

## Effect of Undergraduate Students' Usage of WhatsApp Video/Instant Messaging in Post COVID - 19 Era for Learning and Improvement of Students' Practical Performance in Machine Technology in Technical Education

Nduononwi, Abidiak Abidiak, PhD<sup>1</sup>

Emehelu, Lucy Ogechukwu<sup>2</sup>

Favour-Basse Unwana Okon<sup>3</sup>

Department of Industrial Technology Education,  
Faculty of Vocational Technical Education, Library Science and Information,  
University of Uyo, Uyo,  
Akwa Ibom State.

### Abstract

*This Study was designed to investigate the effect of using WhatsApp video and instant messaging (WVIM) by undergraduate students for the learning and improvement of students' practical work performance in machine technology. Three specific objectives, three research questions and three corresponding null hypotheses were formulated to guide the study at 0.05 significant level. The population for the study was 27 undergraduate students offering machine technology in Technical Education Unit in the Department of Industrial Technology Education, Faculty of Vocational Education, Library and information science, University of Uyo, Uyo. There was no sample; the entire population was used as the sample size for the study. The study adopted pre-test - post-test control group design. Instructional video files, lesson plan, and teachers' made test tagged "machine technology achievement test (MTAT), for pre-test and post-test were the instrument developed, validated by three validators and used for data gathering. The statistical tools used were mean for answering research questions and independent t-test to test the null hypotheses raised in the study. Data analysis revealed that the performance of the experimental group supersedes that of the control group in the study. The study also revealed that being in a social media group help student to have new and instant information that could motivate students and ginger them to learn for improved performance in their practical work examinations. Based on the findings, it was recommended among others that WhatsApp video and instant massaging should be used in the teaching of workshop-based courses, especially technology and engineering courses in the university system, lecturers teaching technology and engineering courses should be trained and or retrained by the university management and the federal government in order to update their knowledge on the use of WhatsApp application in the teaching of technology and engineering courses in a post COVID – 19 era.*

**Key Words:** WhatsApp Video/Instant Messaging, Students' Achievement, Machine Technology

## Introduction

WhatsApp was founded in 2009 by Brian Acton and Jan Koum. The declared purpose of the developers was to replace the existing SMS platform for a system that is free of charge in an ad-free environment. As a means of sending and receiving messages to and from individuals or groups, WhatsApp includes a variety of functions, such as text messages, attached images, audio files, video files, and links to web addresses. WhatsApp video and instant messaging is a cross-platform application that allows iPhone, BlackBerry, Android, Windows Phone and Nokia smartphone users to exchange free text, image, video and audio messages. WhatsApp is popular with end users who do not have unlimited text messaging. WhatsApp instant messaging, apart from basic messaging, also provides group chat and location sharing options. Technically, WhatsApp is a Smartphone application that operates on nearly all current types of devices and operating systems. The application has been on the market since 2010.

In principle, WhatsApp video and instant messaging (WVIM) can be viewed as a social network that allows people to access a great deal of information rapidly. The simple operation system makes the programme accessible to a variety of people of different ages and backgrounds (Sayan, 2016). WhatsApp enables communication with anyone who possesses a Smartphone, has an active internet connection, and has installed the application. The overall cost of the application is very low. One of the application's unique features is the option to create a group and to communicate within its boundaries. The creator of the group becomes its manager, a position that includes the privilege of adding and removing participants without the need for approval from the group members (Sayan, 2016). Aside from this, all of the participants in the group enjoy equal rights. The application enables the participants to receive an alert for each message sent.

The theory of Connectivism acknowledges that learning is no longer an individual activity, but rather a process that allows for students to flourish in the digital era (Siemens, 2005). Digital communication between groups of students and between students and lecturers has become popular during the last decade through various channels: Email, SMS, Facebook groups, Twitter, and recently WhatsApp, etc. Each one of these media tools has different characteristics that influence its suitability for pedagogic purposes (Calvo, Arbiol & Iglesias, 2014). Pedagogic mobile tools (WhatsApp) have emerged and showed great potential to help students construct and share information and knowledge for learning through computers or mobile devices (Pence, 2007). Educational systems around the world are under increasing pressure to use the new information and communication technologies (ICTs) tools to teach students the knowledge and skills they needed in the 21st century. The influence of the above mentioned media on learning and teaching environments is growing more in the education sector. WhatsApp video and Instant Messaging Applications (WVIMA) can reinforce learning positively, influence discussions, and collaborative team work.

