

## INTERNET SIGNAL CONSTRAINTS FOR COLLEGE STUDENTS IN ONLINE LEARNING DURING THE COVID-19 PERIOD

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### A. Introduction

#### Institut Teknologi Adhi Tama Surabaya

Institut Teknologi Adhi Tama Surabaya (ITATS) is one of the private universities in Surabaya, East Java., the Adhi Tama Institute of Technology in Surabaya has 12 departments, Mechanical Engineering, Electrical Engineering, Industrial Engineering, Chemical Engineering, Civil Engineering, Architecture, Environmental Engineering, Product Design, Naval Architecture Engineering, Mining Engineering, Informatics Engineering, and Information Systems Department [1]. Institut Teknologi Adhi Tama Surabaya was founded in 1963 with the initial name of the Akademi Teknik Surabaya (ATS), in 1983 Akademi Teknik Surabaya changed to Institut Teknologi Adhi Tama Surabaya. Based on the reporting data for the Dikti forlap (Higher Education Report Forum) in 2018/2019, information about active college students was 5,591 college students and in 2019/2020 information was got that the number of active college students was 6,676 college students [2].

#### Covid-19

Covid-19 stands for Coronavirus Disease 2019. According to Imam Agus Faizal and Nur Ariska Nugrahani, Covid-19 is a type of Coronavirus (COV) which is very pathogenic (causes illness in its host). In addition, there is one more type of Coronavirus which is low in pathogens (HCOVs 229E, NL63, OC43, and HKU1). Both Covid-19, and HCOVs 229E, NL63, OC43, and HKU1 are types of viruses that attack humans [3]. At first, Covid-19 attacked China near Wuhan, in December 2019. This disease attacks residents of the Wuhan area because it spreads through contact between humans and other humans who have been infected with this virus. Covid-19 also spreads through the air when sufferers cough and sneeze. coughing and sneezing small fluids (droplets) spread in the air and hit other humans and cause other humans who are nearby to be infected [4].

The virus attacks the people of Wuhan has spread in the world and has become an epidemic. On January 12, 2020, the World Health Organization (WHO) gave the temporary name of the virus the Novel Coronavirus 2019 (2019-nCoV). On January 30, 2021, WHO declared 2019-nCoV an epidemic of a world public health emergency. And to be precise on February 11, 2021, WHO gave the official name from 2019-nCoV to Coronavirus Disease 2019 (COVID-19). On the same day, an international study association / group called the Committee on Taxonomy of Viruses named 2019-nCoV severe acute respiratory syndrome coronavirus 2 / Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) [5].

Indonesia is one country affected by Covid-19. March 2020, is the first time Covid19 case entered Indonesia [6]. The spread of the Corona Virus in Indonesia is going quick. In a short time, many Indonesians contracted the Covid-19 disease [7]. From the data available on the Indonesian Covid-19 Handling Task Force, information was got that as of December 31, 2020 there were 8,074 cases of which 7,356 cases had recovered with 194 cases who died [8].

