



Analysis of Student Learning Difficulties in Plants Physiology Online Lectures During Pandemic of COVID-19

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Abstract: The COVID-19 pandemic made higher education institutes support online education. Searching for the learning difficulties of students who have gone through lectures online needs to be done as anticipation and looking for solutions in the next lecture. This quantitative descriptive research was conducted in biology education study programs that have studied Plant Physiology in the 2020-2021 academic years. 56 respondents were given a questionnaire related to their difficulties during the online lectures. Learning difficulties in the external aspect were the slow internet network (58.90%) and the internal aspect was very difficult to focus on listening to online lectures if the room where the lecture was messy (58.90%). Physical and physical health profile, easy to get sore and sleepy during the course (57.10%). On the profile of academic learning, students find it more difficult to find textbooks during online lectures than during offline lectures (69.60%). The characteristics of the courses that affected the mastery of the material were the presence of many illustrations of physiological processes (30.40%) and complex concepts (30.40%). Lecturers and students work together to overcome these difficulties so as not to disrupt the overall course of lectures so that online lectures continue well.

Keywords: Courses online; COVID-19; Learning difficulties; Pandemic; Plant physiology

Introduction

The existence of the COVID-19 pandemic that emerged in Indonesia in early 2020 made the Ministry of Education and Culture decide anticipation of the spread of COVID-19 in higher education institutes by requiring lectures to be held online starting at the beginning of the odd semester of the 2020-2021 academic year (Ririen & Hartika, 2021). Online lectures are an effort to keep the learning process running so that learning objectives are achieved (Al-Bari & Saputri, 2020; Amirullah & Maesaroh, 2020). Likewise, lectures for plant physiology courses for the 2020-2021 academic year have taken place online.

Plant physiology is a branch of biology that studies metabolic processes and functions that occur in plants that cause plants to continue to survive. Knowledge of plant physiology can be utilized in the scope of ecology and economics (Lakitan, 2011). The plant physiology course consists of 3 *Satuan Kredit Semester* (SKS) for

theory lectures and 1 SKS for practicum lecture given to students of the Biology Education Study Program in semester 5 (Pendidikan Biologi - Universitas Muhammadiyah Prof. Dr. HAMKA, 2021). Giving theoretical lectures is complemented by practical lectures to develop mastery of the concepts that have been given. Practicum can help students discover and prove theories (Purwanti & Fauzi, 2020). Practicum activities even encourage students to hone their skills in communicating practicum reports that have been carried out (Astuti & Suciati, 2017). In science subject, learning should be carried out experientially through experiments, which is impossible because students only watch and are not involved in the experiment (Miroslavjević et al., 2023).

Online lectures are lectures that are conducted with the help of online network communication technology (Mustofa et al., 2019). Several studies have found that online lectures have both negative and positive impacts. In Kusnayat et al. (2020) research, difficulty sleeping

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because of the assignments indicated psychological pressure due to online lectures. While Firman & Rahman's (2020) research, shows that the flexibility of implementation in online learning will encourage student independence and motivation to learn actively.

The process of teaching and learning in college is known as lectures. In the lecture process, the lecturer is tasked with delivering material so that it can be understood and mastered by students. However, each student has different conditions and abilities in mastering the material presented (Mutakin, 2015), so learning difficulties are sometimes encountered.

Learning difficulties are the condition of a person with average or above-average intelligence abilities but have learning disabilities or failures related to obstacles in the process of perception, conceptualization, language, memory, the concentration of attention, self-mastery, and sensory integration functions. Factors that cause learning difficulties can be brain dysfunction, genetics, environment, malnutrition, and biochemistry. Learning difficulties are divided into two groups, namely developmental learning disabilities and academic learning disabilities. The main components of developmental learning disabilities are attention, memory, visual and motor perception disorders, thinking, and language disorders, while academic learning difficulties include disabilities in reading, spelling, writing, and arithmetic (Suryani, 2010).

The practicality of online lectures has made many institutions hold online lectures, especially during a pandemic. However, online lectures are not a type of lecture that is without problems in its implementation. Some of the problems that usually arise are three things, namely the use of teaching materials, student interaction, and the learning atmosphere (Adijaya & Santosa, 2018). Changing the face-to-face method is a challenge for both students and lecturers. Little time, lots of assignments, quotas, and signals make students need to prepare everything optimally. Online lectures also create different learning experiences by optimizing the potential and learning environment (Kusnayat et al., 2020). This challenge causes online lectures to have their level of difficulty.

Hence, this study traces the learning difficulties of students participating in online lectures for plant physiology courses during the pandemic. This study was also to recognize the student experiences with academic learning and physical health conditions through plant physiology courses. This study needs to be carried out in anticipation and seeking solutions to overcome learning difficulties in the following year, whether during a pandemic or not. The findings can be used during a pandemic or post-pandemic so that lecturers can prepare learning according to student's educational needs. The higher education institution

needs to ensure that learning outcomes comply with education standards in this pandemic situation.

Method

This research was quantitative and descriptive in identifying student learning difficulties during online lectures. The research respondents were 5th-semester students in the biology education study program at Muhammadiyah Prof. Dr. Hamka University (UHAMKA) who had taken plant physiology courses in the 2020-2021 academic year to 56 students as respondents.

The data collection used a questionnaire in the form of a Google form developed by the researcher which was distributed to the respondents. The components of the questionnaire consist of the identity of the respondent, questions and statements related to learning difficulties during online lectures, the physical health profile, and the academic learning profile. Those learning difficulties include external and internal aspects. External aspects consist of lecture facilities, lecture locations, and family factors. Internal aspects consist of attention, memory, visual motor perception, thinking, and language. These statements are given the answer options "yes", "sometimes", and "no" as well as other options.

