Technology Acceptance Model for Pre - Service Teachers of Region I

Maria Theresa V. Forneas, University of Northern Philippines, Philippines

The IAFOR International Conference on Education – Hawaii 2020
Official Conference Proceedings

Abstract
The study aimed to determine the profile of College of Teacher Education Faculty and Pre-service Teachers; Adequacy and extent of Utilization for ICT – Based Instruction along hardware, software and peopleware; degree of Perceived Usefulness, Perceived Ease of Use, and attitudes towards the use of ICT in teaching; level of assessment of the respondents in terms of technological practices; degree of difficulties on frequency of use by pre-service teachers in the school; developed ICT-based instructional materials used by the pre-service teachers in practice teaching; and propose a Technology Acceptance Model for Pre-Service Teachers.The findings revealed that the profile of the respondents' majority is female. Majority of the respondents earned graduate or postgraduate degrees or earned postgraduate units. Most respondents are at the Instructor level in terms of academic rank. The level of adequacy and extent of utilization for ICT-based instruction is Moderate Adequacy / Moderately Extent, while the Perceived Usefulness is strongly agree / very useful in using ICT-based instruction. Assessment in terms of Technological Practices is excellent in surfing the internet for educational research. For Degree of difficulties concerning the frequency of use, respondents used ICT-based teaching activities four times a week. PowerPoint presentation with audio, and animation and using traditional-based instructional material ranked first in the availability of the developed ICT-based instruction. A Technology Acceptance Model is proposed to address the 21st-century education and Sustainable Development Goal of 2030.

Keywords: Technology Acceptance Model, ICT, Pre-Service Teachers

Introduction

The 21st-century has brought about unprecedented changes in all fronts of life. These changes are due to the advancement of technology that is beyond anyone's expectations. During this period, the man not only conceptualized technical ideas but also used electronically operated mail, fax machines, cell phones, computerized databases and high – technology classrooms.

Technology has become a part of day-to-day life. It is revolutionizing education just as it is doing with all aspects of human life. This phenomenon is evident through computers being used in the education system because of their versatility. The internet is helping people learn informally by sharing information and facilitating communication by connecting people. These and other advantages of the internet and associated technologies are being merged to support education and training to improve and overcome the limitations of traditional learning methods.

Information and Communication Technology integration in instruction implies the utilization of technology-based teaching and learning innovations in schools. The ICT integration is deemed advantageous because students are familiar with technology, and they will learn better within the technology-based environment. Moreover, the utilization of technology in instruction contributes to the innovation of the curriculum in particular and education system in general.

Considering this present context, numerous higher education institutions realize and appreciate the possibilities of utilizing the innovation in classrooms as a viewpoint of improving the learning environment (Masrom, 2007). Information technology opens opportunities for instructors to incorporate innovative devices into the teaching-learning process, and include opportunities for collaboration, sharing, and interaction in learning (Suleiman, 2011).

Correspondingly, the State Universities and Colleges in Region I aim to produce quality teachers who have a positive image and who can be at par with other professionals in the region and the nation through a deliberate effort to improve instruction, research, extension, and production. Thus, the college brings its graduates at the helm of all professionals.

Furthermore, its mission is the preparation of globally competent teachers who are imbued with the ideals, aspirations, and traditions of Philippine life and are sufficiently equipped with pedagogical knowledge and skills. It is believed that this vision could be attained through the development of instructional materials to be used and the formulation of strategies and techniques to be implemented.

By the pertinent provision of the Republic Act 7722, otherwise known as the "Higher Education Act of 1994", the Commission on Higher Education (CHED) revised the policies and standards for undergraduate teacher education curriculum to keep at pace with the demands of global competitiveness. As stated in Article I, Section I of the CHED Memo No. 30 series of 2004, the quality of pre-service teacher education is a vital reason for quality Philippine education.

The researcher has observed that today's generation begun to cling tight to the fast development of thoughts and know-how. Technology evolved in various ways. People continued to delve into a large range of interest in ICT. Mass media has set out on the same innovation to fulfill its reason. With the headway of innovation, educating and learning ought to have ended up exceeding available, anyplace (Fu, 2013). However, there are, in any case, challenges that proceed to introduce within the way (Bingimlas, 2009).

In this research, these focuses were utilized to evaluate the status levels of pre-service instructors on ICT-based instruction. To couple, such appraisals are the self-assessment of status by the pre-service instructors themselves. These avocations and comparisons may be adequate to outline curricular change in instructor instruction making ICT-based guidelines methodologies and procedures at the bleeding edge of pre-service instructor preparation.

With all these in consideration and in the context of teaching Educational Technology in Region I, it is important that classroom environment and experiences using computers be made available for all learners. The main purpose of this study is to examine pre-service teachers' attitudes towards digital learning and to analyze the effectiveness of ICT integration from teaching and learning perspectives and the effective elements of ICT integration using TAM in teaching.

Objectives of the Study

This study aimed to propose the Technology Acceptance Model for pre-service teachers in Region I. Specifically; it answered the following problems:

1. What is the profile of the respondents regarding the following:
   a. College Education Faculty respondents
      a.1 sex,
      a.2 age,
      a.3 highest educational attainment,
      A.4 academic rank,
      a.5 number of years in service, and
      a.6 number of training / seminars attended?
   b. Pre-service teacher respondents
      b.1 sex,
      b.2 age,
      b.3 course, and
      b.4 major/area of specialization?
2. What is the level of adequacy and extent of utilization of resources for ICT based instruction in terms of:
   2.1 hardware,
   2.2 software, and
   2.3 peopleware?
3. What are the degree of Perceived Usefulness, Perceived Ease of Use, and attitudes of pre-service teachers and college of teacher education faculty towards the use of ICT in teaching?

4. What is the level of assessment of the respondents in terms of technological practices:
   a. Students as assessed by faculty, and
   b. Faculty as assessed by students?
5. What is the degree of difficulties concerning frequency of use by pre-service teachers in the school?
6. What are the developed ICT-based instructional materials used by the pre-service teachers in practice teaching in terms of:
   a. Utilization, and
   b. Availability?
7. What validated technology acceptance model for the pre-service teacher can be proposed?

