Information and Communication Technology (ICT) Skills and Level of Integration in Teaching Science

Mary Rose Gimao Encinares[1] and Noel Gaspi Benavides[2]

[1]Gubat National High School, Gubat, Sorsogon

[2]Sorsogon State University, Sorsogon City

***Abstract*—** This study aimed to determine the Information and Communication Technology (ICT) skills and level of integration of teachers in teaching Science in Gubat District for the School Year 2020-2021. It used the descriptive-survey method since questionnaire was devised for the gathering of the primary data as reflected in the problem. The respondents were the 48 secondary Science teachers from the national high schools in Gubat District. The statistical tools utilized were the frequency, percentage, weighted mean and Chi-square of association. The study revealed that majority of the Science teachers are 41 years old and above, female, and have 10 years and below experience. Also, most of them are Teacher I, with master's units, and attended the local ICT-related training. The Science teachers have very satisfactory ICT skills in productivity tools, video presentation, internet searching, and email management. However, they have satisfactory skills in other online learning tools. Similarly, the age, sex, length of service, position, educational attainment, and ICT-training attended are significantly associated with productivity tools, video presentation, and internet searching. However, sex and educational attainment have significant relationship with email management and other online learning platform. Likewise, the Science teachers often integrate the ICT skills in teaching Science. The In-Service Training program was proposed in order to enhance the ICT skills and level of integration in teaching Science.

***Keywords*—** ICT Integration, ICT Skills, Science Teaching, Profile and ICT Skills.

I. INTRODUCTION

Information and Communication Technology (ICT) has brought better access to information in the education sector over the years. It has enabled teachers and students to access a variety of academic resources. In addition, it enabled teachers to enhance their teaching techniques and improve the learning skills of students. Integrating ICT into education is indeed helpful for both teachers and students; nevertheless, instructors must have the necessary skills in ICT for it to be effective. As a result, training teachers in ICT use is critical since it will help them improve their ICT abilities.

The ICT integration in education is well-established in certain developed and developing nations. Since 1990, the developed countries (e.g., U.S. and Japan) have been researching Information Technology and launched a series of programs to integrate ICT and education (Donnelly, 2002; Gallali & Abase, 2004). Moreover, the Philippines' major ICT/education endeavor, the "school computerization" program, was supervised by the Department of Education (DepEd). It started in numerous places in 1996, but its implementation was inconsistent. This initiative was then enhanced and enlarged into the "DepEd Computerization Program/DepEd Internet Connectivity Program" (DCP/DICP). However, according to Vergel de Dios (2016), coordination of large-scale ICT/education initiatives by numerous groups alongside DepEd projects proved difficult, especially in the absence of a defined national vision and no relevant national standards to comply with. It was difficult to share information and expertise, coordinate public-private partnerships, and replicate and expand successful projects. The reason for this is that there is no clear and consistent responsibility for tracking individual projects, as well as related support from partners and key stakeholders. The ideal way for emerging countries to excel in the integration of ICT in education is to learn from the experiences of rich countries and build parallel policies with them.

The perspective of professionals and authorities on the significance of ICT is crucial in the quality of education (Troterr, 2004). Thus, the need to conduct this study is vital to provide information about teachers' ICT skills and level of integration in teaching Science. The study's findings would aid in establishing in-service training for teachers to enhance their ICT skills.

In light of this, the researcher conducted this study to determine the ICT skills and level of integration of Secondary teachers in teaching Science. The researcher covered the age, sex, length of service, position, highest educational attainment, and ICT-related training of Science teachers. This study also included the significant relationship between the profile of Science teachers and the level of ICT skills along with the identified variables. Furthermore, this study determined the level of integration of ICT in teaching Science along with the identified variables, and in-

service training for teachers was proposed based on the results.

II. METHODOLOGY

The study employed the descriptive-survey research design, unstructured interview was also used to gather teacher's experiences in utilizing ICT in teaching and for the validation of their responses. The respondents of this study included the 48 junior and senior high school science teachers of Gubat district, Gubat, Sorsogon. The results were analyzed and interpreted with the use of appropriate statistical tools such as frequency count, percentage, weighted mean, ranking and Chi-square test for association.