The collected data is then grouped based on the selected answer. If the answer "yes" is the most chosen in the statement then the student is experiencing these difficulties. If the answer is "sometimes" the most means still or occasionally experiencing difficulties. If the answer is "no" at most it means that students are not experiencing difficulties or have been able to overcome these difficulties. This data is then tabulated in percentage form, displayed in tabular form, and conclusions are drawn.

Result and Discussion

The learning difficulties experienced by students during online lectures for plant physiology courses are described based on the findings of the most dominating difficulties from each component aspect. In other words, the answer option "yes" is prioritized for discussion. While other findings are described as supporting and reinforcing students' main difficulties.

External aspects come from factors that are outside the student's self. This external aspect is related to the environment that surrounds students in their daily lives, such as lecture facilities, lecture locations, and family factors.

Lecture facilities include quota assistance, applications, devices, internet sources, and reference sources used. In addition, constraints related to facilities

experienced during online lectures are also determined. The gains are listed in Table 1.

Table 1. Lecture Facilities that Support Online Lectures

Statements	Category	Gain (%)
Get internet quota assistance from the government	Yes	60.70
	Sometimes	25
	No	14.30
The most difficult application to use during online lectures	Google Meet	28.60
	Online Learning UHAMKA (OLU)	17.90
	Zoom	12.50
	No one	16
	No answer	5.40
	Other	19.60
Devices most frequently used during online lectures	Smartphone	33.90
	Laptop	64.30
	Computer	1.80
The source of the internet connection used	WiFi	53.60
	Mobile data	46.40
The most frequently used reference source during online lectures	Internet	75
	Textbook	5.40
	Journal	19.60
The most hindering facility constraints during online lectures took place	Weak internet network	58.90
	Improvident quota	14.30
	Unsupported devices	5.40
	Electrical interference	12.50
	Other	8.90

The most hindering facility constraints during online lectures were weak internet networks (58.90%). The condition of the network or internet signal at the student's residence is full but less fluent (51.80%). Even though most students live in urban areas (76.80%). Anshori et al. (2021) suggest that to anticipate this weak internet network, online lectures can be diverted to the WhatsApp application which doesn't need the best internet network. In addition, WhatsApp only consumes a small amount of quota and the application is owned by almost all students (Anhusadar, 2020; Jariyah & Tyastirin, 2020). In this research, students received an internet quota from the government (60.70%) to overcome the limited quota. Following Nurmalahayati et al. (2022), to provide internet access to students and teachers during distance learning, schools (government) must make efforts, even though the available bandwidth is not very high.

As written by Inkaew (2022), some students also have difficulty studying online due to inadequate internet signals because these students live in quite remote areas. In this study, a weak internet network was an obstacle that greatly influenced online lectures by 58.90% (Table 1.) even though the majority of students lived in urban areas (76.80%). Meanwhile, only 1.80% of students live in remote areas such as mountainous areas.

Google Meet is the most difficult application to use (28.60%). It is important to introduce other learning applications or digital tools during online lectures to make learning as interesting as possible and easy to access (Mirosavljević et al., 2023). Laptops (64.30%) and smartphones (33.90%) are devices most used during online lectures. Laptops and cellphones are technological devices that are connected to the internet via WiFi hotspots or internet quota which help increase the flexibility of online lectures (Setyoko et al., 2023).

The location of the lecture is related to the position where the student lives and takes part in ongoing online lectures. The location referred to is the residence, the condition of the internet signal at the residence, the landscape, the lecture room, the room with the strongest internet signal, and the atmosphere of the home environment, as shown in Table 2.

Table 2. Lecture Locations That Support Online Lectures

Statements	Category	Gain (%)
Location of residence during online lectures	Jabodetabek	85.70
	Outside Jabodetabek	14.30
The condition of the network or internet signal at the residence	Full and very fluent	14.30
	Full and less fluent	51.80
	Less full but fluent	14.30
	Less full and not fluent	7.10
	Sometimes there is and sometimes not	12.50
Most of the locations during online lectures	Parents' house	89.30
	Relatives' house	5.40
	Boarding house	1.80
	Other (boarding school, wood)	3.50
Area of the landscape of the lecture location	Urban area	76.80
	Rural area	12.50
	Rice field area	7.10
	Mountain area	1.80
	Other areas	1.80
The room where students take online lectures	Living room	12.50
	Personal bedroom	76.80
	Other (kitchen, garden, other room)	10.70
Location of internet access that is easy to reach or has a strong signal	Living room	19.60
	House terrace	16.10
	Personal bedroom	17.90
	All the rooms in the house	35.70
	Other	10.70
The environment around the lecture location supports online lectures	Quiet and very conducive	41.10
	Quiet and less conducive	14.30
	Crowded but conducive	30.40
	Crowded and not conducive	14.30

Parents' house was the location most often used for online lectures (89.30%) and personal bedrooms were the rooms where students took online lectures (76.80%). This is because students can feel comfortable and familiar with the learning environment so they can learn better by studying (Miroslavljević et al., 2023).

Family factors that affect student performance during online lectures consist of economic ability, family members who are involved in lectures, and constraints that occur while at home. An overview of family factors is shown in Table 3.