Methodology

This study employed the descriptive method with quantitative and qualitative data since this research was designed to find out the facts about present status. The researcher, in this case, adopted the descriptive research method.

This study was conducted among the selected State Universities and Colleges of Region I the basis of selection is based on the policies and guidelines. Respondents of the study were the pre-service teachers, specifically the Fourth Year Education students and the College of teacher education faculty. Total enumeration of College of Teacher Education faculty respondents was employed to come up with a more reliable result.

The first stage of this research consisted of the gathering of quantitative data and information. The next stage was the focus group discussion in which the pre-service teachers shared their ideas on ICT-based instructional materials, which they usually developed and used in their practice teaching.

A set of standardized survey questionnaire with TAM as the guide was used in this research work. Some modifications were done to fit the context of the research study. This was employed to gather significant information to answer specific problem stated in the study. The questionnaire was in the form of checklist and rating scale.

Focus Group Discussion was conducted with administrators, faculty members and students to enhance the discussion of the study based on feedbacks provided by the participants.

These processes are the basis for the preparation and validation of proposed Technology Acceptance Model for pre-service teachers of Region I.

Results and Discussions

Profile of the College of Education Faculty

Sex

It can be gleaned from Figure 1 that the majority or 72% of the College of Education Faculty in Region I are female. This implies that teaching is more suited to women and considered a less-masculine profession in the society. Based on the result of the focus group discussion, preferably both male and female will become teachers, especially primary teachers so that it can be a bit balance for children development.

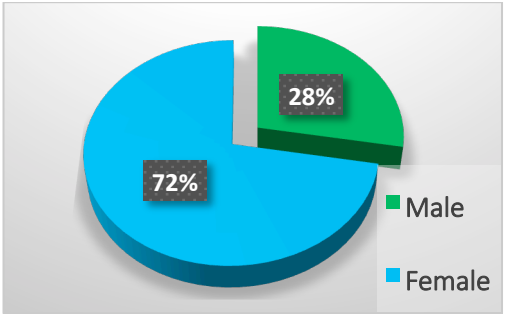

Fig. 1. *Profile of the College of Education Faculty along Sex*

Gender roles and stereotypes find a coherent explanation in gender ideology. The basis of most gender ideology is biological determinism, the thesis that the biological differences between men and women dictate a difference in social roles as well. The logic goes: because women are the ones physically prepared to bear and nurture children (Dionisio, 1994).

Damme (2017) states that gender imbalances the teaching profession measure the results of women's acutely aware and strategic decisions the maximum amount as of labour market conditions, social norms and cultural messages. Also, stereotypic view of teaching as a profession that, at times, resembles parenting, in all probability play a job, particularly with younger generations of girls UN agency apparently price.

Age

The profile of the College of Education Faculty in Region I along age is shown in Figure 2. A marked percentage of the respondents or 20.14% belong to the age bracket 36 - 40 years old. Age brackets of 31- 35 and 41- 45 got 15.28%. On the other hand, age brackets 46 - 50 and 26 - 30 got 10.42% while only 1.38% fall under the age bracket 61 - 65 years old. Age 61 – 65 is mandatorily a retirement age under Republic Act 7641 known as an act amending article 287 of presidential degree no. 442, as amended, otherwise known as the labor code of the Philippines, by providing for retirement pay to qualifies private sector employees in the absence of any retirement plan in the establishment.

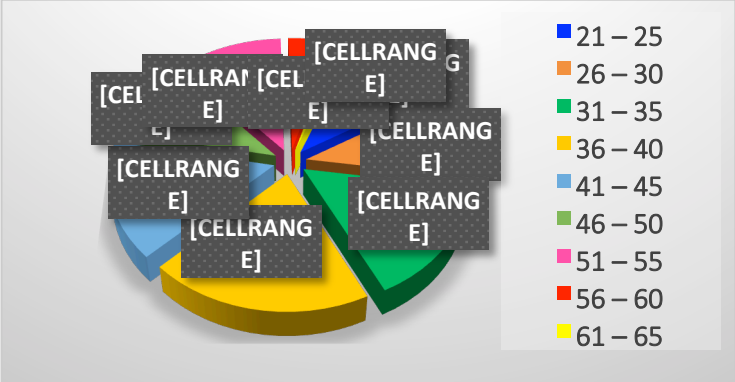

Fig. 2. *Profile of the College of Education Faculty along Age*

Highest Educational Attainment

As shown in Figure 3, the level of educational attainment of the majority of the respondents earned graduate or postgraduate degrees or have earned units towards a higher level of academic degree. Those with doctorate units registered the highest population with 40.28% while the lowest with 2.77% of the respondents are bachelor degree holders. The figure presents that most respondents had relatively high educational attainment which accounts for a positive significant impact on their job performance, wage level, and professional development. This is to conform of strict Civil Service Commission and Commission on Higher Education requirement for teaching positions to be filled up at least one step higher to their students or at least master's degrees aligned to their fields or area of specialization.

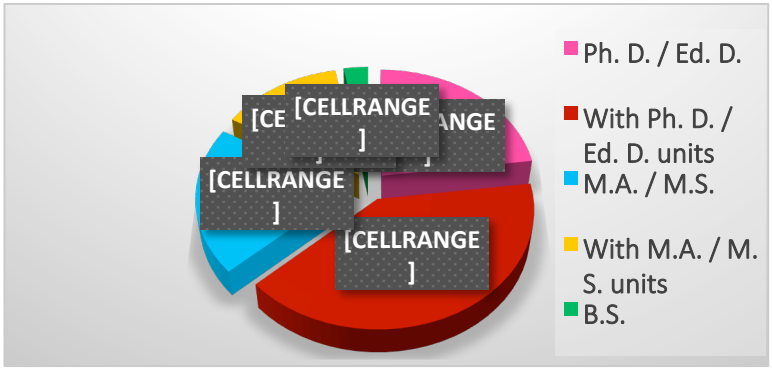

Fig. 3. Profile of the College of Education Faculty along Higher Educational Attainment

Educational attainment distinguishes people on a vertical scale, i.e. academic attainment classes will mostly (although typically not entirely) be ordered hierarchically. Academic attainment refers to a crucial direct outcome of education (Jenkins & Sabates, 2007), as opposed to rather than the info (e.g., intellectual capacity; exertion), process (e.g., instructive pathway taken, full-time or part-time study) or aberrant results of training (e.g., pay). The most elevated level of instruction finished is either demonstrated by the most elevated instructive capability (professional or scholastic) accomplished, or by the quantity of long stretches of training or tutoring finished (in which case every year is viewed as a sort of level).