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1. Profile of the Respondents

This section covers the profile of the respondents in terms of age, sex, length of service, position, highest educational attainment, and ICT-related training. Frequency and percentage were utilized in the data analysis.

Table 2: *Profile of the Respondents*

Categories	Frequency	Percentage
Age (in years)		
25 and below	3	6
26 to 30	11	23
31 to 35	7	15
36 to 40	7	15
41 and above	20	41
Total	**48**	**100**
Sex		
Male	12	25
Female	36	75
Total	**48**	**100**
Length of Service (in yeas)		
5 and below	10	21
6 to 10	15	31
11 to 15	9	19
16 to 20	6	13
21 and above	8	16
Total	**48**	**100**
Position		
Teacher 1	24	50
Teacher 2	2	10
Teacher 3	17	35
Master Teacher 1	2	5
Total	**48**	**100**
Highest Educational Attainment		
Bachelor's degree	14	29
With master's unit	29	60
Master's degree	5	11
Total	**49**	**100**
ICT-related training		
Local	31	65
District	5	11
Provincial	3	6
Regional	7	15
International	2	3
Total	**48**	**100**

The data revealed that relative to age,3 or 6% of the teachers are 25 years old and below, 11 or 23% of them are 26 to 30 years old, and 7 or 15% of the teachers are 31 to 35 years old. Similarly, there are 7 or 15% of the teachers are 35 to 40 years old and 20 or 41% of them are 41 years old and above.

Relative to sex, there are 12 (25%) teachers who are male. Then, 36 (75%) of them are female. However, in terms of length of service, 10 or 21% of teachers have 5 years and below experience in teaching, 15 or 31% of teachers are in the service for 6 to 10 years, and 9 or 19% of teachers have 11 to 15 years stay in the school. Also, 6 or 13% of the teachers have 16 to 20 years of length of service and 8 or 16% of the teachers have spent 21 years or more in the school.

Moreover, there are 24 (50%) teachers having Teacher I as their position. Then, 29 (60%) teachers attained Teacher II and 17 (35%) teachers got Teacher III positions. Meanwhile, 5 (11%) teachers landed to Master Teacher I position.

In relation to the highest educational attainment, 14 or 29% of the teachers finished Bachelor's degree, 29 or 60% of them have master's units, and 5 or 11% of the teachers obtained master's degrees. Further, in terms of the ICT-related training attended, 31 (65%) teachers went to the local level training, 5 (11%) teachers had district-level training, and 3 (6%) teachers went to provincial level training. Also, 7 (15%) teachers witnessed the national level training and only 2 (3%) teachers enjoyed the international level training.

2. Level of ICT skills of the Science teachers

- Level of ICT Skills of teachers along productivity tools

Table 3A: *Level of ICT skills of teachers along productivity tools*

Indicators	WM	I
Demonstrate basic skills for using hardware and applications (e.g., start-up and shutdown the computer, open and close a file, start an application, and create a document	**4.56**	**O**
Save/backup and retrieve a file to/from local hard drive, portable disk/device, and/or online storage location.	**4.35**	**VS**
Select a printer and print a document with appropriate resolution and orientation (portrait or landscape)	**4.60**	**O**
Use basic editing and formatting features of a word processing program e.g., centering, spacing, fonts, enter text, edit, copy and paste, and insert graphics)	**4.58**	**O**
Identify and use a variety of storage media (e.g., CD/DVD, flash drive, network servers, online storage spaces). Explain why a particular medium is not or is not suited for a particular storage task.	**4.21**	**VS**
Recognize and work with a variety of different multimedia and document formats (e.g., jpg, HTML, mp3,pdf, doc, odt).	**3.58**	**VS**
Demonstrate intermediate word processing skils (e.g.., indents, headers, and footers, endnotes, bullets and numbering, tables, track changes, insert a comment.	**4.06**	**VS**
Customize formatting of charts or graphs created in a spreadsheet. Define and use built-in data functions of a spreadsheet such as sort, filter, find.	**3.81**	**VS**
Use multiple sheets within a spreadsheet and link cells together across sheets.	**3.60**	**VS**
Import/export and link data between spreadsheets, databases, and other applications, including presentation applications.	**3.60**	**VS**
Overall Weighted Mean	**4.09**	**VS**

The data revealed that generally, the level of ICT skills of teachers along productivity tools is very satisfactory with an overall weighted mean of 4.09. Specifically, the teachers have outstanding skills in selecting a printer and printing a document with appropriate resolution and orientation with the highest weighted mean of 4.60. Also, they are outstanding in using basic editing and formatting features of a word processing program and in demonstrating basic skills for using hardware and applications with a weighted mean of 4.58 and 4.56, respectively.

