



Research Article

Assessing the Effectiveness of Online Information and Communication Technology Instruction for Grade 9 Students in a Private School in Manila, Philippines

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Article Information

Article ID Number

202306059

Article History

Received	26	Aug	2023
Reviewed	16	Sep	2023
Revised	30	Sep	2023
Accepted	21	Oct	2023
Published	04	Nov	2023

Gunning Fog Index: 15.09

Similarity Index: < 20%

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Quick Response Code



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Abstract

The COVID-19 pandemic drastically altered educational practices in the Philippines, compelling a shift from traditional face-to-face instruction to online learning. This transition posed significant challenges for teachers, students, administrators, and other stakeholders as they adapted to the new normal. Since the first reported case of COVID-19 on January 21, 2020, the country has experienced months of lockdowns and strict health protocols, affecting various sectors including education. Subjects traditionally taught in physical classrooms, such as Math, Science, Filipino, and ICT (Information and Communication Technology), faced particular difficulties in this online environment. This study focuses on the effectiveness of teaching ICT, specifically the topic of Cascading Style Sheets (CSS), in an online format. ICT is typically taught in computer laboratories where teachers can demonstrate processes in real-time, a practice that is challenging to replicate online. CSS, which involves designing websites using HTML and CSS codes, requires a structured, step-by-step approach that is difficult to convey without direct, hands-on guidance. This research aims to evaluate whether online instruction can effectively replace traditional methods in teaching ICT, despite the inherent challenges. The findings will contribute to understanding the efficacy of online education in maintaining the quality of instruction for complex, skills-based subjects during the pandemic.

Keywords

cascading style sheet, face-to-face set-up, ICT, online set-up, pandemic

DOI 10.5281/zenodo.13146947

URL: <https://actonlineedu.org/ijaapr-v2i2-202306059>



Published by

Academic Course Tutorial Online Education Inc., Philippines

Philippine SEC Registration No. 2022090068590-16 Website: <https://actonlineedu.org/>



INTRODUCTION

Background of the Study

The COVID-19 pandemic has dramatically transformed educational practices worldwide, compelling a swift shift from traditional face-to-face teaching to online learning environments. In the Philippines, this transition has been particularly challenging, impacting various aspects of the educational landscape. This study examines the effectiveness of online instruction for Information and Communication Technology (ICT), specifically focusing on Grade 9 students in a private school in Manila and the teaching of Cascading Style Sheets (CSS).

The pandemic, which began in early 2020, caused widespread disruptions across multiple sectors, with education being significantly affected. UNESCO (2020) reported that over 1.5 billion students globally faced school closures, necessitating a rapid adoption of online learning solutions. In response, the Department of Education (DepEd) in the Philippines shifted from traditional classroom settings to online platforms to adhere to health protocols and curb virus transmission (Asio & Bayucca, 2021). This sudden transition fundamentally altered teaching and learning dynamics (Mamolo & Sugano, 2023). The shift to online education posed considerable challenges for Philippine schools, including inadequate infrastructure, limited digital literacy among educators and students, and socio-economic disparities that affected access to technology (Bolton et al., 2024). ICT subjects, which traditionally rely on physical classroom settings for practical demonstrations, faced particular difficulties. This study aims to evaluate the effectiveness of online ICT instruction, with a specific focus on CSS, a subject that requires hands-on, interactive learning approaches.

CSS, essential for web design and development, involves complex coding and problem-solving skills (Davenport et al., 2020). Teaching CSS online presents unique challenges, as it typically benefits from direct, real-time feedback and practical exercises (Driscoll et al., 2012). The transition to online instruction has necessitated a rethinking of pedagogical strategies to deliver these skills effectively in a virtual environment (Tsai et al., 2021). This research will provide insights into the challenges and potential solutions for teaching complex ICT subjects like CSS online, contributing to the improvement of online education practices.

Significance of the Research

The aim of this research is to evaluate the effectiveness of teaching Information and Communication Technology (ICT) in an online setup during the new normal. By assessing the current methods and outcomes, this study will provide valuable insights for researchers, educators, and administrators, helping them identify areas for improvement and enhance the quality of ICT instruction in virtual environments.