As shown in Figure 4, almost all of the College of Education Faculty or 90.97% have education related courses. The data reflects that most of the faculty members had

obtained a degree in Education which is the response to the call for Education-related teaching positions. Only 9.03% are not aligned to Education.

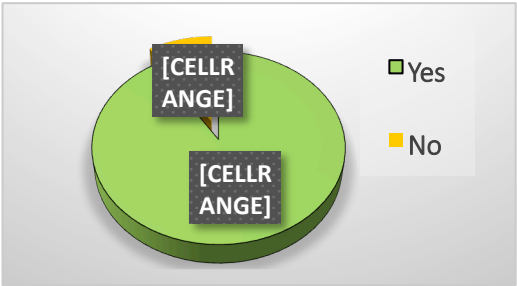

Fig. 4. Profile of the College of Education Faculty along Highest Educational Attainment is Education Related

Arabejo (2016) states that one of the parameters which gauge the quality of the Higher Education Institutions (HEIs) is the academic qualifications of the faculty members. It is also measured by faculty research outputs and other scholarly works which are relevant to their chosen discipline. Professors of different colleges and universities are expected to possess the necessary skills and competencies in their discipline. They are high performing professional educators who contribute to the generation and transmission of new knowledge. However, not all faculty members in every HEI are vertically aligned regarding degrees and outputs. One of the worries which the administration investigates is to realign educators at all levels most particularly in Higher Education Institutions (HEIs). Achievement in the execution of a scholastic program depends, all things considered, on the nature of the personnel.

Academic Rank

It can be observed in Figure 5 the academic ranks of the College of Education faculty in Region I; most faculty members were in Instructor level or 38.89%. There was 31.25% Assistant Professor, 19.44% Associate Professor while there was only 10.42% holding a full professor plantilla position.

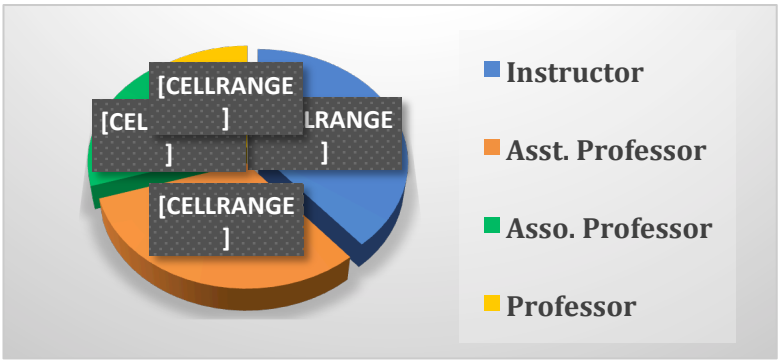

Fig. 5. *Profile of the College of Education Faculty along Academic Rank*

The National Budget Circular (NBC) 461 provides the guidelines for the promotion of faculty members in state universities and colleges. The areas where each of the faculty members are evaluated including educational qualification, experience and length of service, professional development, achievement, and honors received. Every faculty member is encouraged to prepare themselves for evaluation as promotion may indicate professional growth and development and provides the

respective universities with high profiled faculty members as one necessary are for accreditation.

Number of Years in Service

As to the respondents' length of service, Figure 6 reveals that 23.61% of the respondents have rendered services for 6 – 10 years. This followed by less than one percent who have served for 36 – 40 years.

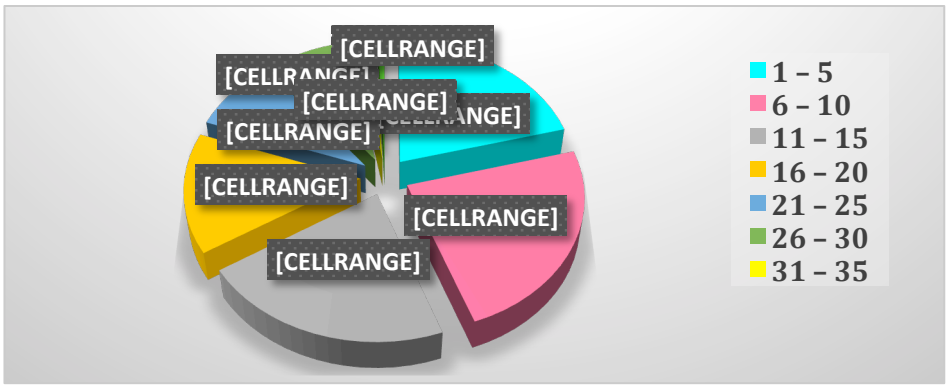

Fig. 6. *Profile of the College of Education Faculty along Number of Years in Service*

Some research shows that instructors with over 20 years of experience are more successful compared to educators with no experience. Studies have additionally recorded some proof that viability decreases after some point, especially among secondary teachers. Some evidence recommends that the most experienced (more noteworthy than 25 years) secondary school arithmetic instructors might be less powerful than their less experienced partners (Ladd, 2008) and even their unpracticed associates (Harris & Sass, 2007).

Number of Training and Seminars Attended

It can be gleaned from Figure 7 that 43.03% of the respondents attended training and seminars 1 – 4 times, 3.47% attended 21 and above and 2.08% never attended training seminars and at all.