In addition, they are very satisfactory in identifying and using various media and saving/backup and retrieving a

file to/from local hard drive, portable disk/device, and/or online storage location with weighted means of 4.21 and 4.35, correspondingly. In the same manner, demonstrating intermediate word processing skills and customized formatting of charts or graphs created in the spreadsheet have weighted means of 4.06 and 3.81 respectively, which are interpreted as very satisfactory. Moreover, the use of multiple sheets within a spreadsheet and link cells together across sheets and Import/export and link data between spreadsheets, databases, and other applications, including presentation applications have the lowest mean of 3.60 which is described as very satisfactory.

Based on the results, it can be implied that the Science teachers' level of competency in using the productivity tools is very satisfactory. This indicates that Science teachers may be capable of using the productivity tools effectively.

- ***Level of ICT of teachers along video presentation***

Table 3B: *Level of ICT skills of teachers along video presentation*

Indicators	WM	I
Use camera for personal use	**4.35**	**VS**
Create a multimedia presentation that includes a design template, tables, imported audio and graphics.	**3.85**	**VS**
Design, create, modify, and manipulate an original database	**3.33**	**S**
Create a simple multimedia presentation and explain the terminology(e.g. slide, transition, build.)	**3.81**	**VS**
Use videos effectively, in the classroom to deliver content.	**3.98**	**VS**
Create video projects for example use video to document student progress, or give students a video camera and a video project assignment.	**3.46**	**S**
Overall Weighted Mean	**3.80**	**VS**

Based on the results of teachers' level of ICT skills along with video presentation, the teachers can use cameras for personal use very satisfactorily, which has the highest weighted mean of 4.85. Also, the teachers are very satisfactory in using the videos effectively in the classroom to deliver content with a weighted mean of 3.98. Similarly, they can create a multimedia presentation that includes a design template, tables, imported audio, and graphics, and a simple multimedia presentation and explain the terminology with weighted means of 3.85 and 3.81, respectively, which is interpreted as very satisfactory.

Moreover, the teachers are satisfactory in creating video projects for example using video to document student progress or giving students a video camera and a video project assignment with a weighted mean of 3.46 and in the design, create, modify and manipulate an original database with the lowest weighted mean of 3.33. Generally, the teachers have very satisfactory ICT skills along with video presentation with an overall weighted mean of 3.80. Designing, creating, modifying, and manipulating an original database and creating video projects to document students' progress or to give students a video project assignment has the lowest weighted mean.

The result of Science teachers' ICT skills along with video presentations is very satisfactory, which implies that the Science teachers have the necessary knowledge and skills in incorporating video presentations into Science teaching.

- ***Level of ICT of teachers along internet searching***

Table 3C: Level of ICT skills of teachers along internet searching

Indicators	WM	I
Access the web and identify the use navigation feature of an internet (e.g., "home," "back" "forward", hyperlinks, and multiple tabs).	**3.98**	**VS**
Add a website to favorite or bookmark it for future reference.	**3.48**	**S**
Perform basic searches (including multiple keywords) on digital and online databases (e.g., library card catalog, encyclopedia). Use available tools to refine and limit the results of search.	**3.75**	**VS**

Organize bookmarks or favorites into folders for future reference.	**3.54**	**VS**
Identify and use basic search strategies on the internet.	**3.83**	**VS**
Use the internet regularly for purposes such as research and communication.	**4.21**	**VS**
Utilize the internet as an instructional tool regularly, with students moving easily between websites and other sources of information.	**3.77**	**VS**
Evaluate the content of websites for reliability and appropriateness.	**3.67**	**VS**
Use an internet search engine to find web pages related to subject matter interest.	**3.85**	**VS**
Overall Weighted Mean.	**3.79**	**VS**