Literature Review

Education is fundamental in shaping societal development by empowering various facets of a nation. The quality of education significantly influences this development, with diverse teaching and learning methods employed to enhance educational outcomes. Information and Communication Technology (ICT) has become central to modern educational practices, facilitating the integration of technology into learning processes (Desai et al., 2023). ICT encompasses a range of tools and techniques that support and enhance educational activities, promoting computer literacy and digital skills (Coates, 2006).

The integration of ICT has revolutionized both professional environments and educational systems, transforming how knowledge is delivered and accessed (McDougall et al., 2010). However, the COVID-19 pandemic has exacerbated existing challenges, triggering not only a health crisis but also an educational upheaval in the Philippines. The pandemic has intensified mental health concerns among students and educators while disrupting traditional educational practices (Toquero, 2020). According to a 2021 survey by Statista Research Department, 30% of Filipino respondents rated online learning as only 20 to 50 percent effective, reflecting widespread concerns about its efficacy.

Research highlights both challenges and opportunities in online education. Zhao et al. (2005) emphasize the need for interactive and engaging content to sustain student interest in virtual learning environments. They point out that while online platforms offer flexibility, maintaining engagement requires careful consideration of instructional design. Laurillard (2013) supports this by arguing that effective online teaching necessitates a redesign of traditional pedagogical approaches to address the limitations inherent in virtual learning settings.

In the realm of ICT education, Bainbridge and Wark (2022) find that online learning can be successful if it incorporates interactive elements and practical applications. However, they also note that subjects such as Cascading Style Sheets (CSS), which typically benefit from hands-on, real-time instruction, face significant challenges when taught online. This highlights the need for innovative approaches to effectively teach complex ICT subjects in a virtual format.

Statement of the Problem

This research aims to evaluate the effectiveness of teaching ICT in an online setup, seeking to understand its impact and identify areas for improvement in this new educational landscape.

1. Is online instruction an effective method for teaching ICT?
2. How has the new normal impacted the learning outcomes for ICT subjects?

METHODS

Research Design

This study is a classroom-based action research project aimed at evaluating the effectiveness of online ICT instruction, specifically focusing on teaching Cascading Style Sheets (CSS) to Grade 9 students at Espiritu Santo Parochial School. The research adopts a quantitative approach to collect and analyze data, utilizing survey methods to gather students' perceptions and learning outcomes related to online instruction.

Sample and Sampling Technique

The sample consists of 57 Grade 9 students selected through stratified sampling. This technique ensures that the sample is representative of the broader student population, taking into account factors such as academic performance, digital literacy, and access to technology. The stratified sampling approach allows for a more nuanced understanding of how different student subgroups experience online ICT instruction.

Research Instrument

Data will be collected using a survey questionnaire distributed through Google Forms. The questionnaire is composed of closed-ended questions designed to assess various dimensions of the online learning experience. These include the students' level of understanding of ICT concepts, particularly CSS, their engagement and satisfaction with online classes, and any challenges they face in this learning modality. The survey items are structured to capture the effectiveness of online teaching methods, the clarity of instructional materials, and the adequacy of support provided during online learning.

Data Analysis

The data collected from the survey will be analyzed using descriptive statistics. Frequencies, percentages, and mean scores will be calculated to summarize the responses. This statistical analysis will provide insights into the general trends and patterns in students' understanding, satisfaction, and experiences with online ICT instruction. The results will be used to assess the overall effectiveness of the online teaching methods employed and to identify areas that may require improvement.

Data Gathering Procedure

The survey questionnaire will be administered to the selected sample of students via Google Forms. The data gathering process will be conducted within a specified timeframe to ensure timely collection and analysis. Students will be given clear instructions on how to complete the survey, and reminders will be sent to encourage participation. The collected data will be automatically compiled and stored securely in digital format, ready for analysis.

Ethical Considerations

Ethical considerations are integral to this study. Informed consent will be obtained from all participants before they complete the survey. Participants will be fully informed about the purpose of the research, the nature of their involvement, and their right to withdraw at any time without penalty. The confidentiality of the participants' responses will be strictly maintained, with all data anonymized to protect their identities. Additionally, ethical approval for the study will be sought from the school administration prior to data collection, ensuring that the research adheres to ethical guidelines and standards.

