

IMPLEMENTATION OF ONLINE LEARNING TO PREPARE THE YOUTH GENERATION IN THE DISRUPTIVE ERA

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Abstract – Education is one of the sectors affected by the covid-19 virus. The teaching implementation that was originally face-to-face has been transferred to online learning or distance learning. This study aims to analyze the implementation of online chemistry lectures by both students and lecturers in the 2020/2021 academic year. The subjects of this study consisted of 65 chemistry education students for the academic year 2020/2021. This quantitative descriptive study uses a survey method through a questionnaire conducted online with the help of Google Forms. The results showed that: 1) the implementation of online chemistry lectures was going well, 2) the interaction between lecturers and students and between students was going well, 3) the platforms used were varied and according to their benefits, 4) teaching materials were presented with quality, understanding the material is quite good and the majority of student learning outcomes are in a constant range until it increases, 5) technical constraints of lectures such as signal, cellular data, other activities outside of lectures, and 6) practicum courses cannot be carried out properly because the video provided is not suitable practicum guide.

Keywords: Online learning; young generation; disruptive era.

INTRODUCTION

Coronavirus Disease 2019 (Covid-19) is a new type of disease that has never been previously identified in humans. On January 30, 2020, WHO declared it a public health emergency troubling the world (Zhou et al., 2020). The Covid-19 pandemic has caused the largest educational disruption in history, having an almost universal impact on learners and teachers worldwide, from pre-primary to secondary schools, technical and vocational education and training institutions, universities, adult learning, and development skills. By mid-April 2020, 94 per cent of students worldwide were affected by the pandemic, representing 1.58 billion children and youth, from pre-primary to higher education, in 200 countries (Fergus, Botha, & Scott, 2020).

At the beginning of 2020, the Coronavirus Disease (Covid-19) virus had spread in Indonesia, resulting in an out-of-control situation in various sectors. The government has chosen various ways to minimize the spread of COVID-19 by providing physical restrictions or physical distancing. Formal educational institutions are one of the sectors that have been affected by COVID-19. Therefore, the central government has issued a policy to deal with the impact of

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COVID-19. The policy to close educational institutions is an effort to anticipate the coronavirus's wider spread. The policy is stated in the circular letter of the Minister of Education and Culture Number 3692/MPA.A/HK/2020 dated March 17, 2020, regarding online learning and working from home in the context of preventing the spread of covid 19.

The State University of Semarang (UNNES) followed up on this policy by issuing the Chancellor's Circular Number B/1413/UN37/2020 concerning Vigilance and prevention of Covid-19 infection in academics public services within the State University of Semarang. The circular contains policies that lectures are carried out online or online using ELENA or other applications adapted to conditions and agreements between students and lecturers and monitoring lectures. As much as possible, UNNES as an educational institution prevents the spread of the COVID-19 virus by implementing changes in teaching patterns. The teaching pattern that was originally face-to-face conventionally has turned into online learning by utilizing supporting information technology (Hariani, 2020). This pandemic emergency period requires the learning system to be replaced with online learning to continue the learning process (Sintema, 2020). This process changes the learning pattern that requires teachers and education developers to provide learning materials and teach students directly through remote digital tools (United Nations, 2020)

Distance learning (PJJ) aims to meet educational standards by utilizing information technology by using computers or gadgets interconnected between students and teachers. Online learning or distance learning methods where students learn separately from educators and the learning process is carried out using the internet and online learning resources according to information and communication technology and is supported by sophisticated media (Nurdin, 2005). Through technology, the teaching and learning process can still be carried out properly. Information technology is expected to cope with the learning process well, even during the coronavirus pandemic (Pakpahan and Yuni, 2020).

