Exploring the Teacher’s Utilization of ICT Resources in Schools and their Student’s Competence in Basic Computer Applications

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Abstract. This descriptive study explored the Teacher’s Utilization of ICT Resources in Schools and their Student’s Competence in Basic Computer Applications. This involved the fourteen Science teachers and the 245 Grade 10 students in the three selected public secondary schools in Ragay, Camarines Sur, Philippines, for the School Year 2019-2020. It revealed that selected public secondary schools in Ragay Sometimes Utilized various ICT Resources in teaching Science, and the Science teachers of those schools are Skillful in Information and Communications Technology and are Much Ready in Equipment Readiness in integrating ICT in school and at home; their Grade 10 students are Competent in the Basic Computer Applications particularly in the Word Processing, Spreadsheet application, PowerPoint Presentation and the Use of Internet. Thus, it is recommended that computers and the internet be made available for students and teachers and regular training of teachers to utilize various resources in teaching Science to improve the students' critical thinking, motivation, and higher-order thinking skills.

Keywords: Utilization of ICT Resources, Science Teachers, Basic Computer Applications, Grade 10 students

1. Introduction

Information and communication technology (ICT) has significantly altered nearly all forms of business processes, practices, and procedures in industry and government over the last two decades. In Education Sector, quality teaching has long been synonymous with tenacious teachers who maintain high levels of personal contact with students, as education is a very social activity wherein information and knowledge are limitless with the integration of ICT. The secondary schools in Ragay District, Ragay Camarines Sur, Philippines, support the Department of Education's (DepEd) mission to "protect and promote the right of every Filipino to a quality, fair, culture-based, secure, and motivating basic education where students learn in a child-friendly, gender-sensitive, safe, and motivating environment" where "teachers facilitate learning and constantly nurture a love of learning" (www.deped.gov.ph).

Students gain valuable knowledge, skills, attitudes, and moral values through education, which is so important in the nation's growth and its citizens. "Education for all Filipinos, Anytime, Wherever" is the Department of Education's overarching aim for the twenty-first century, which necessitates an
ICT-enabled educational system that transforms students into dynamic life-long learners as well as value-centered, active, and compassionate individuals. According to the Department of Education Information and Communication Technology Strategic Plan (2008), which was developed collaboratively by educational stakeholders in the Philippines, ICT offers compelling opportunities for learning and collaboration for schools and learners. The Plan outlines the information and communication technology skills, comprehension capacities, amounts, and values that Filipino students should possess.

Incorporating ICT into the teaching-learning method, on the other hand, is not as easy as it appears. Critics are skeptical of the effectiveness of these Information and Communication Technology systems in achieving technical innovation in the classroom, citing factors such as class size, teacher availability, teacher credentials, and required teacher preparation, among others. As a result, many people doubt that Philippine schools, especially public schools, can afford to use such costly technology.

ICT utilization in schools is affected by various factors and conditions wherein teachers face difficulties in the availability of ICT equipment, internet connection, computer units [1], ineffective leadership, improper support and planning in school, and lack training programs [2]. Likewise, teachers should be trained on how to effectively integrate computer, the internet, and other aspects of ICT in the instructional process of teaching and learning [3] since it caused greatly their motivation to integrate technologies in teaching like the use of smartphones in science lessons that the teachers commonly use for proper learning interaction with students [4]. This study also premised on the findings of [5] that the teachers’ behavioral intention in integrating ICT is affected by various governmental policies related to its integration in the entire teaching and learning process.

With such, the researchers, who are members of Higher Education Institutions with prior teaching experience in the Basic Education Sector, assessed the use of ICT resources in schools as perceived by science teachers from various secondary schools in the Ragay District in order to see whether their abilities in using ICT resources affect their students’ competence in using the basic computer applications which will be paved for better policy recommendations in these schools as well as information in training the teachers in improving their ICT capabilities.

2. Methodology

This study used the descriptive research design, which deals with the status or trend of studies and the analysis of existing attributes of a group of subjects or individuals (Hancock, Ockleford, and Windridge, 2009). The purposive sampling technique was used in this research. It only enumerates all Science teachers in three secondary schools in the Ragay District: Sisa Feliciano Memorial High School, Tomas Andaya National High School, and Cristobal D. Aquino Memorial High School. During the 2019-2020 school year, 14 teachers and 245 Grade 10 students participated in the report. Informed consent and study permits were obtained before the actual conduct of the study.