Some literature has reported the relevance of using ICT – based packages such WhatsApp for teaching and learning of science and workshop-based subjects/courses. Kim, J., Gilbert, Yu, & Gale (2021) reported that there are several advantages to using ICT-based devices in the teaching and learning processes. Some of these gains include availability and ease of use of the devices; stimulus and motivation from using the devices, connectivity, and so on. The ICT-based devices assist learners to take advantage of trending learning platforms and use them for developing new knowledge by performing activities that are related to their immediate interests and real-life scenarios in learning domains (Papadakis, Kalogiannakis, & Zaranis, 2021).

Terzić and Miljanović (2009) stated that the use of ICTs – based system such as WhatsApp for teaching and learning science and technology showed much more effective results compared with the traditional method in terms of quality, durability, and applicability of knowledge. Therefore, using WhatsApp, a digitalized media, affords students the opportunity the media presents, and this aids students' multiple sensory modalities, thereby motivating them to pay better attention to the contents presented. By using WhatsApp media as a learning/teaching medium, machining technology teachers and their students make use of a highly interactive teaching and learning tools which can motivate students into complex thinking and problem solving (McLaughlin & Arbeider, 2008).

The covid-19 pandemic locked out millions of teachers and students out of the classroom for months. At present, teaching and learning activities are still being done based on social distancing rules. In a world where ICT – based system such as WhatsApp has permeated almost every sphere of human lives, especially in the pedagogic setting, lockdown instituted by any infection/disease should not be an instance for alarm. This is because ICT - based packages for teaching and learning either in the physical classrooms or online are numerous. Hence, pandemics or natural disasters need not lockdown teachers and students at home as the application of ICTs – based systems could bridge the gap.

Similarly, the abstract nature of workshop-based courses, such as machining technology, can be eliminated through the use of relevant ICT – based contraptions/mechanisms, which include WhatsApp. This mechanism can assist students to learn at their own pace and their comfort at home and can also assist teachers in facilitating students online. Therefore, the difficulties teachers and students pass through, including the use of conventional/traditional teaching methods, shortage of time in the physical classroom, lack of instructional aids, the rear situation of drawings in the machining technology's curriculum and so on might be reduced drastically while leveraging on WhatsApp. Since students can now learn anywhere in the world from the comforts of their home and regardless of any pandemic resulting in a lockdown of schools, it becomes imperative to find out the effects of using WhatsApp video and instant messaging (WVIM) by undergraduate students

for the learning and improvement of students' practical work performance in machine technology in the post COVID – 19 era..

In the post COVID - 19 Pandemic Era, educators are experimenting with these technologies hoping to stimulate critical thinking skills, collaboration, and knowledge construction. The pedagogic system nowadays tries to develop new critical skills for the students not only to learn content but also offers teachers the ability to transform the quality of instruction—to achieve a more student-centered learning environment, have more differentiated instruction, and develop problem-based learning, and demand higher order thinking skills. Technology integration is affecting advanced lecture hall interactions especially in the post COVID -19 era. Teaching in all settings, particularly in the post COVID -19 era, should incorporate technology in connotation to student-centered approaches to learning. Tool for demonstration such as an electronic overhead projector, white or chalk-board should rather pave the way for the use of technology.

Students, through technology, should be made an integral part of instruction. In student-centred approaches to learning, students should become the source for problems solving. Students and lecturers must have opportunities to identify problems, collect and analyse the data, draw conclusions, and convey results using electronic tools such as WhatsApp technology to accomplish these tasks. Incorporating and or engaging WhatsApp video and instant messaging into the pedagogy for the teaching of technology and engineering courses can allow a diverse group of interested students and other individuals to engage in creating and developing content and to gather online to share knowledge, information, materials and opinions devoid of face – to face interaction in the post COVID – 19 era (Minshew & Anderson, 2015).