Table 3. Family Factors That Influence Online Lectures

Statements	Category	Gain (%)
Family economic affects performance in attending lectures	Yes	44.60
	No	55.40
Family members who often interfere when online lectures take place	Father	1.80
	Mother	10.70
	Older sibling	5.40
	Younger sibling	19.60
	Nephew/niece	17.90
	No one	33.90
There are family members who listen or accompany them during lectures	Yes	3.50
	Sometimes	30.40
	No	66.10
	No one	16
Obstacles in the family that hindered the most during online lectures took place	Asked to do something inside the house during lecture hours	28.60
	Asked to go out of the house to do something	3.60
	Family noise when chatting or gathering in the house	23.20
	Called and invited to speak during lectures	12.50
	Courier/neighbor/guest calls that are not responded to by other family members	16.10

Family factors influence students' moods, such as the atmosphere in the household, the presence of siblings as a nuisance element, or the mood of all family members (Puhrová, 2023). In this study, student family members generally do not disturb during lectures (33.90%). Even though there was something that bothered them, especially from younger siblings (19.60%); nephews/nieces (17.90%); and mother (10.70%). However, during the lecture, most of the family members did not listen or accompany (66.10%). The obstacle in the family that hindered the most during

lectures was that students were asked to do something at home during lecture hours (28.60%).

According to Marlina (2019), revealed that family factors at home are the first form of the educational process, so families, especially parents, must create an atmosphere that is conducive to learning so that they are expected to be able to realize good education. Parental involvement in learning is quite important even though parents may not have sufficient expertise to support home learning. This involvement includes doing homework or other activities that require the provision of learning resources available at home (Puhrová, 2023). In Rahmadani et al. (2021) research, it was stated that during biology learning during the pandemic, parents played the role of educators, supervisors, and counselors. These parents help shape their children's character to be able to do schoolwork, practice learning at home, and be creative in creating work as a form of implementing learning.

According to Suryani (2010), one of the learning difficulties is developmental learning disabilities. Developmental learning disabilities are used as an internal aspect because they are still related to the current development of students. Internal aspects come from factors that are within the student. This internal aspect is related to developmental learning because this learning ability is still developing in students. Developmental learning is seen in terms of the difficulties encountered, such as consisting of attention (attention difficult), memory (memory difficult), impaired visual and motor perception, thinking (thinking difficult), and language (language difficult).

Attention (Attention Difficult)

Attention is important to determine the choice of things that need attention. Difficulty in focusing attention will hinder the next learning process (Jamaris, 2009). Findings of attention difficulties in students are shown in Figure 1.

The most common difficulties experienced by students were being unable to focus for more than 30 minutes while reading (42.90%); always looking for distractions during lectures (55.40%); and difficulty focusing if the room is cluttered (58.90%). The last difficulty is the biggest difficulty for students. In Table 2, generally, the room where students study is in a private bedroom (76.80%). Thus, the bedroom becomes a kind of learning environment because it is where the learning process takes place just like the classroom. According to Hidayat's research (2015) research, learning achievement is significantly impacted by the learning environment.

However, learning at home requires students to be able to set their study hours. Unfortunately, most students (58.90%) have difficulty managing themselves

(Figure 7), so simply tidying up their bedrooms is certainly not a top priority during online learning. Adijaya & Santosa's (2018) research also supports the idea that in general, the learning environment in online

lectures does not support student learning; therefore, to improve the quality of online lectures, cooperation from all stakeholders is required.