RESULTS AND DISCUSSION

Results

Table 1
Distribution of Students' Understanding of Cascading Style Sheets

Level of Understanding	No. of Respondents	Percentage
Well Understood	36	63.20 %
Somewhat Understood	18	31.60 %
Lightly Understood	3	5.30 %
Not at All	0	0.00 %

Table 1 presents the distribution of students' understanding of Cascading Style Sheets (CSS) among 57 respondents. The data reveals that a majority of the students, 63.2%, have a strong grasp of CSS, indicating a solid understanding of the topic. A substantial portion, 31.6%, has a somewhat adequate understanding of CSS. Only 5.3% of the students have a minimal understanding, while none of the respondents reported having no understanding of CSS. This distribution suggests that the online instruction has been relatively effective in conveying the fundamentals of CSS, with most students achieving a good or adequate level of comprehension.

Table 2
Students' Understanding of Adding Images in CSS

Level of Understanding	No. of Respondents	Percentage
Well Understood	38	66.70 %
Somewhat Understood	15	26.30 %
Lightly Understood	4	7.00 %
Not at All	0	0.00 %

Table 2 illustrates the students' understanding of adding images in CSS among 57 respondents. The data indicates that a significant majority of students, 66.7%, have a strong understanding of how to add images using CSS, demonstrating a high level of proficiency in this area. Additionally, 26.3% of students have a somewhat adequate grasp of the topic. A smaller proportion, 7.0%, have only a minimal understanding, while none of the respondents reported having no understanding of the concept. This distribution suggests that the instruction on adding images in CSS has been largely effective, with most students demonstrating a solid or adequate comprehension of the topic.

Table 3
Students' Understanding of Adding Rows and Columns in CSS

Level of Understanding	No. of Respondents	Percentage
Well Understood	35	61.4%
Somewhat Understood	17	29.8%
Lightly Understood	5	8.8%
Not at All	0	0%

Table 3 illustrates the students' understanding of adding rows and columns in CSS, based on responses from 57 participants. The data shows that 61.4% of students have a thorough understanding of adding rows and columns in CSS, indicating a high level of competency in this area. Additionally, 29.8% of students have a somewhat adequate grasp of the concept. A small proportion, 8.8%, have only a basic understanding, while no students reported a complete lack of understanding. This distribution suggests that the instruction on rows and columns in CSS has been largely effective, with most students achieving a solid or adequate level of comprehension.

Table 4
Students' Understanding of Creating Biodata

Level of Understanding	No. of Respondents	Percentage
Well Understood	28	49.1%
Somewhat Understood	15	26.3%
Lightly Understood	13	22.8%
Not at All	1	1.8%

Table 4 displays the students' understanding of creating biodata, as reported by 57 respondents. The data indicates that nearly half of the students, 49.1%, have a comprehensive understanding of creating biodata, reflecting a solid grasp of the subject. A quarter of the students, 26.3%, have a somewhat adequate understanding, while 22.8% possess only a basic understanding. A small minority, 1.8%, reported having no understanding at all. This distribution suggests that while most students have a reasonable or strong comprehension of creating biodata, there remains a need to address the gaps in understanding among the smaller percentage of students.

Table 5
Students' Understanding of Adding Fonts and Font Styles in CSS

Level of Understanding	No. of Respondents	Percentage
Well Understood	45	78.9%
Somewhat Understood	11	19.3%
Lightly Understood	1	1.8%
Not at All	0	0%

Table 5 illustrates the students' understanding of adding fonts and font styles in CSS, based on responses from 57 participants. The data reveals that a substantial majority of students, 78.9%, have a strong understanding of adding fonts and font styles in CSS, demonstrating high proficiency in this area. Additionally, 19.3% of students have a somewhat adequate grasp of the topic. Only 1.8% have a minimal understanding, and no students reported a complete lack of understanding. This distribution suggests that the instruction on fonts and font styles in CSS has been highly effective, with most students showing a thorough or adequate comprehension of the material.