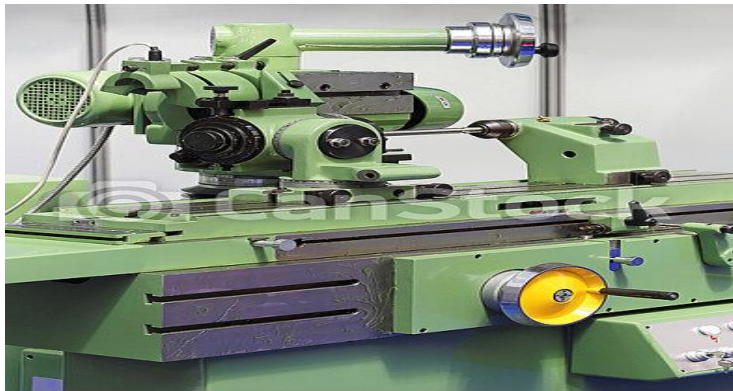
Machining technology is a process in which a material (often metal, plastics or glass) is cut to a desired final size and shape by controlled material-removal process. Machining technology is part of the manufacture of many metal products, but it can also be used on other materials such as wood, plastic, Ceramic, glass and composite material etc (Albert, 2011). When performing various machining operations in a lathe machine, the job is being supported and driven by any of the following methods:

- a. Job is held and driven by chuck with the other end supported on the tail stock centre;
- b. Job is held between centres and driven by carriers and catch plates;
- c. Job is held on a mandrel, which is supported between centres and driven by carriers and catch plates; and
- d. Job is held and driven by a chuck or a faceplate or an angle plate.

The above methods for holding the job can be classified under two headings: namely

- i. job held between centres; and
- ii. job held by a chuck or any other fixture.

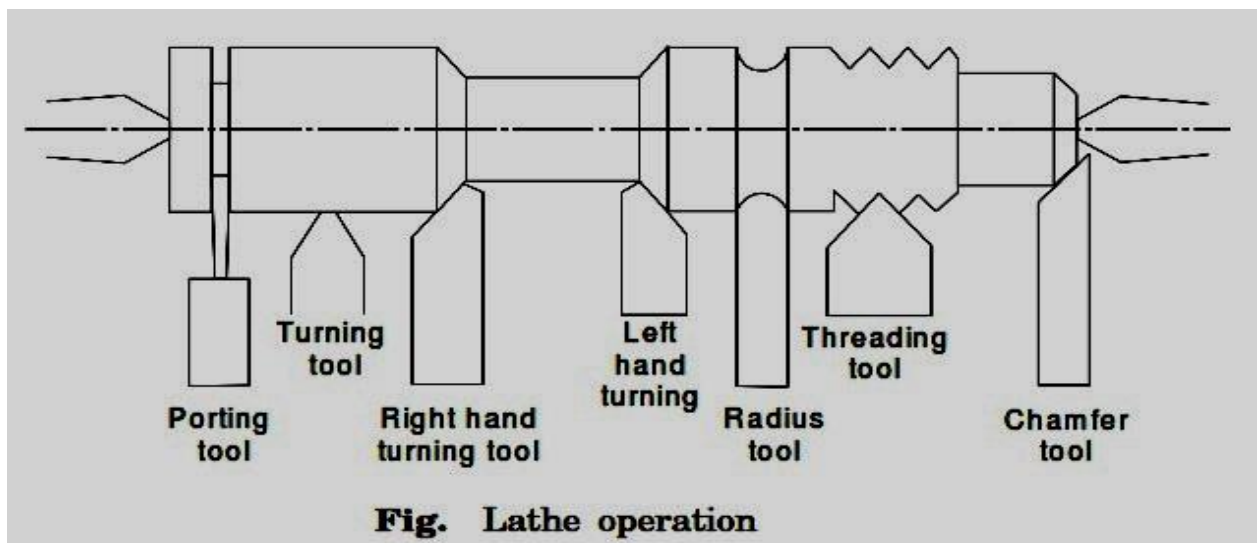
The various important lathe machine operations are represented through WhatsApp Video clips below. The operations performed in a lathe can be understood by three major categories.



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**Figure (a) WhatsApp Video Clip of lathe machine tool in metal production shop**