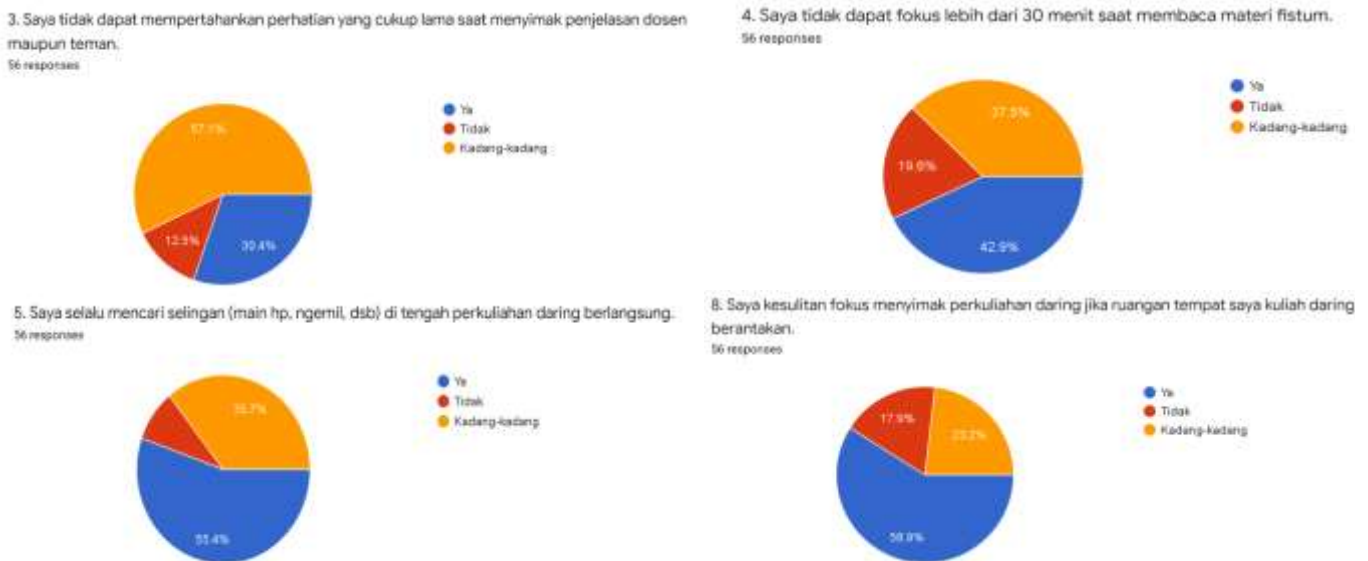


Figure 1. Difficulties in focusing attention in student

As many as 57.10% of students still cannot maintain attention when listening to the explanations of lecturers and friends. According to Jamaris (2009), excessive concentration causes a person to be unable to see the relationships that exist in the stimulus provided. In addition, this situation can also indicate that the student has a kinesthetic or auditory learning style. Students tend not to be silent for a long time so they need to move to understanding the explanation from the lecturer. This can be seen from the number of students who sometimes snack during lecture hours (55.40%). Chewing during snacking can raise oxygen levels, which improves focus, sharpness of vision, and ability to distinguish between crucial information (Nuryana & Purwanto, 2010).

Memory (Memory Difficult)

Findings of difficulty in retaining memories related to online lectures can be seen in Figure 2. Most students still have difficulty in their ability to remember because the results for the answer "sometimes" are above 50%. However, if you look at the answer "yes", the biggest difficulty for most students is difficulty in remembering the terms or vocabulary contained in the subject (30.40%). The most significant cognitive function that explains how knowledge interacts with sensory processes to generate long-term memory is remembering and memory (Dania & Novziransyah, 2021). In remembering terms or vocabularies, long-term

memory is expected to be able to make students remember information for a long time.

Unfortunately, most students sometimes still have difficulty remembering what they have seen and heard from the lecturer's explanation (75%), as well as recalling sentences in the PPT subject from friends and lecturers (75%). As a result, the majority of these students only have short-term memory, which lasts anywhere from an hour to a day or two (Dania & Novziransyah, 2021). This is also reinforced by the number of students who sometimes find it difficult to remember theoretical subjects (64.30%) and practicum subjects (57.10%) plant physiology during the midterm and final exams.

One of the causes of forgetting is due to changes in the environmental situation between learning time and recalling time. According to research, during lectures conducted utilizing the lecture technique, students can only recall 70% of the material during the first ten minutes of instruction and 20% during the final ten minutes (Silberman, 2007). Therefore, learning needs to actively involve all five senses optimally to help students store subject data and information in their memory (Kosim, 2015). This is in line with the research of Riadi et al. (2020) which says that understanding the content is the largest barrier for students taking online courses. Thus, lecturers are required to be more innovative during a pandemic.