Table 6
Students' Understanding of ICT During Face-to-face

Level of Understanding	No. of Respondents	Percentage
Well Understood	35	61.4%
Somewhat Understood	16	28.1%
Lightly Understood	6	10.5%
Not at All	0	0%

Table 6 presents the students' understanding of ICT during face-to-face classes, based on responses from 57 participants. The data indicates that a majority of students, 61.4%, had a strong understanding of ICT during face-to-face classes, reflecting a solid grasp of the subject. Nearly 28.1% of students had a somewhat adequate understanding, while 10.5% had only a minimal grasp of the material. None of the students reported having no understanding at all. This suggests that the face-to-face instruction was generally effective in conveying ICT concepts, with most students achieving a good or adequate level of comprehension.

Table 7
Students' Understanding of ICT During Online classes

Level of Understanding	No. of Respondents	Percentage
Well Understood	40	70.2%
Somewhat Understood	15	26.3%
Lightly Understood	1	1.8%
Not at All	1	1.8%

Table 7 displays the students' understanding of ICT during online classes, based on responses from 57 participants. The data shows that 70.2% of students reported a strong understanding of ICT during online classes, indicating a high level of proficiency with the subject matter. Additionally, 26.3% of students have a somewhat adequate understanding. A small proportion, 1.8%, reported only a minimal understanding, and another 1.8% reported having no understanding at all. This suggests that online instruction has been largely effective, with most students demonstrating a solid grasp of ICT concepts despite the challenges of remote learning.

Table 8
Students' Understanding of their Teacher During Face-to-face Classes

Level of Understanding	No. of Respondents	Percentage
Well Understood	38	66.7%
Somewhat Understood	15	26.3%
Lightly Understood	4	7.0%
Not at All	0	0%

Table 8 illustrates the students' understanding of their teacher during face-to-face classes, based on responses from 57 participants. The data indicates that 66.7% of students felt they had a strong understanding of their teacher during face-to-face classes, reflecting effective communication and clarity. An additional 26.3% reported a somewhat adequate understanding, suggesting that the majority of students had a good or moderate grasp of the instruction provided. Only 7.0% had a minimal understanding, and none reported having no understanding at all.

This distribution highlights that face-to-face teaching was generally successful in conveying the teacher's instructions and concepts, with most students achieving a solid or adequate level of comprehension.

Table 9
Students' Understanding of Their Teacher During Online Classes

Level of Understanding	No. of Respondents	Percentage
Well Understood	37	64.9%
Somewhat Understood	18	31.6%
Lightly Understood	2	3.5%
Not at All	0	0%

Table 9 displays the students' understanding of their teacher during online classes, based on responses from 57 participants. The data indicates that 64.9% of students felt they had a strong understanding of their teacher during online classes, suggesting that the online instruction was generally effective in conveying information. An additional 31.6% reported a somewhat adequate understanding, indicating that most students were able to grasp the material to a reasonable extent. Only 3.5% had a minimal understanding, and none reported having no understanding at all. This suggests that while online teaching was effective for the majority of students, there is still room for improvement in addressing the needs of those with less comprehension.

Table 10
Students' Willingness to Take Online Classes in ICT

Willingness of Respondents	No. of Respondents	Percentage
Yes	48	84.2%
No	9	15.8%

Table 10 presents the students' willingness to take online classes in ICT, based on responses from 57 participants. The data reveals that 84.2% of students are willing to take online classes in ICT, indicating a strong preference or positive attitude toward continuing with online learning formats for this subject. In contrast, 15.8% of students expressed reluctance or opposition to online ICT classes. This suggests that while the majority of students are open to or enthusiastic about online ICT instruction, a smaller portion remains hesitant, potentially highlighting areas where improvements or additional support may be needed to address concerns and enhance overall student acceptance.

Discussion

Effectiveness of Online Set-up in Teaching ICT

The results from the survey indicate that both online and face-to-face setups are perceived as effective for teaching ICT by the majority of respondents. Notably, 70.2% of students reported a strong understanding of ICT during online classes, slightly higher than the 61.4% who reported the same for face-to-face instruction. This suggests that the online format is not only a viable alternative but may offer certain advantages in terms of content delivery.

