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Adoption of Digital Learning Technology: An Empirical Analysis of the Determinants in Telecom Sector

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Abstract— *Technology has advanced significantly from the analogue period to the digital era. Digital Learning Technology (DLT) is a learning paradigm based on the use of ubiquitous latest technologies, by using smart devices. It can be described as a learning environment that is assisted in daily life by wireless networks, mobile, and embedded computers. It aims to offer content and interaction to students wherever they are, at any time. The learning process has advanced thanks to the technology revolution, which has also fundamentally altered how knowledge is shared and learned. At present, there exist other frameworks too, but they are centered towards different paradigms, and point of view pertaining to DLT with its emphasis on Telecommunication Sector has not been taken into consideration. As, existing frameworks are centered towards different environments hence there exists a need to add dimensions of Empowered Learner, Digital Citizen, Knowledge Curator, Innovative Designer, Computational Thinker and Creator, Communicator & Global Collaborator. These have not been integrated together in existing available research. The study will ascertain level of knowledge of DLT and examined factors which affect the adoption rate, use, and role of DLT in telecoms setups. The results of this research will help create a framework that, if used in any academic or learning setting in a technology-based firm.*

Keywords— ***Artificial Intelligence, Lendo, Swedbank***

I. INTRODUCTION

The newest development in educational technology is digital learning. The widespread use of smart gadgets, which have powerful computing and communication capabilities, is responsible for this educational revolution. The major technologies that are paving the way for DLT are thought to be those relating to information, communication, and computation. "Urban learning paired with Technology Centered Learning Environment (TCLE) devices has created enormous opportunity and paradigm shift for the users." (Xianzhi Ye, 2008).

1.1. Background

The development of digital learning is supported by improvements in computing technology combined with a "always connected" digital world. The process of learning from the environment has become considerably simpler as a result. The ubiquitous world is encouraging knowledge sharing to happen naturally, methodically, consistently, and continuously. According to (Yano, 2003), based on (Chen Y.S, 2002), the main characteristics of ubiquitous digital learning are Empowered Learner, Digital Citizen, Knowledge Curator, Innovative Designer, situating of instructional activities and Creator, Communicator & Global Collaborator.

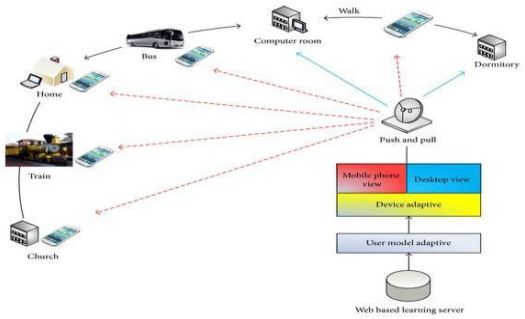

Fig 1.1-1: The conceptual design for a ubiquitous learning system

Source: (Chen Y.S, 2002)

The design above shows a digital learning environment where the user has the liberty to move from one place to another while always being connected to the web based learning server installed at telecommunication services

providers. With the advancements in telecom technology, the location of the web based server can be on the cloud. Cloud computing is a new concept which allows the servers available for computing in the cyber space.

Fig 1.1-2: The cloud computing model

Source: (Xorlogics, 2017)

The above model shows the complete cloud structure. The services have following categories.

- IaaS - Infrastructure as a service
- PaS - Platform as a service
- SaS - Software as a service

IaaS outsources virtualization, storage networking and load balancers.

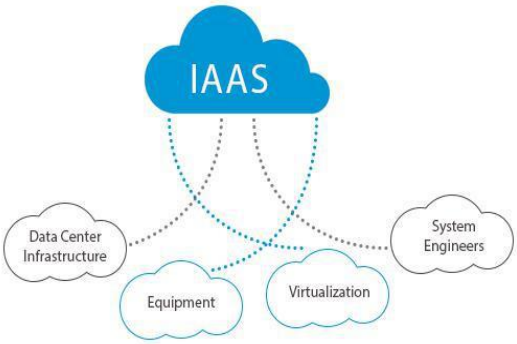

Fig 1.1-3: Infrastructure as a Service

Source: (Wilson, 2019)

PaaS consists of hosting operating system and services that allow the user to run his/her applications.

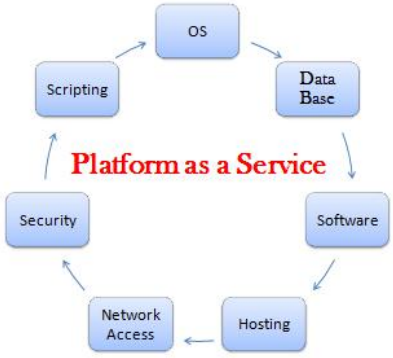

Fig 1.1-4: Platform as a service

Source: (IndiaMART, 2019)

And finally the Software as a service is used only for the needed applications. The cloud has public, private and hybrid space for the specific users.

Fig 1.1-5: Infrastructure as a service

Source: (Solutions, 2019)

DLT is a fresh, dynamic approach to learning that builds on traditional teaching strategies. Because consumers can now afford to use digital media, it is now conceivable. The emergence of ubiquitous learning has altered the roles and responsibilities of educators, trainers, educators, and trainees/students. The core of this strategy is new ways of creating, storing, delivering, and accessing knowledge, not the logic or technical requirements of smart devices employing telecommunication infrastructures. A new digital learning paradigm is starting to take shape, and it is guiding us to take the lead in technological innovation.

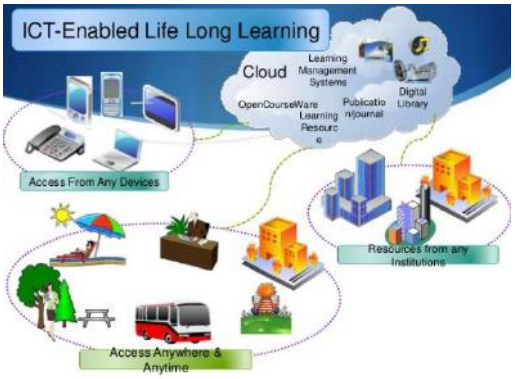

Fig 1.1-6: Information and Communication Technology Enabled Life Long Learning

Source: (Hasibuan, 2013)

The information and communication (ICT) enabled lifelong learning model depicts the overall learning environment integrated with cloud computing infrastructure.

DLT environment offers an interoperable, pervasive, and seamless learning architecture (Saadiah Yahya, 2010). It offers appropriate learning partners, appropriate learning materials, and appropriate learning services at the appropriate location and time. Because the context in which learners are learning has a significant impact on the effectiveness and efficiency of digital learning, context models and contextual acquisition methods are needed (Stephen J.H. Yang. Yang, 2006).

DLT also incorporates learning analytics, a method created very recently to make use of the vast amount of knowledge. It has proven to be a very effective technique to promote initiatives for advanced learning. The learner's mobility and the potential benefit of employing learning analytics to improve the digital learning experience are significant features.

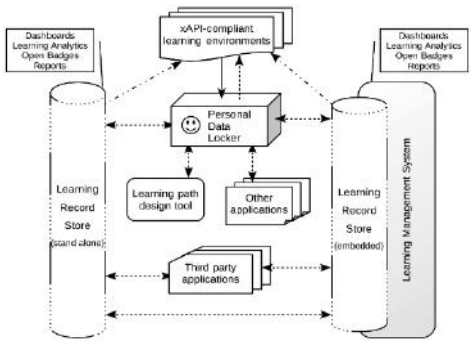

Fig 1.1-7: Ubiquitous Learning Analytics

Source: (Magoulas, 2016)

As boundary-crossing tools, mobile devices, and particularly mobile social media, help learners create multimodal representations that reflect their experiences and identities and share them with their non-digital / digital social networks. (Pimmer, 2016).

Fig 1.1-8: Ubiquitous Learning Smart Mobile Devices

Source: (Lentini, 2019)

Keeping digital records is another aspect of digital learning. They can share their expertise and log their activity on social media. One can focus on targeted quizzes and discover solutions to the targeted questions by making use of specific tools. Interest in digital learning is growing significantly, especially in light of its potential applications in academic contexts.

Although there are now few widespread implementations of DLT, empirical evidence suggests that this will change in the near future thanks to access to digital platforms and telecommunications infrastructures. A paradigm shifts from conventional learning methods to high technology based learning methods will occur in the future when various types of learning technologies are adopted. By the use of communication networks, this will allow us to access any information from anywhere at any time.

1.2. Research Problem

The actual issue is how to develop a conceptual framework for digital learning that can transform current learning approaches into cutting-edge virtual domains in a telecom setting. With the implementation of new DLT mechanisms and technologies, conventional digital learning techniques will become ineffective in the future. The solution to this issue is to provide a conceptual framework for sustained learning that is integrated into the pervasive digital learning echo system.

1.3. Research Objectives

- Analyzing and evaluating existing technologies relating to DLT.
- To come up with a Digital Learning Technology framework in order to find out relationships between dependent and independent variables which are affecting adoption of Digital Learning Technology in the Telecommunication Sector.

- Analyzing through the use of statistical method collected questionnaires and subsequently validating the research hypothesis.
- Coming up with DLT framework.

1.4. Research Motivation

The motivation behind the selection of this area is based on developing a guideline for the telecommunication sector learners where digital learning frameworks are non-existent. This is a completely new domain/area of research in which not much work has been done and there is a dire need to come up with some sustainable framework, which can eventually lead to learning transformations in the futuristic digital world.

