on the gathered data and results from the evaluations conducted by the respondents and professional evaluators as shown in Table 3 and Table 4 of this chapter, which have a difference of 1.08 from the average weighted mean of 2.68 for normal utilization and 3.76 for optimized utilization with acceptable and strongly acceptable interpretations, respectively. These weighty results from the two evaluations based on the six out of eight general characteristics and sub-

characteristics of the ISO/IEC 25010: 2011 system quality model signify that applying the developed optimized innovative technological management approach of the common video conferencing applications for online classes and business conferences is credible and effective.

Table 5

The Significant Difference Between the Normal Utilization and the Developed Optimized Innovative Technological Management Approach Model Utilization for the Most Common Video Conferencing Application Platforms used for Online Classes and Business Conferences Based on the Conducted Evaluation of the Respondents using the General Characteristics and Sub-characteristics of the ISO/IEC 25010: 2011 System Quality Model

General Characteristics	Average Acceptability Level		t-Value	p-Value	Interpretation
	Normal	Optimized			
Maintainability	2.76	3.66	-8.460	0.0000	Significant
Security	2.50	3.74	-14.903	0.0000	Significant
Reliability	2.61	3.77	-12.684	0.0000	Significant
Compatibility	2.68	3.72	-8.422	0.0138	Significant
Performance Efficiency	2.67	3.80	-10.907	0.0000	Significant
Usability	2.87	3.85	-10.214	0.0000	Significant

Significant @ 0.05

Note: t-test was used since it is a summarized data

Legend: Normal - The average level of acceptability for the normal utilization of the common video conferencing application platform used for online classes and business conferences

Optimized - The average level of acceptability for the developed optimized strategic model utilization of the common video conferencing application platform used for online classes and business conferences

Table 5 shows the difference between the normal utilization and optimized utilization of the common video conferencing application platforms used for online classes and business conferences. The optimized utilization involves the utilization of the developed optimized innovative technological management approach and its strategic model as shown in Table 2 and Figure 10 of this chapter. The gathered data from Table 3 and Table 4 of this chapter were based on the six out of eight general characteristics and sub-characteristics of the ISO/IEC 25010: 2011 system quality model. Based on the average weighted mean in terms of maintainability, the normal utilization received 2.76 while 3.66 for the optimized utilization, which had an increase of 0.9. On the other hand, an increase of 1.24 from the normal utilization of 2.50, which the optimized utilization earned a 3.74 average weighted mean for the security. Similarly, an increase of 1.16 for the reliability of the normal utilization of 2.61, which the optimized utilization received a 3.77 average weighted mean. Likewise, the normal and optimized utilizations for compatibility garnered an average weighted means of 2.68 and 3.72, respectively, with a 1.04 increase. For the performance efficiency, the normal utilization received 2.67 while 3.80 for the optimized utilization, which had an increase of 1.13. Lastly, an increase of 0.98 from the average weighted mean of the normal utilization of 2.87 for usability, which resulted to 3.85 for the optimized utilization. With this, all data gathered underwent a t-test were obtained p-values at 5% significance level are less than 0.05 ($p\text{-value} < 0.05$), giving a rejected hypothesis (H_0), thus the interpretation being significant.

Proving that the produced means from the gathered data of the normal utilization and optimized utilization have a significant difference considering that probabilities were not just coincidence, and it was solved with a t-test since it is a summarized data. As such, an evaluation was conducted of the difference between the normal utilization (default setting) and the applied optimized utilization for video conferencing applications made a significant change as the p-value met the required condition to reject the hypothesis. These results proved that the main problem of this study provided a credible solution using the developed optimized innovative technological management approach and its strategic model for the common video conferencing application platforms used for online classes and business conferences.

Chapter 5
Summary of Findings, Conclusions and Recommendations

This chapter covers the summary of this dissertation and its significant findings, conclusions, and recommendations for further improvements and modification of this Optimization and Innovative Utilization of Virtual Video Conferencing Applications dissertation.

The main objective of this dissertation was to develop a new technological management approach based on the innovative ways of optimization and utilization of different video conferencing application platforms used most especially during online classes and business conferences. Furthermore, the different technological management aspects were also included in the newly developed strategic model, which can be used with the said different video conferencing apps through different computer and personal devices. Particularly, this dissertation sought answers to the following specific problems:

1. What are the most common video conferencing application platforms used for online classes and business conferences?
2. What are the problems encountered in using the different video conferencing application platforms used for online classes and business conferences?
3. What are the factors to be considered in using the different video conferencing application platforms?

