

## Chemistry Education Students' Perception Toward Their Learning Outcomes During Online Learning

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**Abstract:** This study aims to determine the self-perception of chemistry education students related to online learning in the UIN Ar-Raniry. This descriptive research involved chemistry education students of the 2019 batch. Their perception was obtained using an online questionnaire with 15 questions. It can be concluded that implementing the online learning system does not entirely affect students' learning outcomes.

**Keywords:** Students' attitude, active learning, student's achievement, survey

### INTRODUCTION

The emergence of Covid-19 forced the Indonesian government to apply some restrictions and social distancing, including the closure of educational institutions. Online or remote education has replaced the traditional classroom method of instruction (Wardani et al., 2022). The government policy leads to implementing online learning to avoid the face-to-face process (Mandailina et al., 2021) using several e-learning platforms such as Zoom, WhatsApp, google meet, and google classroom. According to Belawati (2019), online learning is learning remotely where teachers and students are at their respective homes—implementing this learning using internet facilities and other electronic devices. This online learning requires lecturers and students to be more skilled in using technology, independent, responsible and establish good communication. E-learning platforms can help lecturers and students be independent and gain more knowledge about science and technology (Al-Idrus et al., 2021). Riyana (2019) emphasises the accuracy and foresight of students in receiving and processing information as a critical factor for online learning success. The impact of modern technology on teaching motivates the previous study (Putri & Kurniawati, 2021), which looks at how different approaches to using computers and androids for multimedia purposes affect students' motivation to learn.

Learning outcomes are knowledge, skill and any competencies gained after participating in a learning process. Students will succeed if they put in the time and effort to study and grasp the proper information. In addition, using an appropriate learning approach affects students' success in learning (Pratiwi & Puspasari, 2021). The UIN Ar-Raniry, an Islamic state university in Banda Aceh, also taught online, including in the Chemistry Education Study Program. The common obstacle in this mode is the lack of a network connection.

Attitude towards chemistry has been considered a determining factor in the student's achievement. Many students believe in the essential chemistry knowledge for daily life, but they still have differing opinions on whether or not chemistry is challenging (Habiddin et al., 2020).

### METHOD

This descriptive study aimed to know student perceptions of learning outcomes during online learning. The participants were chemistry education students of the 2019 batch of the UIN Ar-Raniry. They were selected using a purposive sampling technique. Online questionnaires using the

Google Form E-Learning consisting of 15 questions with the answer choice "Yes / No" was employed for data collection. Thirty-one students voluntarily completed the questionnaire.

## RESULTS AND DISCUSSION

Students' perception regarding their learning outcomes during online learning is analysed and presented according to the following questions.

### Does online learning make you more active?

Students' responses regarding the questions are presented in Figure 1. The vast majority of students, 80.6%, admitted that online learning does not contribute to their active learning activities. Only a tiny portion of students acknowledge that online learning makes them more engaged in learning.

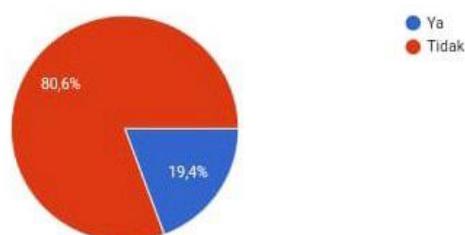


Figure 1. Students' Perceptions of Activeness

### Does online learning improve your ability to think creatively?

When the question goes to creativity, the number of students who admitted that online learning makes them more creative is almost equal to those who oppose it. However, the number of students who think online learning does not contribute to their creativity is still higher (Figure 2).