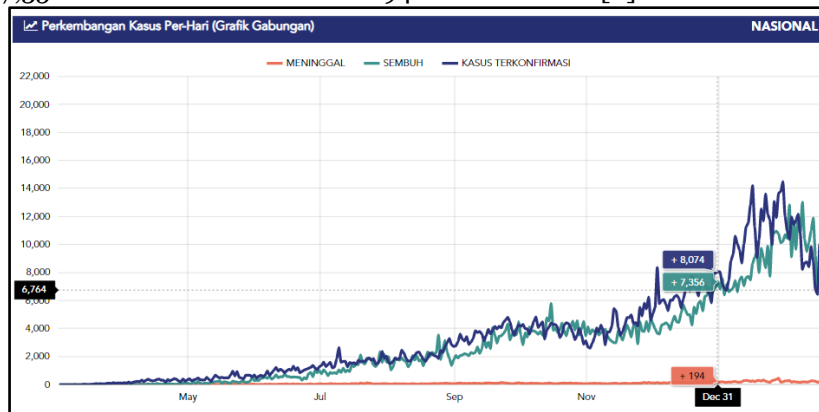


Figure 1. Covid-19 in Indonesia as of 31 December 2020

### **Distance Learning**

Distance Learning or also known as Distance Education is a learning technique by utilizing media that allows interaction between educators and college students not face to face [9]. The distance learning process in Indonesia in 2016, 2017, 2018 was only implemented certain areas or certain conditions. Education in Indonesia uses face-to-face learning techniques, but at the end of 2019 or Odd 2019, learning techniques in Indonesia faltered, this is because in December 2019 the covid virus attacks appeared and in the first quarter of 2020 the covid virus attack made Indonesia implement learning long distance.

Spreading covid-19 is quick and has caused many deaths. This condition caused the government to issue a large-scale social restriction (PSBB) policy. This policy taken by the government to reduce the impact of the covid-19 virus transmission [10]. The impact of PSBB is not only on the trade sector, community life, PSBB applied in the education / school sector [11]. The government through the Ministry of Education and Culture (Kemdikbud) regulates the education policies implement in the emergency period of COVID-19 through Circular Number 4 of 2020. In this Circular Letter, there are six things discussed, the National Examination, Learning Process from Home, School Examination for Graduation, Graduation, New College students Admission, and School Operational help Fund [12].

With the Circular Letter Number 4 from the Ministry of Education and Culture, it is an obligation for the world of education to carry out distance learning. The concept of distance learning is a concept that is being implemented for the first time in Indonesia, starting from Kindergartens, Elementary Schools, Junior High Schools, High Schools, and even Universities. Distance learning materials can be as video, audio, images, text communication, and software and internet network support [13]. According to Zainal Abidin, et al, distance learning emphasizes independent learning and uses special techniques and special methodologies of communication through various media. The various learning processes in distance education include: self-study, guided learning, face-to-face tutorials, electronic tutorials, and other help. Implementing distance learning consists of several principles: clear objectives, relevant to needs, quality of education, efficiency and effectiveness of programs, equity and expansion of learning opportunities, independence, integration, and sustainability [14].

### **Internet and Signals**

Internet is the architecture of a computer network that connects computers to other computers in the world using the TCP / IP protocol which allows users to exchange information, either as text, images, videos, or voice using computer network devices [15]. The internet in society very rapid and now the internet has become a basic necessity for society, from children to adults. With the internet, users get information even though The internet still cannot replace books in education [16].

Internet is one medium that is used by users to get information in the world. In this era of globalization and industry 4.0, the internet is a pillar of the progress of a nation. Using the internet for the world of education very supportive of educational activities, teachers, and college students, both from the side of preparing materials to accessing documents for college students [17]. According to Sasmita, The internet in the world of education has a significant effect on college students interest in learning and motivation and the internet is a learning resource for college students in improving their abilities. Internet technology provides convenience and flexibility for college students to get information and knowledge, and increase college students achievement [18].

Base Transceiver Station, often referred to as BTS, is a telecommunication infrastructure that bridges telephone users. The role of BTS is very important for cellular phone users in Indonesia because The BTS will affect the signal strength of the user's cellular phone so that the more BTS available in an area will cause signal strength from cellular phones [19]. BTS is part of a GSM (Global System for Mobile Communication) network connected to a mobile station (mobile station) [20].