Distance learning produces many benefits, one of which is based on research conducted by (Gozali, 2012) which states that one of the factors for the success rate of distance learning is high flexibility in eliminating various limitations that have been faced by face-to-face education to provide access to education for all. Another study from Waryanto (2006) revealed the benefits of distance learning, namely, the provision of online learning could increase independence. Distance learning is seen as something effective to be applied, especially in universities. Distance learning allows students to have the flexibility to study anytime and anywhere (Dhull & Sakshi, 2017). According to Isman (2020), distance learning positively impacts institutions, lecturers, and students, including: (1) institutions can overcome class limitations if lecture classes are lacking if lectures are carried out face-to-face. Complaints so far can be resolved with online learning, (2) lecturers can use their spare time to do research and community service, (3) students, especially students who study while working, are greatly helped because they don't need to come to campus to study just through the internet. Learning online can be done anytime, anywhere. It can overcome cost limitations because online learning is more cost-effective.

Distance learning is also known as distance learning. Nurdin (2005) states that distance learning is an educational program designed to facilitate learning strategies that do not depend on daily learning contacts but utilize the best potential of learners to learn according to their own will and ability. The use of technology and information is proof that education is currently facing a period of revolution 4.0, where this phase is called the era of disruptive innovation, where innovation is developing very rapidly so that it can help create markets, the internet is not only for information but for living life and technology is part of humans themselves (Suryadi, 2020).

Sholekhah (2019) adds that information is no longer dammed in the disruptive era of increasingly advanced communication and technology. Information sources are not only obtained from one or two media.

The disruptive era is very much in line with 21st-century learning, which is related to technology use. 21st-century learning applies learning skills and innovation of information, media, and technology skills or digital literacy (Effendi, 2019). Digital literacy is necessary so that online lecture learning can be carried out optimally. Sari (2020) added that the ability to use technology is needed so that students stay connected with teachers so that knowledge transfer can still be carried out properly.

Following the initial survey that has been carried out, it can be seen that UNNES chemistry students have used technology as learning, namely by using 70% of smartphones (smartphones) and 30% using laptops and tabs in carrying out online learning. However, there are still obstacles students face both technically and non-technically, such as the level of understanding of the material. Therefore, this study will explain how students and lecturers implement online chemistry lectures and what obstacles students experience in taking online chemistry lectures during the covid-19 pandemic.

METHOD

The research method used is a descriptive study (Creswell, 2009) that describes how students respond in carrying out chemistry learning during the Covid-19 pandemic. The subjects of this study were 65 students of chemistry education who were taking semester 5 of the 2020/2021 academic year. The research procedure includes the preparation, implementation, and completion stages. The data collection technique was done by using a questionnaire. The questionnaire was used to find out the responses from students regarding the use of e-learning in distance lectures majoring in chemistry. The research instrument used was a questionnaire sheet on Google Form. Analysis of research data is done by descriptive-quantitative.

RESULTS AND DISCUSSION

Online chemistry lectures began to be carried out in the 3rd week of even semester lectures for the 2019/2020 academic year and are continuing today, namely in the odd semester lectures for the 2020/2021 academic year. Online chemistry lectures are implemented with various new efforts and adaptations by lecturers, educators, IT staff, and students. The online is done to carry out lectures to the maximum as when lectures are carried out face-to-face in class. A questionnaire was given to several respondents majoring in chemistry to determine the extent to which online chemistry lectures were conducted. Student responses to the application of the online learning system need to be carried out to evaluate the optimization of implementation to improve the quality and improvement of learning (Riyanda et al., 2020). Based on the results of filling out the questionnaire, the responses shown in Figure 1 are obtained.