4. What are the optimization and innovative technological management approach in using the most common video conferencing application platforms for online classes and business conferences?
5. What is the strategic model to be developed in using the most common video conferencing application platforms?
6. Is there any significant difference between the normal utilization and the developed optimized innovative technological management approach model in using the most common video conferencing application platforms used for online classes and business conferences in terms of usability, reliability, performance efficiency, maintainability, compatibility, and security?

Descriptive quantitative research was used as research methodology since it inspects the connection among variables about the different independent aspects of the said strategic model approach and its characteristic properties through numerical evaluation to produce an appropriate collection of data. Three hundred one (301) respondents of the total population were randomly selected from schools, colleges, universities, and small to midsized companies around the Province of Laguna, Philippines, which served as the research locale. Similarly, the said population was composed of two hundred three (203) respondents from schools, seventy-eight (78) respondents from companies, and twenty (20) computer engineers and technicians, and information technologists (IT) served as professional evaluators.

The results of this dissertation were only focused on the developed innovative technological management approach model in using the most common video conferencing application platforms used for online classes and business conferences, and its comparative analysis between the normal utilization. These include the laptop battery optimizations, optimization of multi-tasking utilization of other applications, optimization of Internet and mobile data connectivity and its security, minimizing the consumption of computer hardware memory storage, and other technological properties.

In connection thereto, initial closed-ended questionnaires, evaluation forms with a 4-point Likert scale, interviews, consultations, and series of testing were the main research instruments as well as sources of data. The developed strategic model was evaluated through its level of acceptability such as usability (simplicity), reliability, performance efficiency, maintainability (scalability), compatibility, and security using the six (6) out of eight (8) general characteristics of the ISO/IEC 25010: 2011 system quality model. All data gathered was part of the instrument validation process as well as the statistical treatments such as percentage, weighted and composite means, and t-test, which was used to determine the significant difference of the normal and optimized utilization of video conferencing application platforms by using the developed strategic model approach.

This dissertation mainly benefited by the teachers and students and as well as the employers and employees of business enterprises to have a basis for new technological management approach to determine the different innovative strategies utilizing different video conferencing application platforms especially during online classes and business conferences. Computer engineers, and computer and information technology technicians

of schools and companies, the common users, professional associations, local government units, other non-profit and non-government organizations, and future researchers could also benefit from this dissertation for further improvement and modification of the optimized utilization of the common video conferencing application platforms used for education and business purposes.

Summary of Findings

The pertinent findings of this study were specified based on the presentation, analysis, and interpretation of the gathered data in Chapter 4 of this dissertation:

1. The commonly used and suited video conferencing application platforms for online classes are Google Meet and Microsoft Teams while Cisco WebEx and Skype are mostly applicable for business meetings. On the other hand, Zoom app is considered as the top choice platform due to its flexibility and it could be used for both education and business purposes. Based on the gathered results signify that each of the most common used video conferencing platforms has a distinct and appropriate use.
2. Based on the gathered results via multiple responses, Internet and network connectivity, audio background noise and video feed lagging, camera resolution and camera connection failure were revealed as the six significant issues experienced while utilizing video conferencing application platforms. These results signify that the appropriate hardware peripherals, updated software

version, stable Internet and network connection, and its users (peopleware) are the vital components of virtual conferencing.

3. Based on the gathered results, maintaining a stable Internet and network connection, applying optimization processes, and changing and adjusting default settings are the major factors to be considered when using video conferencing apps, which could improve audio and video quality as well as file transfer and sharing, update application version, and reduce CPU and memory usage. In addition, successful video conferencing and group participation are dependent on each user, group dynamics, and organizational outcomes.
4. The common optimization processes and solutions came from different researchers and professionals, compiled, and tested on the common video conferencing application platforms, which includes the solutions for the common encountered problems, and its key factors based on the gathered results of this dissertation. The said optimization processes are applicable for the most preferred devices and video conferencing apps of the respondents.
5. The developed strategic model categorized each common video conferencing applications, which are best for education and business purposes. In addition, Zoom and Cisco WebEx accepts up to 100 participants for a less than an hour video conferencing while Skype also accepts 100 participants for 10 hours. Google Meet only accepts 150 while 300 participants for MS Teams, and both can hold a 24-hour video conferencing. Likewise, the average bandwidth requirements are 2 MBps to 4 MBps, and 3G, 4G LTE, and 5G for mobile data

users. As for web browsers, Google Chrome is the best compatible to be used while 2GB to 4 GB are required for RAM specifications. Lastly, Windows 10 Home Pro and Enterprise are the required OS for desktop and laptop computers while i0S 8.0, iPadOS 13, and macOS X to macOS 10.3 for Apple devices. Android 8.0 or later is the recommended OS for Android smartphones and devices.