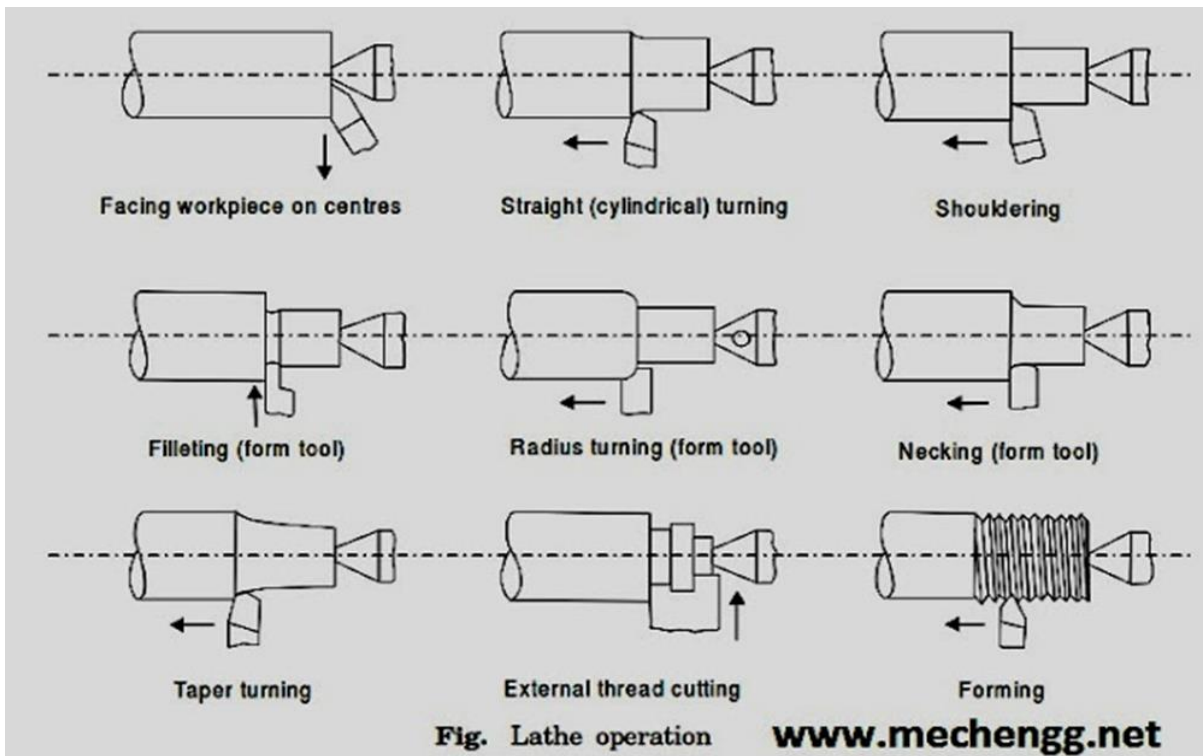
Machine operations, which can be performed in a lathe machine either by holding the workpiece between centres or by a chuck which are Straight turning; Shoulder turning; Taper turning; Chamfering; Eccentric turning; Thread cutting; Facing; Forming; Filing; Polishing; Grooving; Knurling; Spinning; and Spring winding. Below is WhatsApp Video clip (fig. b) for machine operations performed in a lathe either by holding the workpiece between centres/a chuck.



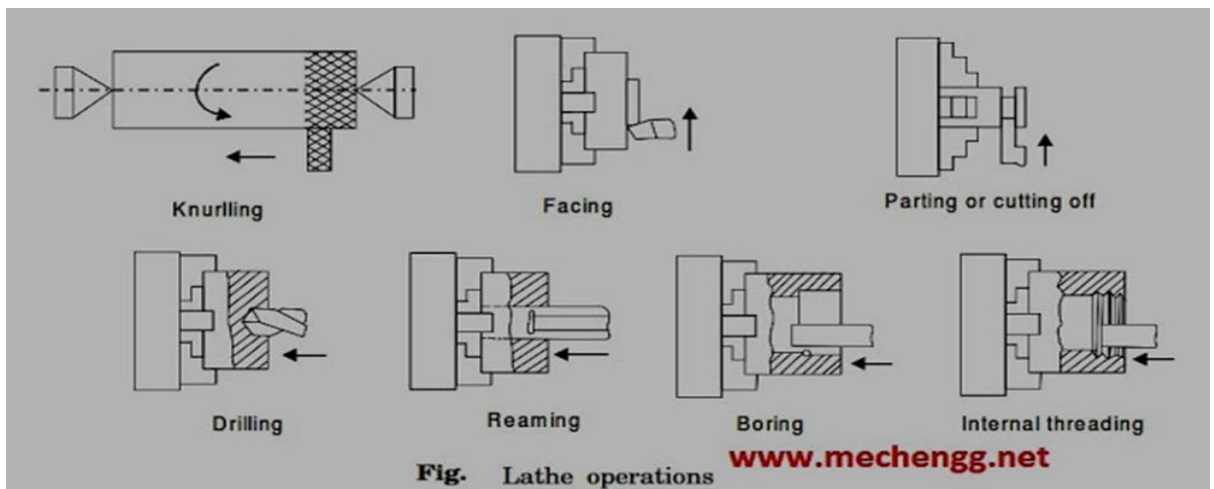
**Fig. Lathe operation**

**Figure (b). WhatsApp Video Clip of Machining (Lathe) Operation - Parting off tool, Turning tool, Threaded tool, Chamfering tool, Left hand turning, Right hand turning, radius tool.**





