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ABSTRACT

The purpose of the study is to determine the readiness of Filipino teachers and students for the challenges of digital technology, which impacts greatly on the teaching-learning process that should prepare the youth to be ready with the skills and competencies required for the economic, trade and communications integration in the ASEAN and the movement towards Globalization. Respondents were grouped as Digital Immigrants/ Generation X, Digital Natives/ Generation Y, and Cloud Natives/ Generation Z. Through mixed method research – sequential explanatory design, data was gathered to know if there is a significant difference in the digital literacies of the respondents based on their profile which considered age, sex education, and civil status; and on how Information and Communication Technology (ICT) influence the teaching-learning process. The study showed that only the attribute education influence the significant difference, and solely in the digital information literacy of the three groups of respondents who underwent digital technology skills assessment; and were rated as either Beginner, Capable or Competent. Recommendations include a separate Digital Literacy Program for teachers and students which is modular and progressive, based on their present level of competency. Students can be empowered to help build the capacity of their peers, staff and school community in the use of digital technologies, by providing and promoting ICT leadership opportunities, and by showcasing students' digital work.

Keywords : information & communication technology, digital literacy,

Introduction

Today's world is marked with a movement leading to economic, financial, trade, and communications integration. The direction is towards globalization. It encourages the opening of local and nationalistic perspectives to a broader outlook of an interconnected and inter dependent world with free transfer of capital, goods, and services across national frontiers (Levitt,1983). Information and Communication Technology is facilitating the interaction and integration among people, companies and governments of different nations, towards a robust international trade and investment.

The ASEAN Economic Community (AEC) composed of Malaysia, Indonesia, the Philippines, Singapore, Thailand, Brunei, Burma, Laos, Cambodia, and Myanmar have similar aspirations. It wants to position the ASEAN region as a hub for investments and trade. So, every member country has to be ready for regional integration or be left out of the gains of this initiative (Bernales, 2016). The citizens of each country must be

prepared to face the opportunities and challenges of the regional economy. Education must prepare the youth to be ready. Schools must equip them with the skills and competencies required by the regional market place. However, Information and Communication Technology (ICT) appears to have created a big problem in the schools today. It has exposed the rapidly growing gap between young people in the classroom and the adult teachers who teach them. Educators have yet to fully admit that the digital environment affecting the new learners today is radically different from what they experienced when they themselves were learners.

Most teachers who have lived in the age of widening mass communication were schooled with textbooks and mass media as their main sources of information and knowledge. Their school reports were either handwritten with pen, typewritten using manual typewriters or encoded with the aid of the early models of the desktop computer. Their learning has been highly text-based and focused on basic literacy and information memorization skills. With the turn of the millennium, however, the new generation grew in an ICT landscape wherein their absorbing, interpreting and processing information and knowledge learning are affected. Traditional methods of teaching no longer elicit the expected response from the students.

The challenge is on the teachers who need to become literate in digital technology, and to endeavor to build competencies to be able to engage the present crop of students in the teaching – learning process. The situation must be addressed as soon as possible.

Undertaking this research was important in order to come up with the profile of the three generations of teachers and learners, so that instructional planning will be better able to proactively consider the variability of all learners.

Thus, this study aimed to determine the challenges of digital technology teaching – learning process in Las Piñas City Schools, which can be used as basis for a proposed digital literacy and fluencies builder program.

Literature Review

Presented below are the related literature from foreign and local researchers, studies and publications which have significant bearing on this undertaking. Online sources were

also cited for additional information and data that supported the study.

Digital Disconnect

Several researches have been undertaken which examined the relationship of home – school technological practices. Gronn et. al. (2014) directed their study on the concept of a “digital disconnect” between home and school. The discussion is about children who are natural users of technologies and have experienced difficulty connecting with the traditionally used technologies in school. The lives of 12 children respondents aged 2 – 12 years old were observed closely in the research as it pertained to the digital – disconnect. Three siblings 5 – 12 years old, attending the same school, recorded their home and school technology use for one week. There were marked differences in the use depending on the setting. However, similarities associated with retrieval of information, mechanical learning by memorization and recreation were noted. The penetrable social boundaries as an idea espoused by Buffin & North and Dyson was cited to explain why technology use may be more similar than disconnected in each unique situation.