The objective of this study is to identify the profile of ICT resources utilized in teaching Science; the science teacher’s Extent of Integration of ICT Resources in school as to their ICT Skills and Equipment Readiness in school and at home; and the ICT skills of the Grade 10 learners in Word, Spreadsheet, PowerPoint operations and skills in accessing the internet. A researcher-made instrument was used in gathering the data, and its interpretation was ascertained using descriptive statistics. Furthermore, to avoid bias and preserve the integrity of the sections, the researchers utilized the average means of the entire population of the study.
3. Result and Discussion
The following data were generated in this study:

3.1 Extent of Utilization of ICT Resources in teaching Science

Table 1. The Extent of Utilization of ICT Resources in teaching Science

| ICT resources in school | Mean | Extent of Utilization |
|-------------------------|------|-----------------------|
| Speaker                 | 3.97 | Often Utilized        |
| LCD Projector           | 3.90 | Often Utilized        |
| Laptop, notebook computer, and netbook computer. | 3.50 | Often Utilized        |
| Lapel microphones.      | 2.82 | Sometimes Utilized    |
| Handheld computers like cellular phones and smartwatch | 2.68 | Sometimes Utilized    |
| LCD/LED TV              | 2.50 | Sometimes Utilized    |
| Router and portable Wi-Fi. | 2.30 | Seldom Utilized       |
| Tablet computer.        | 2.19 | Seldom Utilized       |
| Digital camera.         | 2.10 | Seldom Utilized       |
| DSLR camera for magnification of cultured and prepared slides of microorganisms. | 1.80 | Seldom Utilized       |
| **Average**             | **2.78** | **Sometimes Utilized** |

Based on Table 1, the results revealed that the teachers often utilized speaker and LCD projector and their computer device in teaching Science lessons. However, it can be noted that they seldom utilized routers and portable Wi-Fi, tablet computer, and digital camera while they DSLR cameras. Therefore, it implies that teachers utilize ICT resources in teaching Science in an average manner and further imply that they are not left behind other aspects of ICT in teaching. However, the digital camera and DSLR cameras are least utilized since most of the teaching material such as video, pictures, and simulations related to science concepts are now widely accessible on the world wide web. Therefore, Science teachers in Ragay District are not behind the ICT aspect since they must change with the changing pedagogical time [1].

3.2 The Science Teacher’s Extent of Integration of ICT Resources in School

Table 2 to 3 presents the Science teacher’s Extent of Integration of ICT Resources in School regarding their ICT Skills and Equipment Readiness in school and home.

Table 2. The Science Teachers’ ICT Skills

| The Science Teachers’ ICT Skills | Mean | Extent of Competency |
|----------------------------------|------|---------------------|
| Knows the fundamentals in the use of the internet and selected electronic media | 3.82 | Much Skillful       |
| Knows the basic concepts and functions of computer and communication technologies | 3.78 | Much Skillful       |
| Uses various search engines and electronic media for research | 3.45 | Skillful            |
| Uses productivity software and basic peripherals for general productivity | 3.39 | Skillful            |
| Use internet and electronic media confidently | 3.38 | Skillful            |
| Install and uses specific applications in teaching the subject | 3.36 | Skillful            |
| Install and use digital devices | 3.23 | Skillful            |
| Install and uses specialize application of offline and online tools | 3.19 | Skillful            |
| **Average** | **3.45** | **Skillful**        |
As revealed in Table 2, science teacher respondents perceived themselves as Skillful in using the various essential ICT competencies. As expected, since they usually utilize speaker, LCD projector, and their computer in developing their teaching materials, they are Much Skillful in the fundamentals of using the internet and selected electronic media and the basic concepts and functions of computer and communication technologies. However, their skills in installing different programs and applications related to the teaching of science subjects, digital devices, and offline and online tools should be improved, although their skills in those competencies are comparably within their expected levels.