**Figure. (c) WhatsApp Video clip of machining operations** - Facing, Form turning, Radius Turning, Forming, Taper turning, radius turning, filletting, Necking, Shouldering, straight turning, and external thread cutting.



**Figure (d) WhatsApp video Clip: Machining operations with special lathe attachments** – knurling, Facing, Drilling, Reaming, Boring, parting or cutting off and internal threading.



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**Figure (e) WhatsApp Video Clip of the Image of the Lathe Machine**



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**Figure (f) WhatsApp Video Clip of a auto/metal student operating a lathe machine in a technical education workshop**

WhatsApp video/instant messaging (WVIM), as a relatively new tool in education, has similar positive characteristics as previous technological tools that were implemented in the pedagogical system, but it seems that WhatsApp has some up to date features that encourage lecturers and students to use it in order to enhance understanding in their professions (Bouhnik and Dshen, 2014).

However, the variables considered in this study include: broaching, shaping and tapping. *Broaching Operation:* a broach is a multitoothed machining device that is pushed to pull through a pilot hole in the work piece. Each tooth removes a little more material than the previous one, and the machining process is completed in one stroke. Hexagonal holes are being produced by a broaching operation. *Shaping Operation:* shaping operation involves forming, extrusion, rolling, forging, bending, stamping and drawing of complex shapes. In this study, forming is considered. Forming is a process in shaping operation, by which solid material is subjected to stresses great enough to cause a desired permanent deformation or flow of the material. *Tapping Operation:* in this operation, a tap is used to form threads in a hole whose diameter is in the thread root.

This research is conducted among undergraduate students offering machining technology courses in Technical Education unit in the Department of Industrial Technology Education, Faculty of Vocational Education, Library and Information Science. The study is also conducted to find a better way in this post COVID 19 era of imparting psychoproductive



skills to technological students as well as motivate them to study, learn and to perform better in their future examinations.

## Statement of the Problem

Undergraduate students from technical education unit of the department of industrial technology education, Faculty of Vocational Education, Library and Information Science, university of Uyo, are not doing well in their previous practical examinations in technology courses including machine technology. During practical work session in the post COVID - 19, these undergraduate technical students display abysmal performances in practical work in machine technology operations despite intensive lecturing. On the other hand, lecturers have not been frequent to the machining workshop due partly to the fear of contracting COVID – 19. Although lecture and practical work sessions takes place once a week, facial contact between lecturers and students have been a problem which may be due to fear of COVID. The questions to ask now are: what is responsible for students’ poor practical work performance in machine technology in the post COVID – 19 era? Could it be due to teaching method employed by technology lecturers? Could it be that students does not have someone to lead them in carrying out practical work due to COVID – 19 situation that make face – to – face appearance of lecturers a bit difficult? Can the use of WhatsApp video and instant messaging help students to interact with their lecturers in order to study and improve in their practical work performance in examination in the Post – COVID Era? There are no ready answers to the foregoing questions. Therefore, this study was designed to investigate the effects of using WhatsApp video and instant messaging (WVIM) by undergraduate students for the learning and improvement of students’ practical performance in machine technology in the post COVID – 19 era.

## Purpose of Study

The purpose of the study was to investigate the effects of using WhatsApp video and instant messaging (WVIM) by undergraduate students for the learning and improvement of students’ practical work performance in machine technology in the post COVID – 19 era. Specifically, the study sought to:

1. determine the effect of using WhatsApp Video/instant messaging on students’ performance in broaching operation.
2. determine the effect of using WhatsApp Video/instant messaging on students’ performance in shaping operation.
3. determine the effect of using WhatsApp Video/instant messaging on students’ performance in taping operation.

## Research Questions

This study is designed to provide answers to the following research questions.