II. LITERATURE REVIEW

This section starts with a discussion of the existing theories based on which this research work is ingrained, and then follows a review of literature explaining relationships between the various variables and the existing gaps in the knowledge.

2.1 Literature Review

The implementation of digital learning is a good opportunity to address the affordability, Digital Citizen, and quality issues of the higher education sector that are present in many countries (A'ang Subiyakto, 2019). Mobile learning solutions improve engagement among students, communication, time management, and information delivery according to their needs. Mobile technology elements that allow for time and location independence as well as personalization opportunities capture students' attention more. (Ayse Gunay, 2014).

A digital learning query/answer System developed by (Lei Jing, 2017) makes use of digital artifacts in the ubiquitous environment and have provided ability to learner to learn from more extensive learning contents. They discussed architecture of ubiquitous query/answer system with the ability of searching and providing real/virtual learning content. To implement the suggested method, they developed a matching algorithm. To meet the needs of today, learner-centered approaches and possibilities are required, broadening the application of mobile learning (Travis L. Irby, 2015).

Digital Learning Technology (DLT) is a learning method in which the learner can effectively start learning process at anytime and anywhere (Keengwe, 2015). It is structured by Technology Centered Learning Environment (TCLE) Technology and is the integration of physical, such as humans, physical devices, places, info-space etc. DLT environment is a mechanism that anyone can access from anywhere at any time and by any device.

Digital learning analytics in Telecommunication Networks Support (TNS)s by (Naif Radi Aljohani, 2012) describes the advantages of using learning analytical techniques to enhance learning in mobile and Telecommunication Networks Support (TNS)s from a theoretical perspective.

Contextual data can be used to improve interactions between students, gadgets, and learning environments. The interaction between mobile devices and students is improved by the DLT apps' retrieval of contextual data about the students. Learning resources are made available that are based on gathered contextual data. To make mobile device interaction easier, the precise contextual information is gathered (Naif Radi Aljohani, 2012). Contextual data gathering is helpful in increasing student focus on critical activities and enabling time savings. The most recent technical tools that have affected social norms of society in many sectors of life are regarded as mobile equipment (Norbert Pachler, 2011). (Ogata, 2011) investigated computer supported digital learning and came up with ubiquitous learning log system called SCROLL (system for capturing and reminding of learning log). It helps the learners to log their understanding experiences by the use of photos, audios (mp3), videos, location, codes, tags and sensor set.

Similarly, mobile technology has penetrated at an unprecedented rate in the last few years. (Sung Youl Park, 2011) Argued that m-learning is rather a new research topic and the effectiveness of m-learning has not been fully explored. "Evolution of Technology Centered Learning Environment (TCLE) has been catalyzed because of the improvement in wireless telecommunications and led to DLT that allows the embedding of individual learning activities in daily lives.

(Alhassan, 2016) says that greatest added value of m-learning is dependent on the features that encompass classroom interactions to other settings by using the communication networks; Mobile and U-learning in higher educational institutes, a proper review of empirical studies by (Pimmer, 2016) talks about harnessing the increasing access to digital mobile media for the enrichment of traditional forms of higher education.

An article by (Saadiah Yahya, 2010) describes new learning paradigm that is supported by digital computing technologies. It describes information regarding to u learning. Observation of u-learning features are discussed in order to propose a conclusive definition of u-learning together (O.K. Boyinbode, May 2009).

According to (Gwo-Jen Hwang, 2008), the fast changes occurring in the learning contexts, DLT lacks a precise definition. As a result, the academics have developed many meanings for the term DLT. A learning mechanism that

includes collaborators, contents, and services is offered by the DLT environment. DLT is concerned with giving strategies to find the best learning partners and having the appropriate content. We should pay special attention to the consequences of the Technology Centered Learning Environment (TCLE) as we examine its affordance. The digital divide, where individuals cannot afford to purchase the most modern and advanced products despite prices lowering, needs to be closed. (Bill Cope, New Media, New Learning, 2007). The proponents of Technology Centered Learning Environment (TCLE) in the academic world are working hard to lower the cost of technology for the general public (Yang, 2006). (Stephen J.H. Yang. Yang, 2006) Researched upon context aware Telecommunication Networks Support (TNS)s.

An Agenda for Educational Transformation by (Bill Cope, 2006) explores the dimensions of this proposition by using new technologies to learn old things. "Emergence of Technology Centered Learning Environment (TCLE) creates new conditions for professionals".

From an evolutionary standpoint, the transition is significant because it has enabled people to engage without being constrained by physical contact (Hans, 2004). (Scholtz, 2004) gives framework which was developed through discussion of the computing applications with a view to developing a framework for the evaluation of Technology Centered Learning Environment (TCLE) applications.

Looking at the learners' perspective, context is defined in terms of the surrounding environment affecting the learners. From a services viewpoint, it is described as the environment, which has an impact on how learning services are delivered and carried out. Additionally, as sensing technologies have advanced, it is now possible to collect contextual data, such as time and location, by utilizing tools like Wi-Fi, GPS, and other technologies. The DLT environment can be distinguished from the mobile learning (ML) environment (Kalle Lyytinen, 2002).

2.2 Research Direction

Shift from e-learning to digital learning is shown below (Boyinbode O. K., 2008).

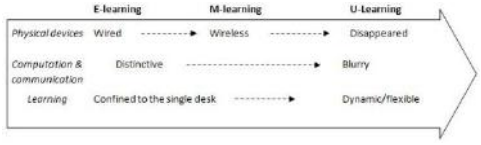

Fig 2.2-1: Comparison and flow of Digital E-learning, M-learning, and U-learning

Source: (Moreiraa, 2017)

Following are some of the important characteristics/variables of UL (Chen Y.S, 2002) and (Mohd Khairul Ikhwan, 2015).

2.2.1 Empowered Learner

By Empowered Learner it is meant that the learner has access to all the tools needed for the digital learning purposes.

2.2.2 Digital Citizen

By Digital Citizen, we mean that all the information, data, documentations, audio-visual data or videos can be accessed from anywhere by any individual. The availability of the information is based on the digital learner's requirements, hence the learning being self-directed.

2.2.3 Knowledge Curator

The knowledge curator is able to save and hold the information safely for digital access at any time.

2.2.4 Innovative Designer

Through Innovative Designer, the learners can come up with innovative solutions.

2.2.5 Computational Thinker

It means having computational capabilities while thinking out of the box.

2.2.6 Creator, Communicator & Global Collaborator

By Creator, Communicator & Global Collaborator, we mean that the learner has the drive to get hold of the digital learning materials through interactions and collaborations. On the basis of these variables, researchers developed research framework that guarantee proper execution of ubiquitous learning in a high-knowledge environment (Mohd Khairul Ikhwan, 2015).

III. RESEARCH METHODOLOGY AND DESIGN

In this section, we look at the concept of framework for futuristic digital learning environment. Based on these understandings, a conceptual framework is developed, and research hypothesis established.

3.1 Research Framework

These factors led us to develop a research framework based on types of interactions that take place in a digital learning scene (Mohd Khairul Ikhwan, 2015)

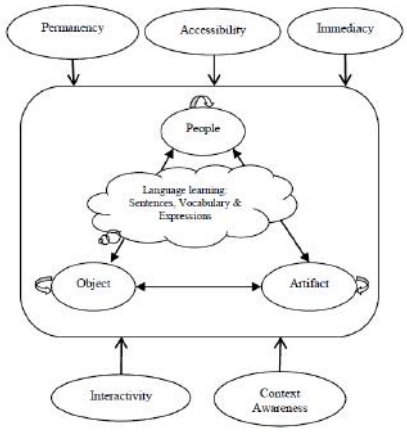

Fig 3.1-1: Type of Interaction in Digital Language Learning Environment

Source: (Mohd Khairul Ikhwan, 2015)

Based on the above model, the variables identified for this research contribution are Empowered Learner, Digital Citizen, Knowledge Curator, Innovative Designer and Computational Thinker. In the Perceived model, Creator, Communicator & Global Collaborator has been added. The model with Creator, Communicator & Global Collaborator.

The six independent variables are:

- Empowered Learner (EL)
- Digital Citizen (DC)
- Knowledge Curator (KC)
- Innovative Designer (ID)
- Computational Thinker (CT)
- Creator, Communicator & Global Collaborator (CCGC)

Dependent variables are selected to be:

- Telecommunication Networks Support (TNS)
- Technology Centered Learning Environment (TCLE)
- Technology Adaptation Mind-Set (TAMS)

The study will evaluate the level of knowledge about DLT and examine the contributions of various factors influencing how quickly it is being adopted in the telecommunications industry. The results of the research will help create a framework that, when used in any technology configuration, will enable the delivery of cutting-edge telecommunication networks support in an efficient manner (TNS).

3.2 Research Model

Based on the extensive literature review, the following research model is proposed.

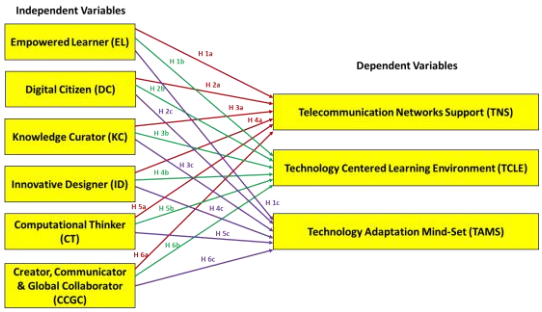

Fig 3.2-1: Research Model

The relationship between IV and DV needs to be looked into. There are many approaches to data analysis. First of all, validity/reliability of the method is essential in research. Reliable measuring method gives the same measurements when one repeatedly measures the same unchanged objects or the events.