Table 3. The Science Teachers Equipment Readiness in integrating ICT in school and at home

|                                | Mean | Extent of Readiness |
|--------------------------------|------|---------------------|
| Owns personal computer or laptop | 4.43 | Very Much Ready     |
| Have access to computers and printers in school | 4.05 | Very Much Ready     |
| Have access to printer and scanner at home         | 3.86 | Much Ready          |
| Have access to the internet at home                | 3.73 | Much Ready          |
| Have access to multimedia projectors in school     | 3.68 | Much Ready          |
| Have access to the internet in school and at home  | 2.70 | Ready               |
| **Average**                                      | **3.74** | **Much Ready**     |

As revealed in Table 2, science teacher respondents perceived themselves as Much Ready to integrate ICT in their teaching as they have equipment at school and home. They further revealed that they have a high level of ICT equipment readiness as they owned or with access to personal computers or laptops and printers at home and in school. However, the study contends that the internet in school and at home should be improved since improved ICT infrastructure and high-speed internet at home affect education technology, e-learning, and 21st-century pedagogy strategies and programs country. Any attempts to design, operate, and adopt ICT in schools will be thwarted by a poor Internet connection experienced in the Philippines [6].

3.3 The Competence of the Grade 10 learners on Basic Computer Applications

Table 4. The Basic Computer Application competence of Grade 10 Learners

| Basic Computer Application       | Mean | Level of Competence |
|----------------------------------|------|---------------------|
| Word Processing                  | 3.15 | Competent           |
| Spreadsheet application          | 2.99 | Competent           |
| PowerPoint Presentation          | 3.37 | Competent           |
| The Use of the Internet          | 3.03 | Competent           |
| **Average**                      | **3.14** | **Competent**     |

Table 4 shows the results of 133 item test given to the 245 Grade 10 students of the three selected public high schools in Ragay District. Shown below are the highest ten and lowest ten items per basic computer application tested in the study.

a. Word Processing

Arranged in descending manner according to their weighted mean were: Changing the font style, size and color, 3.88; Opening of office word application and other similar application, 3.72; Saving of document file, 3.70; Changing the background color, 3.59; Inserting symbols, 3.52; Inserting tables, shapes and graphs, 3.43; Using keyboard shortcuts, 3.43; Using spelling and grammar, 3.43; Viewing of word documents , 3.35; Redoing the spacing, 3.31; Inserting pictures from desktop or other folders, 3.30; Using and changing word art, 3.30; Putting borders and changing border style, 3.28; Changing or adjusting alignment, 3.25; Inserting tables, 3.23; Putting pictures in front and back of the
text, 3.23; Counting of words, 3.19; Printing of the document, 3.17; Inserting pictures from external device, 3.15; Changing paper size, 3.12; Bulleting information and changing bullet styles, 3.06; Setting columns, 3.01; Merging of tables, 3.0; Inserting hyperlinks, 2.99; Changing word documents themes, 2.99; Inserting videos, 2.95; Changing page orientation, 2.94; Formatting pictures, 2.92; Translating of words and finding its synonyms or antonyms, 2.92; Emailing the document, 2.92; Using comment and removing the comment box, 2.86; Formatting the pagination, 2.74; Intermixing page orientation, 2.7; Converting and saving document file to different format, 2.62; Using, putting and formatting watermark, 2.58; and Putting, changing and inserting bibliographies, 2.48. The first five indicators were rated as Much Competent, while the remaining thirty-one indicators were verbally rated as Competent.

b. Spreadsheet application
Arranged in descending manner according to their weighted mean were: Opening excel and other spreadsheet application, 3.41; Changing back color, 3.39; Can save excel file, 3.32; Putting borders and changing border style, 3.30; Inserting symbols, 3.21; Inserting picture pictures from external device, 3.19; Using spelling and grammar, 3.15; Inserting pictures from desktop or other folders, 3.14; Adding new sheet, 3.14; Inserting tables, 3.11; Inserting borders, 3.10; Inserting charts, 3.10; Changing paper size, 3.03; Inserting hyperlinks, 3.01; Changing paper orientation, 2.94; Renaming sheet, 2.93; Familiar and can use formula bar, 2.79; Can print excel file, 2.74; Changing sheet order, 2.73; Changing sheet view (standard view, page break view, page layout view), 2.68; Can sort record, 2.68; Formatting the pagination, 2.66; Can clear print area, 2.63; Can set print area, 2.58; Can use formula function (sum, count, hyperlink, max, min, average), 2.54; Can freeze portion of the sheet using freeze panes, 2.48; Arithmetic computation, 2.43. The first twenty-seven indicators were verbally rated as Competent, while the last two indicators were rated as Less Competent.