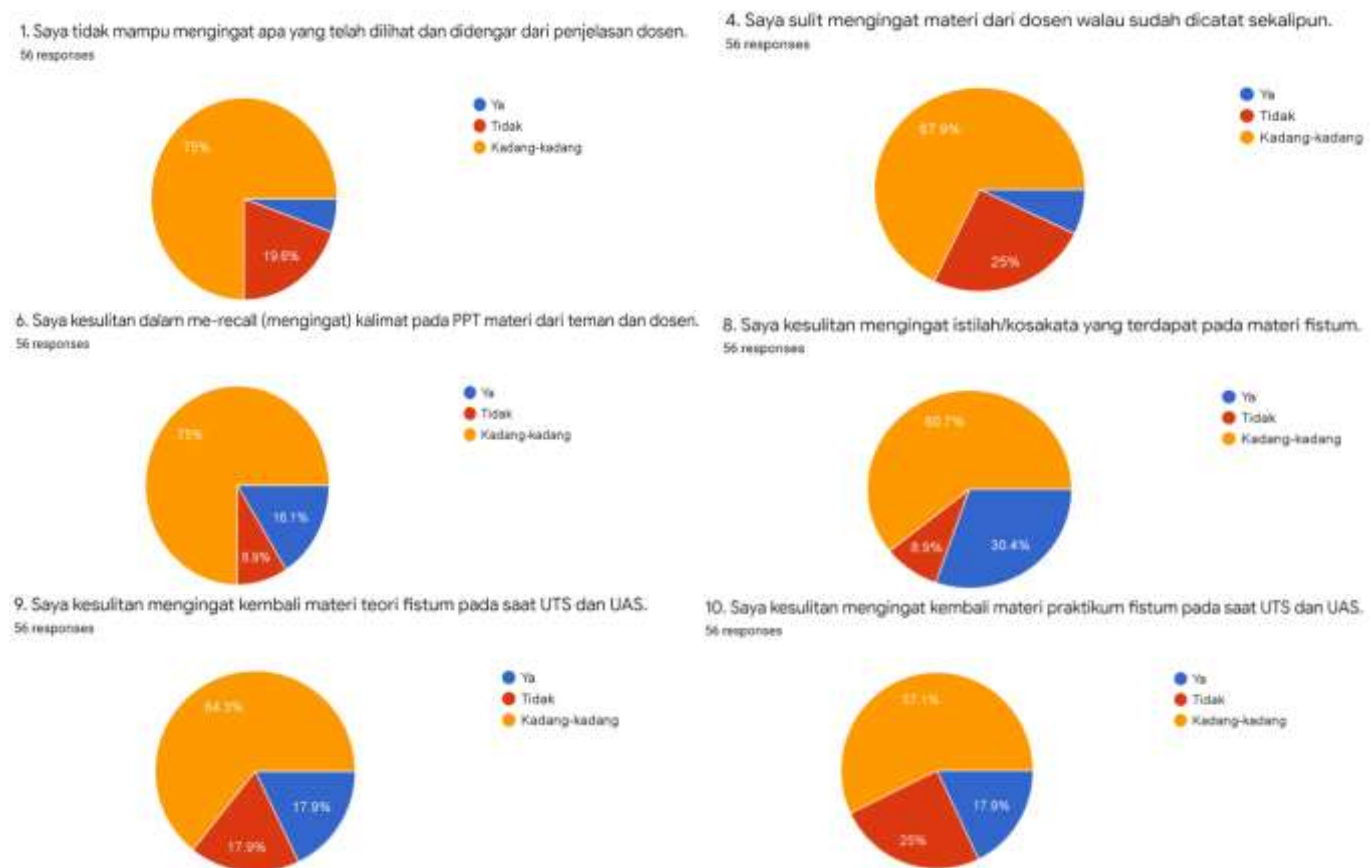


Figure 2. Difficulties in storing memory in students

Impaired Visual and Motor Perception

The process of combining the movement of motor muscles with the interpretation of visual information is known as visual and motor perception (Jamaris, 2009). This difficulty is illustrated in Figure 3.

The biggest obstacle for students in visual and motor perception with the most "yes" answers is that students always need the help of others in practicing practicum activities (37.50%). This is natural because students cannot interact with lecturers and adequate tools, so it is the family who must help provide their practicum tools and materials at home (Winarti, 2021). Tools and supplies for the practicum must be prepared following the lecturer's instructions, which have already

been shown (Al-Bari & Saputri, 2020). According to research by Sholikhah et al. (2020), one type of practicum that students are most interested in during online lectures is practicum with basic tools and materials that are easy to access while not compromising the practicum objectives. This obstacle should be overcome by using virtual laboratories as an alternative to real practice because the learning process takes the form of a fairly interactive science experiment simulation. Practical activities through virtual laboratories are sufficient to increase students' understanding of the material and anticipate real laboratory unpreparedness (Sari et al., 2020).



Figure 3. Difficulties in visual and motor perception in students

Meanwhile, the difficulties that students sometimes experience are difficulties in understanding the pictures

in the subject presented visually in both PPTs and books (57.10%). This was reinforced by the opinions of

students in Figure 7 that the course characteristics that most influenced mastery of the subject were the presence of illustrations or pictures of quite a lot of physiological processes (30.40%) and complex concepts (30.40%). Conditions during the COVID-19 pandemic have given rise to new challenges that emphasize the importance of balancing theoretical learning and practical learning for students. Students can develop time management skills in preparing practical materials and reflecting on the results of their work with lecturers. In the end, students can achieve meaningful knowledge and develop skills flexibly and creatively (Hergan & Pečar, 2022).

The difficulty of the characteristics of this subject, coupled with learning that is done online, will certainly bring up various emotions that will affect cognitive abilities. These emotions arise as a result of the transition from offline learning to online learning (Cleveland-Innes

& Campbell, 2012). Emotions tend to bring stress which can affect a person's memory and attention in carrying out cognitive activities (Gusniarti, 2002).

The differences in the learning styles of each student, which are not limited visually, also contribute to helping to understand (Maulah et al., 2020) the lecture subject which is full of complex concepts. This means that the lecture subject which consists of these pictures also needs to be explained auditory so that students with an auditory learning style can also understand the subject.

Thinking (Thinking Difficult)

Thinking is the ability to use cognitive functions to solve problems by combining various concepts (Jamaris, 2009). Difficulties in thinking for students can be seen in Figure 4.

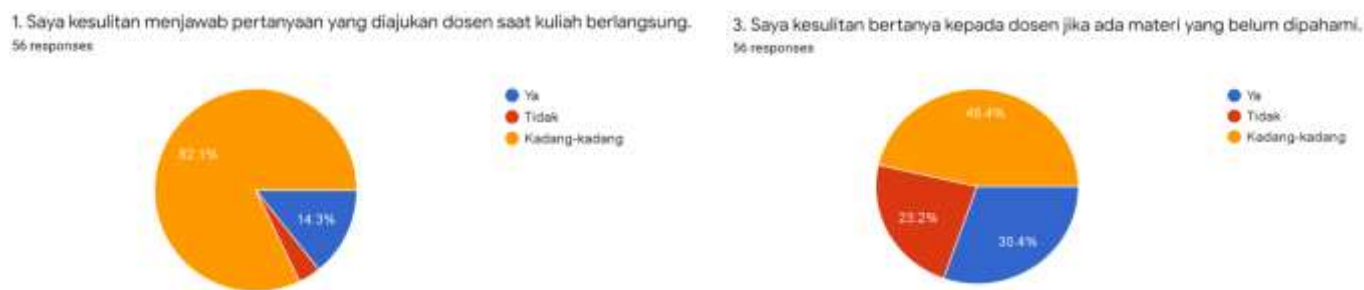


Figure 4. Difficulties in thinking in students

The most "yes" answers the sense that the most difficulties experienced by students were the difficulty of asking the lecturer if there was a subject they did not understand (30.40%). Even though online lectures allow mutual interaction between lecturers and students (2-way communication), or semi-2-way communication, namely lecturers and students communicating alternately but continuously with any type of application (Maulah et al., 2020). Thus, there is no reason for students to be embarrassed to ask when there is a subject they do not understand. However, generally, based on Figure 7, students prefer to find out on the Internet (37.50%) compared to discussing with the lecturer (28.60%). Students can lead themselves through developing research, responsibility, thinking, and problem-solving skills during online learning. Especially with the assumption that students must be responsible for their learning (Durnali, 2020).