It can be inferred from the table that generally, the teachers have very satisfactory ICT skills relative to internet searching with an overall weighted mean of 3.79. In particular, they can use the internet regularly for purposes, such as research and communication with the highest weighted mean of 4.21. In addition, the teachers have very satisfactory skills in accessing the Web, identifying and using navigation features of the Internet, and using an internet search engine to find web pages related to subject matter interest with weighted means of 3.98 and 3.85, correspondingly. Similarly, they can identify and use basic search strategies on the Internet, utilize the internet as an instructional tool regularly, with students moving easily between websites and other sources of information with weighted means of 3.83 and 3.77, respectively, which are described as very satisfactory. Moreover, the Science teachers are satisfactory in adding a website to Favorites or Bookmark for future reference with the lowest weighted mean of 3.48. The result indicates that science teachers have adequate knowledge and skills in using the internet to access and share information related to science teaching.

- ***Level of ICT of teachers along e-mail management***

Table 3D: Level of ICT skills of teachers along e-mail management

Indicators	WM	I
Create and send a message using email. Retrieve and read the email. Reply to the sender and forward an email and attach a file. Save, print, and delete an email. Differentiate "reply: and "reply to all"	**3.67**	**VS**
Send an email attachment. Receive an attachment, open it, and save it to an appropriate location.	**4.25**	**VS**
Create an address book in an e-mail program.	**3.48**	**S**
Share links among users via a variety of technologies(e.g., mail, instant messaging, social networks, message boards.)	**3.73**	**VS**
Subscribe to a distribution list.	**3.27**	**S**
Create a nickname or an alias to send emails to several people at once.	**3.13**	**S**
Keep copies of outgoing messages sent to others.	**3.65**	**VS**
Overall Weighted Mean.	**3.60**	**VS**

From the table, it can be asserted that generally, the teachers have very satisfactory ICT skills in terms of email management with an overall weighted mean of 3.60. Specifically, they are very satisfactory in sending an email attachment, receiving an attachment, opening it, saving it to an appropriate location with the highest weighted mean of 4.25, and sharing links among users via a variety of technologies with the weighted mean of 3.73. Likewise, they are very satisfactory in creating and sending a message using email and keeping copies of outgoing messages sent to others with weighted means of 3.67 and 3.65, respectively. Moreover, the teachers have satisfactory skills in creating an address book in an e-mail program and Subscribing to a distribution list with weighted means of 3.48 and 3.27, correspondingly. Then, they are satisfactory in creating a nickname or an alias to send emails to several people at once with the lowest weighted mean of 3.13. The result of teachers' ICT skills along e-mail management is very satisfactory, which implies that the teachers know how to utilize e-mail in receiving and sending files.

- ***Level of ICT of teachers along other online learning platforms.***

Table 3E: *Level of ICT skills of teachers along other online learning platforms*

Indicators	WM	I
Locate and participate in appropriate technology professional development activities offered by the district, local college/university, or online provider	**3.63**	**VS**
Plan for the management of technology resources within the context of learning activities (e.g., schedule use of computer lab, wireless laptops, whiteboard)	**3.46**	**S**
Evaluate technology resources, including online resources for accuracy and suitability for your curriculum area and the students you teach.	**3.31**	**S**
Identify and discuss the technology proficiencies needed in the workplace, as well as strategies for acquiring these proficiencies.	**3.27**	**S**
Facilitate technology-enhanced lessons that address content standard and student technology literacy standards, while addressing a variety of learning styles.	**3.31**	**S**
Use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.	**3.42**	**S**
Identify and evaluate developing technologies as they relate to your subject area, grade level and student population.	**3.44**	**S**
Assess students learning using a variety of district, school or individual technology tools and strategies (e.g. the state data warehouse, progress spreadsheets, or commercial gradebook applications).	**3.25**	**S**
Overall Weighted Mean	**3.38**	**S**

It can be noticed from the data that the teachers have very satisfactory skills in locating and participating in appropriate technology professional development activities offered by the district, local college/university, or online provider with the highest weighted mean of 3.63. Moreover, they have satisfactory ICT skills in planning for the management of technology resources within the context of learning activities such as schedule use of computer laboratory and use of technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning with weighted means of 3.46 and 3.42 correspondingly.