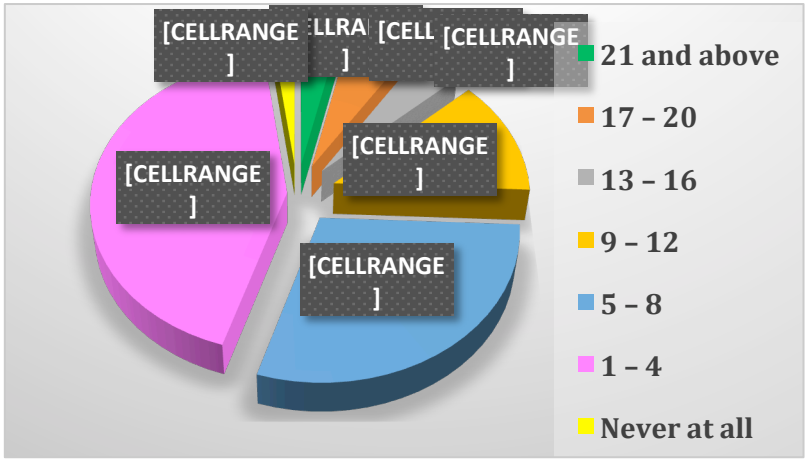

Fig. 7. *Profile of the College of Education Faculty along Number of Training and Seminars Attended*

Educators' expert improvement is a key factor to a fruitful mix of PCs into homeroom instruction. Sandholtz and Reilly (2004) guarantee that educators' innovation abilities are solid determinants of ICT joining, yet they are not conditions for viable utilization of innovation in the study hall. They contend that preparation programs that focus on ICT instruction rather than specialized issues and specialized help assist educators more successfully with applying advances in instructing and learning. Researchers thinks that quality expert preparation assists educators with executing innovation and change (Brinkerhoff, 2006; Diehl, 2005). Uncivilized and Pellegrino (2007) guarantee that if the preparation program is of high caliber, the period for preparing becomes longer and new advancements for instruction get to be offered. With this, teachers will be associated with significant substance exercises, and cooperation among partners will improve and an unmistakable vision for understudy will be achieved. Educators may receive and incorporate ICT into their encouraging when preparing programs focus on the topic, qualities, and innovation.

Profile of the Pre- Service Teachers

Sex

The graphical presentation of the sex profile of pre-service teachers as shown in Figure 8 reveals that 77% are females and 23% are males.

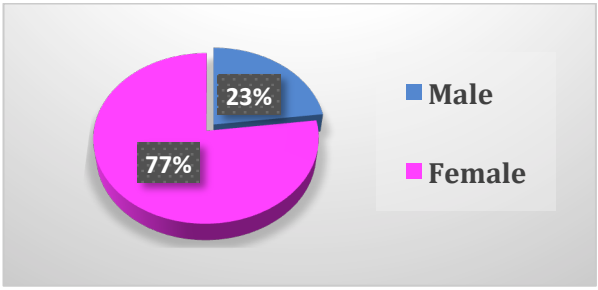

Fig. 8. *Profile of the Pre-Service Teachers along Sex*

As a result of focus group discussions, they took teaching as their course because of it is their parent's choice. Other respondent says it's their passion since childhood and opportunity to work with young people and make a difference in their lives, that there's the chance to inspire students in the way their teachers inspired them.

Age

Figure 9 shows the graphic presentation of the age profile of pre-service teachers. It can be seen that 46% of the pre-service teachers are 20 years old while 1.60% of the respondents are ages 18, 22 and 23 and less than 1% of them are 24 and 25 years old respectively. Based on the result are the transition from adolescence (12-19 years old) and young adult hood (20 – 40 years old). Early adulthood comprises the cohort currently between 20-24 years of age belong to the millennial or Net generation (Prensky, 2011) and the cohort currently aged 25-40, who are known as generation X.

Piaget (1976) termed the stage of adolescence as the period of formal operations. Adolescents have attained a new, higher-order level of reasoning superior to earlier childhood thoughts. They are capable of abstract thought and complex logical

reasoning described as propositional as opposed to syllogistic. Their reasoning is both inductive and deductive, and they are able to hypothesize and apply the principles of logic to situations never encountered before.

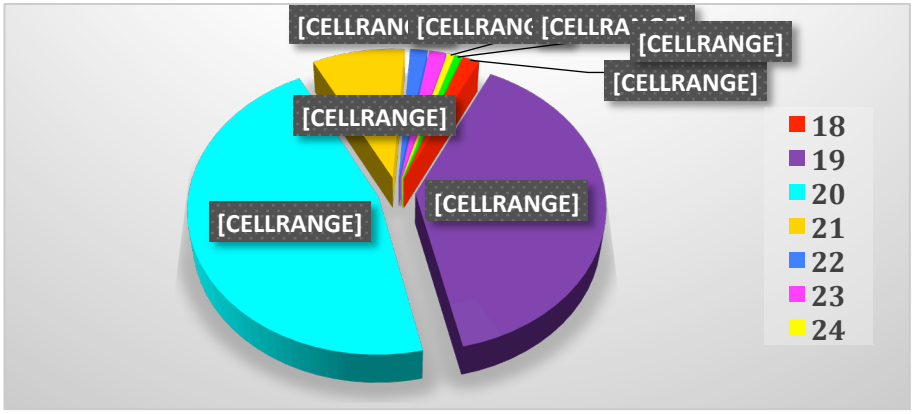

Fig. 9. *Profile of the Pre-Service Teachers along Age*

Young adults continue in the formal operations stage of cognitive development (Piaget, 1976). These experiences add to their perceptions, allow them to generalize to new situations, and improve their abilities to critically analyze, problem solves, and make decisions about their personal, occupational, and social roles. Their interests in learning are oriented toward those experiences that are relevant for immediate application to problems and tasks in their daily lives.

Teacher Education Programs

Figure 10 presents the graphic presentation of the course profile of the pre-service teachers. It can be noted that out of 313 pre-service teachers 39 % are in Bachelor of Secondary Education (BSEd) course followed by 38.98% who are Bachelor of Elementary Education (BEEd), while 21.08% belongs to Bachelor of Science in Industrial Education. Passing the Licensure Examination for Teachers is one of their requirements to be considered in choosing what course in education they take.