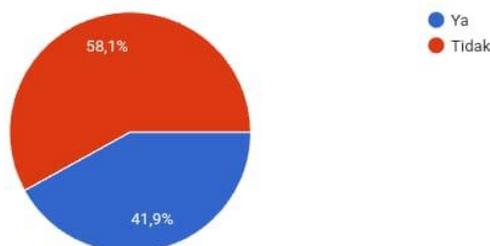
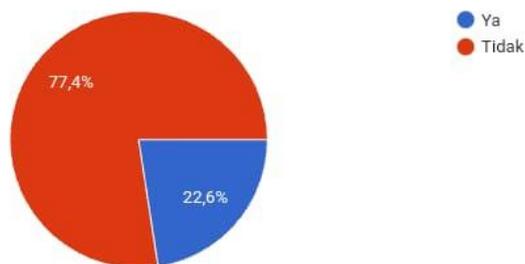


Figure 2. Students' Perceptions of Creativity

### Has your understanding increased as a result of your online studies?

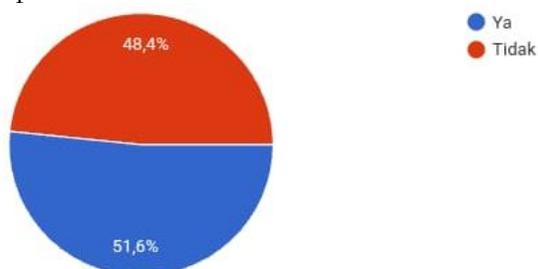
Most students, 77.4%, did not experience increased understanding due to their difficulty elaborating the concepts independently. The remaining 22.6% of students considered that they still gain proper knowledge with this learning platform (Figure 3).



**Figure 3.** Students' perceptions of gained knowledge during online learning

**Have you noticed an improvement in your learning outcomes during online learning?**

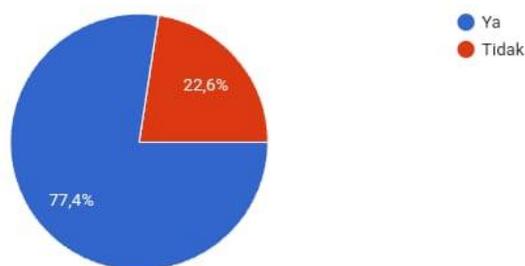
For this question, the number of students who answered "yes" are almost equal to those who answered "no" with a slight advantage over the previous choice (Figure 4). This phenomenon is because students have varying learning styles; those that put in the time and effort to master the content will be rewarded with positive results.



**Figure 4.** Student perception of the improvement of learning outcomes

**Does the use of media in online learning enhance the efficiency of the learning process?**

An interesting phenomenon was observed in this question. Although 77.4% of students (Figure 3) considered that online learning did not improve their understanding, the exact number of them (Figure 5) admitted that this learning mode is efficient. However, 22.6% of students are against using media in online classes since they are still used to a brand-new e-learning environment.



**Figure 5.** Student perceptions of the effectiveness of media use

### Has your learning pattern changed after implementing online learning?

The data shown in Figure 6 indicates that 73.3% of students experience shifts in their learning patterns during online learning, whereas 26.7% do not. This is due to today's students' shift towards digital education methods.

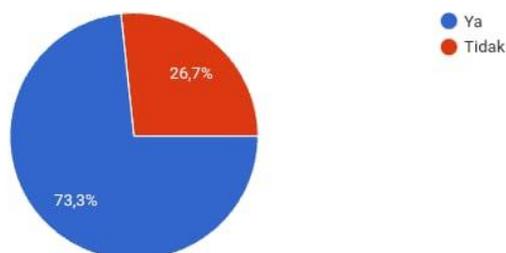


Figure 6. Student perceptions of learning patterns in online learning

### How much do you think online learning has helped you learn about cutting-edge technologies?

According to the data presented in Figure 7, while 71% of students improve their understanding of scientific and technological concepts while engaging in online learning, only 29% of students fail to improve their understanding while engaging in online education due to a lack of motivation to try new approaches to learning.

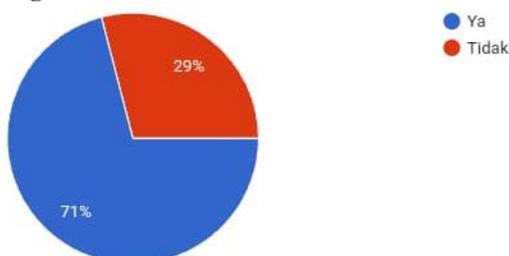


Figure 7. Students' perceptions of their knowledge of science and technology

### Are you satisfied with the grades obtained during online learning?

According to the data in Figure 8, 61.3% of students report being happy with their final grades earned through online education. However, 38.7% of students are disappointed with the results they have achieved.