In addition, the teachers have satisfactory skills in identifying and evaluating developing technologies as they relate to the subject area, grade level, and student population, evaluating technology resources, including online resources for accuracy and suitability for the curriculum area and the students being taught, facilitating technology-enhanced lessons that address the content standards and student technology literacy standards while addressing a variety of styles with weighted means of 3.44, and 3.31, respectively. Also, they have satisfactory skills in identifying and discussing the technology proficiencies needed in the workplace, as well as strategies for acquiring these proficiencies and assessing student learning using a variety of district, school, or individual technology tools and strategies with the lowest weighted mean of 3.27 and 3.25 respectively.

The results show that the respondents have satisfactory skills in integrating other online learning platforms into Science teaching. This implies that Science teachers may need more knowledge in incorporating other online learning platforms into Science teaching. Moreover, from the conducted unstructured interview, the respondents mentioned that there are barriers that hinder the teachers in utilizing the different online learning platforms in their teaching. The remote location of the school where internet reception is not available and the lack of gadgets that can be used by the students are the primary considerations why they hardly integrate online learning platforms in their teaching.

3. Relationship between the profile and the level of ICT skill of science teachers.

- Relationship between age and level of ICT skills of teachers

Table 4A: *Relationship between age and level of ICT skills of teachers*

Statistical Bases	Statistical Analyses				
	PT	VP	IS	EM	OOLP
Degrees of freedom	16	16	16	16	16
Level of significance	5%	5%	5%	5%	5%

χ2critical value	26.996	26.996	26.996	26.996	26.996
χ2computed value	28.342	32.948	31.109	22.563	13.209
Decision on Ho	reject	reject	reject	Do not reject	Do not reject
Conclusion	S	S	S	NS	NS

Legend: *PT-Productivity Tools; VP-Video Presentation; IS-Internet Searching; EM-Email Management; OOLP-Other Online Learning Platforms*

The data revealed that the χ^2 computed values of 28.342, 32.948, and 31.109 for productivity tools, video presentation, and internet searching, respectively, are greater than the χ^2 critical values of 26.996 at 0.05 level of significance with degrees of freedom of 16. Therefore, the null hypothesis is rejected which means that the three variables mentioned are significantly related to age. Based on the data, the majority of the respondents are 41 years old and above, implying that there are only a few young teachers who work in science education. Moreover, the table shows that there is a significant relationship between age and the Science teachers' level of ICT skills in terms of the first three variables. The result implies that the majority of the respondents, who are older instructors, may have acquired adequate knowledge on how to integrate ICT into their teaching methods due to their greater teaching experience than the young teachers who are still new to the teaching profession.

- ***Relationship between sex and level of ICT skills of teachers***

Table 4B: Relationship between sex and level of ICT skills of teachers.

Statistical Bases	**Statistical Analyses**				
	PT	VP	IS	EM	OOLP
Degrees of freedom	4	4	4	4	4
Level of significance	5%	5%	5%	5%	5%
χ2critical value	9.488	9.488	9.488	9.488	9.488
χ2computed value	12.201	15.385	16.799	12.844	10.221
Decision on Ho	reject	reject	reject	reject	reject
Conclusion	S	S	S	S	S

Legend: *PT-Productivity Tools; VP-Video Presentation; IS-Internet Searching; EM-Email Management; OOLP-Other Online Learning Platforms*

It can be shown from the table that χ^2 computed values of 12.201, 15.385, 16.799, 12.844, and 10.221 of productivity tools, video conference, internet searching, email management, and other online learning platforms, correspondingly, exceeds the χ^2 critical value of 9.488 at a 0.05 level of significance with degrees of freedom of 9. Thus, the rejection of the null hypothesis. This means that the mentioned variables are significantly associated with sex. The results indicate that male and female teachers may have different levels of ICT skills along with productivity tools, video presentation, email management, and other online learning platforms. This implies that male teachers may have a higher level of ICT skills than female teachers and vice versa.