Utina et al. (2022) research shows that online learning does not make students actively ask questions during learning. This is because students tend to prefer turning off the camera and audio features. After all, they feel bored. In fact, by turning off this feature, the teacher will not know whether the students are paying attention to the material provided or what activities the students are doing during the lesson. This is following the

findings of this research that students tend to feel uncomfortable talking with the camera turned on when the Zoom meeting is turned on (21.40%) and 44.60% sometimes still feel uncomfortable with the camera on (Figure 5).

Some students still have difficulty answering questions asked by lecturers during lectures (82.10%). This is supported by the finding in Figure 2 that most students still have difficulty remembering what they have seen and heard from the lecturer's explanation (75%), so that when asked they cannot answer immediately. Uno & Lamatenggo (2016), revealed that memory is related to thought processes and retention. The better the memory function, the more information a person can remember and understand. Jamaris (2009) describes the difficulty of thinking will cause someone to be difficult making decisions.

To overcome this thinking difficulty students need to be trained by emphasizing memorization through various learning processes such as using e-modules that contain materials and exercises that are interesting (Sukarmin & Sani, 2023) or can also apply project-based online learning (Mardizal et al., 2023).

Language (Language Difficult)

Language difficulties related to students' abilities in spoken and written language during lectures. The results obtained are as in Figure 5.

Lecturer interaction with students during online lectures is limited to verbal communication to provide feedback and support students apart from providing material. However, this communication is not always successful with all students (Miroslavljević et al., 2023). The difficulty experienced by students was that most students often lost words to be spoken orally during lectures (35.70%). This contradicts Supriyatin's (2021) research, which found that the absence of a lecturer in person did not make pupils feel embarrassed when speaking. This difficulty may be caused by students having difficulty understanding word concepts, word groups, word relationships, and word meanings from the structure of the language heard so it is difficult to

assemble phonemes in various words and sentences (Jamaris, 2009). This is supported by the fact that many students still have difficulty rewriting terms or vocabulary in the subject (66.10%) and often misread sentences and terms in the subject (66.10%). This difficulty causes students to find it difficult to express opinions and behavior in the form of words or sentences during lectures. Serry et al. (2022) said difficulty reading and writing can be caused by internal factors such as nervous disorders or external factors from a disturbing environment. Students and lecturers must be able to identify the causes and continue to support students who experience reading difficulties by continuing to invite them to contribute during learning. Online education makes people aware of the importance of applying the principle of individualization in education which requires a perspective that is centered on the students themselves (Mazurek, 2022).



Figure 5. Difficulties in language in students

This difficulty in communicating can occur with hybrid learning. In research of Rahmatulloh et al. (2023), the existence of hybrid learning in higher education can improve communication skills in digital spaces through digital technology. This communication can take the form of discussing and sharing topics or materials, using digital applications, and actively participating in class.

The physical health profile describes the physical health conditions of students while undergoing online lectures which can be seen from Figure 6. Health problems experienced by students were easily sore and sleepy when sitting following online lectures (57.10%) and difficulty sleeping when thinking about assignments given by lecturers (39.30%). It is natural for

most students to feel sore and sleepy when sitting in online lectures because their eyes stare at cell phones and laptop or computer screens for too long during online lectures (Jannah et al., 2020; Pawicara & Conilie, 2020). Plant physiology lectures usually start at 07.00 WIB in the morning. In addition, most students still sometimes have breakfast before lectures start (60.70%). Students also sometimes have breakfast with balanced nutrition which contains carbohydrates, protein, fat, and fiber (57.10%). Ramadhani et al. (2021) said adequate nutritional status would have a positive impact on one's productivity. Conversely, if nutritional intake is insufficient, you will experience fatigue more quickly.