c. PowerPoint Presentation
Arranged in descending manner according to their weighted mean were: Changing of Font styles, colors and size, 3.97; Opening of PowerPoint application, 3.94; Adding new slide, 3.77; Customizing and changing background style, 3.75; Choosing layout, 3.72; Deleting slides, 3.64; Inserting table, shapes, symbols and graph, 3.57; Selecting theme format, 3.48; Starting slide show, 3.48; Saving the document or presentation, 3.46; Using keyboard shortcuts, 3.41; Setting up the slide show, 3.40; attaching pictures, audios and videos from external device, 3.35; attaching pictures, audios and videos from desktop and other folders , 3.33; Adding sound effects, 3.30; Using different transition effects, 3.29; Using spelling and grammar, 3.27; Using presentation views, 3.27; Inserting hyperlinks, and comments, 3.21; Inserting animation pane, 3.20; Using animation style , 3.17; Formatting pictures, 3.16; Lay outing different types of certificates, 3.16; Choosing effect option, 3.12; Setting timer, 3.06; Converting the document or presentation to different file format, 2.97; Adding duration and delay, 2.94; and printing of the document or presentation, 2.86. The first seven indicators were verbally rated as Much Competent, while the last twenty-one indicators were rated as Competent.

d. The Use of the Internet
Arranged in descending manner according to their weighted mean were: Full screen viewing, 3.86; Using refresh button, 3.63; Downloading images, 3.61; Connecting into Internet, 3.59; Viewing history, 3.53; Downloading videos, 3.52; Downloading music, 3.52; Adding new tab, 3.51; Viewing downloads, 3.38; Copying files or data, 3.29; Inputting Universal resource Location (URL), 3.20; Zooming window, 3.17; Closing search engine application, 3.17; Minimizing search engine application, 3.16; Pasting files / data, 3.14; Editing files / data, 3.12; Cutting files / data, 3.10; Accessing and changing settings, 3.06; Clearing browsing data, 3.03; Maximizing search engine application, 2.99; Finding and using help setting , 2.99; Adding site to favorites or bookmarked reading list, 2.97; Direct printing of accessed files, 2.97; Setting aside tab, 2.90; Adding Notes, 2.90; Viewing Site Information, 2.87; Using cookies in accessing previous browsing history, 2.86;
Bookmarking, 2.86; Viewing the set aside tab, 2.82; Going to Task Manager, 2.82; Reloading Page Search Engine Application, 2.79; Changing default browser, 2.67; Creating Account in Search Engine Application, 2.66; Installing Search Engine Application, 2.63; Extracting Search Engine Application, 2.63; Going to Developer Tools, 2.62; Pinning Page in the Start, 2.62; Opening Incognito Window, 2.60; Importing bookmarks and setting, 2.60; Pinning Page in the Task Bar, 2.54; and Searching the internet using Voice, 2.33. The first eight indicators were verbally rated as Much Competent, while the succeeding thirty-three indicators were rated as Competent, and the last one indicator was rated as Less Competent.

The Grade 10 students were purposively selected in the study since they are into their second year of specialization in their Technology and Livelihood Education (TLE) majorship gearing towards their Senior High School specialization in Technical and Vocational Education subjects. As revealed by the test given to the 245 Grade 10 students, they are within the ICT competence expected for them as Grade 10 students.

According to this report, the lack of ICT facilities, especially those that support multimedia applications, limits the level of ICT application in teaching, thereby affecting students' knowledge of various basic computer operations exposed to them by their schools. ICT resources at home and in schools frequently obstruct students' ability to use the computer and its basic operations required for their studies, particularly in word processing, spreadsheets, PowerPoint, and the internet. Thus, the access to ICTs, ICT services, utilities, and technical support in school as experienced by the public high school students is also critical [7], [8].

4. Conclusion

The selected public secondary schools in Ragay Sometimes Utilized various ICT Resources in teaching Science, and the Science teachers of those schools are Skillful in Information and Communications Technology and are Much Ready in Equipment Readiness in integrating ICT in school and at home; meanwhile, their Grade 10 students are Competent in the Basic Computer Applications particularly in the Word Processing, Spreadsheet application, PowerPoint Presentation and the Use of Internet.

Since the availability of ICT resources in schools and exposure to ICT resources affects teachers' and students' ICT competence, this study recommends that computers and the internet be made available to students and teachers in subjects other than ICT. Also, regular training of teachers, especially science teachers, in various computer applications and programs relevant to improve the competence of the students not just in Science but also in the Technology, Engineering, Mathematics, and other related fields can inspire the students to specialize in those areas in their Senior High School and their baccalaureate programs.

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