Similarly, Cronbach's alpha is defined as the measure of internal consistency i.e. as a group, how closely related a set of items are. It is a measure of the scale reliability. If we look at the frequency distribution of a particular observation, it is the number of times the observation occurs in the data.

In statistics, Pearson correlation coefficient measures linear correlation between two variables. Regression will find relationships between variables. It comprises of many techniques for modeling & analyzing variables i.e. dependent and independent variables.

3.3 Research Hypotheses

Following are the research hypothesis.

H1a: In the learning environment, Empowered Learner (EL) needs Telecommunication Networks Support (TNS).

H1b: In the learning environment, Empowered Learner (EL) needs Technology Centered Learning Environment (TCLE).

H1c: In the learning environment, Empowered Learner (EL) needs Technology Adaptation Mind-Set (TAMS).

H2a: In the learning environment, Digital Citizen (DC) needs Telecommunication Networks Support (TNS).

H2b: In the learning environment, Digital Citizen (DC) needs Technology Centered Learning Environment (TCLE).

H2c: In the learning environment, Digital Citizen (DC) needs Technology Adaptation Mind-Set (TAMS).

H3a: In the learning environment, Knowledge Curator (KC) needs Telecommunication Networks Support (TNS).

H3b: In the learning environment, Knowledge Curator (KC) needs Technology Centered Learning Environment (TCLE).

H3c: In the learning environment, Knowledge Curator (KC) needs Technology Adaptation Mind-Set (TAMS).

H4a: In the learning environment, Innovative Designer (ID) Needs Telecommunication Networks Support (TNS).

H4b: In the learning environment, Innovative Designer (ID) needs Technology Centered Learning Environment (TCLE)

H4c: In the learning environment, Innovative Designer (ID) needs Technology Adaptation Mind-Set (TAMS).

H5a: In the learning environment, Computational Thinker (CT) needs Telecommunication Networks Support (TNS).

H5b: In the learning environment, Computational Thinker (CT) needs Technology Centered Learning Environment (TCLE).

H5c: In the learning environment, Computational Thinker (CT) needs Technology Adaptation Mind-Set (TAMS).

H6a: In the learning environment, Creator, Communicator & Global Collaborator (CCGC) needs Telecommunication Networks Support (TNS).

H6b: In the learning environment, Creator, Communicator & Global Collaborator (CCGC) needs Technology Centered Learning Environment (TCLE).

H6c: In the learning environment, Creator, Communicator & Global Collaborator (CCGC) needs Technology Adaptation Mind-Set (TAMS).

Due to the fact that it is grounded in the corpus of existing knowledge, this research project is oriented towards positivistic research philosophy.

Following a study of the relevant literature from earlier investigations, a conceptual framework is being created using accepted scientific procedures. For establishing if the presented hypotheses are true or false, basic laws of hypothesis are applied to the observations. Propositions were tested empirically as part of the research project. To generalize the results, the entire population was analyzed. Research Methodology and Design

In this research work, the following tests were performed:

Validity Test	Cronbach's Alpha	Frequency Distribution
Descriptive Statistics	Pearson Correlation	Regression Analysis

For the analysis of this study, the researcher will use the package of SPSS. SPSS is used to find Cronbach's Alpha Coefficient aiming to find how much reliable is the method for the collected data (questionnaire's). However, before we apply Cronbach's Alpha Reliability, it should be ensured that all independent variables, measuring the dependent variables are in the same direction; i.e., there exists no negatively items in the developed questionnaire. Research design in this study is descriptive and is based on cross sectional design. Furthermore cross-sectional research studies are undertaken that represents a snapshot at that point in time (Cooper, 2008).

Using the information gathered from the pilot study, questionnaires are tested to determine the validity of the procedure. The purpose of the pilot test is to make the questionnaires better so that respondents will have no trouble responding them, the questions will be clear, and there won't be any issues with the data being recorded accurately. This result in the assessment of the validity of data which will be collected (Mark Saunders, 2007).

Comparable to external validity, internal validity is defined as the capacity of the study methodology to measure what it is intended to assess. The degree to which the approach adequately covers the research issues is known as content validity. The success of the measurements employed for the predictions or the estimations is explained by the criterion associated validity. Finally, the construct validity considers both the theory and the chosen measurement technique (Cooper, 2008).

Cronbach's Alpha is calculated to test the reliability. Alpha can take any value from zero (no internal consistency) to one (complete internal consistency) whereas 0.7 is defined as an acceptable limit. As per (George, 2003), the following rules apply (as shown in the table);

Table 3.3-1: Cronbach Alpha (Reliability Limits)

Reliability	Assessment
>0.9	Excellent
>0.8	Good
>0.6	Questionable
>0.5	Poor
<0.5	Unacceptable

3.4 Target Population

The samples will be collected from the following three telecommunication Companies;

1. PTCL (100 questionnaires)
2. Worldcall (100 questionnaires)
3. Nayatel (100 questionnaires)

3.5 Data Collection

The research study makes use of primary data collection procedures.

3.6 Data Analysis & Presentation

Regression-analysis & Pearson's Product Moment Correlation-analysis are used. Mean scores were calculated for the Likert scale type of questions.

IV. DATA ANALYSIS, FINDINGS AND DISCUSSION

The findings are described in depth in the chapter based on the respondents' response on the questionnaire. Surveys were performed to find out how respondents felt about various traits. A total of 300 questionnaires were given, and 268 of those were correctly completed and returned, representing a response rate of roughly 89.33%.

4.1 Reliability

Table 4.1-1: Reliability Statistics

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.750	.765	30

Table 4.1-2: Cronbach Alpha

Questionnaire Items	Cronbach's Alpha
Are learning tools available to the learner?	.739
Is empowered learner having access to all the learning material?	.722
Does empowered learner has requisite knowledge and skills to carry out his learning endeavor?	.742
Is the Digital Learner fully equipped with communication devices?	.737
Is the digital citizen living in an area where all digital communication services are available?	.746
Are there any communication breakdown issues for the digital citizen to carry out his learning assignments?	.726
Does the knowledge curator has technology solution available for storing his data?	.762
Is the knowledge curator fully aware of the digital data disaster management implementations?	.754
Does the digital curator have access to the cloud services?	.744
Is the employee aware of designing tools?	.765
Does the designer have innovative designing skill set?	.764
Does the innovative designer think out of the box solutions?	.762
Is the employee good at computations?	.755
Does the employee has computation thinking skills?	.757
Is employees educational background supports application of computational capabilities?	.748
Are the learners good at being creative?	.760
Do employees have good communication skills?	.739
Is the learner capable of engaging in global collaborations to achieve his learning objectives?	.739
Is telecommunication network available?	.722
Is the bandwidth needed for learning endeavors good enough?	.741
Is networking support good enough in the area?	.736
Does telecom services provider provides free applications for learning?	.745
Does your organization support learning opportunities for the employees?	.725
Is there any learning and development setup in place in the organization?	.739
Is top management encouraging employees to enhance their learning and skills?	.722
Is your organization knowledge and learning based centric?	.741
Do the employees in your organization have the mind set to adopt new technologies?	.736
Do the employee have positive mind set regarding trying new learning methods?	.745
Is your company embedding latest technology settings in its infrastructure?	.725

The table expresses the values of Cronbach Alpha test for each item of the questionnaire. Greater than 0.70 value depicts strong reliability of scale of measurement strength of the questionnaire.

4.2 Descriptive Statistics

The following section presents descriptive statistics regarding variables under consideration of the study.

Table 4.2-1: Descriptive Statistics regarding the individual variables

Questions	N	Min.	Max.	Mean	StDev
Are learning tools available to the learner?	268	4.00	5.00	4.7575	.42942
Is empowered learner having access to all the learning material?	268	3.00	5.00	4.6642	.62942
Does empowered learner has requisite knowledge and skills to carry out his learning endeavor?	268	3.00	5.00	4.7500	.52019
Is the Digital Learner fully equipped with communication devices?	268	3.00	5.00	4.6119	.70748
Is the digital citizen living in an area where all digital communication services are available?	268	3.00	5.00	4.6903	.55854
Are there any communication breakdown issues for the digital citizen to carry out his learning assignments?	268	2.00	5.00	4.6082	.72892
Does the knowledge curator has technology solution available for storing his data?	268	2.00	5.00	4.7127	.63858
Is the knowledge curator fully aware of the digital data disaster management implementations?	268	3.00	5.00	4.7761	.51410
Does the digital curator have access to the cloud services?	268	2.00	5.00	4.5410	.71513
Is the employee aware of designing tools?	268	3.00	5.00	4.5299	.72608
Does the designer have innovative designing skill set?	268	3.00	5.00	4.4440	.74492
Does the innovative designer think out of the box solutions?	268	3.00	5.00	4.3694	.84008
Is the employee good at computations?	268	3.00	5.00	4.6679	.67995
Does the employee has computation thinking skills?	268	3.00	5.00	4.7052	.61111
Is employees educational background supports application of computational capabilities?	268	3.00	5.00	4.6119	.64663
Are the learners good at being creative?	268	3.00	5.00	4.7201	.59338
Do employees have good communication skills?	268	3.00	5.00	4.6828	.61212
Is the learner capable of engaging in global collaborations to achieve his learning objectives?	268	4.00	5.00	4.7575	.42942
Is telecommunication network available?	268	3.00	5.00	4.6716	.62142

Two hundred and sixty-eight objects for each & every variable dimensions were analysed in the questionnaire, with rate ranging from 2-5 and variance being 0.5-0.65.