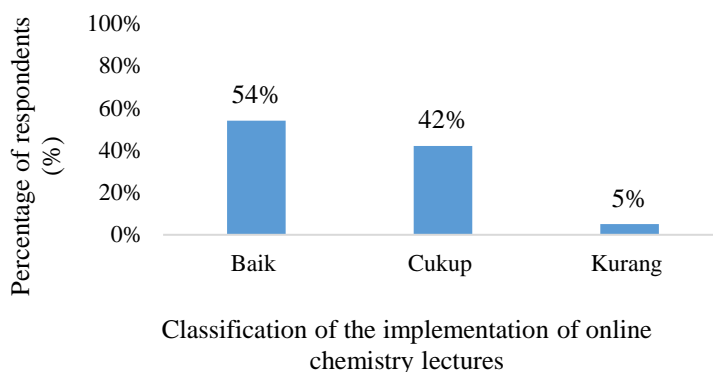


Figure 1. Implementation of Online Chemistry Lectures

Figure 1 states that chemistry lectures conducted online are good, which is indicated by the acquisition of good responses of more than 50%. This shows that the various efforts that have been made by various parties to support the implementation of lectures can run in a structured, on schedule, and well-coordinated manner. This result is in line with the research conducted by Sadikin and Hamidah (2020) which shows that online learning or lectures organized by the university can run in a structured, smooth and coordinated manner. Students are satisfied with lectures that are flexible, not constrained by time and place so that they can be carried out from their respective homes or from anywhere. In online lectures, lecturers provide lectures through virtual classes that can be accessed anywhere and anytime, not bound by space and time. This condition allows students to freely choose which courses to take and which assignments to do first.

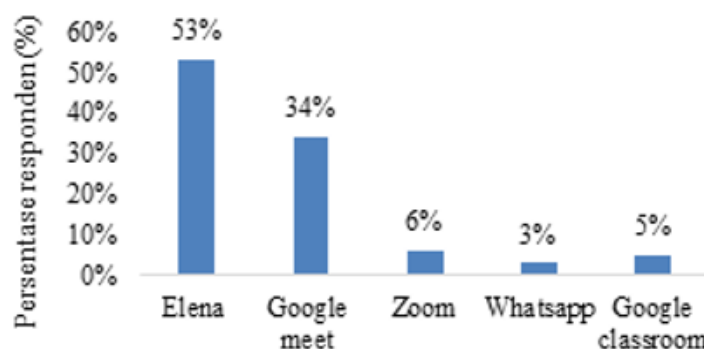


Figure 2. Platforms Used in Chemistry Online Lectures

Chemistry lectures conducted online include all activities, both material delivery activities, discussions, presentations to practicums. To support the implementation of these online lectures, several platforms are used such as e-learning UNNES (elena), WhatsApp Group, Zoom, G-meet, YouTube, and so on. Figure 2 shows that the most frequently used platform is the e-learning UNNES (Elena) with a response gain of 53%. Elena is a platform issued by UPT UNNES based on e-learning to support the implementation of online lectures. The use of Elena in lecture activities is recommended to be used in the implementation of lectures. This is because Elena's uses are very diverse. Elena here functions as a virtual classroom where lecturers provide materials, teaching materials, assignments, and discussion topics to students. Compared to Google Classroom, Elena occupies the top position because Elana makes it easy for students to take control of their respective learning success. As research from Hartanto (2016) states that in the use of e-learning, learners are given the freedom to determine when to start, when to finish and how in a module

they want to learn first so that when they encounter difficulties, they can be repeated until they feel able to understand. According to Dabbagh and Ritland (in Pakpahan, 2020), e-learning is information and communication technology to enable students to learn anytime and anywhere. In addition, the use of Google Classroom has drawbacks. Research from Rozak (2018) states that Google Classroom is an application developed by Google that is always synchronized with Google Drive, when the device used to access the application is lost, all documents and assignments will be lost. which has been saved by google drive.

Meanwhile, virtual meetings in lectures are carried out with the help of google meet (G-meet) and meeting zoom. G-meet occupies the second position after Elena with a response gain of 34%. For the zoom platform, only get a response of 6%. Lecturers and students prefer to use the G-meet virtual meeting platform over Zoom because the Meet platform has several advantages that make virtual meetings easier to carry out. Google meet or G-meet is a service issued by Google that allows users to make video calls with 25 or more other users per meeting. G-meet can be an alternative media for teaching and learning processes and lectures from home. G-meet is a more powerful version than its predecessor Hangouts because G-meet can be displayed on web applications Android and iOS applications. G-meet makes virtual face-to-face lectures run smoothly without interruption due to signal interference. G-meet also has a unique and functional interface that is lightweight and fast, prioritizes efficient management, is easy to use (user friendly), and can be followed by all participants (Sawitri, 2020).