- ***Relationship between length of service and level of ICT skills of teachers***

Table 4C: *Relationship between length of service and level of ICT skills of teachers*

Statistical bases	**Statistical Analyses**				
	PT	**VP**	**IS**	**EM**	**OOLP**
Degrees of freedom	16	16	16	16	16
Level of significance	5%	5%	5%	5%	5%
χ^2critical value	26.996	26.996	26.996	26.996	26.996
χ^2computed value	31.675	35.211	29.413	12.223	9.485
Decision on Ho	reject	reject	reject	Do not reject	Do not reject
Conclusion	S	S	S	NS	NS

Legend: *PT-Productivity Tools; VP-Video Presentation; IS-Internet Searching; EM-Email Management; OOLP-Other Online Learning Platforms*

From the table, it can be asserted that relative to productivity tools, video presentation, and internet searching, the χ^2 computed values of 31.675, 35.211, and 29.413, respectively, is greater than the χ^2 critical values of 26.996 at a 0.05 level of significance with degrees of freedom of 16. Thus, the hypothesis that is stated in the null form is rejected. This means that the teachers' length of service is significantly related to the mentioned variables. Based on the data, 31% of respondents have taught Science for 6 to 10 years. Moreover, the table shows that the length of service may have a significant impact on the level of ICT skills of Science teachers. This implies that the Science teachers who have been teaching for quite a long time may have a higher level of ICT skills than those who have only been teaching for a short time. Also, this indicates that the majority of respondents may have gained enough experience in teaching, and developed ICT skills in using productivity tools, video presentation, and the internet over the years.

Also, it can be observed from the table that relative to email management and other online learning platforms, the χ^2 computed values of 12.223 and 9.485, respectively, are smaller than the χ^2 critical values of 26.996 at a 0.05 level of significance with degrees of freedom of 16. Thus, the null hypothesis is not rejected. It means that there is no significant relationship between the length of service and email management and other online learning platforms. This would imply that the Science teachers' level of ICT skills in email management and other online learning platforms may not depend on their length of service.

- ***Relationship between position and level of ICT skills of teachers.***

Table 4D: *Relationship between position and level of ICT skills of teachers.*

Statistical bases	**Statistical Analyses**				
	PT	VP	IS	EM	OOLP
Degrees of freedom	12	12	12	12	12
Level of significance	5%	5%	5%	5%	5%
χ2critical value	21.064	21.064	21.064	21.064	21.064
χ2computed value	35.336	29.100	31.588	9.218	15.009
Decision on Ho	reject	reject	reject	Do not reject	Do not reject
Conclusion	S	S	S	NS	NS

Legend: *PT-Productivity Tools; VP-Video Presentation; IS-Internet Searching; EM-Email Management; OOLP-Other Online Learning Platforms*

The data shows that the χ^2 computed values of 35.336, 29.100, and 31.588 of productivity tools, video presentation, and internet searching are greater than the χ^2 critical value of 21.064 at a 0.05 level of significance with degrees of freedom of 12. Thus, the null hypothesis is rejected, which means that there is a significant relationship between the position acquired by the teachers and the variables mentioned. This implies that the position of the respondents may have a significant contribution to their level of ICT skills. On the other hand, e-email management and other online learning platforms are not significantly associated with the position because the χ^2 computed values of 9.218 and 15.009 are lower than the χ^2 critical values of 21.064 at a 0.05 level of significance with degrees of freedom of 12. Thus, the non-rejection of the null hypothesis. This implies that the respondents may have a higher or lower level of ICT skills, regardless of their position title.