6. Based on the gathered results from the conducted evaluations the 6 out of 8 general characteristics of the ISO/IEC 25010: 2011 system quality model in terms of usability, reliability, performance efficiency, maintainability, compatibility, and security, the overall composite means of 2.68 for normal utilization and 3.76 for optimized utilization with acceptable and strongly acceptable interpretations, for using the common video conferencing applications platforms in online classes and business conferences. In addition, the difference between the said two utilizations were also determined using t-test, which resulted to a significant interpretation.

Conclusions

Based on the analysis and interpretation of the pertinent findings of this dissertation, the following conclusions were determined:

1. Zoom Video Conferencing is the most flexible applications due to its wide range of services especially for education and business, and to its accommodation capacity. Similarly, Google Meet is considered as best for

education because of its workplace, which the users can connect by using one Google account only to their other different platforms such as Gmail, Google Drive for cloud storage, Google Docs for real-time editing of documents, YouTube for video streaming, and others that could help the users in their school activities and unfinished business agendas. Likewise, MS Teams is the same as the Google Meet, which the users can also access by also using one Microsoft account with their MS Office files, One Drive cloud storage, Outlook mail, and other useful applications. On the other hand, Cisco WebEx and Skype are essential for business since it has an easy, modern, and intuitive set-up feature that could make workflow more optimal.

2. Since the fourth industrial revolution of technologies include the cloud computing and wireless communications to have remote communication and sharing platforms, the major problem encountered in using the video conferencing applications is the Internet and network connectivity and its bandwidth requirements and specifications of the wireless communications standards.
3. The key factors to be considered when using video conferencing applications platforms are hardware, software, peopleware, and most especially Internet and network connections. Since having an unstable bandwidth and network connectivity will have a domino effect, which will start with the software that cause lagging followed by the connection failures of hardware peripherals, and

then to its peopleware (users) that can cause additional stress and fatigue due to the delay and unwanted disruptions of the video conferencing.

4. The immediate transition of face-to-face into the new normal environment had a big impact especially to the network communications, which is become growing in demand, but several network traffic and other unexpected disruptions occur due to increasing number of users. Then, by applying the common optimization processes and solution in using the different conferencing applications to be easily adopt and create an efficient pace of work, deliver faster problem solving and increase innovation through technological management.
5. The developed strategic model for using the common video conferencing applications could serve as basis on which application is more suitable for a specific video conferencing depending on its requirements and limitations. With this, the users will be prepared for necessities and to eliminate the unexpected disruptions due to misinformed requirements and specifications of the application to be used.
6. The optimized utilization made a significant increase of 0.98 to 1.24 from the normal utilization of the average weighted mean for each general characteristics of ISO/EIC 25010: 2011 system quality evaluations of the respondents. With this, all data gathered underwent a t-test were obtained p-values are less than 0.05 significance level. Thus, the hypothesis (H_0) written in Chapter 1 is rejected.

Recommendations

With the relevant findings and determined conclusions, the following recommendations were enumerated:

1. For the hosts of the video conferencing, always check first the number of attendees, the time consumptions, and the network specifications of the users before selecting the video conferencing application to be used since each video conferencing applications have a specific and appropriate use. Similarly, the attendees should also check the specific requirements of the video conferencing application provided by the hosts to prepare necessary peripherals and apply the common optimization processes for an optimal video conferencing experience.
2. Securing a stable Internet connection is the best way to eliminate all the problems encountered in using the video conferencing applications by using a router booster or wireless range extenders to maintain the network connectivity.
3. Additional key factors to considered in using video conferencing applications were the specific compatibility of hardware peripherals, wireless devices through Bluetooth and Wi-Fi connectivity, and device pairings, which is one of the problems encountered especially for the Apple devices.
4. Additional specific optimization processes and solutions, which can be used only to a specific device, operating system used, and its specific optimizations

based on the brands of the computer used as well as smartphone and tablet devices.

5. Additional modifications for the developed strategic model, which include minimum and recommended requirements and specifications for Linux, ROM and video card specifications, and internal memory specifications for smartphone and devices.
6. To significantly increase more the level of acceptability of the developed strategic model, modifying or redeveloping new one, which focus on the familiarization of the user interface and its features of the common video conferencing applications for online classes and business conferences.
7. Additional key factors to considered are the ages and generation gaps of the peopleware also as the users of the video applications. Millennials and Generation-Z are very familiar and can adopt easily to the new trends of technologies unlike the other generations. In addition, most of the newly-hired workers are millennials and gen-z, which prefers to a technological way of optimal workflow.

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