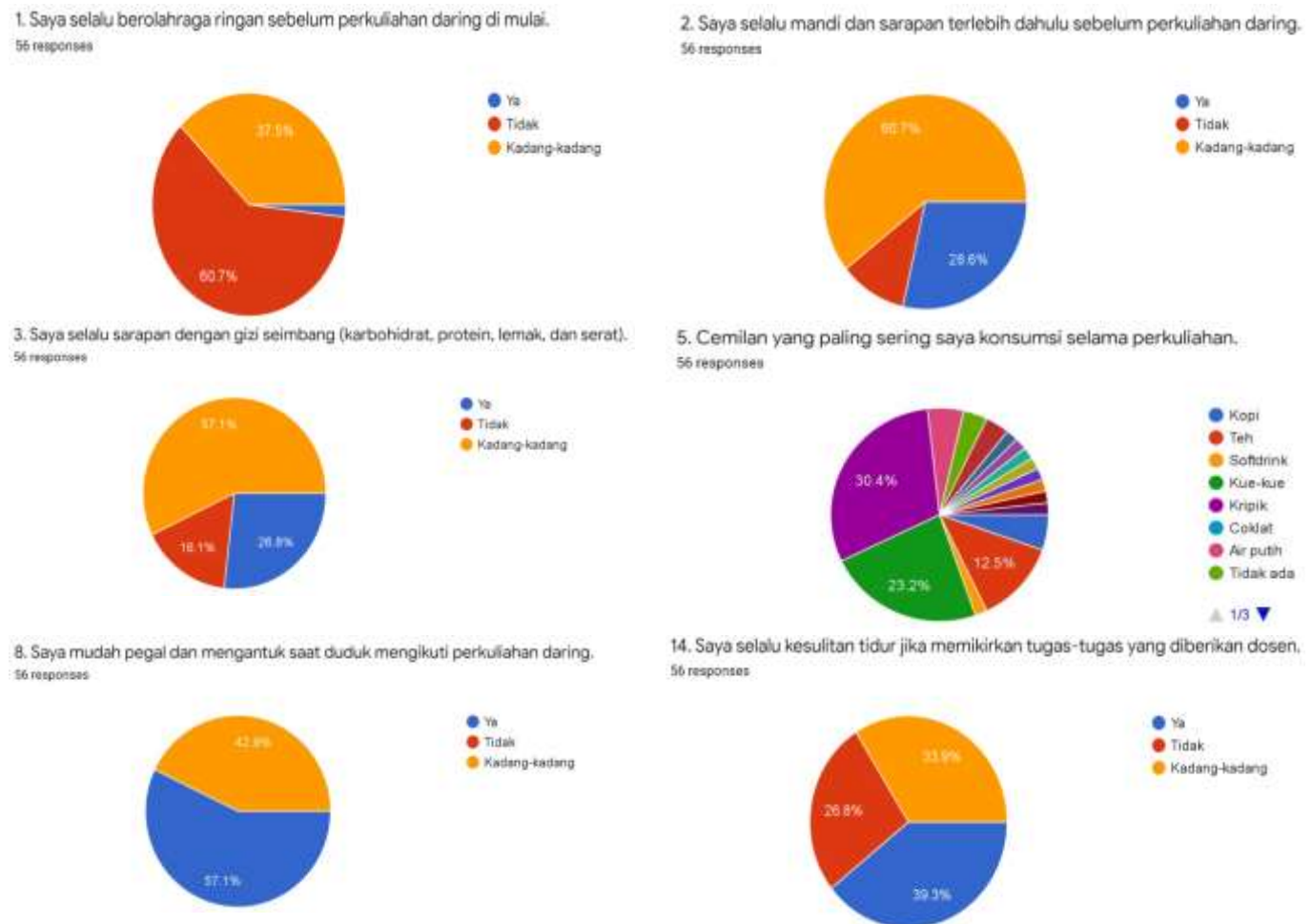


Figure 6. Physical health conditions in students

As many as 60.70% of students also don't do light exercise at all before online lectures begin. Even though exercise is beneficial for improving cognitive function and preventing depression by utilizing blood oxygen from a racing heart (Setyaningrum, 2020). Lack of physical activity such as sports causes hemoglobin levels, which are a supplier of oxygen, to decrease (Wahyudi, 2020).

The snacks most frequently consumed by students during lectures were chips (30.40%) and cookies (23.20%). According to Adevia et al. (2020), foods that contain excess sugar, coloring agents, artificial preservatives, and other preservatives can affect concentration such that attention is easily distracted by distractions or outside stimuli.

To increase the body's immunity, especially during a pandemic, food must contain several vitamins, amino acids, minerals, and fatty acids which can increase the intestinal microbiota which affects the immune system. The recommended foods are fruit, vegetables, and whole grains (Sumarto et al., 2023).

According to Suryani (2010), one of the learning difficulties is academic learning disabilities. In this study

academic learning disabilities are traced based on the student's academic learning profile. The Academic learning profile describes students' opinions of the obstacles they face related to academic activities in plant physiology courses. Student opinions on academic learning are shown in Figure 7.

Students find it difficult (58.90%) to manage themselves during lectures, such as managing study time, determining study strategies, and completing assignments. Zhao et al. (2021) stated that the biggest difficulty for students in online learning is the problem of self-control. Thus, there needs to be improvements in teaching methods and methods so that the quality of online lectures does not decrease even without being in the classroom.

Most students have difficulty finding textbooks during online lectures compared to offline lectures (69.60%). The nature of the internet, which can be accessed anytime and anywhere, can overcome space and time constraints, so students should be able to solve the problem of learning resources (Pujilestari, 2020). This statement is supported by the finding that it is not difficult for students to find other sources of reference

(besides textbooks) during online lectures (71.40%). Campuses should also provide reference sources through digital libraries that can be accessed while students are at home so that they can still study during online learning (Singh & Meena, 2022).

Students feel not sure if they understand lecture subjects if lectures take place offline (64.30%), while only 28.60% felt they could master the material offline. This is because the subject requires laboratory practicum, practical experience, and external collaboration to master it. While online learning does not allow for

physical presence, online learning cannot provide effective mastery of all subjects (Sultanova et al., 2021). In line with research by Xu et al. (2013) it is still unclear whether online or offline learning is an effective learning alternative. The lack of interaction between students - and lecturers and interaction between students - and students during online lectures makes students feel isolated so studying becomes a heavy burden making the online lecture experience less enjoyable (Ghaderi et al., 2022).