To fully understand the data's segregation and the related numbers obtained from the survey, the next part includes pie charts for each item.

4.3 Pie Charts:

The first pie chart is regarding the question, are learning tools available to the learner? A majority of the participants strongly agreed with the statement and a few agreed. None were in disagreement. This shows the availability of the requisite tools for learning.

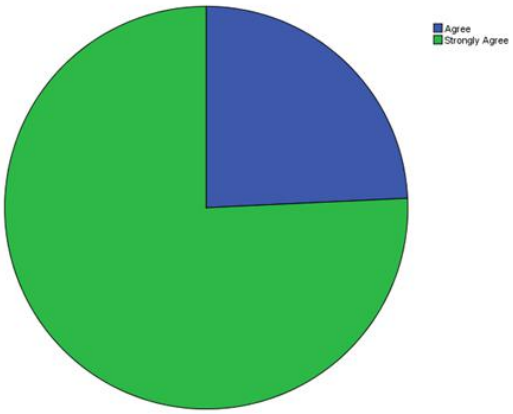

Fig 4.3-1: Are learning tools available to the learner?

The following pie chart displays the responses provided by the participants in response to the question, "Do empowered learners have access to all the learning materials?" The majority of the responses were found to be in agreement, while a minority gave responses that were indifferent. Most were in agreement.

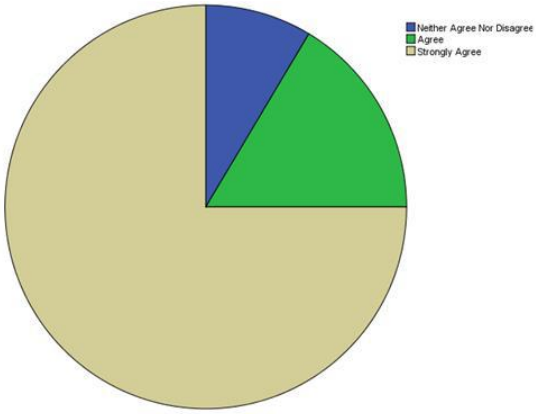

Fig 4.3-2: Is empowered learner having access to all the learning material?

The following comments were gathered from participants when they were asked if an empowered learner had the necessary knowledge and abilities to carry out his learning endeavour. The majority of people strongly agree with the statement, as seen in the pie chart. Only a small percentage of responders were undecided about their choice.

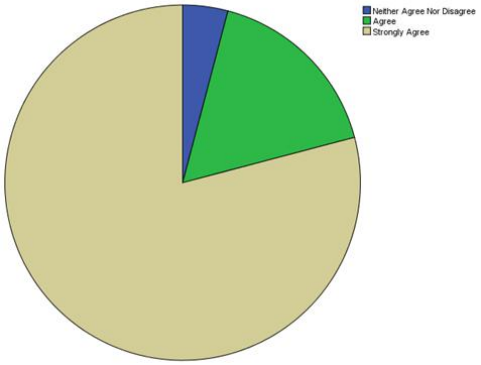

Fig 4.3-3: Does empowered learner has requisite knowledge and skills to carry out his learning endeavor?

The question was asked that weather Digital Learner is fully equipped with communication devices? Majority depicting strong agreement with no disagreement.

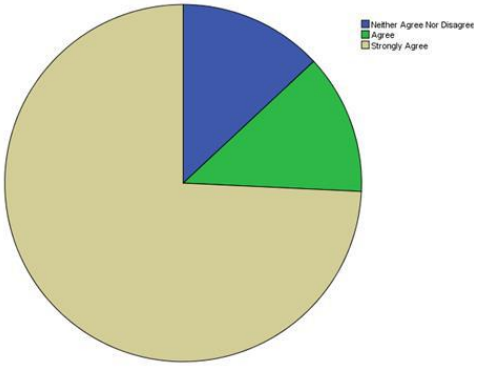

Fig 4.3-4: Is the Digital Learner fully equipped with communication devices?

Is the digital citizen living in an area where all digital communication services are available? Respondents strongly agreed because of reason that the study was conducted for the companies whose employees have good access to communication infrastructures.

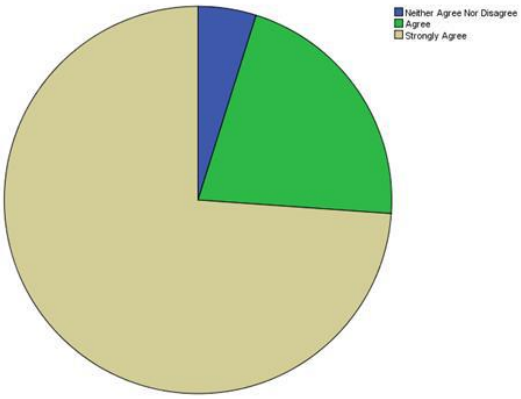

Fig 4.3-5: Is the digital citizen living in an area where all digital communication services are available?

To the question if there any communication breakdown issues for the digital citizen to carry out his learning assignments, majority of the respondents strongly agreed whereas marginal number showed disagreement.

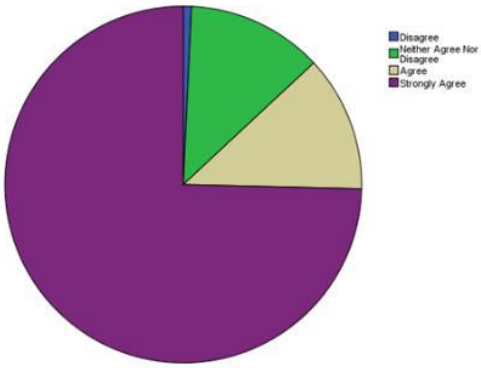

Fig 4.3-6: Are there any communication breakdown issues for the digital citizen to carry out his learning assignments?

When asked if the knowledge curator have technology solution available for storing his data, most of them agreed with the statement with very small number disagreed.

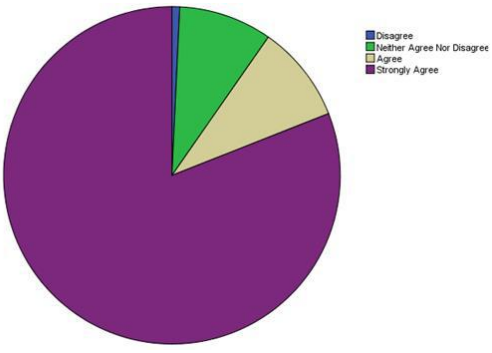

Fig 4.3-7: Does the knowledge curator have technology solution available for storing his data?

When asked if the knowledge curator is fully aware of the digital data disaster management implementations, it was strongly agreed. Some of the respondents remained neutral.

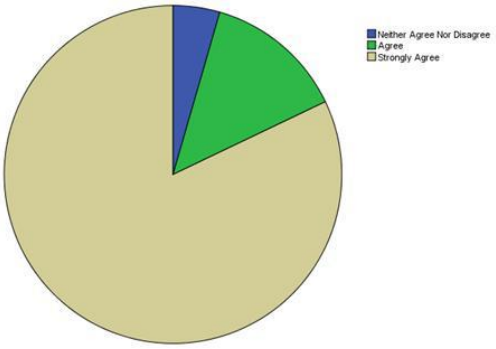

Fig 4.3-8: Is the knowledge curator fully aware of the digital data disaster management implementations?

The next item related to the query if digital curator has access to the cloud services? Major number gave strong agreement with minute disagreement. This can be because of the fact that cloud services have recently cropped up in the market.

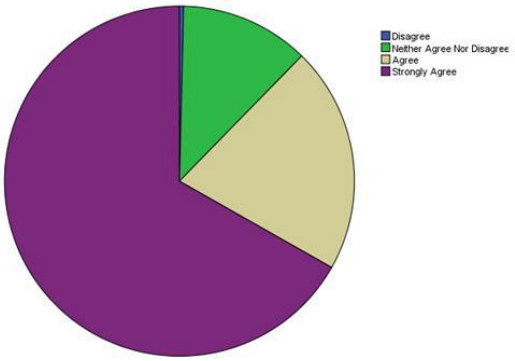

Fig 4.3-9: Does the digital curator have access to the cloud services?

The interaction between learners is possible only if the employee aware of designing tools. Substantial numbers lie in not any one agree not any one disagree category in the responses gathered.

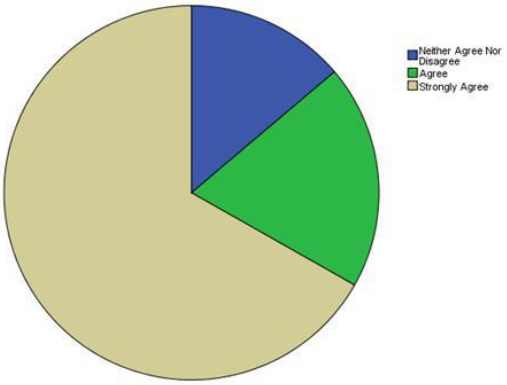

Fig 4.3-10: Is the employee aware of designing tools?