While the use of the WhatsApp and telegram platforms received a response of 3%, so it occupies the lowest position of the classification of platforms used in lectures. The use of WhatsApp in lectures is currently limited as a place to communicate between lecturers and students regarding the platform used for lectures at the meeting that day and as a place to make attendance only. The WhatsApp platform has shortcomings, such as research from Zulkarnain (2020), which states that WhatsApp cannot hold lectures face-to-face, so there is less interaction between teachers and students. Some students will be motivated to learn if there is a response from the teacher.

Online learning is not just material that is transferred through internet media, it is also not just assignments and questions sent through social media applications. Online learning must be planned, implemented, and evaluated as well as learning that occurs in the classroom. Majid (2011) says that planning can be defined as the process of compiling subject matter, using teaching media, using teaching approaches and methods, and assessing in an allocation of time that will be carried out at a certain period to achieve predetermined goals. The implementation of lecture activities must be accompanied by the provision of teaching materials as an initial effort to introduce the material to students. Teaching materials given to students can be given directly and indirectly by providing recommendations for some teaching materials that can be used by students in a course. The teaching materials provided indirectly must be sought independently by students to support understanding of the material. Teaching materials given directly by the lecturer will be delivered on the Elena platform or google classroom which is used in a course.

Teaching materials are one of the important components in online lectures, so they must be prepared as well and as much as possible. This is in line with the opinion of Ubaidah (2019) which states that teaching materials must be able to stimulate and support the formation of a quality learning experience for students independently. Teaching materials must also be able to turn on imagination and mental activity, trigger learning motivation, and encourage students to carry out meaningful learning activities. At the university level, students can mean students so teaching materials that must be prepared by lecturers must also meet these characteristics. Ubaidah (2019)

also states that teaching materials used in distance learning must be designed in such a way that they are modular, self-contained, and self-instructional. Modular means that teaching materials consist of modules that allow students to have specific competencies if studied thoroughly. Self-contained means that the teaching materials compiled must contain the complete material or substance of scientific material that needs to be studied so that it can be applied as carefully as possible. Self-instruction means that teaching materials must be able to make students learn independently with relatively minimum assistance from tutors. Teaching materials must be designed to contain instructions that can teach participants who take part in distance learning programs.

The implementation of lectures, both face-to-face lectures and online lectures must be supported by the availability of additional references. The use of additional references in lecture activities is quite important because it can help students to improve their understanding and strengthen the understanding they have mastered. In addition, additional references are also able to add insight and new knowledge for students about an interesting thing or phenomenon that is not obtained in the main teaching materials. The availability of additional references in online chemistry lectures is presented in Figure 3.

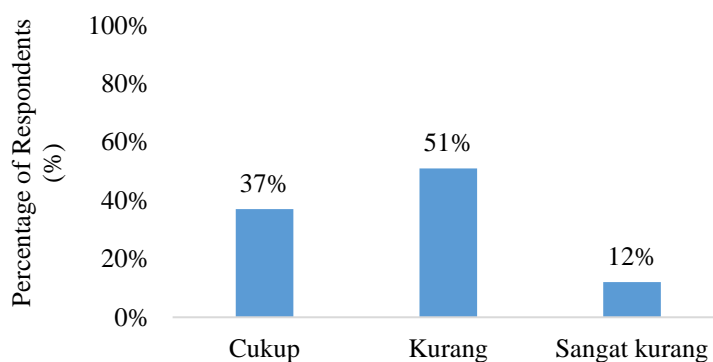


Figure 3. Additional Reference Availability Classification

Figure 3. states that the availability of additional references in online chemistry lectures is still limited. This is indicated by the percentage of respondents who gave sufficient responses by 37%, and 51% of respondents gave less responses. The limited number of additional references is one of the shortcomings in implementing online lectures. In addition, with few references, it can be one of the inhibiting factors for students to develop their insight, understanding, and ability in a chemical material. This fact is a challenge for lecturers to assist students in finding and finding additional references that are appropriate and in accordance with the field of science being studied.