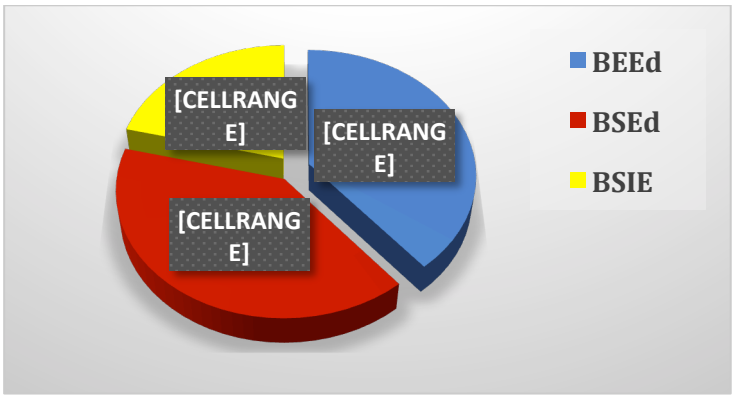

Fig. 10. *Profile of the Pre-Service Teachers along Teacher Education Programs*

As indicated by Ozbek (2007) understudy educators pick their profession with individual factors as opposed to financial and social components. In addition, in some different study, it is guaranteed that understudy decides to educate as a vocation since it is an independent calling while some others imagine that they can remain youthful

in this profession. Also, while a few up-and-comers believe that they can raise their children in this profession simpler than some other work, some others have some ideological methodologies like affecting youthful ages (Kelly, 2012; Lawver & Torres, 2011). Hacıomeroglu and Taskın (2010) found that while a few applicants pick the career as they believe that the profession is good and they like teaching children, others feel that the profession will satisfy them. Tataroglu, Ozgen, and Alkan (1998) assert that they have an interest and love in educating, consider the to be as a proper, decent and favored work.

Major / Area of Specialization

The figure presents the graphical representation of the pre-service teachers along major / area of concentration of the State Universities and Colleges in Region 1. As reflected in Figure 11, the result shows that 36.10% were General Education major in the BEEd program. General Education course covers all of the basic information for teaching in primary education. In addition, it is a field of study that has no specific specialization because students are considered generalists thus, a challenging course.

Less than 1% were major in Garments and Fashion Design, Chemistry and Special Education (SPEd). In connection with the previous study, BSIE is the least among the course selected in the Region. This is due to the little opportunities in employment and success in the board examination for teachers.

Garments and Fashion Design is one of the major of Bachelor of Industrial Education Course. Like the BSEd and BEEd programs, the BSIE program also includes General and Professional Education Courses. Graduates take the Licensure Examination for Teachers (LET) to allow them to become professional teachers. BSIE is a ladderized program, meaning that students who complete each year level and pass the TESDA Competency Assessment are issued the National Certificate (NC) of that particular level.

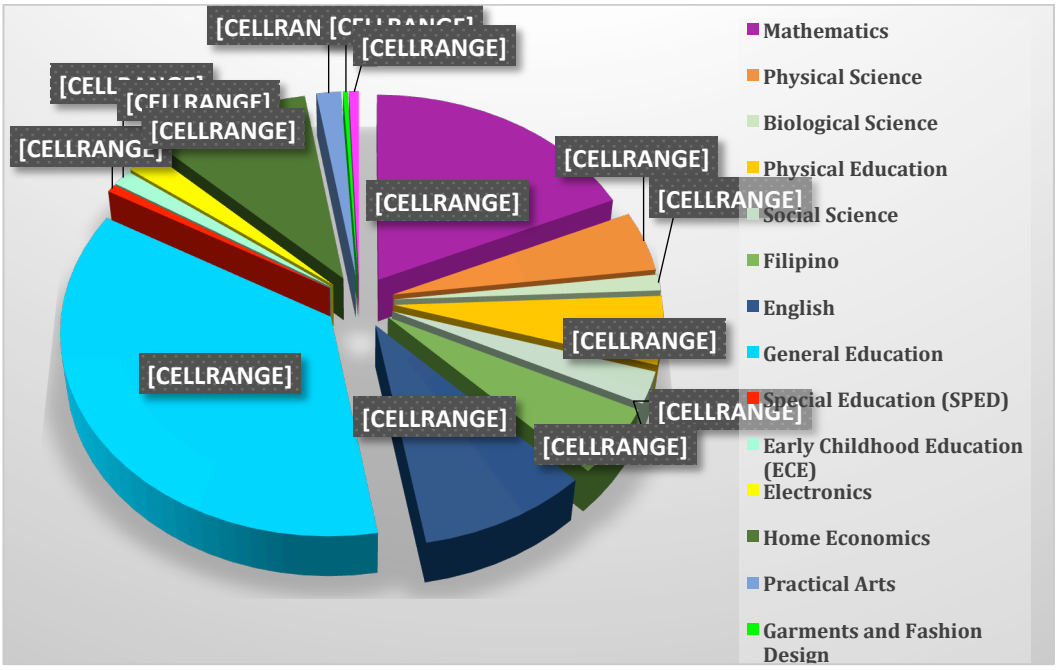

Fig. 11. *Profile of the Pre-Service Teachers along Major / Area of Specialization*

Level of Adequacy and Extent of Resources for ICT - Based Instruction

Table 1 presents the level of adequacy and extent of utilization for ICT-based instruction. The level of adequacy for ICT-based Instruction is High Adequacy as supported by the grand mean of 3.41. The indicator software, which include the Word Processor, Desktop Publishing, Calculation Spreadsheet Worksheet Maker, Slide Presenter, Multimedia Authoring, Image and Drawing Editor, Web Page Maker, Test Maker, Math Study helper, Science Study Helper, English Study Helper, e-mail, Weblog and Wiki, and File Sharing, earned an average score of 3.52 that means High Adequacy for ICT-based instruction. Peopleware that includes the Computer Technician, MIS Officer, IT Officer, Network Administrator, System Administrator, System Analyst, Programmer and Computer Operator / Encoder ranked the least with an average of 3.35 which is Moderate Adequacy. For the extent of utilization, software ranked the highest for ICT -based instruction with an average score of 3.44 which is High Extent, while peopleware ranked the least with an average of 3.28. This extent of utilization for ICT-based instruction has gained 3.34 average which is Moderate Extent.