The next item related to the designer having innovative designing skill set. Majority falls in strong agreement.

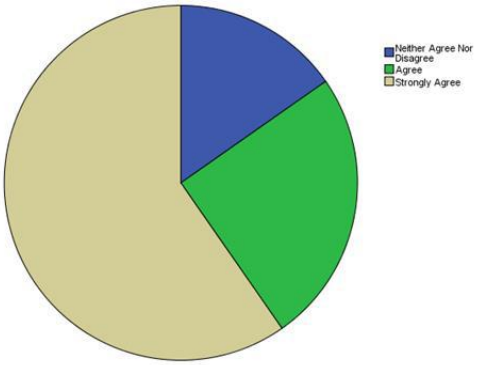

Fig 4.3-11: Does the designer have innovative designing skill set?

The next item related to the question about innovative designer thinking out of the box solutions. Majority of respondents strongly showed agreement whereas no disagreement was found.

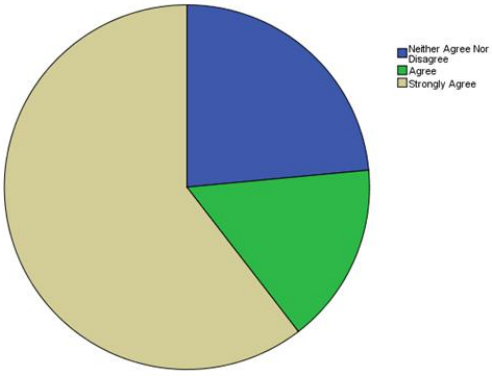

Fig 4.3-12: Does the innovative designer think out of the box solutions?

The question asked from respondents if the employees good at computations. Mostly respondents strongly agreed or agreed, or were neutral.

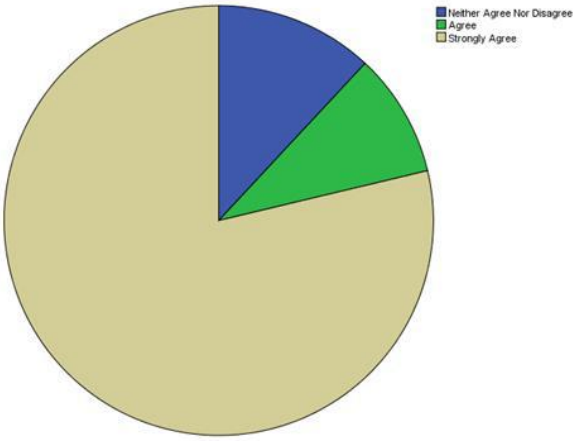

Fig 4.3-13: Is the employee good at computations?

When asked if the employee have computation thinking skills, majority falls in strong agreement with very small disagreement seen.

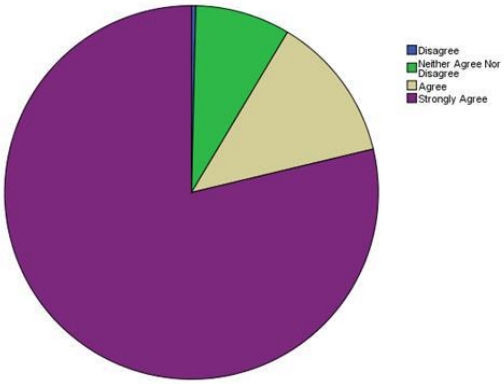

Fig 4.3-14: Does the employee have computation thinking skills?

When asked if the employees educational background supports application of computational capabilities, mostly respondents were in agreement. No disagreement was found.

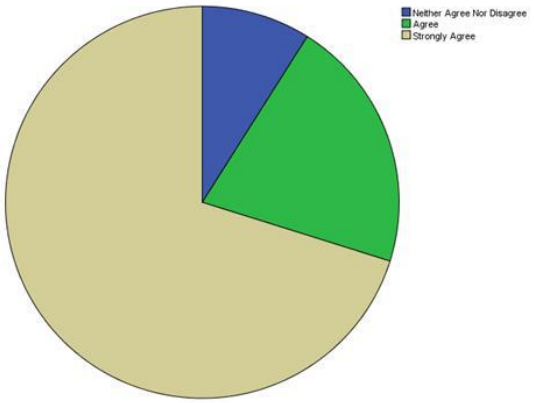

Fig 4.3-15: Is employees educational background supports application of computational capabilities?

The respondents were asked if learners are good at being creative. Majority of responses were found in agreement.

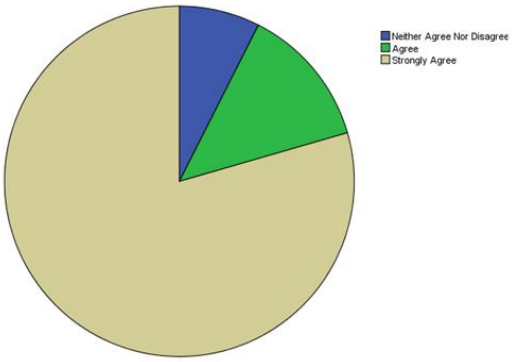

Fig 4.3-16: Are the learners good at being creative?

When asked if the employees have good communication skills, mostly strongly agreed with the statement.

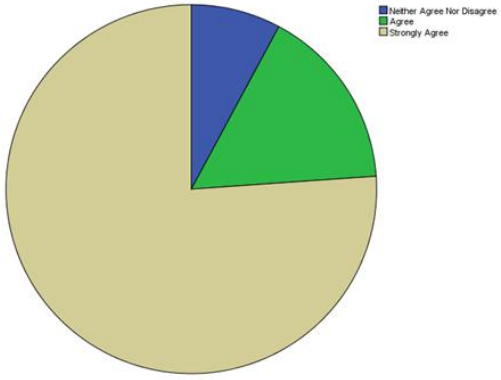

Fig 4.3-17: Do employees have good communication skills?

Respondents were asked if the learner capable of engaging in global collaborations to achieve his learning objectives? The answers showed that all of the respondents either agreed or strongly agreed with the statement that it would not be a big challenge and can be taken care by the learners.

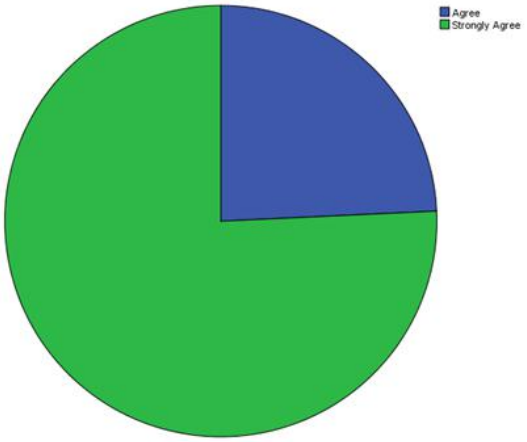

Fig 4.3-18: Is the learner capable of engaging in global collaborations to achieve his learning objectives?

To the question if telecommunication network is available, answers were more inclined towards agreement.

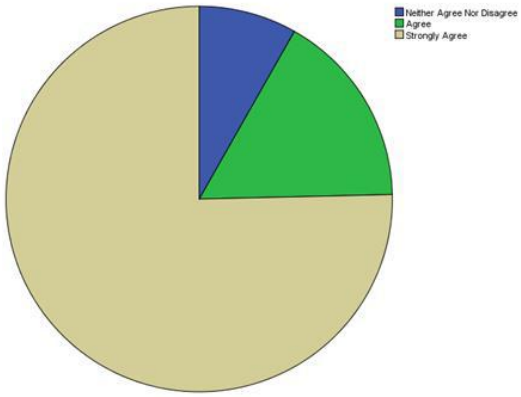

Fig 4.3-19: Is telecommunication network available?

Next question related to the availability of bandwidth needed for learning endeavours is good enough, it received major responses in agreement.

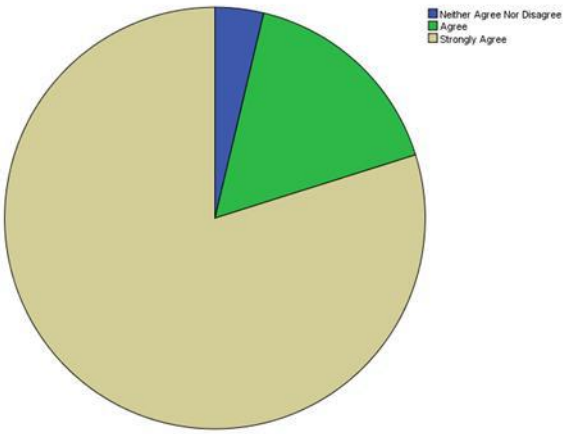

Fig 4.3-20: Is the bandwidth needed for learning endeavors good enough?

Regarding the statement that whether networking support is good enough in the area, the answers showed major agreement. No disagreements were observed.

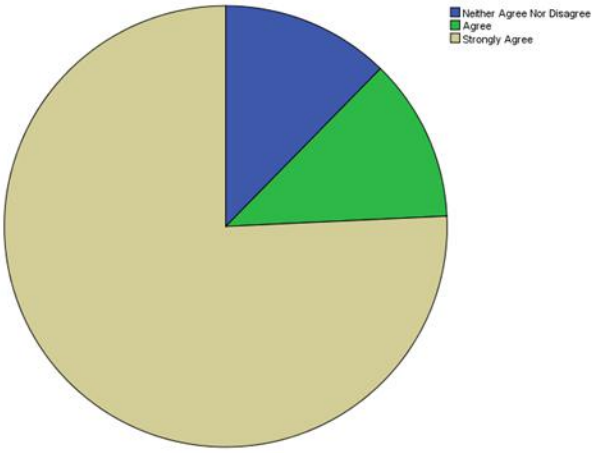

Fig 4.3-21: Is networking support good enough in the area?