Frequency signal is between 800 MHz - 1800 MHz with a speed of between 9.6-14.4 Kbps it only sends text messages (SMS) and phone calls. GPRS (Global Package Radio Service): is GSM. GPRS is also known as 2.5G which has an access speed of 115-160 Kbps. This GPRS technology can send pictures (Multimedia Message Service / MMS), email, Wireless Application Protocol (WAP), World Wide Web (WWW). EDGE (Enhanced Data rates for GSM Revolution): EDGE signal GSM with speeds up to 473 Kbps. EDGE signal is also known as 2.75G technology. This technology is three times faster than GPRS. 3G (Third Generation Technology): This technology is also known as UMTS (Universal Mobile Telecommunication System) or WCDMA (Wideband Code-division Multiple Access). 3G is better quality than EDGE and can make video calls and streaming video and audio. HSDPA (High Speed Download Packet Access): This signal has a speed of 7.2 - 14.4 Mbps and is known as a 3.5G signal. This technology is also used by modems. This technology is like 3G but with clearer picture capabilities. 4G (Fourth Generation) LTE (Long Term Evolution): This technology has a download speed of 100 Mbps and an upload of 50 Mbps. With 4G technology users can upload extensive files or HD (High Definition) [21].

## B. Problems

Based on the above background, how the influence of cellular phone signals on the learning process in the era of the COVID-19 pandemic for informatics engineering college students.

## C. Discussion

### Informatics Engineering

Informatics engineering is one department with the largest number on the campus of the Adhi Tama Institute of Technology Surabaya. In the COVID-19 pandemic, the learning process was based on face to face. The fourth week, the learning process turns into a DARING learning model (Online) or an online learning process by utilizing Internet technology. The learning process in a DARING manner causes massive changes for both teachers (lecturers) and college students.

College students may not enter campus in PSBB to prevent the spread of the COVID-19 virus. This condition causes college students to return to their respective regions. College students in carrying out lectures must be online and take advantage of internet technology. The lecture process by utilizing internet technology and PSBB regulations from the government causes college students not to meet face-to-face with friends or lecturers. College students can only communicate via WhatsApp, telephone, share conditions through social media, and video calls.

The COVID-19 condition causes the Tri Dharma Perguruan Tinggi process and the administrative process to change from face-to-face to online or digital, even for practicum, it must also turn online. The Informatics Engineering Department must take effective steps in carrying out lecture, administration and practicum activities.

### Learning Process

The learning process carried out online causes lecturers to work hard because they have to prepare digital documents: materials, videos, virtual classes, and other activities to support the online learning process. This learning process requires doses to have a very large internet quota. During the online learning process the informatics engineering lecturer must share the campus internet quota with lecturers from 13 other departments. This condition causes the signal to often be cut off, and the material cannot be conveyed. From the campus, it also provides convenience with the learning process that does not have to be carried out from campus but can be carried out at home with WFH (Work From Home) rules.

Lecturers in this condition must prepare digital material starting from video, ppt, and even have to provide excellent service when college students experience a lack of understanding of the existing material, so that the lecturer explain for college students who ask questions misunderstood. Unlike during the face-to-face lecture process where lecturers explain material without limited to internet quota.

College students implementing online learning experience obstacles in terms of data and signal quotas in the regions. Many of the college students returned to their hometowns to do lessons from home. Over 60% of informatics engineering college students come from the regions. Many college students only attended online lectures not full time because of several conditions: the quota was running out, and there was difficulty signals in the area.

### Respondents

In this section learning respondents are college students majoring in informatics engineering with 607 college students out of 1260 college students who are active in even semester 2019 and Odd 2020. In the 2019 even semester there are 282 college students out of 599 active college students who fill out the learning evaluation form, and in the Odd semester 2020 There are 325 college students out of 661 active college students who filled out the Odd 2020 learning evaluation form.

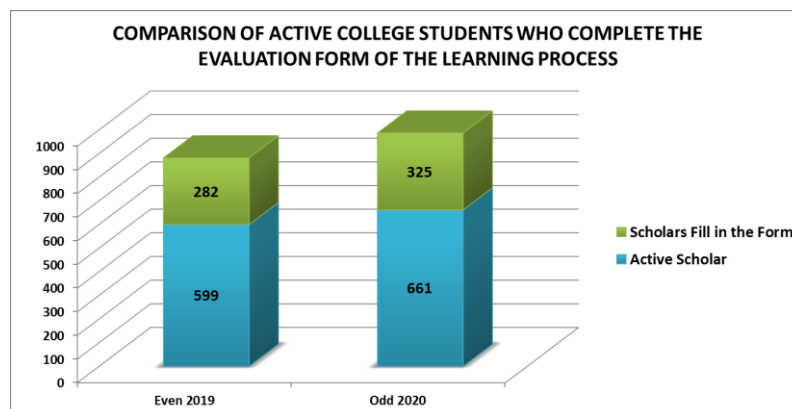


Figure 2. College students Data Filling in the Teaching and Learning Process Evaluation Form on Even 2019 and 2020 Odd Department of Information Technology