	Level of Adequacy				**Extent of Utilization**			
	Pre-Service teachers	**College of Education Faculty**	**Mean**	**DR**	**Pre-Service teachers**	**College of Education Faculty**	**Mean**	**DR**
Hardware	3.36	3.35	**3.36**	**MA**	3.35	3.26	**3.31**	**ME**
Software	3.49	3.54	**3.52**	**HA**	3.52	3.35	**3.44**	**HE**
Peopleware	3.41	3.29	**3.35**	**MA**	3.35	3.21	**3.28**	**ME**
GRAND MEAN	**3.42**	**3.39**	**3.41**	**HA**	**3.41**	**3.27**	**3.34**	**ME**

Legend: **DR** – Descriptive Rating **HA / HE** – High Adequacy / High Extent **MA / ME** – Moderate Adequacy / Moderate Extent

Table 1. Level of Adequacy and Extent of Utilization for ICT – Based Instruction

Lau and Sim (2008), conducted a study on the degree of ICT adaptation among 250 teachers in Malaysia. Their discoveries uncovered that more established educators oftentimes use PC innovation in the homerooms more than more youthful instructors.

Perceived Usefulness, Perceived Ease of Use and Attitudes Towards the Use of ICT – Based on Teaching

Table 2 shows the perceived usefulness, perceived ease of use and attitude towards the use of ICT-based in teaching. Perceived Usefulness acquired the descriptive rating of strongly agree / very usable with a weighted mean of 4.33, while perceived ease of use acquired the agreeable/usable rating. The grand mean is 4.24 tagged as strongly agree / very usable. This further signifies that the pre-service teachers and college of education faculty perceive the use of ICT as beneficial in enabling students to be more active and engaged in the lesson.

	Pre-Service Teachers	College of Education Faculty	Mean	DR
Perceived Usefulness	4.20	4.46	**4.33**	**SA/VU**
Perceived Ease of Use	3.98	4.21	**4.09**	**A/U**
Attitude towards the Use of ICT in Teaching	4.23	4.36	**4.30**	**SA/VU**
GRAND MEAN	**4.14**	**4.34**	**4.24**	**SA/VU**

Legend: **DR** – Descriptive Rating **SA / VU** – Strongly Agree / Very Useful
A / U – Agree / Useful

Table 2. Perceived Usefulness, Perceived Ease of Use and Attitude towards the use of ICT-based in Teaching

Level of Assessment in terms of Technological Practices

Table 3 presents the data on the level of assessment in terms of technological practices. It evaluates the students as assessed by faculty and faculty as assessed by students. Based on the data, the item "ICT is used in surfing the internet for educational research" which obtained the highest weighted mean rating of 4.36 described as "Excellent", got the lowest weighted mean rating 3.64, the item "All ICT tools in the school are taken many advantages of because teachers minimally use them" tagged as "Very Good". The level of assessment in terms of technological practices has an overall mean of 3.99 described as "Very Good."

Many teachers are allowing students to use the Internet as a source of information for research projects assignments. Honey (2005) stated that, according to the National Center for Education Statistics (NCES), public schools had made consistent progress in expanding Internet access in instructional rooms.

ICT practices	Students as assessed by faculty	Faculty as assessed by students	Mean	DR
1. ICT is used in doing student-teaching tasks	4.16	4.18	**4.17**	**VG**
2. ICT is used in surfing the internet for educational research	4.35	4.37	**4.36**	**E**
3. Download and upload curriculum resources from/to websites or learning platforms for students to use.	4.22	4.20	**4.21**	**E**
4. There is computer laboratory in the school in which teachers can bring students there to watch educational videos.	3.79	3.97	**3.88**	**VG**
5. ICT is used in preparing and organizing school tasks, projects, and paper works	4.16	4.20	**4.18**	**VG**
6. ICT facilities in the school are well-functioning and can be used	3.73	3.96	**3.84**	**VG**
7. Technical supports are provided if teachers are faced with difficulties.	3.80	3.84	**3.82**	**VG**
8. Frequent access to internet prevents the teacher from using it in teaching.	3.63	3.79	**3.71**	**VG**
9. Support from the school top management encourages the teacher from using ICT.	3.87	3.89	**3.88**	**VG**
10. Instruction time is enough for the teacher to use ICT for teaching and learning process.	3.90	4.35	**4.12**	**VG**
11. There are enough training and professional development provided for teachers about ICT use in teaching.	3.84	3.73	**3.78**	**VG**
12. All ICT tools in the school are taken many advantages of because teachers minimally use them.	3.61	3.68	**3.64**	**VG**
13. Teachers are given more time to learn and be comfortable with the use of ICT in teaching.	3.92	3.84	**3.88**	**VG**
14. ICT is used in communicating and transmitting documents through emails, social network groups.	4.18	4.13	**4.15**	**VG**
15. Teachers are given the freedom to design their teaching with the help of ICT.	4.20	4.22	**4.21**	**E**
Mean	**3.96**	**4.02**	**3.99**	**VG**

Legend: **DR** – Descriptive Rating **E** – Excellent **VG** – Very Good

Table 3. Level of Assessment in terms of Technological Practices

Degree of Difficulties Concerning Frequency of Use

Table 4 presents the data on the frequency of use in ICT-based teaching activities of the pre-service teachers and college of education faculty of the State Universities and Colleges in Region I. It has an overall mean of 3.68 described as "Often" or they use ICT-based in teaching activities four times a week. Among the indicators, the highest weighted mean rating was *"making lesson presentations with the use of relevant applications"* with an average weighted mean rating of 4.11 described as "Sometimes" or four times a week use in ICT-based in teaching activities. The indicators with the least frequency of use in ICT-based in teaching activities with a mean rating of 2.97 tagged as "Often" or used ICT three times a week is *"Online interactive teacher-student meetings".*

It is also interesting to note that in the study of Fox and Bird (2017), some teachers, unlike other members of society, do not all use social media. They explained that there are some teachers who avoid it; some experiment with it while others embrace it enthusiastically. They further theorized that as a means of communication available to everyone in modern society, "*social media is challenging teachers, like other professionals in society, to decide whether to engage with these tools and, if so, on what basis – as an individual (personally), or a teacher (professionally)."*

ICT-based teaching activities	Pre-Service Teachers	College Education Faculty	Mean	DR
1. Online interactive teacher-student meetings	2.92	3.03	**2.97**	**S**
2. Surfing internet for research and downloads	3.89	3.79	**3.84**	**O**
3. Organizing school tasks and reports using computer applications	3.80	3.69	**3.74**	**O**
4. Computing grades and the like using computer applications	3.90	3.99	**3.95**	**O**
5. Making lesson presentations with the use of relevant applications	4.17	4.05	**4.11**	**O**
6. Preparing database of student records for storage and easy retrieval	3.80	3.77	**3.78**	**O**
7. Creating video clips and other hypermedia instructional aids	3.73	3.77	**3.78**	**O**
8. Networking in professional groups online	3.31	3.43	**3.37**	**O**
Mean	3.69	3.68	**3.68**	**O**