The respondents when asked about telecom services provider providing free applications for learning showed strong agreement. This relates to the value added services offered by the service providers to attract the customers in a cut throat competition.

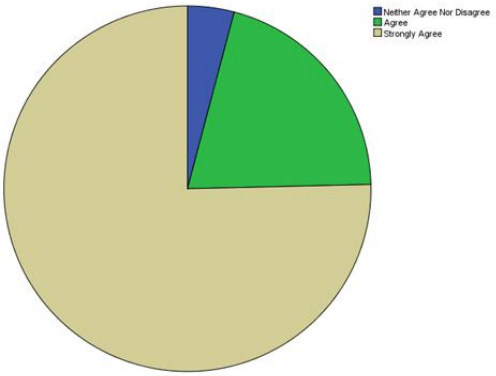

Fig 4.3-22: Does telecom services provider provide free applications for learning?

Does your organization support learning opportunities for the employees? The respondents answered in agreement.

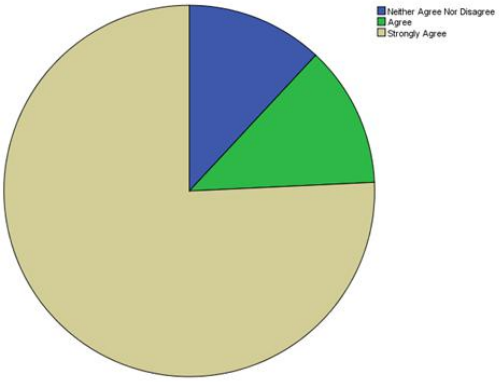

Fig 4.3-23: Does your organization support learning opportunities for the employees?

Is there any learning and development setup in place in the organization, was asked with respondents strongly agreeing to it.

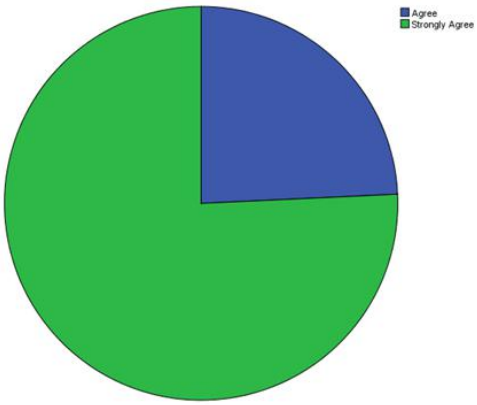

Fig 4.3-24: Is there any learning and development setup in place in the organization?

When asked from the respondents if top management encourages employees to enhance their learning and skills, most of them strongly agreed. There were no disagreements.

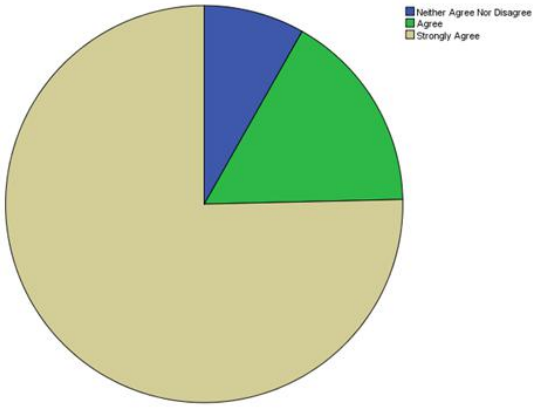

Fig 4.3-25: Is top management encouraging employees to enhance their learning and skills?

When asked from the respondents if their organization is knowledge and learning based centric, respondents strongly agreed with no disagreements.

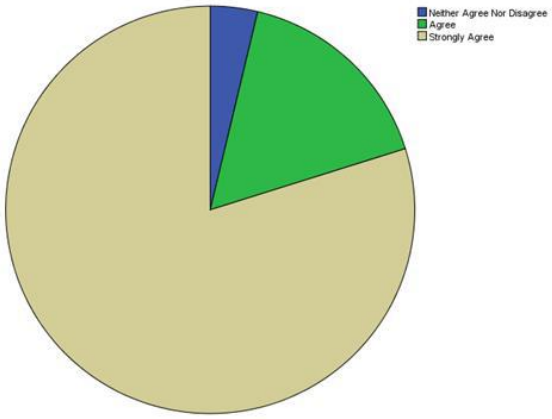

Fig 4.3-26: Is your organization knowledge and learning based centric?

When respondents were asked if the employees in their organization have the mind set to adopt new technologies, more of the respondent agreed strongly. An equal number of responses proportion were in agreement or neutral.

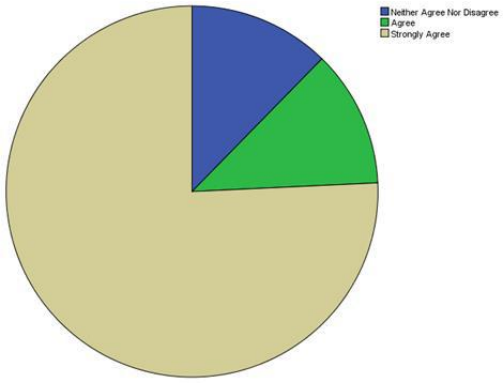

Fig 4.3-27: Do the employees in your organization have the mind set to adopt new technologies?

It was asked from respondents if the employee have positive mind set regarding trying new learning methods, most of the respondents strongly agreed.

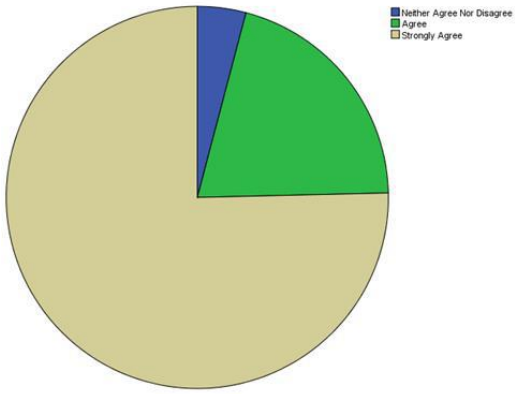

Fig 4.3-28: Does the employee have positive mind set regarding trying new learning methods?

In response of the statement if their company is embedding latest technology settings in their infrastructures was mostly agreed by the respondents.

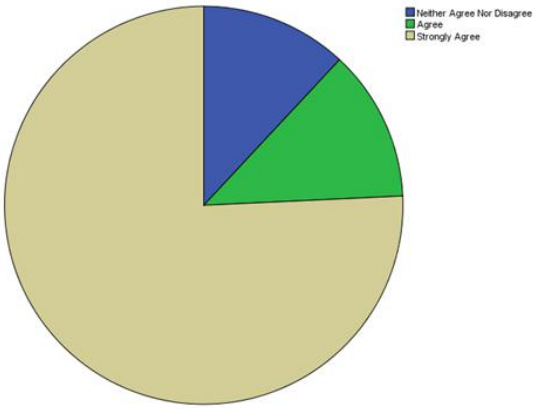

Fig 4.3-29: Is your company embedding latest technology settings in its infrastructure?

When respondents were asked if majority of employees in their organization are ready to adopt latest digital technologies, most of them strongly agreed.

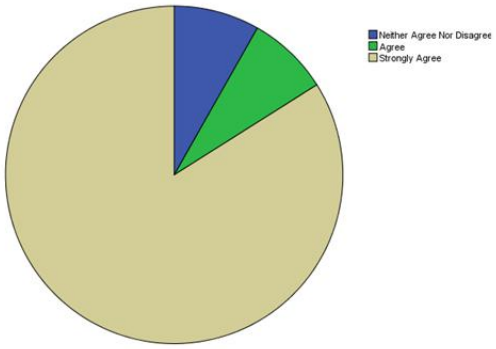

Fig 4.3-30: Are majority of employees in your organization ready to adopt latest digital technologies?

4.4 Hypotheses Testing

4.4.1 Pearson Correlation

The following table shows the descriptive indicators of main variables of the study. The variables have multiple dimensions measured through questionnaire items. The results obtained from questionnaires were converted to composite results in order to use them in correlation and regression analyses.

In the mean and Standard Deviation descriptive statistics table it is clear that 268 cases of each variable were analyzed. The respective means and standard deviation are provided for each variable under consideration.

Table 4.4.1-1: Descriptive Statistics: Mean and Standard Deviations

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Empowered Learner (EL)	268	4.00	5.00	4.7239	.31478
Digital Citizen (DC)	268	3.67	5.00	4.6368	.37496
Knowledge Curator (KC)	268	3.00	5.00	4.6741	.34249
Innovative Designer (ID)	268	3.67	5.00	4.4478	.42518
Computational Thinker (CT)	268	3.33	5.00	4.6592	.32503
Creator, Communicator & Global Collaborator (CCGC)	268	4.00	5.00	4.7201	.29428
Telecommunication Networks Support (TNS)	268	3.75	5.00	4.6950	.35620
Technology Centered Learning Environment (TCLE)	268	3.75	5.00	4.7071	.37292
Technology Adaptation Mind-Set (TAMS)	268	4.25	5.00	4.6856	.27761
Valid N (list wise)	268				

Pearson correlation test came up with Correlation matrix in SPSS. There are a few prominent correlations found in the matrix such as Empowered Learner is directly correlated with Digital Citizen with a Pearson's r value/rate of 0.737. Empowered Learner is also highly associated with all three dependent variables Telecommunication Networks Support (TNS), Technology cantered Learning Environment (TCLE), and Technology Adaptation Mind-Set (TAMS) having Pearson's r rate of 0.732, 0.922, and 0.674 correspondingly.