1. What is the effect of using WhatsApp Video/Instant messaging on students’ performance in broaching operation?

2. What is the effect of using WhatsApp Video/instant messaging on students' performance in shaping operation?
3. What is the effect of using WhatsApp Video/instant messaging on students' performance in taping operation?

## Null Hypotheses

The following null hypotheses are formulated to guide the study and were tested at .05 alpha level.

1. There is no significant effect between the use of WhatsApp Video/instant messaging and students' performance in broaching operation.
2. There is no significant effect between the use of WhatsApp Video/instant messaging and students' performance in shaping operation.
3. There is no significant effect between the use of WhatsApp Video/instant messaging and students' performance in taping operation.

## Methodology

The study adopted pre-test - post-test control group design. The population for the study was 27 undergraduate students offering machine technology in Technical Education Unit in the Department of Industrial Technology Education, Faculty of Vocational Education, Library and information Science, University of Uyo, Uyo. There was no sample; the entire population was used as the sample size for the study. The undergraduate students offering machine technology were asked if they would like to study, learn and prepare for practical examination using WhatsApp Video & instant messaging (WVIM); of the entire population, 14 students declined to use WhatsApp and were assigned to control group while 13 undergraduate students who accepted to study, learn and prepare for their practical exams in machine technology by using WVIM were assigned to the experimental group respectively. While 14 undergraduate students in the control group were studying their lesson in traditional ways, the remaining 13 students (experimental group) were studying their lesson through WhatsApp; video clip; messaging text, sharing materials like information, drawings and pictures, asking questions and getting answers, as well as discussing on machine technology's course content by means of WhatsApp medium. A twenty item test developed by the researchers tagged "machine technology achievement test (MTAT) was used to obtain data for the study. The instrument was validated by three validators; two from Computer Education Unit in the Department of Industrial Technology Education, Faculty of Vocational Education, Library and information Science while one validates came from the Department of Curriculum Studies, Faculty of Education, all in the University of Uyo, Uyo. The reliability coefficient of the instrument was 0.82. The statistical tools used were mean statistic for answering research questions while independent t-test was used to test the null hypotheses raised in the study.

**Presentation of Results****Analysis of Research Questions**

The analysis of research question is as presented in Table 1 – 3 below.

**Research Question 1:** What is the effect of using WhatsApp video/instant messaging on students' performance in broaching operation in machine technology?

**Table 1:** mean score analysis of experimental and control groups on students' performance in broaching operation

Broaching Operation	N	Pre-Test	Post-Test	Mean Gain	Mean Gain Difference
Experimental Group	13	8.56	36.98	28.42	14.62
Control Group	14	11.87	25.67	13.8	

Data presented in Table 1 shows that for students in the experimental group using WhatsApp Video/instant messaging to learn, study and prepared for their practical exams in machine technology, their mean increases from 8.56 in pre-test to 36.98 in post-test. The mean gain is 28.42; for students in the control group using traditional ways to learn, study and prepared for their practical exams in machine technology, the mean increases from 11.87 in pre-test to 25.67 in post-test, giving mean gain of 13.8. The difference in mean gain for students in the experimental group exceeds the mean gain for students in the control group by 14.62. It is, therefore, inferred that the use of WhatsApp Video/instant messaging enhances students' performance in broaching operation in machine technology.

**Research Question 2:** What is the effect of using WhatsApp video/instant messaging on students' performance in shaping operation in machine technology?

**Table 2:** mean analysis of experimental and control groups on students' performance in shaping operation

Shaping Operation	N	Pre-Test	Post-Test	Mean Gain Score	Mean Gain Difference
Experimental Group	13	10.06	46.78	36.72	21.32
Control Group	14	13.92	29.32	15.4	

Data presented in Table 2 shows that for students who used WhatsApp video/instant messaging to study, learned and prepared for practical exams in machine technology, their mean increases from 10.06 in pre-test to 46.78 in post-test. The mean gain is 36.72; for students in the control group using traditional ways to learn, study and prepared for their practical exams in machine technology, the mean increases from 13.92 in pre-test to 29.32 in post-test, giving

mean gain of 15.4. The difference in mean gain for students in the experimental group exceeds the mean gain for students in the control group by 21.32. It is, therefore, inferred that the use of WhatsApp video/instant messaging enhances students' performance in shaping operation in machine technology.

**Research Question 3:** What is the effect of using WhatsApp video & instant messaging on students' performance in taping operation in machine technology?