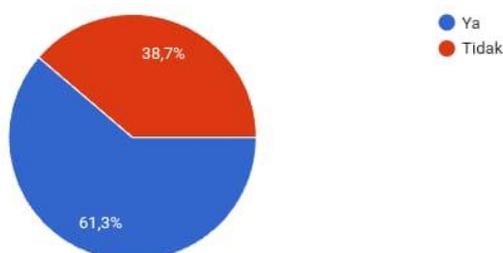


Figure 8. Student satisfaction with the grades obtained during online learning

### Does the use of media during online learning affect your learning outcomes?

According to the data presented in Figure 9, nearly all students (93.5%) encounter shifts in their use of media as a result of their exposure to and engagement with novel forms of media

employed in the course of online learning. However, 6.5% of students reported no shifts in media consumption habits due to their online education.



Figure 9. Student perceptions of the effect of media use on learning outcomes

**If you study independently, can you achieve more remarkable results from your online learning?**

The data in Figure 10 shows that 58.1% of students agree that working independently during online courses improves their chances of success. This is because, to learn the content and perform well on exams, students must put in significant effort when studying independently. However, 41.9% of students are sceptical that being left to their devices during online courses will help them succeed.

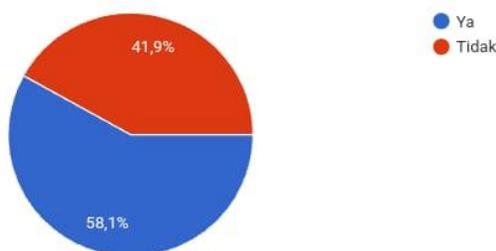


Figure 10. Students' perceptions of the ease of self-study in online learning

**Do the learning outcomes you obtained during online learning affect your enthusiasm for learning?**

According to the data presented in Figure 11, 74.2% of students have an impact on the learning outcomes achieved through online learning. When students begin using new media during online learning, their mindsets must also adapt. However, this does not affect the learning outcomes attained by the remaining 25.8% of students because they continue to learn both online and offline.

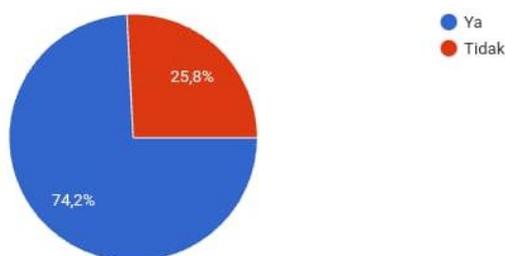


Figure 11. Students' perceptions of how learning outcomes affect their enthusiasm

### Have your interest improved as a result of your engagement with online learning?

According to the data in Figure 12, 77.4% of students do not see an improvement in their interest in studying due to online learning because they struggle to comprehend the material presented by lecturers. While 22.6% of students reported higher levels of interest in learning after participating in online instruction, this may have been due to their satisfaction with and comprehension of the information covered.

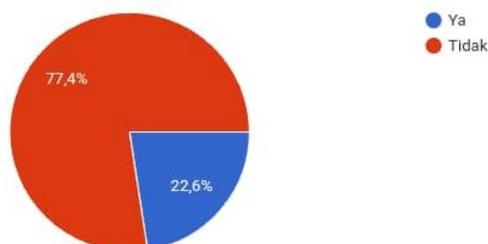


Figure 12. Students' perceptions of their learning interest

### Do the results of online learning align with the learning process?

71% of students' grades were consistent with their learning process, as depicted in Figure 13. In the meantime, 29% of students complain that they are not compensated fairly for the effort they put into learning. This is because different students have various learning styles, resulting in demonstrably varying levels of mastery.