Digital Citizen is mostly associated with Empowered Learner, Telecommunication Networks Support (TNS), and Technology Adaptation Mind-Set (TAMS)with correlation values of 0.737, 0.859, 0.683, and 0.791 correspondingly. There is a week relation exist b/w Digital Citizen and Knowledge Curator, Computational Thinker, and Creator, Communicator & Global Collaborator.

Knowledge Curator has a weak correlation ship to all the other variables having highest correlation-value (0.291) and it is related with the technology adaptation of the learning environment.

Computational Thinker is also related very weakly with all other variables other than Creator, Communicator & Global Collaborator where it has a direct relations of r=0.409 value strength. The Telecommunication Networks Support (TNS) is highly correlated with Digital Citizen, Empowered Learner, and the technology adaptation of learning surrounding. Whereas Technology Cantered Learning Environment (TCLE) and the technology adaptation of the learning surrounding are mostly related with: Empowered Learner, Digital Citizen and Telecommunication Networks Support (TNS).

Table 4.4.1-2: Correlations

Correlations									
		PE	AC	IM	IN	CA	AD	DLTE	UE
EL	Pearson Correlation	1	.737**	.112	-.012	.212**	.474**	.732**	.922**
	Sig. (2-tailed)		.000	.068	.848	.000	.000	.000	.000
	N	268	268	268	268	268	268	268	268
DC	Pearson Correlation	.737**	1	.080	-.020	.128*	.316**	.859**	.683**
	Sig. (2-tailed)	.000		.194	.741	.036	.000	.000	.000
	N	268	268	268	268	268	268	268	268
KC	Pearson Correlation	.112	.080	1	-.026	.150*	.215**	-.040	.247**
	Sig. (2-tailed)	.068	.194		.673	.014	.000	.513	.000
	N	268	268	268	268	268	268	268	268
ID	Pearson Correlation	-.012	-.020	-.026	1	.075	-.072	-.008	-.048
	Sig. (2-tailed)	.848	.741	.673		.218	.238	.900	.437
	N	268	268	268	268	268	268	268	268
CT	Pearson Correlation	.212**	.128*	.150*	.075	1	.409**	.102	.157*
	Sig. (2-tailed)	.000	.036	.014	.218		.000	.097	.010
	N	268	268	268	268	268	268	268	268
CCGC	Pearson Correlation	.474**	.316**	.215**	-.072	.409**	1	.207**	.507**
	Sig. (2-tailed)	.000	.000	.000	.238	.000		.001	.000
	N	268	268	268	268	268	268	268	268
TNS	Pearson Correlation	.732**	.859**	-.040	-.008	.102	.207**	1	.608**
	Sig. (2-tailed)	.000	.000	.513	.900	.097	.001		.000
	N	268	268	268	268	268	268	268	268
TCLE	Pearson Correlation	.922**	.683**	.247**	-.048	.157*	.507**	.608**	1
	Sig. (2-tailed)	.000	.000	.000	.437	.010	.000	.000	
	N	268	268	268	268	268	268	268	268
TAMS	Pearson Correlation	.674**	.791**	.291**	-.011	.150*	.268**	.864**	.629**
	Sig. (2-tailed)	.000	.000	.000	.853	.014	.000	.000	.000
	N	268	268	268	268	268	268	268	268
****. Correlation is significant at the 0.01 level (2-tailed).**									
***. Correlation is significant at the 0.05 level (2-tailed).**									

4.4.2 Linear Regression Analysis

The following models explain the impact of variables calculated using regression models in SPSS.

H1a: In the learning environment, Empowered Learner (EL) needs Telecommunication Networks Support (TNS).

H1b: In the learning environment, Empowered Learner (EL) needs Technology Centered Learning Environment (TCLE).

H1c: In the learning environment, Empowered Learner (EL) needs Technology Adaptation Mind-Set (TAMS).

The following table expresses results regarding regression analysis explaining the effect of Empowered Learner. Almost 73% variation in Telecommunication Networks Support (TNS) is demonstrate by Empowered Learner. The proportion of Ubiquitous-Computing which is elaborated by Empowered Learner is much as compare to other values in the regression analysis, a 92%. A 67.4% of Technology Adaptation in Telecommunication Networks Support (TNS) is explained by Empowered Learner.

Table 4.4.2-1: Regression Analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		R	B	Std. Error	Beta		
1	EL[a]	.732	.829	.047	.732	17.546	.000
	EL[b]	.922	1.093	.028	.922	38.928	.000
	EL[c]	.674	.595	.040	.674	14.900	.000

a. Dependent Variable: Telecommunication Networks Support (TNS) – H1a
b. Dependent Variable: Technology Centred Learning Environment (TCLE) – H1b
c. Dependent Variable: Technology Adaptation Mind-Set (TAMS) – H1c

H2a: In the learning environment, Digital Citizen (DC) needs Telecommunication Networks Support (TNS).

H2b: In the learning environment, Digital Citizen (DC) needs Technology Centered Learning Environment (TCLE).

H2c: In the learning environment, Digital Citizen (DC) needs Technology Adaptation Mind-Set (TAMS).

The table here expresses the regression values of Digital Citizen and other variables. The regression analysis express that 85.9 percent of the Telecommunication Networks Support (TNS) is explained by Digital Citizen, 68.3 percent of U-Computing, and 79.1% of Technology Adaptation.

Table 4.4.2-2: Regression values of Digital Citizen and other variables

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		R	B	Std. Error	Beta		
1	DC[a]	.859	.905	.033	.859	27.401	.000
	DC[b]	.683	.679	.045	.683	15.240	.000
	DC[c]	.791	.586	.028	.791	21.088	.000

a. Dependent Variable: Telecommunication Networks Support (TNS) – H2a
b. Dependent Variable: Technology Centred Learning Environment (TCLE) – H2b
c. Dependent Variable: Technology Adaptation Mind-Set (TAMS) – H2c

H3a: In the learning environment, Knowledge Curator (KC) needs Telecommunication Networks Support (TNS).

H3b: In the learning environment, Knowledge Curator (KC) needs Technology Centered Learning Environment (TCLE).

H3c: In the learning environment, Knowledge Curator (KC) needs Technology Adaptation Mind-Set (TAMS).

The following regression table explains the effect of Knowledge Curator on dependent variables. R Highest value 0.291 is the value of impact of Knowledge Curator on Technology adaptation on learning environment (TALE).

Table 4.4.2-3: Effect of Knowledge Curator on dependent variables

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		R	B	Std. Error	Beta		
1	KC[a]	.040	.42	.064	.040	16.375	.000
	KC[b]	.247	.269	.065	.247	4.155	.000
	KC[c]	.291	.236	.048	.291	4.954	.000

a. Dependent Variable: Telecommunication Networks Support (TNS) – H3a
b. Dependent Variable: Technology Centred Learning Environment (TCLE) – H3b
c. Dependent Variable: Technology Adaptation Mind-Set (TAMS) – H3c

H4a: In the learning environment, Innovative Designer (ID) Needs Telecommunication Networks Support (TNS).

H4b: In the learning environment, Innovative Designer (ID) needs Technology Centered Learning Environment (TCLE)

H4c: In the learning environment, Innovative Designer (ID) needs Technology Adaptation Mind-Set (TAMS).

The table that follows now contains values regarding regression analysis pertaining to effect of Innovative Designer on Telecommunication Networks Support (TNS), Ubiquitous-Computing, and (TALE). The results show that Innovative Designer doesn't significantly effect on variable that are dependent as the R values are now highest than 0.12 in any of the other cases.

Table 4.4.2-4: Regression Analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		R	B	Std. Error	Beta		
1	ID[a]	.117	.093	.048	.117	23.571	.053
	ID[b]	.086	.071	.051	.086	22.067	.162
	ID[c]	.101	.063	.038	.101	29.338	.097

a. Dependent Variable: Telecommunication Networks Support (TNS) – H4a
b. Dependent Variable: Technology Centred Learning Environment (TCLE) – H4b
c. Dependent Variable: Technology Adaptation Mind-Set (TAMS) – H4c

(Regression analysis pertaining to effect of Innovative Designer on Telecommunication Networks Support (TNS), Ubiquitous-Computing, and Technology)

H5a: In learning environment, Computational Thinker (CT) needs Telecommunication Networks Support (TNS).

H5b: In the learning environment, Computational Thinker (CT) needs Technology Centered Learning Environment (TCLE).

H5c: In the learning environment, Computational Thinker (CT) needs Technology Adaptation Mind-Set (TAMS).

In the table following the effect of Computational Thinker on Telecommunication Networks Support (TNS), Technology Centered Learning Environment (TCLE), and (TALE) have been measured. Like Innovative Designer, Computational Thinker has no significant impact on any one of the dependent variables. In any of the dependent variable no more than 16% variation has been expressed by the Computational Thinker that may be contributed to a chance.