Willis (2015) reports that there are rapid and radical change in every facet and this is called digital disruption. There are several activities that have been completely redesigned by digital disruption or even now, on offer where earlier there was nothing. Combining the online environment with the access to technology, people now can do everything.

Digital Divide

Chakrabarty and Dutta (2014) investigated the effect of unequal opportunities of people to access computer technology, as it relates to the economy, politics and society. They also looked closely on the gap brought about by several changes in large groups of people over a period of time and the socio – graphic representation of information users. This study considered what happened in the past which may have influenced or caused the digital divide, and includes what prevents people from utilizing the benefits of digitization. The study gave importance to the role of libraries to connect the digital divide in terms of the use of digital facilities like the internet, computer, mobile phones and wifi facility, AIT Technology, JAWS usage etc. to cater to the needs of its information users, and to lessen the gap of using digital divides in the various sectors of society.

Kaba and Said's (2014) study centered on limiting the disparity of the digital

divide which is crucial in education, employment and economic growth of any nation. The status of the Gulf Cooperation Council (GCC) was compared with countries in Southeast Asia and the Arab world , using 19 indicators taken from the Global Information Report 2009 – 2010 to measure the digital gap. Better ICT infrastructure is the edge of the GCC countries from the ASEAN and other Arab countries. There was no marked differences among the 3 groups of countries in terms of government support and ICT usage. The results of the study showed the importance of ICT infrastructure in narrowing the digital divide. It noted the significant connection between the extent of government support for ICT and its concomitant usage of ICT.

Digital Gap between Generations

Hariri and Rad (2012) determined the digital gap between generations as it considered the familiarity, interest, and usage of information and communication technologies which include the internet, email, chat, computer games and mobile phones. Analytical survey was conducted as research method, with the questionnaire used as data collection tool. Non-random purposive sampling of boys and parents were selected – 102 male students of third year secondary schools and first year high schools of region 10 in Tehran, and their parents (102 fathers and mothers) . Significant differences were noted between the average familiarity, interest, and usage of information technology among parents and children. There is a difference between students' comfort in using technology for learning, and the teachers' ease in using technology for teaching as indicated in the study undertaken by Dornische, Michelle (2013). Students want more interesting assignments that use technology. Teachers gave many reasons why they do not feel comfortable in using modern technology in their teaching. The study investigated if the disconnect is a reflection of the students' appraisal of their teachers.

With 101 high school students as respondents, researchers gathered data which indicated that only students who are very much involved in the use of technology react negatively, when they evaluate their teachers who do not feel comfortable using technology in teaching.

Digital Literacy

Ting, Yu Liang(2015) in his study on students of today as digital natives, found

out that they become digitally literate on their own, and are skillful in using different tools of Information and Communication Technology (ICT) to make their leisure life more enriching. Earlier studies on this phenomenon and its effect to school learning were carried out, but focus was on what ICT tools were chosen by the students to fast track their learning. Ting's study related students' digital literacy to their school curriculum and the method of teaching to improve self – learning. The suggested learning structure is to provide a supporting framework along the original – general range from operation-oriented knowledge and hands – on – experience with ICT tools, to the principles and better system of tools development and operation. The goal is for students to develop self–determination; to choose to learn more with the digital literacy that they have acquired on their own. To test the validity of the proposal, 36 university students enrolled in the engineering course of multimedia technology participated in an experiment that was carried out and evaluated. The qualitative results showed that participants developed their autonomy to exercise their digital literacy, to resolve the difficulties they faced during Web exploration and data collection for their school learning. The quantitative data also evidenced their improvement on learning autonomy. The findings and the learning practice designed and implemented , should offer teachers experience acquired outside schools. The findings give an encouraging development on the process of students' digital literacy acquisition.

Methodology

Mixed Methods Research – Sequential Explanatory Design was utilized to gather the data and combine the strengths of both the quantitative and qualitative approaches. The combination provides an expanded understanding of the research problem and aids in explaining and interpreting relationships.

The data were gathered in phases. Quantitative data were collected first from the sample representatives of the population, and analyzed. This was followed in the second phase with qualitative data gathering and analysis that built on the results of the initial quantitative findings. The data were analyzed separately.