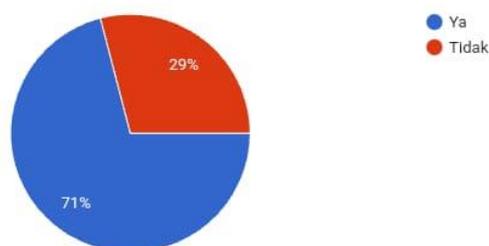


Figure 13. Students' perceptions regarding the alignment of the learning process and outcome

### When studying online, do video materials help you retain more information?

According to the data presented in Figure 14, the usage of video media in online learning improves learning outcomes for 80.6% of students. While most students benefited from online video content, 19.4% did not because they found it too challenging to follow up.

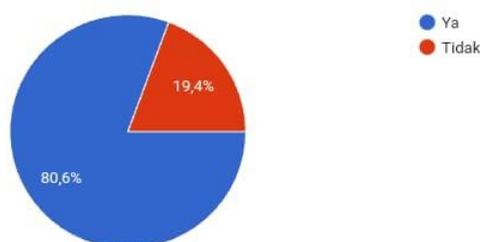
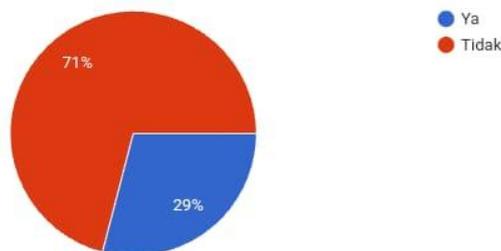


Figure 14. Students' perceptions about the effectiveness of visual media during online learning

### Have your learning outcomes regularly improved after 2 years of online education?

The higher the semester of the lecture, the more the subject matter requires a high degree of knowledge, and many students complain about the learning, as shown in Figure 15. As a result, 71% of students do not consistently see a rise in learning outcomes. In comparison, only 29% of pupils see a steady improvement in their academic performance.



**Figure 15.** Student perceptions of consistency improvement in learning outcomes

This study found that the learning outcome's 2019 batch chemistry students of the UIN Ar-Raniry have not improved. This is related to students' issues grasping the curriculum as well as internal student factors. In this study, most students (77.4%) did not experience an increase in understanding learning, but most students (51.6%) experienced an increase in learning outcomes. This improvement in student learning outcomes did not occur consistently; only 29% of students experienced a consistent improvement in learning outcomes during online learning.

Online learning has an impact on students, and the effect is that students feel highly bored and tired with learning. Students' excitement and zeal are dwindling day by day. This is distinct from the situation in which students study in class with their peers (Putria et al., 2020).

Online learning is possible due to various supporting aspects, such include telephones, credit, quotas, and a steady and good internet network. Mobile phones are the most important enabling factor in online learning since online learning would not be possible without them. Purwanto et al. (2020) highlighted that these facilities, such as laptops, computers, or cell phones, will make it easier for teachers to deliver online teaching and learning materials is vital for the smooth teaching and learning process.

## CONCLUSIONS

Using an online learning system does not affect the chemistry education students' learning outcomes in the UIN Ar-Raniry class 2019. One factor influencing it is the difficulties students have with the material offered because they do not yet have independence in learning. It is evident that online learning presents challenges for students, including the need for greater self-motivation, discipline, and independent learning strategies. The results suggest the importance of supporting and guiding students to enhance their ability to adapt to and succeed in online learning environments. Furthermore, continuous improvement in online learning platforms and resources is required to enable effective delivery of educational materials and stimulate student involvement.

This finding also suggests a need for acknowledging students' psychological aspects, such as motivation, perception, mindset, attitude, and efforts to improve them. Several studies have been concerned with this issue including Arisandi et al. (2021) with Stimulation, information Processing, Application, Reflection, and Evaluation (SPARE) strategy for promoting students' perception of chemistry. Future studies should look into practical strategies and interventions that might help students build self-directed learning skills and adapt to online learning environments. This will help to improve students' learning results and experiences in online education settings.

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