In online lectures, various activities or activities that occur are carried out in the same way as during face-to-face lectures in class. In addition, the interaction that exists between lecturers and students or between students is also carried out as well and as much as possible. This is done to create a conducive and enjoyable learning atmosphere. The interactions that exist between lecturers and students during online chemistry lectures are presented in Figure 4.

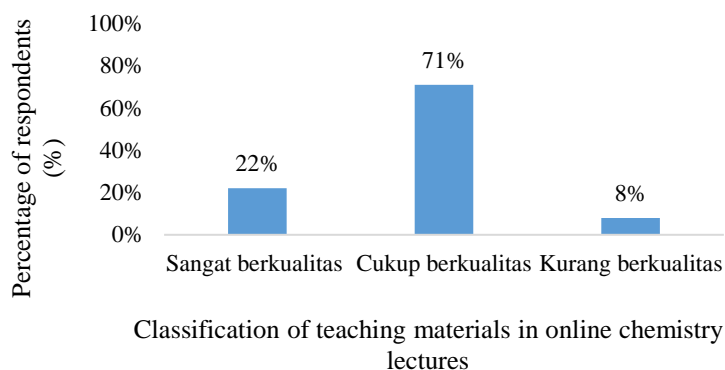


Figure 4. Interaction between Lecturers and Students During Online Chemistry Lectures

Figure 4. Stating that the interaction that has been established is quite good. This is evidenced by the respondents who gave good responses, as much as 34% and who gave sufficient responses as much as 55%. The two percentages illustrate that both lecturers and students try to carry out lecture activities as much as possible by carrying out interaction activities both through virtual classrooms and virtual meetings. The better the interaction between lecturers and students, the better the understanding formed by students will be. This is because students have many opportunities to ask questions and form understanding by listening to lecturers' explanations, discussing with lecturers, doing assignments, or studying independently. Students feel more comfortable in expressing ideas and questions in online learning. Participating in learning from home makes them not feel the psychological pressure from their peers that they usually experience due to face-to-face learning. The absence of lecturers directly or physically also causes students to feel not awkward in expressing ideas (Sun et al., 2008).

To carry out maximum online lectures, it must also be supported by collaborative activities through discussion activities and group assignments. The implementation of collaborative activities carried out virtually will form a separate experience for students. The interactions that occur will also be different and give an interesting impression to students. Based on the results of the analysis obtained, the classification of interactions between students is presented in Figure 5.

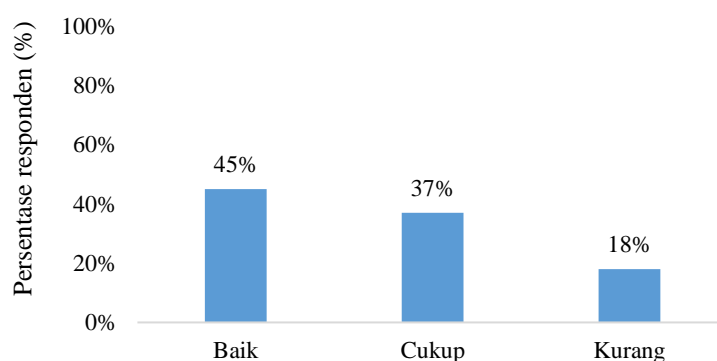


Figure 5. Interaction between Students in Completing Group Assignments in Chemistry Lectures Online

Figure 5. Stating that the interaction has been good. This can be seen from the response of students who gave a good rating of 45% and a sufficient assessment of 37%. Although interaction must be carried out with the help of several applications or platforms, it does not prevent students from working on group assignments as much as possible. Students take advantage of the various

facilities available to conduct discussions in order to complete group assignments. These various efforts are made to produce good assignments and in accordance with the wishes of the lecturer so that they can provide final results in the form of satisfactory grades for students.