Legend: **DR** – Descriptive Rating**O** – Often (four times a week) **S** – Sometimes (three times a week)

Table 4. Frequency of use in ICT-based in Teaching Activities

Developed ICT-based instructional materials used by the pre-service teachers in practice teaching along utilization and availability

Table 5 shows the developed ICT-based instructional materials used by the pre-service teachers in practice teaching. In the availability of the developed ICT-based instruction, using traditional-based instructional materials ranked the first but the utilization of this traditional based instruction ranked second. This means that teachers today prefer to use modern educational technologies in teaching their students.

PowerPoint presentation with audio and animation ranked second in the availability of developed ICT-based Instruction with the percentage equivalent of 30.99% while in the utilization of developed ICT-based instruction, it ranked first with 36.74%.

Multi Media Presentation ranked third in the availability and utilization of developed ICT-based Instruction. Based on the result, 56 of the respondents access Multimedia, but 66 out of 313 utilized this technology in their practice teaching because it helps students visualize difficult concepts or procedures. In Digital presentation storytelling, 13 of the respondents developed but only 11 utilized the used of it because of lack of technology resources used in their teaching. Furthermore, the pre –service who utilize game and puzzles is 3.83%, while its availability is 3.51%. Also, 1.28% of the respondents have utilized the developed Spreadsheets to compute specific mathematical problems and creating graphs, while its' availability is 2.56%. On the hand 1.60% is available in their school, and less than 1% of the respondents have utilized the used of Smartboard presentation in the classroom because of the limited information and knowledge how to use this technology.

Based on the result of focus group discussion, two out of five schools have 1:1 computer-to – student ratio in a laboratory class, but for them to achieve that ratio they divide the class into two. Other schools have the of 1:3 and 1:2.

The results are contradicted by the CHED CMO 25 s. 2015 Section 16 of Article VI, Laboratory and Physical Facilities under Laboratory requirements state that the number of terminals dedicated to computing students should be at least 1/5 of the total number of computing students. This is to allow each student to have enough individual hands-on computer time per week. The computer-to-student ratio in a laboratory class should be 1:1.

Developed ICT—based Instructional Materials	Availability of the developed ICT-based Instruction			Utilization of developed ICT-based Instruction		
	f	%	Rank	*f*	%	Rank
Multi Media Presentation	56	17.89	**3**	66	21.09	**3**
Games and Puzzles	11	3.51	**5**	12	3.83	**4**
PowerPoint presentation with audio and animation	97	30.99	**2**	115	36.74	**1**
Spreadsheets	8	2.56	**6**	4	1.28	**6**
Digital presentation story telling	13	4.15	**4**	11	3.51	**5**
Using Interactive Television	3	.96	**8**	2	.64	**8**
Using smartboard presentation	5	1.60	**7**	3	.96	**7**
Used Traditional -based Instructional materials	120	38.34	**1**	100	31.95	**2**
TOTAL	313	100		313	100	

Table 5. Developed ICT-based instructional materials used by the pre-service teachers in practice teaching along utilization and availability

Proposed Technology Acceptance Model of Pre-Service Teachers

The proposed model as shown in Figure 11 reveals the interrelationships of External and Internal Variables, Digital Natives, Enhanced ICT Integration, Developed Innovation, Developed Pedagogical Skills and 21st-Century Teachers will bring about for the proposed Technology Acceptance Model of Pre-service teachers and address the 21st-Century Education and Sustainable Development Goals no. 4 (quality education).

External and internal variables. The model espouses profile of the respondents for pre-service teachers namely: gender, age, course, and major/area of specialization. For faculty respondents namely: gender, age, highest educational attainment, academic rank, number of years in service, and number of training/seminars attended in Information Communication Technology. While in internal variables, include the cognitive, affective and behavioral response of the pre-service teachers and education teacher towards the use of ICT in teaching.

Digital Natives. It refers to the preservice teachers who were born after the widespread adaptation of digital technology. It does not refer to a particular generation. Instead, it is a catch-all category for children who have grown up using technology like the Internet, computers and mobile devices.

Enhanced ICT Integration. This refers to the result of the usefulness, ease of use and attitudes towards the use of ICT-based in teaching. Teachers and administrations' attitude towards the use of ICT is key to enhance the integration, e.g., plan and commitment of management and school, infrastructure (comp. Lab., multimedia center, etc.), Educational Resources, Coordination and maintenance, Training (technical and didactical teachers and school).

Developed Innovation. The model embraces that the digital natives should enhanced ICT integration in their teaching for them to developed innovation ICT-based instructional materials used in their practice teaching.

Developed Pedagogical Skills. The model pursues the developed Pedagogical skills, which refers to the teaching skills teachers have and the activities these skills generate to enable students to learn the knowledge and skills related to different subject areas. The model embraces the principles of Blooms' Taxonomy, Dale's cone of experience and teaching instructional model.

Practice Teaching. As regards ICT-based teaching, pre-service teachers believe that they are ready to face their students' learning concerns based on the pedagogical skills they have developed.

21st Century Teachers. The model pursues the concept of 21st century teachers.