- ***Relationship between educational attainment and level of ICT skills of teachers***

Table 4E: *Relationship between educational attainment and level of ICT skills of teachers*

Statistical Bases	**Statistical Analyses**				
	PT	VP	IS	EM	OOLP
Degrees of freedom	8	8	8	8	8
Level of significance	5%	5%	5%	5%	5%
χ2critical value	15.507	15.507	15.507	15.507	15.507
χ2computed value	25.55`1	23.322	19.583	21.342	34.871
Decision on Ho	reject	reject	reject	reject	reject
Conclusion	S	S	S	S	S

Legend: *PT-Productivity Tools; VP-Video Presentation; IS-Internet Searching; EM-Email Management; OOLP-Other Online Learning Platforms*

The data revealed that the χ^2 computed values of 25.551, 23.322, 19.583, 23.342, and 34.871 of productivity tools, video presentation, internet searching, email management, and other online learning platforms, correspondingly, exceeds the χ^2 critical value of 15.507 at 0.05 level of significance with degrees of freedom of 8. Thus, the null hypothesis of the study is rejected. It means that there is a significant relationship between educational attainment and ICT skills along the five variables mentioned above. This would imply that the respondents' educational attainment may have an impact on their level of ICT skills. Moreover, it may be implied that the respondents with a Master's degree are most likely to have a higher level of ICT skills than those with a Bachelor's degree.

- ***Relationship between ICT-related training attended and level of ICT skills of teachers***

Table 4F*: Relationship between ICT-related training attended and level of ICT skills of teachers.*

Statistical Bases	Statistical Analyses				
	PT	**VP**	**IS**	**EM**	**OOLP**
Degrees of freedom	16	16	16	26	16
Level of significance	5%	5%	5%	5%	5%
$\chi^2_{\text{critical value}}$	26.996	26.996	26.996	26.996	26.996
$\chi^2_{\text{computed value}}$	29.172	36.477	41.253	23.118	12.926
Decision on Ho	reject	reject	reject	Do not reject	Do not reject
Conclusion	S	S	S	NS	NS

Legend: *PT-Productivity Tools; VP-Video Presentation; IS-Internet Searching; EM-Email Management; OOLP-Other Online Learning Platforms*

It can be inferred from the data that there is a significant relationship between ICT-related training attended and productivity tools, video presentation, and internet searching. This conclusion is based on the χ^2 computed values of 29.172, 36.477, and 41.253, respectively, exceeding the χ^2 critical values of 26.996 at a 0.05 level of significance with degrees of freedom of 16. Hence, the null hypothesis is rejected, which means that there is a significant difference between the ICT-related training attended and productivity tools, video presentation, and internet searching. This implies that the ICT-related training may have a huge contribution to the level of ICT skills of the respondents. The respondents who have attended ICT-related training may have a higher level of ICT skills in using productivity tools, video presentation, and the internet in Science teaching.

On the other hand, the χ^2 computed values of 23.188 and 12.926 of email management and other online learning platforms, correspondingly, are less than the χ^2 critical value of 26.996 at 0.05 level of significance with degrees of freedom of 16. Therefore, the non-rejection of the null hypothesis means that there is no significant relationship between ICT-related training attended and the variables mentioned. This implies that Science teachers' level of ICT skills in email management and other online learning platforms is not based on whether they attended ICT-related training or not.

4. Level of Integration in Teaching Science

Table 5: Level of Integration of ICT in teaching science

Indicators	WM	I
I use ICT to prepare lesson and reports	3.48	Often
I use ICT internet to search teaching material	3.56	Frequently
I use ICT to communicate with students and parents	3.40	Often
I use ICT especially computer and its application	3.50	Frequently
I use ICT to monitor and evaluate children progress or performance	3.15	Often
I use ICT to make presentation slides/delivery	3.29	Often
I use ICT to provide and prepare online work or assignment	2.92	Often
I use ICT to locate quality software programs , websites to supplement the curriculum and reinforce specific content standards.	2.90	Often

I use ICT to assign web-based projects to students as a means of emphasizing specific complex thinking skill strategies aligned to the content standards.	2.65	Often
I use the classroom technology resources to locate lesson plans I can use in class that are appropriate to my grade level and are aligned to ur content standards.	2.94	Often
Overall weighted Mean	**318**	**Often**

It can be asserted from the table that generally the teachers often integrate the ICT in the teaching of Science with an overall weighted mean of 3.18. Explicitly, they frequently used the internet to search teaching material with the highest weighted mean of 3.56 and the computer and its applications with a weighted mean of 3.50. On the other hand, the teachers often use ICT to prepare lessons and reports and use ICT to communicate with students and parents with weighted means of 3.48 and 3.40, correspondingly. Also, use ICT to make presentation slides/ delivery and use ICT to monitor and evaluate children's progress or performance with weighted means of 3.29 and 3.15, respectively. However, the use of ICT to assign web-based projects to students as a means of emphasizing specific complex thinking skill strategies aligned to the content standards has the lowest weighted mean of 2.65 that is interpreted as often.