However, there are also a small percentage of students who struggled with both setups: 10.5% of students indicated they only lightly understood the material in face-to-face settings, while 1.8% reported minimal or no understanding in the online setup. The understanding of teacher instruction also followed a similar pattern, with 66.7% of respondents reporting a good understanding of their teacher during face-to-face classes and 64.9% during online sessions. This slight decrease in understanding in the online environment suggests that while online classes are effective for most students, there may still be challenges related to communication or engagement that need to be addressed.

Impact of the New Normal on Learning ICT

The survey results suggest that the transition to the "new normal" has not negatively impacted students' ability to learn ICT. A majority of respondents reported a good understanding of key ICT topics, with 63.2% of students indicating they well understood Cascading Style Sheets (CSS), the primary focus of the course. Subtopics such as adding images, adding rows and columns, adding fonts and font styles, and creating biodata were also well understood by most students, with percentages ranging from 49.1% to 78.9%. These findings indicate that despite the challenges posed by the new normal, students are still able to grasp complex ICT concepts effectively.

Additionally, the willingness of students to continue with online ICT classes is high, with 84.2% indicating they would be open to taking online ICT courses again. This suggests a positive reception to the online learning environment and highlights the potential for online education to play a sustained role in ICT instruction moving forward. The overall positive feedback regarding the online setup underscores its effectiveness and adaptability, even in the face of unprecedented disruptions to traditional educational models.

CONCLUSION AND RECOMMENDATION

Conclusion

The study found that the majority of Grade 9 students at Espiritu Santo Parochial School (ESPS) demonstrated a strong understanding of their ICT subject, regardless of whether the instruction was delivered online or through face-to-face classes. Additionally, students reported a high level of comprehension of their ICT teacher's instruction across both learning modalities, indicating that the mode of delivery did not significantly impact their ability to grasp the material. These findings suggest that online classes, part of the new normal educational setup, do not hinder students' understanding or learning of ICT. The effectiveness of online instruction in this context highlights its viability as an alternative or complementary method to traditional teaching.

Recommendation

To build on these positive outcomes, it is recommended that the school enhance its infrastructure to better support Hyflex Learning, a blended approach that accommodates both online and in-person students. Specifically, the school should upgrade classroom setups to facilitate seamless learning experiences in both formats.

Additionally, ICT laboratories should be equipped with Hyflex Learning tools to ensure that hands-on instruction is accessible to all students, regardless of their physical presence. Strengthening the school's internet connectivity is also crucial to support these new learning modalities, ensuring that online sessions are smooth and uninterrupted. By implementing these strategies, the school can further improve the effectiveness of its educational offerings and better meet the needs of all students and teachers.

IMPLICATIONS

This research highlights the adaptability and resilience of students and educators in the face of rapid changes to educational delivery methods, particularly during the COVID-19 pandemic. The findings suggest that online instruction can be as effective as traditional face-to-face teaching, even for complex and technical subjects like ICT. This has significant implications for the future of education, where blended and online learning modalities may become more prevalent, offering flexibility and accessibility to a broader range of students. Schools may consider investing more in digital infrastructure and teacher training for online pedagogy, recognizing that the effectiveness of online learning is not only feasible but can be optimized to match or even exceed traditional classroom instruction. This study also implies that with the right resources and support systems in place, the perceived barriers to online education, such as reduced interaction or engagement, can be mitigated, leading to successful learning outcomes across diverse modalities.

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Author(s)' Statements on Ethics and Conflict of Interest

Ethics Statement	The author/s hereby declare that research/publication ethics and citing principles have been considered in all the stages of the study. The author/s take full responsibility for the content of the paper in case of dispute.
Originality and Plagiarism Assessment	The manuscript has a similarity assessment of less than 20% in accordance with the publication ethics in terms of originality and plagiarism and the plagiarism policy of the journal.
Statement of Interest	The author/s have no conflict of interest to declare.
Funding	None

**Suggested Citation****American
Psychological
Association (APA)**

Chua Jr., J. R. & Tezano, J. V. (2023). Assessing the Effectiveness of Online Information and Communication Technology Instruction for Grade 9 Students in a Private School in Manila, Philippines. *International Journal of Academic and Practical Research*, 2(2), 31-37.

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