Phenomenological research was undertaken for the qualitative data gathered. The

study tried to understand the essence of the phenomenon of digital technology, by examining the views of the Digital Immigrants, Digital Natives and Cloud Natives who have experienced it. In-depth interviews with the respondents were conducted to get a good picture of their experience with technology. Patterns of behavior surfaced which may aid in looking for the universal nature of their experience.

Population and Sampling

Teachers and students who belong to different age groups comprised the population of the study. They were sourced from the following public National High Schools (NHS) in Las Pinas City :

- 1.Main NHS – located along Diego Cera Avenue
- 2.Captain Antonio Aguilar (CAA) NHS – located along CAA Road
- 3.East NHS – located at Verdant Acres

Purposive homogenous sampling was used to get workable data from the population. Attention focused on teachers with attributes that established their respective profile as either Digital Immigrants/ Generation X or Digital Natives/ Generation Y. Participants were grouped in terms of age / generation, sex, education and civil status.

Respondents of the Study

One hundred seventy one respondents of the study are teachers and students of national public high schools based in Las Pinas City, National Capital Region, and were classified into three groups by :

Table 1

Profile of the Digital Immigrants, Digital Natives, and Cloud Natives

BIRTH YEAR	GENERATION	LITERACY	COMPOSITION
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Those born before 1980

(36 yrs or older as of Yr. 2016)	X – Digital Immigrants	Less likely to pick up new technologies	Working professionals in the academe;
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Those born in

1981 – 1996 (20 yrs – 35 yrs old as of Yr. 2016)	Y – Digital Natives / Millennials	Exposed to digital technology at an early age	Young professionals
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Those born in

1997 – 2010 (19 yrs old and younger as of Yr. 2016)	Z – Cloud Natives	Focused on online and smart phones to interact with family, friends and acquaintances	Secondary Education students
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Research Instrument

For the quantitative data, a survey was conducted. Questionnaires were used to gather data. A standardized set of questions allowed respondents' answers to be systematically compared and / or contrasted.

The qualitative information were supplied by inputs from the Focus Group and Interviews. The focus group was composed of twelve respondents who were led through an open discussion by a moderator.

Data Gathering Procedure

Quantitative Data Collection

Phase 1 – The survey instrument was prepared to establish the personal profile of the teachers and students spread across the three groups of respondents.

Phase 2 – The survey instrument was validated by experts who are recognized in their areas of specialization by the Department of Education – Las Piñas Division office and by an IT company.

Phase 3 – Letters to the Department of Education – Las Pinas City Division Superintendent and three School Principals seeking permission or approval of the teachers and students' participation in the study were prepared, submitted, followed up and collected.

Phase 4- The survey instruments were administered to the teachers and students.

Phase 5- The retrieval and collation of accomplished survey instruments administered to the three sets of respondents were done by immediate retrieval right after administration.

Phase 6 – Tabulation, analysis, statistical treatment and interpretation of data from the survey instruments were undertaken.

Qualitative Data Collection

Phase 1- Letter to the Department of Education – Las Pinas Division Superintendent seeking permission/ approval of the teachers' and students' participation in the study was prepared, submitted, followed up and collected.

Phase 2 -The semi-structured interview instrument was prepared to determine the digital literacies and competencies of the three sets of respondents.

The interview technique utilized open – ended questions.

Phase 3- Conduct of interviews were set for the teacher- respondents and student – respondents. Faithful recording and note taking were done.

Phase 4- Focus Group Discussions were conducted separately on homogenous groups of respondents who were asked about their perceptions, opinions beliefs and attitudes toward ICT in the teaching – learning

process.

Statistical Treatment of Data

Quantitative Data Analysis

The study used Descriptive and Inferential statistical treatments in the analysis and interpretation of data as follows :

- a) Frequency count and Percentage of Distribution for the demographic profile data of the three groups of respondents
- b) Measure of Central Tendency such as the Mean showed the point on the scale where the scores tend to group themselves.
- c) Measure of Variation such as the Analysis of Variance determined whether the scores for one group of respondents is different from another group of respondents after the values of other related variables were statistically controlled.
- d) Inferential Statistics such as the T- Test of difference was used to determine whether one group of numerical scores was statistically higher or lower than another group of scores.