During lectures conducted online, students can carry out other activities that can increase their productivity. In addition, students also become closer to their families because they attend lectures from home. Some of the activities carried out by students while attending lectures online are presented in Figure 6.

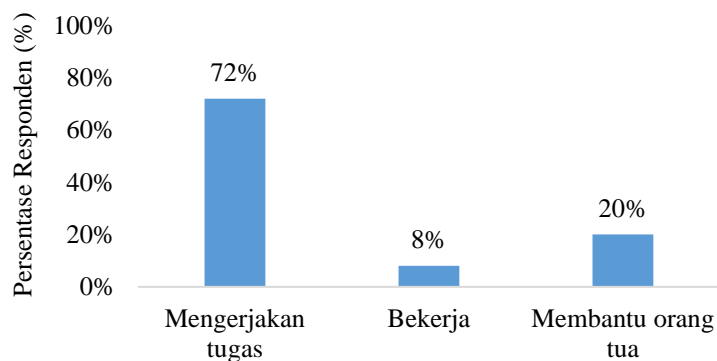


Figure 6. Student Activities During Online Chemistry Lectures

Figure 6 states that the activities carried out by students during online lectures are positive and useful activities. Task work activities occupy the first position with a percentage of 72%. This is because lectures are conducted online to give students assignments to form an understanding of the material and fulfil lecture hours according to the number of credits taken by students. Work activity occupies the third position with a percentage of 8%. Some students work to fill their spare time between lectures. This activity is carried out by students in addition to making money but also to train mentally and other abilities that are not obtained in lectures. Activities to help parents occupy the second position with a percentage of 20%. Lectures carried out from home make it easier for students to help their parents' daily activities. Students can help parents in their spare time after studying and doing assignments. The position of students at home can increase the closeness between children and parents so that a harmonious family can be established and good communication can be established.

Online lectures have advantages and disadvantages. The advantage of online lectures is that lectures can be done from anywhere. While the drawbacks of online lectures are efforts to understand more extra lecture material and learning outcomes that are difficult to predict. The level of understanding of student material in taking online lectures is presented in Figure 7.

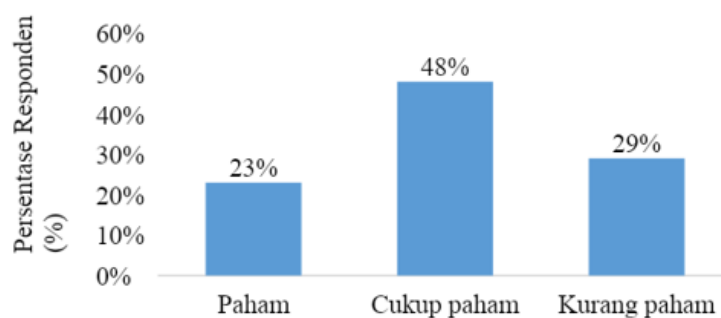


Figure 7. Classification of Material Understanding in Chemistry Lectures Online

The understanding of student material in this online lecture is quite good. This can be seen in Figure 7. students who understand are 23% and students who understand enough are 48%. The level of understanding achieved by students with these two percentages is considered good considering that students must try to understand more about the material in this online lecture. Students must be more active during discussions and diligent in reading various references so that they can form a correct and good understanding.

Practical activities carried out online provide a different experience for students. Students must be able to imagine and plan how a practicum will be carried out. This makes it difficult for students to understand a practical activity. The level of convenience of students in understanding online practicum is presented in Figure 8.