**Table 3:** mean analysis of experimental and control groups on students' performance in taping operation

Taping Operation	N	Pre-Test	Post-Test	Mean Gain	Mean Gain Difference
Experimental Group	13	9.98	51.09	41.11	25.02
Control Group	14	11.03	27.12	16.09	

Data presented in Table 3 shows that for students who used WhatsApp video/instant messaging to study, learned and prepared for practical exams in machine technology, their mean increases from 9.98 in pre-test to 51.09 in post-test. The mean gain is 41.11; for students in the control group using traditional ways to learn, study and prepared for their exams, the mean increases from 11.03 in pre-test to 27.12 in post-test, giving mean gain of 16.09. The difference in mean gain for students in the experimental group exceeds the mean gain for students in the control group by 25.02. It is, therefore, inferred that the use of WhatsApp video/instant messaging enhances students' performance in taping operation in machine technology.

### Analysis of Null Hypotheses

The results of the test of null hypotheses are as presented in table 4 – 6 below.

#### Hypothesis 1

There is no significant effect between experimental and control groups on students' performance in broaching operation in machine technology.

**Table 4:** t-test analysis of experimental & control groups on students' performance in broaching operation

Variables	n	$\bar{X}$	df	t-value	t-critical	significance
Experimental Group	13	28.42	26	13.93	9.48	*
Control Group	14	29.72				



The result in table 4 shows that the t- value (13.93) is greater than the t-critical value (9.48) at .05 alpha level of significance. This shows that there is a significant effect in the use of WhatsApp instant messaging on students' performance in broaching operation in machine technology workshop.

**Null Hypothesis 2:** There is no significant effect between the use of WhatsApp Video/instant messaging and students' performance in shaping operation in machine technology workshops.

**Table 5:** t-test analysis on the effect of WhatsApp instant messaging on students' performance in shaping operation

Variables	n	X	df	t-value	t-critical	significance
Experimental Group	13	46.78	26	23.72	9.48	*
Control Group	14	13.8				

The result in Table 5 shows that the t- value (23.72) is greater than the t-critical value (9.48) at .05 alpha level of significance. This shows that there is a significant effect in the use of WhatsApp instant messaging on students' performance in shaping operation in machine technology workshop.

**Null Hypothesis 3:** There is no significant effect between the use of WhatsApp Video/instant messaging and students' performance in taping operation in machine technology workshops.

**Table 6:** t-test analysis on the effect of WhatsApp instant messaging on students' performance in taping operation

Variables	n	X	df	t-value	t-critical	significance
Experimental Group	13	51.09	26	19.83	9.48	*
Control Group	14	27.12				

The result in Table 4 shows that the t- value (19.83) is greater than the t-critical value (9.48) at .05 alpha level of significance. This shows that there is a significant effect in the use of WhatsApp instant messaging on students' performance in taping operation in machine technology workshop.

### Findings of the Study

Based on the data analysis, the findings of the study are as follows.

1. The use of WhatsApp video and instant messaging enhances students' performance in broaching operation in machine technology.

2. The use of WhatsApp video and instant messaging enhances students' performance in shaping operation in machine technology.
3. The use of WhatsApp video and instant messaging enhances students' performance in taping operation in machine technology.
4. There is a significant effect in the use of WhatsApp video and instant messaging on students' performance in broaching operation in machine technology.
5. There is a significant effect in the use of WhatsApp video and instant messaging on students' performance in shaping operation in machine technology.
6. There is a significant effect in the use of WhatsApp video and instant messaging on students' performance in taping operation in machine technology.

## Conclusion

Based on the data analysed and the findings of the study, it is concluded that WhatsApp video and instant messaging technology has positive effect on students' performance in machine technology in this post COVID -19 era and can also enhanced other technological and engineering courses in higher institutions.

## Educational Implications of the Study

The educational implication of these findings is that undergraduate students in technical education can acquire knowledge and psychoprodutive skills in machine technology courses and perform better in their examinations, if in this post-COVID 19 era, lecturers accept to utilize WhatsApp video and instant messaging technology in the teaching/learning situations and during practical.

## Recommendations

Based on the findings of the study and conclusion made, the following recommendations were made:

1. The faculty of education should as a way of changing strategy of teaching in the post – COVID 19 era, embrace the use of technology such as WhatsApp video and instant messaging as a medium of teaching of courses, especially technology and engineering courses.
2. Lecturers should be train and or re-trained in the use of WhatsApp as a teaching medium.

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