The results showed that Science teachers often use ICT as it plays a significant role not only in teaching Science but as a teacher in general. As mentioned by the science teachers, this is evident from the task that the teachers need to accomplish such as preparing lesson logs and monthly reports, staying connected with students thru different online communication platforms, online housekeeping of students records on Learners' Information System (LIS), encoding and computing of grades, preparation of different school forms, preparation of multimedia instructional materials, and conducting of google and zoom classes. This implies that the teachers have good knowledge of productivity tools, internet searching, video presentation, email management, and other online learning platforms.

5. Proposed In-Service Training for Enhancing Information and Communication Technology (ICT) Skills.

- Rationale

Information and Communication Technology (ICT) has become integral to the teaching-learning interaction. When ICT is integrated into lessons, students become more engaged in their work. This is because technology provides different opportunities to make it more fun and enjoyable in terms of teaching the same things in different ways. It is also is used to communicate, disseminate, store and manage information.

The result of the study conducted showed that Science teachers have satisfactory ICT skills in creating video projects (using video to document student progress) and in designing, creating, and modifying an original database along with video presentation. Adding a website to favorites or bookmark along with internet searching. Creating an address book in an e-mail program, subscribing to a distribution list, and creating an alias to send email to several people all at once along with e-mail management. Planning for the management of technology resources within the context of learning activities, evaluating technology resources, including online resources for accuracy, using technology to collect and analyze data, interpret results, and communicate findings to improve instructional practice and facilitating technology-enhanced lessons that address content standards and student technology literacy standards along with other online learning platforms. Specific professional development opportunities are needed for teachers to improve their abilities to use ICT for formative learning evaluations, accessing online resources, and facilitating student interaction and cooperation.

It is in this context that this proposed in-service training for Science teachers is designed to respond to the need of the Science teachers in enhancing their ICT skills. This training should positively impact teachers' attitudes towards ICT in the classroom.

General Objectives

To provide an opportunity for teachers to enhance their ICT skills.

Specific Objectives

1. To enhance the ICT skills of science teachers along with video presentations, internet searching, email management, and other online learning platforms.
2. To create a video lesson using different video applications.
3. To construct an assessment test using a zip grade application.

CONCLUSION

Based on the findings of the study, the researcher arrived at the following conclusions:

1. Majority of the Science teachers are 41 years old and above, female, and have 10 years and below experience. Also, most of them are Teacher I, with master's units, and attended the local ICT-related training.
2. The Science teachers have very satisfactory ICT skills in productivity tools, video presentation, internet searching, and email management. However, they have satisfactory skills in other online learning tools.
3. The age, sex, length of service, position, educational attainment, and ICT-training attended are significantly associated with productivity tools, video presentation, and internet searching. However, sex and educational attainment have significant relationship with email management and other online learning platform.
4. The Science teachers often integrate the ICT skills in teaching Science.
5. The In-Service Training program was proposed in order to enhance the ICT skills and level of integration in teaching Science.

RECOMMENDATIONS

In the light of foregoing conclusions, the following recommendations were offered:

1. The Science teachers may attend seminars and training on the application of technology in order to remain confident in their knowledge on it.
2. The school heads may provide LAC sessions for teachers so as to improve their skills on a regular basis and stay up to date through continuing professional development.
3. The teachers may be equipped with skills and knowledge in the use of technology in instructional design and delivery in order to learn all the necessary skills. Positive attitude to encourage individuals to use ICT effectively and improve the skills required.
4. The school heads may send teachers to ICT-related training and workshop which may further enhance their level of integration especially in Science.
5. The proposed In-Service training may be submitted to the Division Office for review and evaluation by concerned authorities prior to its implementation.
6. Further study may be conducted that may consider wider coverage and the inclusion of other areas in ICT such as the integration of drawing and graphics program in teaching in different subject areas.

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