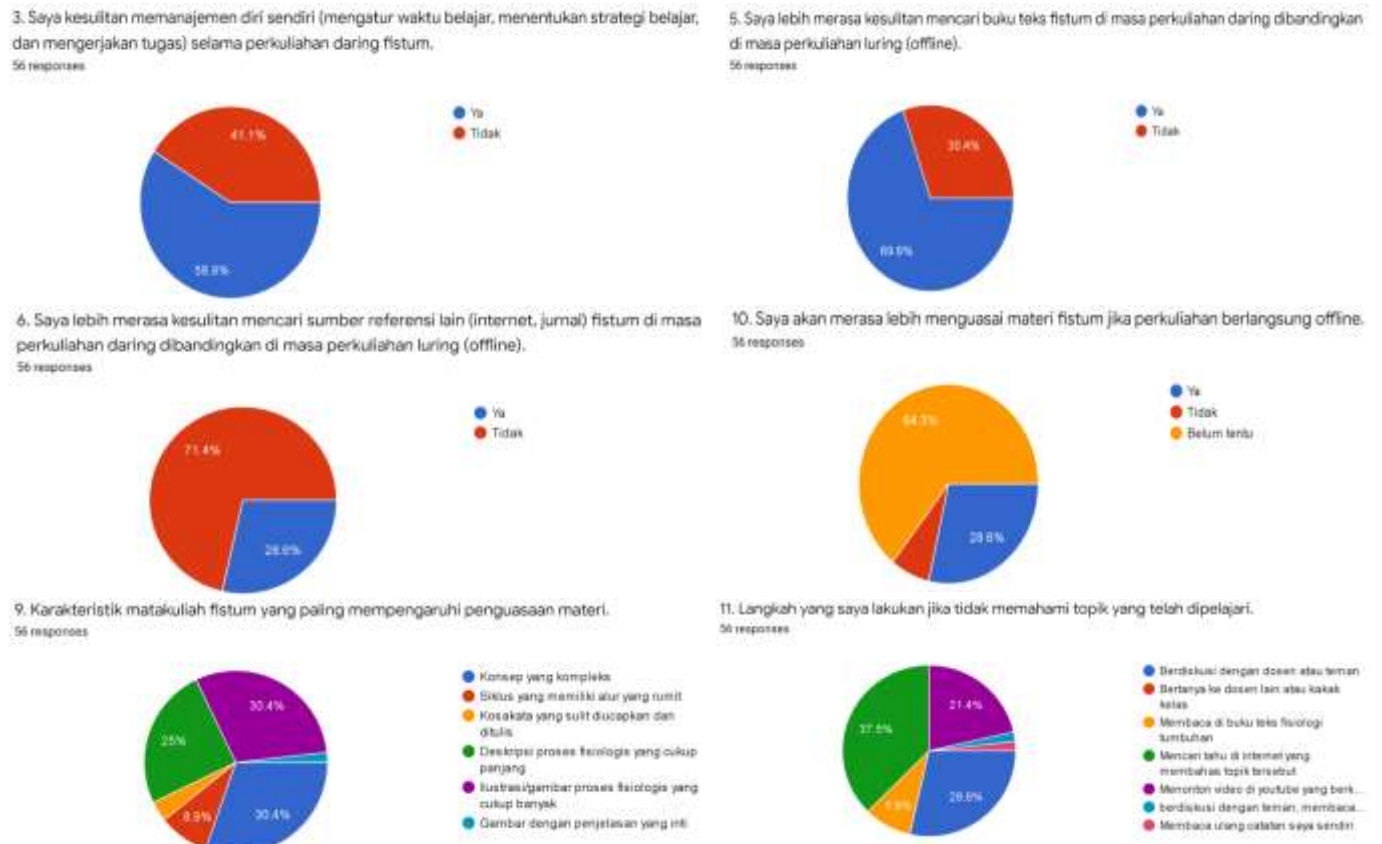


Figure 7. Student academic learning profiles in plant physiology lectures

The characteristics of the plant physiology course that most influenced mastery of the subject were the presence of illustrations or pictures of physiological processes which were quite a lot (30.40%) and complex concepts (30.40%). Thus, these findings indicate that students have disturbances in visual perception and auditory perception, namely the difficulty in understanding the objects seen and heard (Suryani, 2010). In this case, the subject displayed in the form of images on PowerPoint media and explained by the lecturer is still difficult for students to understand. This was also reinforced by the finding in Figure 4 that most students still had difficulty understanding the pictures in the subject presented visually in both PPTs and books (57.10%). Students' success in understanding subjects is

influenced by high motivation and interest. With motivation and interest, the psychological state of students tends to pay attention to a particular object or topic so that they always have a desire to repeat the material and enjoy studying it (Handayani et al., 2021).

The main step taken by students, if they do not understand the topics that have been studied, is to search the internet that discusses these topics (37.50%). This is in line with research of Hutauruk et al. (2020), that students generally overcome problems in understanding lecture subjects by opening websites or YouTube which have explanations related to the topics being studied. Student information literacy is greatly influenced by technical literacy skills in using information technology such as the Internet. If technical

literacy skills increase, then information literacy skills will also increase (Setyoko et al., 2023).

Conclusion

The difficulties students experience come from external aspects of internet facilities with weak networks and family factors when students are asked to do something during lectures. Internal aspects, especially student attention which is difficult to focus on if the lecture room is messy. Health and physical problems experienced by students are easily sore and sleepy during lectures. The academic learning profile describes that it is difficult for students to get textbooks during online lectures compared to offline lectures. The characteristic of the course that most influences mastery of the subject is the existence of illustrations or pictures of physiological processes which are quite a lot of complex concepts. It is hoped that difficulties during online lectures can be overcome together by both lecturers and students who experience these difficulties. This ensures that these difficulties do not prevent students from continuing to study hard. Other difficulties did not interfere with the overall course of lectures and online lectures continued to run well.

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Author Contributions

Nisaa: Design methodology and instrument, leading research, data analysis, writing methodology, result, and discussion in this article. Anugrah: validate the instrument, distribute the instrument to respondents, calculate and draw data, and write the abstract, introduction, and conclusion in this article.

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Conflicts of Interest

The authors declare no conflict of interest.

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