Initial data processing was performed using the Microsoft Excel (2013), while data analysis was carried out using the computer software *Statistical Package for the Social Sciences* (SPSS), 2013 Release 17.0

Conceptual Framework

Figure 1 – Paradigm of the Study

Figure 1 . Paradigm of the Study

The concentric figure with the layered circular shafts presents the variables to be

considered, and will show the sequence in the conduct of the study. It starts with the choice of respondents – Teachers and Students , with their profiles to be established by attributes such as age, sex, education, civil status and their respective level of digital literacy.

With all the variables considered, the study designed a program that promotes digital literacy and builds new digital fluencies of 21st century learners such as :

- 1.a) Information Fluency
- b) Solution Fluency
- c) Collaboration Fluency
- 2.d) Media Fluency
- e) Creative Fluency.

As fluencies, the learners are expected to display the ease and comfort whereby the skills are applied at a level of proficiency that surpasses mere literacy.

Statement of the Problem

The study was conducted in order to determine the ICT challenges to the teaching -learning process in Las Piñas City schools.

Specific Problem:

1.What is the profile of the three groups of respondents according to the following attributes?

1.1 Age / Generation

1.3 Education

1.2 Sex

1.4 Civil Status

2.What are the digital literacies of the three groups of respondents in terms of:

2.1 Digital Information

2.4 Digital Media

2.2 Digital Solution

2.5 Digital Creative

2.3 Digital Collaboration

3. Is there a significant difference in the digital literacies of respondents according to their profile?

4. How does Information and Communication Technology influence the teaching – learning process of the three groups of respondents?

Hypothesis : There is no significant difference in the digital literacies of respondents according to their profile.

Results and Discussion

Based on the analysis and interpretation of data gathered for the study, the following results were found :

1. On the profile of the 3 groups of respondents according to the attributes

– age, sex, education and civil status

More than half of the respondents are students referred to as Cloud Natives; predominantly female, presently in high school and single in status.

2. The digital literacies of the three groups of respondents are students include know – how in information, solution, collaboration, media and creative.

2.1 Digital Information Literacy

Majority of the respondents know how to search, create, scan and sort information; but only a minority of the respondents know how to sift information they gather. There is apparent difficulty determining information that is useful and valuable when collecting data for a homework, project or a study.

The attributes sex and civil status somehow influence the significant difference in the digital information literacy of the three groups of respondents, as statistical scores reveal when the t – test was done within the group of the Digital Immigrants. This is likely due to mindset and priorities as to male or female; single or married.

The female respondents lead in digital information literacy activities such as creating, searching, scanning and sorting information; but the male respondents are better in sifting information.

The single respondents lead in all digital information literacy activities when compared to the married respondents. This may be attributed to free time and less domestic concerns for the single. The married respondents have to deal with priorities such as family income generation, child rearing, health issues, housekeeping and a lot more before they can focus on studying for additional knowledge to keep up with technology.

Age and level of education are not constraints in developing digital information literacy, and building fluency. Whether people belong to Digital Immigrants, Digital Natives, Cloud Natives; or be they Master degree holders, with ongoing Master's studies, college graduates or in high school; they can be in step with the basics and/ or current digital technology developments.

2.2 Digital Solution Literacy

Only a minority of the respondents know how to evaluate information. This corroborates the finding earlier mentioned in digital information literacy.

A good number of the respondents can research, locate, organize, retrieve, and manage information; but only a few can evaluate information that is suitable and appropriate to solve problems.

2.3 Digital Collaboration Literacy

Majority of the respondents know how to send, receive messages, and share information. However, only minority of the respondents know how to navigate multiple screens of content with which end-users interact to increase productivity and save time. A common case here is when an individual wants to allow end-users to navigate between screens of a computer application: where a collection of items is presented to enable the user to pick an item and visualize the selected item's details in a new screen. Knowledge and hands-on experience for this digital collaboration literacy are not sufficient.

2.4 Digital Media Literacy

More than half of the respondents know how to prepare PowerPoint presentations; but are not familiar with other multi-media platforms, websites, blog, video, newscast and other medium to deliver their message.