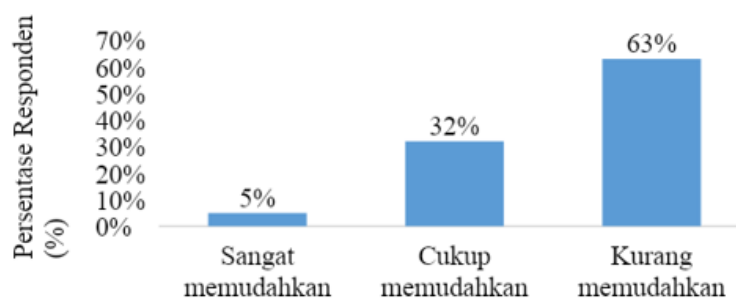


Figure 8. Ease of Understanding Chemistry Practicum Online

Chemistry practicum conducted online makes it difficult for students to process understanding. This is because students have to design practicum activities without directly seeing the tools and materials needed for practicum. These tools and materials are only available in campus laboratories. Although students can search for these tools and materials on the internet, the availability of tools and materials that are actually available in the laboratory is certainly different. In addition, students also sometimes have difficulty choosing the right material to make a solution and determining the procedure for making the solution properly and correctly.

Lectures conducted online also cause the learning outcomes obtained by students to be unsatisfactory. This happens because of various kinds of obstacles or obstacles experienced by students both during the delivery of material and during exam activities. The learning outcomes obtained by students during online chemistry lectures in the even semester 2019/2020 are presented in Figure 9.

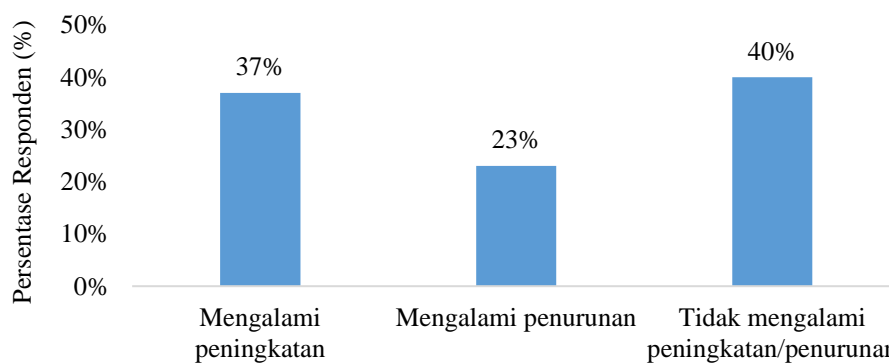


Figure 9. Classification of Student Learning Outcomes in Chemistry Online Lectures

The learning outcomes received by students during their graduation varied as shown in Figure 8. Student learning outcomes increased by 37%. These results were obtained by students because these students tried their best and were able to overcome various obstacles experienced in participating in online lectures. Student learning outcomes decreased by 23%. These results were obtained by students because in participating in online lectures, students encountered various obstacles and obstacles that were difficult to overcome, resulting in unsatisfactory final results. Student learning outcomes that remain or do not increase and decrease by 40%. These results were obtained by students because in participating in online lectures, the obstacles or obstacles experienced by students could be overcome quite well even though they were not fully successful and students also tried to follow lectures to the maximum so that the final score obtained by students was relatively fixed from the previous semester.

The chemistry lecture which was held online for 2 semesters had various obstacles that caused students to be less than optimal in participating in this lecture. Various types of obstacles encountered by students during online chemistry lectures are presented in Figure 10.