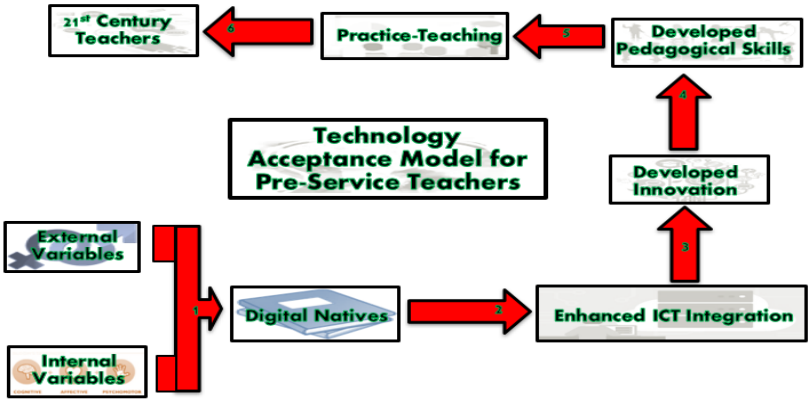

Fig. 12 Proposed Technology Acceptance Model for Pre-Service Teachers

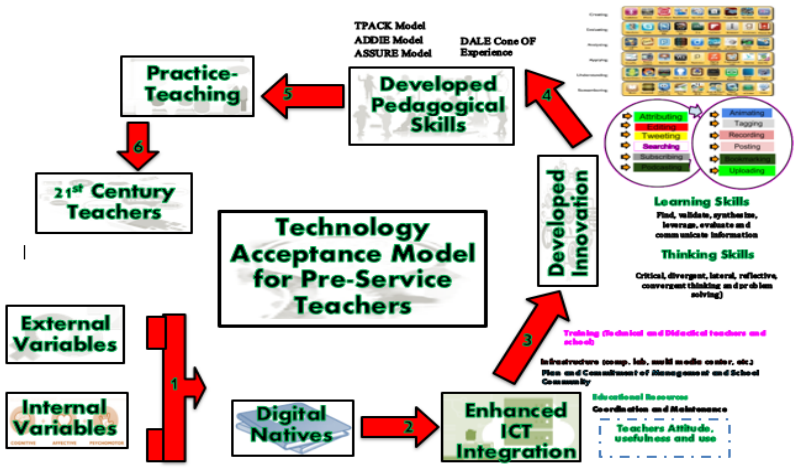

Fig. 12.a Proposed Technology Acceptance Model for Pre-Service Teachers

Conclusions

In light of the findings, the following conclusions were drawn:1. College of Teacher Education faculty are predominantly female and they belong to the middle age with doctorate units, a degree in Education and with limited training and seminars. Pre-Service Teachers belong to the age of younger age**,** majority are Bachelor of Secondary Education students and but specialize in General Education of Bachelor in Elementary Education courses. 2. The extent of utilization of ICT resources in teaching and learning process has a significant influence on teaching to produce quality graduates that compete in the global university. 3. ICT-based resources are

very useful in teaching and learning. 4. The efficient use of technology like ICT develops work outputs necessary to improve and enrich the concepts and theories of ICT-based teaching. 5. The frequency of use of ICT-based teaching activities is attributed to ICT resources (hardware, software, and peopleware). 6. Developed ICT-based instructional materials utilized to promote effective learning as well as to meet the demand of the 21st century teaching skills. 7. The proposed Technology Acceptance Model for Pre-Service Teachers can be integrated and adapted as a guide in teaching and learning process of the pre-service teachers.

References

Arabejo, Claire & Abatayo, Marilou M (2016). Vertical Alignment of Faculty of Science and Mathematics. Volume 1, Issue No. 2. December 2016. ISSN: 2546-0579

Bingimlas, K. (2009). Barriers to the successful integration of ICT in teaching and learning environments: a review of the literature. Eurasia Journal of Mathematics, Science and Technology Education.

Brinkerhoff, J. (2006). Effects of long-duration, professional development academy on technology skills, computer self-efficacy and technology integration beliefs and practices. Journal of Research on Technology in Education, vo. 30, no.1

CHED Memorandum Order No. 26, s. 2004. "Revised Policies and Standards for Undergraduate Teacher Education Curriculum". www.ched.gov.ph/wp-content/uploads/2013/07/CMO-No.30-s2004.pdf, Retrieved 23 May 2017.

Damme, D. V. (2017). Why so many women wants to become teachers?. http://oecdeducationtoday.blogspot.com/2017/03/why-do-so-many-women-want-to-become_1.html. Retrieved 02 March 2018

Dionisio, E. R. Sex and Gender in Philippine Society: A discussions of issues on the relationships between women and men. Printed in the Philippines December 1994. ISBN 971-1014-12-2. Published by the National Commission on the Role of Filipino Women.

Hacıomeroglu, G., & Taskın, C. S. (2010). Ogretmen Adaylarinin Ogretmenlik Meslegini Tercih Sebepleri. Ahi Evran Üniversitesi Egitim Fakültesi Dergisi, 1(1), 77-90 [In Turkish].

Honey, M. (2005). Critical issue: Using technology to improve student achievement. Retrieved March 12,2007, from http://www.ncrel.org

Lau & Sim (2008). Exploring the extent of ICT adoption among Secondary school teachers in Malaysia. International Journal of Computing and ICT Research, vo. 2, no. 2 . http://www.ijcir.org/volume2numbr3/article3.pdf. Retrieved date 6 March 2018

Lawless, K., & Pellegrino, J (2007). Professional development in integrating technology into teaching and learning: Knows, unknowns and ways to pursue better questions and answers. Review of Educational Research, vol. 77, no.4.

Masrom, M. (2007). Technology Acceptance Model and E-learning. A paper presented at the 12thInternational Conference on Education, Sultan Hossanal Bolkiah Institute of Education Universiti Brunei Darussalam.

Ozbek, R. (2007). Ogretmen Adaylarinin Ogretmenlik Meslegini Tercih etmelerinde Kisisel, Ekonomik ve Sosyal Faktorlerin Etkililik Dercesine Iliskin Algilari. Firat Universitesi Sosyal Bilimler Dergisi, 17(1), 145-159 [In Turkish].

Sandholtz, J.H. & Reilly, B. (2004). Teachers, not technicians: Rethinking technical expectations for teachers. Teachers College Record.

Suleiman, A. A. (2011). Essentialities for e-learning: the Nigerian Tertiary Institute in question. Academic Research International. Volume 1, Issue 2, 2011.

Tataroglu, B., Ozgen, K., & Alkan, H. (1998). Matematik ogretmen adaylarinin ogretmenliği tercih nedenleri ve beklentileri. 2nd International Conference on New Trends in Education and Their Implications, Siyasal Kitabevi, Antalya-Turkey, April 27-29, 998-1006 [in Turkish].

Contact email: thetforneas0922@gmail.com
thetforneas@yahoo.com