### Smartphone and Data Package

Smartphone is a communication device that has become a basic necessity for the people of Indonesia and college students of the Informatics Engineering Department. From the results of the learning evaluation conducted by the Informatics Engineering Department, respondents got surprising results because it turned out that two college students did not have a smartphone as shown in Figure 3.

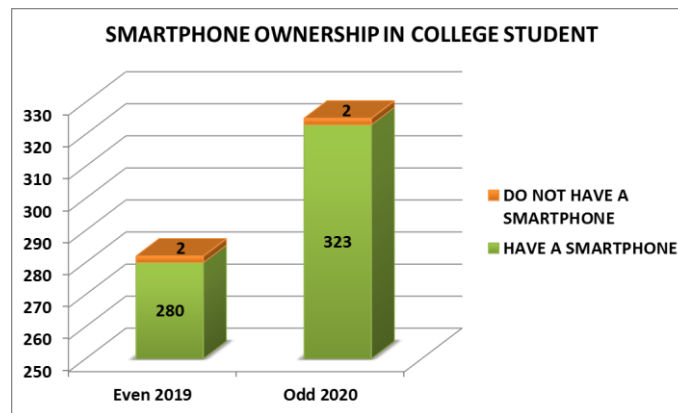


Figure 3. Ownership of smartphones in Informatics Engineering College students

The ownership of smartphones in informatics engineering used by college students to communicate, find information on coursework, and others. From the existing data, 86% (281) of college students in the even semester of 2019 and 86% (243) of college students in the odd semester of 2020 used data packages on smartphones.

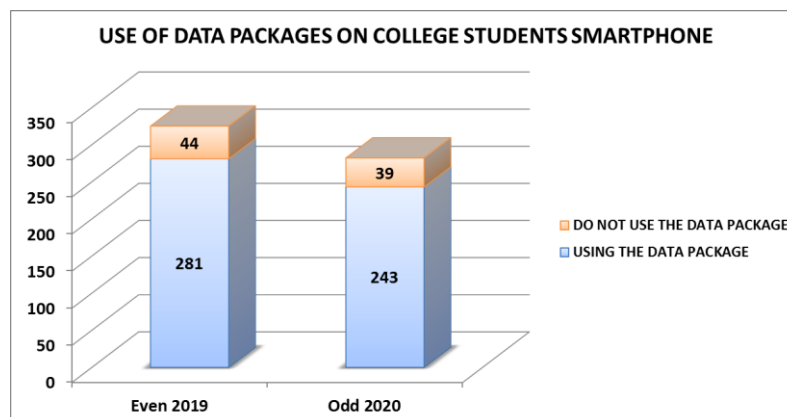


Figure 4. Use of Data Packages in Informatics Engineering College College students

### Online Learning and its Constraints

During Covid-19, the Department of Informatics – Institut Teknologi Adhi Tama Surabaya carried out an Online learning process. The online learning process carried out on even 2019 to be precise starting in March 2020 and odd 2020 to be precise September 2020. Even online learning 2019 is a very difficult learning process for lecturers and college students. Lecturers of the Department of Informatics use a \*.ppt presentation file when attending lectures, then the lecturer explains through writing or a whiteboard. The lecturer explained that the interaction between lecturers and college students very good in class, but during the online learning process, the lecturer carried out a learning process where teaching through digital media presentations on google meet or zoom. In the even semester of 2020, the learning process in class is still online. In the even semester of 2020 lecturers have had face-to-face learning techniques transferred to online learning. Learning in the even semester does not cause difficulties like in the odd semester 2019. The learning evaluation process carried out by the Department there are several obstacles exist in online learning:

#### College Students

1. Many college students do not understand the material even though it explained and given examples.
2. Many college students only activate zoom or meet, but when a question and answer session held, college students still cannot answer and many students do not understand the material.
3. Some college students often come in and out of the meet or zoom and when asked through group WhatsApp the reason for college students is poor signal and the signal often disappears.
4. College students complain that the lecturers too many assignments and very short collection time.

5. College students tired with online learning conditions.
6. College students often ask about the material in group WhatsApp even though lectures accordance with the time.

### Lecturers

1. Lecturers have difficulty in transferring existing knowledge through online learning.
2. The wifi signal on the campus often loses the signal even though large internet capability, this is because the teaching process carried out between one lecturer and another lecturer from different majors.
3. Lecturers have difficulty making video tutorials because there are responsibilities other than teaching, they must fulfill other elements of tridharma.
4. Lecturers often answer questions from students one by one the existing material.
5. Lecturers often make questions and assignments for students as learning and understanding the material.
6. Lecturers complain that many students only enter online meeting rooms (zoom or meet) but many ignore the material..

### Online Learning Survey

From a survey during online learning, the informatics engineering department got data that:

1. Lecturers often give lecture assignments
2. College students ask the material explained until the college students understand the existing material.
3. College students continue to request face-to-face learning by following health protocols because college students difficulty understanding material and signals are often lost in rural areas.
4. College students data packages are limited and college students ask lecturers to use a collaborative teaching and learning process model between text \*.ppt material with video, and meet.
5. Over 70% of college students have lost their signal and are short of funds because of data packages that suffice for consuming the income of students' parents.

### D.Result

From the results of online learning process activities, conclusions can be drawn, including:


1. Difficulty finding smartphone signals in areas outside the city of Surabaya. This signal a major factor in failure of the online learning process, because when the signal cannot be found, it causes students to interfere with online learning and college students do not understand the existing material.
2. The price of data packages very expensive for college students.
3. Online learning wasteful on data packets.
4. The inaccessibility of installing wifi in these areas.
5. A combination learning model needed between text, video, audio, and assignments.
6. College assignments, which should be an independent learning concept, are still considered heavy by college students because each lecturer assigns an assignment.

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### Curriculum Vitae

	<p>Andy Rachman is a lecturer in the Department of Informatics at Institut Teknologi Adhi Tama Surabaya (ITATS). He served for 20 years as a lecturer at ITATS. the author taking part in a research collaboration program in making books with lecturers inside the ITATS campus and outside the campus. The author is an International Journal Reviewer (Springer, Journal of Computer Science) and a Reviewer at the ELTIKOM National Journal, and KERNEL National Journal. the author has ten ISBN books. The author also BNSP Competency Assessor for ICT at LSPTIK Surabaya. The author active as a driving force for student activities in the Department of Informatics - ITATS.</p>
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 A portrait of a woman wearing a patterned hijab and a dark suit jacket over a white shirt and black tie. The background is red.	<p>Sulistyowati is a lecturer in the Information Systems Department at the Institut Teknologi Adhi Tama Surabaya (ITATS). She served for 22 years as a lecturer at ITATS. The author active in research, in the fields of Software Engineering, Decision Support Systems, Operations Research and Programming Algorithms. the author taking part in a research collaboration program in making books together with lecturers on the ITATS Campus.</p>
 A portrait of a man wearing a blue blazer over a white shirt and black tie. He has a small emblem on his lapel. The background is red.	<p>March Angga Vehryza Wardhana is an active student majoring in Informatics Engineering, Institut Teknologi Adhi Tama Surabaya (ITATS). His studies as a transfer student in early 2017 until now. the author is taking a final project and works in an outsourcing company in Sidoarjo.</p>