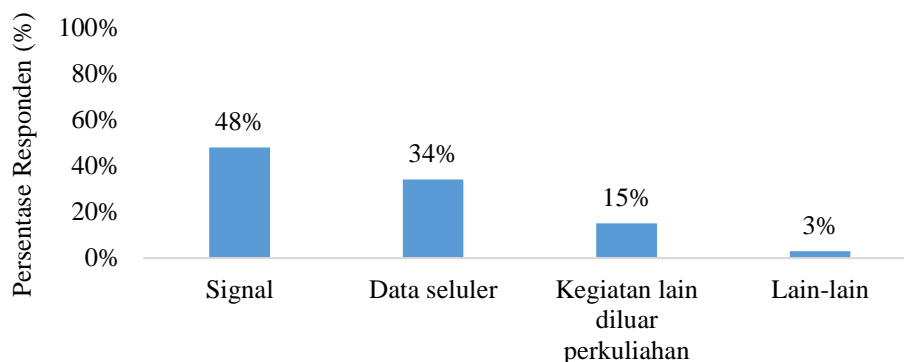


Figure 10. Constraints of Chemistry Online Lecture

The biggest obstacle faced by students in these online lectures is the signal shown in Figure 8. For 48%, the geographical conditions of student residences, which vary from rural to urban, mountainous to coastal, result in different signals for each student. In addition, unfavourable weather conditions also cause the signal to become weak. An unstable signal causes students to be constrained in attending lectures and submitting assignments. Mobile data occupies the second position as an obstacle in this online lecture with a response percentage of 34%. Lectures conducted online have increased the need for students to purchase mobile data packages. The price of cellular data packages, which are not all cheap and run out quickly because of the high intensity of use, has resulted in more student spending during this online lecture period.

Another obstacle encountered by students was other activities outside of lectures, with a response percentage of 15%. This other activity is in the form of an obligation to help parents carry out online organizational activities and other similar activities. This is in accordance with the research of Firman and Rahman (2020) which states that the availability of internet services in their hometowns is limited and makes students sometimes late in getting lecture information and collecting lecture assignments. In addition, the costs that students must incur in participating in online learning tend to be more for buying internet data quotas. Learning carried out in the form of video conferencing consumes a very large quota, while online discussions via instant messaging applications do not require a lot of quotas.

In addition to obstacles from the student side, lecturers also face quite a variety of obstacles. The main obstacle is how to design learning that can still achieve the target (according to the desired

competence) but still make students feel comfortable and still have fun. The task of the lecturer is not only to transfer knowledge but also to teach the meaning of life. If only smart, then lecturers will be more easily replaced by the internet. Asking lecturers is no longer an option because the internet is able to present various information more quickly and completely (Liguori, 2020). Discipline, responsibility, honesty, hard work, independence, and other soft skills can only be taught with direct examples from lecturers. Aspects of humanism and socialism are not enough and cannot even be replaced by any of the most sophisticated gadgets. Therefore, design learning is necessary that still pays attention to psychological aspects or aspects of humanism.

Based on the results of the questionnaire analysis, several suggestions were obtained from students regarding the implementation of online lectures. Some of these suggestions include providing references or teaching materials such as e-books, material links or video materials that are in accordance with the RPS to support student understanding; provision of intensive question and answer and discussion during online lectures; increasing lecturers' enthusiasm in teaching and giving more attention to students by asking students' progress, understanding, and comfort in attending online lectures; lecturers improve the effectiveness of lecture time and use teaching methods that can improve student understanding; in delivering the material, the lecturer should provide a more detailed understanding starting with providing examples of completion, then continuing by providing examples of the use of the application to be used so that students can understand the material presented and know the workflow of a material properly, correctly, and precisely; providing supportive learning facilities for all students to use; and providing practicum lecture methods that can make students understand and skilled in doing practicals.

CONCLUSION

In the era of the Covid-19 pandemic, online learning is no longer an option but a necessity. The main challenge for lecturers and teachers is to design learning that can accommodate the achievement of student competencies and pay attention to the psychological, social, and economic aspects of students/students. Based on the research that has been done, it can be concluded that the implementation of online chemistry lectures is going well, the interaction between lecturers and students as well as between students is going well, the platforms used are diverse and in accordance with their benefits, the teaching materials presented are of good quality, the understanding of the material is quite good and The majority of student learning outcomes are in the constant range until they increase. Constraints experienced by students in these online lectures include technical constraints such as signal, cellular data, other activities outside of lectures, and non-technical obstacles such as the lack of understanding of students in online practicums and limited access to additional references.

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