2.5 Digital Creative Literacy

Majority of the respondents know how to organize and manage information and tap content resources. Half of them can engage in social networking, with digital storytelling coming in close. The minority can blog, but only a

few of the teacher- respondents know how to use ICT for curriculum collaboration. It is apparent that teacher-respondents are not fully aware on how ICT can contribute to their professional development in areas such as subject matter and systematic curriculum design .

2.6 Digital Technology Skills Self Assessment

The teacher and student respondents coming from the three groups rated themselves as either a Beginner, Capable or Competent in digital technology skills. Acknowledged was their need to be able to operate technology in basic, routine and complex tasks. Stressed also was the importance of knowledge in troubleshooting common operational difficulties that come up unexpectedly in classrooms. In varying degrees, respondents confirmed awareness that technology tools may be used collaboratively, should be used safely, responsibly and ethically. The level of literacy and fluency determine the extent of benefits the respondents derive in using technology as a problem solving tool, information and assessment resource; specially in designing class assignments and projects.

Table 2

Significant Difference in the Digital Literacies of Respondents

	According to AGE	According to According to SEX	According to EDUCATION	According to CIVIL STATUS
Digital Information	.121	.121	.008	.309
Digital Solution	.871	.871	.289	.940
Digital Collaboration	.369	.369	.199	.077
Digital Media	.174	.174	.158	.491
Digital Creative	.130	.130	.116	.329

Decision

Ho Not Rejected

Significance at Critical Point .05

Not Significant

Based on the statistical analysis conducted, education is the attribute that mainly influence the significant difference in the digital information literacy of the three groups of respondents according to their profile. It is apparent that the higher the level of education achieved by the respondent, the more likely is the ease by which the individual will become digitally literate and able to build fluency.

The results of the study indicate that digital technology skills can be developed, acquired and possibly attain fluency without regard for age, sex, and civil status. This finding is indeed positive news for anyone who wants to step up to cope with what is latest in technology. Teaching and learning will become more interesting if teachers can engage the students with these digital tools as supplements in outcome- based education. The interest and motivation of the individual to learn, coupled with positive attitude and adequate hands- on experience can make it happen.

When ranked on the basis of how the Digital Immigrants , Digital Natives and the Cloud Natives perceive it, the top 5 positive effects of ICT on the teachers and students are as follows:

Table 3

Positive Effects of Information & Communication Technology

POSITIVE EFFECTS OF ICT

1st	ICT makes learning in school interesting for the students
2nd	ICT facilitates communication and bonding with people
3rd	ICT helps teachers to do their lesson plans and projects
3rd	ICT enables students to view the films they want to watch
4th	ICT provide opportunities to meet new friends
5th	ICT gives the students the chance for career preparation

The interviews and the focus group discussion likewise amplify these results. All the teachers agreed that Information and Communication Technology when utilized in the classroom makes learning in school interesting for the students. Teachers opined that ICT is also very helpful in classroom management. The students tend to be noisy when there are no

visuals. When images are presented to them, it is easier to draw attention to the lesson. They are likely to focus, participate more in the discussion, and join activities to accomplish tasks. Somehow, this lessens the challenges that the teachers face. Those who are adequately literate in digital information utilize their knowledge in preparing lesson plans, tests, and projects.

To the students, the positive effects of ICT center on the speed of communication to interact with people, meet new friends, and bond with peers. They are also given the chance to prepare for their chosen career with the extensive exposure and volume of information they obtain through the world wide web.

The negative effects of ICT noted in the study are mainly health issues such as eyestrain due to radiation exposure, posture concerns, disrupted sleep; and the fact that with the teachers' knowledge and ICT utilization, the students no longer have the excuse not to do their homework.

Conclusion

The findings of the study clearly indicate that digital technology in the teaching-learning process is no longer an option, but a necessity. Older teachers who belong to the Digital Immigrants are not comfortable with ICT, but are trying to cope, specially for teachers who still want to continue working till retirement age. The Department of Education considers this factor in the individual performance rating of the teachers and has a bearing in salary increments and bonuses given periodically. Support from the top school leaders is important to the teachers for adequate educational resources to become available – such as computers, projectors, laptops, tablets, e-learning materials, connectivity, trainings, etc. Adequate time for hands-on experience is being requested. Inclusion of teachers in the decision making process when determining the types of training needed is also of utmost concern.