Table 4.4.2-5: Computational Thinker Effects

Coefficients[a]							
Model			Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		R	B	Std. Error	Beta		
1	CT[a]	.102	.111	.067	.102	1.665	.097
	CT[b]	.157	.180	.069	.157	2.593	.010
	CT[c]	.150	.128	.052	.150	2.480	.014

a. Dependent Variable: Telecommunication Networks Support (TNS) – H5a
b. Dependent Variable: Technology Centred Learning Environment (TCLE) – H5b
c. Dependent Variable: Technology Adaptation Mind-Set (TAMS) – H5c

(Effect of Computational Thinker on Telecommunication Networks Support (TNS), (TCLE), and Technology adaptation in Learning Environment (TALE))

H6a: In the learning environment, Creator, Communicator & Global Collaborator (CCGC) needs Telecommunication Networks Support (TNS).

H6b: In the learning environment, Creator, Communicator & Global Collaborator (CCGC) needs Technology Centered Learning Environment (TCLE).

H6c: In the learning environment, Creator, Communicator & Global Collaborator (CCGC) needs Technology Adaptation Mind-Set (TAMS).

The following table depicts the result related to Creator, Communicator & Global Collaborator and its effect on Telecommunication Networks Support (TNS), (TCLE), & Technology Adaptation in Learning Environment (TALE). Creator, Communicator & Global Collaborator has a weak effect on Telecommunication Networks Support (TNS) & technology adaptation has a strong effect on Technology Centered Learning Environment (TCLE). Almost 51% variation in Technology Centered Learning Environment (TCLE) is being explained by Creator, Communicator & Global Collaborator.

Table 4.4.2-6: Creator, Communicator & Global Collaborator Effects

Coefficients[a]							
Model			Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		R	B	Std. Error	Beta		
1	CCGC[a]	.207	.250	.073	.207	3.448	.001
	CCGC[b]	.507	.643	.067	.507	9.601	.000
	CCGC[c]	.268	.253	.056	.268	4.531	.000

a. Dependent Variable: Telecommunication Networks Support (TNS) – H6a
b. Dependent Variable: Technology Centred Learning Environment (TCLE) – H6b
c. Dependent Variable: Technology Adaptation Mind-Set (TAMS) – H6c

(Creator, Communicator & Global Collaborator and its effect on Telecommunication Networks Support (TNS), Technology Centered Learning Environment (TCLE), & (TALE).

4.4.3 Conclusion

A framework that addresses the dimensions of the empowered learner, digital citizen, knowledge curator, innovative designer, computational thinker and creator, communicator, and global collaborator has been developed by the researcher. Their integration was lacking in earlier study. The framework measures the extent to which people are aware of ubiquitous learning, and it has been determined through careful investigation that the aforementioned elements have a significant influence on how ubiquitous learning is adapted. Any organisation intending to adopt it with specially tailored alterations to fit into their different work settings would use the designed framework as a yardstick or standard.

Is the student able to access learning tools? is the subject of the first pie chart. The majority of participants agreed with the statement, while a few others did as well. None of the observations contradicted the statement, according to the findings. This demonstrates the accessibility of the necessary learning tools. Pie charts show the replied answers of the participants about empowered learner having access to all the learning material? The majority of the responses were found to be in agreement, while a minority gave responses that were indifferent. Nearly all the replied answers were agreed with the argument. The following comments were gathered from participants when they were asked if an empowered learner had the necessary knowledge and abilities to carry out his learning endeavour. The majority of people strongly agree with the statement, as seen in the pie chart. Only a small percentage of responders were undecided about their choice. Was the Digital Learner fully furnished with communication gadgets, the question that was posed? The majority is seen to strongly agree with the statement in the accompanying pie chart. In all the replied answers of participates no one disagree with the given

argument. Does the digital citizen reside in a location with access to all digital communication services? Due to the fact that the study was carried out for businesses whose employees have easy access to communication infrastructures, the results from respondents who strongly agree are displayed in the following pie chart. The majority of respondents strongly agreed with the statement when asked if there were any communication breakdown issues that would prevent the digital citizen from completing his learning assignments, while a small minority of responses indicated a disagreement with the statement's application to the digital citizen. When asked if the knowledge curator had a technological answer for keeping his data, the majority of them agreed with the assertion, while a very small percentage disagreed with it. When asked if the knowledge curator is completely aware of the implementations of digital data disaster management, the majority of study participants strongly agreed, while only a few said they agreed. A small percentage of respondents gave neutral responses. The following question concerned whether the digital curator has access to cloud services. While there is some slight dissent in the replies gathered, the majority of the answers are completely agreeing with the given argument. This is as a result of the emergence of cloud services in the marketplace. Only if the employee is aware of designing tools is the interaction between learners possible. A sizable portion of the comments go into the "strongly agree" group, while a sizable portion fall into the "agree," "neither agree nor disagree" categories. The second point concerned the designer's aptitude for creative design. The assertion in the replies gathered is supported by a sizable portion of the responses. The following topic was connected to the query regarding creative designer solutions that think beyond the box. There is no disagreement among the comments gathered, although a sizable portion of them strongly agree with the assertion. Respondents were asked if the staff were skilled at computations. The majority of responders either strongly agreed, agreed, or answered the question indifferently. If the employee has computational thinking abilities, a sizable portion of the responses will strongly agree with the assertion, yet a little amount of opposition will also be present. When asked if the educational background of the employees supports the use of computing capabilities, the maximum number of answer were simply agreed with the statement, with only a few giving neutral or opposing answers. The comments were all in agreement. If students are good at being creative, was the question posed to the replies. The majority of answers indicated agreement with the statement, but approximately equally as many indicated disagreement. When asked if they had good communication abilities, the staff overwhelmingly concurred. About as many comments as there were in agreement with the proposition in question were also judged to be neutral. When asked if the learner was capable of working with others around the world to attain his learning goals, the respondents gave positive answers. According to the responses, everyone who responded either agreed with the assertion that it wouldn't be a major difficulty and could be handled by the students, or they strongly agreed with it. Answers to the question of whether a telecommunications network is available tended to be in accord. Very less number of people responded neutrally, and no one respondents provided a negate response. The next query, which was about the availability of bandwidth required for educational endeavours, received a majority of affirmative answers. There were very few answers that were neutral towards the remark. Respondents were asked to indicate whether they agreed or disagreed with the statement "Networking support is good enough in the area," and their answers revealed broad and consistent support. There weren't many neutral responses to be found. There were no noticeable differences. When asked about telecom service providers offering free learning applications, the respondents mostly and strongly agreed with the statement, with only a few responding in a neutral manner. This relates to the value-added services provided by service providers to draw clients in a fiercely competitive market. Does your company encourage staff learning opportunities? The respondents replied in agree less number of people response was naturally. The question posed to the responders was, "Does the organisation have any systems in place for learning and development?" All respondents indicated their agreement with the statement, either strongly or somewhat. There was no evidence of disagreement in the responses. Most of the respondents firmly agreed when asked if top management encourages people to advance their learning and abilities. The statistics did not reveal any evidence to contradict the statement. Respondents firmly agreed that peers are willing to assist colleagues in ubiquitous learning when asked if their organisation is knowledge and learning driven. The answers were all in agreement. Most of the respondents strongly agreed when asked if the staff members in their organisation have the mind-set to adopt new technology. Equal numbers of respondents agreed with the statement and expressed no opinion. When asked if the employee has a positive mind set about exploring new learning methods, the majority of respondents highly concurred. The responses are shown in the following pie chart. The majority of respondents nodded in agreement when asked whether their organisation integrates the most recent technology settings into their infrastructures. The statement was met with equal amounts of agreement and disagreement from the responders. Most of the respondents strongly agreed when asked if the majority of employees in

their firm are prepared to accept the newest digital technology. The responses ratio is displayed in the following pie chart.

V. SUMMARY

5.1.1 Summary

Future adoption of new pervasive learning mechanisms and tools will render conventional learning methods ineffective. The solution to this issue is the creation of a long-term learning conceptual framework for the support of telecommunication networks (TNS). The research will explore ubiquitous computer technology and its applications and will come up with a framework to show the endless possibilities of integrating real time and virtual learning for improving quality of education. The study will evaluate the degree of DLT awareness and examine the contributions of various factors influencing the rate of adoption of ubiquitous learning. The study evaluates the degree to which people are aware of ubiquitous learning and examines the role that various elements play in how quickly people embrace it. With a focus on ubiquitous learning, it analyses the currently available technologies related to the ubiquitous ecosystem. As a result, a framework for ubiquitous learning is created to investigate the relationships between the many dependent and independent factors influencing the adoption of ubiquitous learning. This involved performing statistical analysis on the questionnaires that had been gathered and validating the research hypothesis that had been formed in order to create an original, cutting-edge framework for ubiquitous learning based on the study's findings. The results of the research led to the development of a structure, which can be used in any educational setting, this will enable the successful implementation of the omnipresent, future-focused learning space.

5.1.2 Thesis Contributions

The study improved our understanding of the ecosystem of digital learning technologies, with a focus on digital learning specifically. Additionally, it has developed a DLT framework that any entity may use to implement pervasive learning in its surrounds. The creation of a modern, cutting-edge DLT structure formed on the results of the groundwork is ingenious and can be adopted, offering a fundamental benchmark standard.

5.1.3 Future Work

To create a new framework that may assist in creating and developing future DLT policies, the framework should be expanded to include other areas of the nation.

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