Recommendation

Based on the findings of the study, it is recommended that School Administrators develop a Digital Literacy Program for teachers, specially for the Digital Immigrants who need more hands-on experience with the ICT devices and workshops to apply learning from

each module. The present level of digital literacy of teachers and students must be determined to establish their level of competency – either as Beginner, Capable or Competent. Then, plan a Digital Literacy Program for each level which should be modular, progressive and based on their needs. Schools can empower the students to help build the capacity of their peers, staff and more people in their school community in the use of digital technologies by providing and promoting ICT leadership opportunities and by showcasing students' digital work. By training ICT mentors and student experts, or encouraging students to work alongside their teachers to help them learn new skills, schools can give students recognition and positive attention.

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Acknowledgement

The author would like to express her sincere appreciation and gratitude to the special people who have in many ways served as inspiration, guide, mentor and support. Their wisdom, votes of confidence, cooperation and unselfish sharing of valuable time facilitated the completion of this socially relevant undertaking.

1.DANE B. JACINTO, Professor and Prefect of Discipline, UPHSD for the encouragement to enrol in Supplemental Education , to equip the author to become more knowledgeable and effective in her function as Head of the Commission on Catechesis and Religious Education, as she serves the young and adult parishioners of MARY, Mother of the Church Parish, Diocese of Paranaque.

2.EMERLYN E. MANAGUAS, Dean of the College of Education ,UPHSD, for the enlightenment on the importance of Educational Technology in teaching the 21st century learners. Her encouragement to pursue further studies in the Graduate School and deliver quality output are invaluable.

3. BELINDA T. CONDE, Research Director of the Research & Development Center, UPHSD for the suggestion to explore the world of the Digital Immigrants / Generation X in coping with the demands of technology.. Her guidance in the statistical treatment of the data gathered is an expression of her service orientation and empathy to students, which are hallmarks of a respectable academic leader.

4.MA. LOURDES AGUIRRE and DR. MARY JOSEPHINE DURITAN, Professors at UPHSD Graduate School who are members of my panel, for their valuable inputs and suggestions to enhance the study.

5. ALBERTO P. MENDOZA, now retired Full Professor and Research Coordinator of the Graduate School, UPHSD, who introduced the researcher to the challenging but fulfilling experience of undertaking mixed methods study. His standards inspired the researcher to deliver a scholarly output that will be useful to the education sector and to the nation.

Heartfelt thanks to the Department of Education – Las Pinas City Schools Division Superintendent DR. LORETA B. TORRECAMPO, who approved and referred the study to the School Heads / Principals of Las Pinas City National High Schools to facilitate quantitative and qualitative data collection. Acknowledging here the kind assistance of Captain Albert Aguilar (CAA) NHS Principal DR. RICARDO DE LOS SANTOS with

Coordinator MICHAEL C. CENTENO, Las Pinas Main NHS Principal DR. PONDORA S. CAPISTRANO, Las Pinas East NHS Principal DR. EDITHA VALDEZ, Division Office Learning Resources Coordinator JAREN JAY ROBEA and IT Project Officer ELLAINE MONTAS.

APALE FAMILY with children HAZEL GRACE APALE – LAUDIT, MICHAEL VICTOR, and KRISTINE GRACE APALE – ZAIDE, together with their father VICTOR for the affirmation that encourages and uplifts the spirit to turn out a quality output that will be beneficial for the academe, the community and the country.

PARENTS (+) DR. GERARDO V. DE LEON and (+) ANGELINA MALLARI DE LEON, both educators whose memories continuously inspire the researcher to engage in worthwhile academic undertakings for the good of the greater number of people.

For all THOSE WHO HAVE BEEN PART OF THIS WORK, specially RAMINA P. ADVIENTO for encoding and collating the materials for the study presentation, a big thank you.

Above all, credit goes to the ALMIGHTY GOD to whom this work is dedicated. His gifts of time, talent and treasure made possible the completion of this work.

To GOD be the glory

M. G. L. A.