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THE EFFECT OF INTEGRATED INSTAGRAM AND TIKTOK LEARNING MEDIA WITH PBL LEARNING MODEL ON INCREASING STUDENT LEARNING OUTCOMES ON THE TOPIC OF QUALITATIVE ANALYSIS OF CATION

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ABSTRACT

Information and communication technology development demands a transformation of education, especially in fulfilling innovation in learning media. Learning media is an urgent means of teaching and learning chemistry. Students' skills can be developed by increasing motivation and collaboration through digital technology. This research aims to determine the effect of the integrated *Instagram (IG)* and *TikTok* with the PBL learning model on student learning outcomes in qualitative analysis courses. The research method used was a quasi-experimental research design with a Pretest-Posttest Control Group design. The sample used came from a 2nd-year undergraduate student, Department of Chemistry, the State University of Malang, which consisted of 4 classes, two control classes with 44 students and two experimental classes with 50 students. Data analysis used preliminary tests and hypothesis testing. The preliminary test of the research data showed that the data were not normally distributed, so the hypothesis test used the Mann-Whitney test. The results of the hypothesis test show the Asymp value. Sig. (2-tailed) of 0.021 (0.021<0.05), it can be concluded that the use of integrated IG and TikTok learning media with the PBL learning model can increase student learning outcomes of 2nd-year undergraduate students on qualitative analysis of cation

Keywords: *Analysis of Cation Groups 1 and 2, Social Media, Instagram, TikTok*

INTRODUCTION

Information technology in recent years has developed so rapidly. These conditions identify changes in interaction using technology-based communication media. In the current era of globalization, there are many positive and negative impacts; in other words, globalization can be said to be hope and can also be said as a big danger [1]. Data innovation in the era of modernization and globalization plays an important role in various fields. Rapid technological developments from time to time have various impacts, one of which is in the field of education. Information and Communication Technology (ICT) in the field of education

makes a significant contribution to the learning process [1-3]. Implementing a quality learning process can also print quality human resources [4]. Educators who are innovative and critical in creating learning methods and their media are challenged in using a technological approach in learning activities. Efficiency, effectiveness, and attractiveness in learning practices influence the success of implementing a technological approach in learning activities [5]. Learner skills can be developed by increasing motivation and collaboration skills through digital technology.

The application of digital technology in learning has positive and negative impacts. One of the negative impacts that appear is the problem of addiction to applications such as online games and social media, especially social media such as Instagram [6] and TikTok [7]. For example, in Indonesia, Instagram users as of February 2022 were 84.8%, while the proportion of *TikTok* users was 63.1% [8]. This figure shows an increase in social media users compared to the previous year.

There are many users of Instagram and Tik Tok online media, especially among students and college students. But many students are addicted to using *Instagram* and *TikTok* instead forgetting their obligation to study [9]. They are too engrossed to spend time scrolling *Instagram* and *TikTok* and waste their time. The impact for the student is they can decrease learning outcomes if what is accessed on Instagram or TikTok is not useful and adds to knowledge. Apart from that, *Instagram* and *TikTok* can also cause moral decline, especially for teenagers in society, delinquency, and changing patterns of human interaction [9]. This is one of the negative impacts of using Instagram and TikTok, so it is necessary to change the use of *Instagram* and *TikTok*.

Various kinds of interesting features are found on *TikTok* so that it can eliminate the burden of the mind. In addition, Instagram can be another option to relieve fatigue. Instagram is one application that many students have because it is easy to use and gets information quickly. Instagram has a feature to send photos and videos using a unique design, so it is interesting if used as a learning medium. Likewise, with *TikTok* social media [10]

Learning media can be used to channel the sender's message to the recipient, so that it can stimulate students' thoughts, feelings, concerns, and interests to learn [10-13]. Learning media can make teaching and learning more effective and efficient and establish good relations between teachers and students. In addition, the media can play a role in overcoming boredom in learning in the classroom [14]. *Instagram* and *TikTok* learning media can be used in learning models with Problem Based Learning or the PBL Learning model.

Problem Based Learning, or PBL, is a learning model that invites students to think critically to answer problems and find solutions as a way out of these problems. Learning through experience can make connections as an answer to a possible life problem that will occur in the future. Studies on using PBL in the learning environment generally describe the implementation process. The results of [15] research also explain the importance of the PBL learning

model on learning outcomes. Studies were conducted on students through semi-empirical studies using the best design after the non-equivalence trial of the comparison group design. This study examines the effect of PBL on student achievement and motivation [15]. The results showed that the problem-solving method positively affected learning outcomes. In addition, both problem-solving and PBL approaches have a good impression of being used to improve student learning outcomes and increase student motivation [16].

In the current learning environment, not a few students, when getting assignments from teachers/lecturers, use full access to social media from the internet, YouTube, as a source of learning information. Therefore, learning related to digital social media is very helpful for students in their activities [12]. However, it all depends on students' behaviour, whether they can bring the influence of social media in a better direction or even further away from saying good things.

There has been a lot of research on the application of social media in learning activities to measure an indicator for students. The a very significant influence between social media and learning achievement [17]. In line with research conducted by Khoiriyati, learning that involves social media can optimize children's cognitive development [18]. Social media can also increase children's learning motivation, but it must be under parental supervision [19]. Previous research shows only using social media in learning without being accompanied by the use of learning models. This can be applied, one of which is in lecture activities.

One of the courses used the PBL learning method with *Instagram* and *TikTok* learning media in qualitative analysis of cation materials. PBL, or problem-based learning, is a teaching model in which complex everyday problems are used to introduce learning concepts and principles to students. The learning outcomes of this course are expected to lead to the analytical cognitive level (C4-C6), so it is necessary to choose a learning model that increases students' capabilities to think critically and analytically about social issues in society. This study aims to determine the effect of the integrated *Instagram and TikTok* with the PBL learning model on student learning outcomes in qualitative analysis courses. Therefore, innovation in learning needs to be carried out in line with technological developments. Therefore, this research is important because it can provide information about effective learning model innovations for learning chemistry.

METHODS

Research design

This study used a quasi-experimental research method and used a pretest-posttest control group design. This study aims to determine the effect of the integrated *Instagram* and *TikTok* with the PBL learning model on student learning outcomes in qualitative analysis courses

Participant and instrument

The participant was from 2nd-year undergraduate students of Chemistry Education, Department of Chemistry, the State University of Malang. This study

involved four classes of the course Fundamentals of Analytical Chemistry in the qualitative analysis of cation materials groups 1 and 2. Two classes acted as a control class (44 students), and the other class was an experimental class (50 students) randomly selected as experimental and control groups. In the experimental class, treatment was given using *Instagram* and *TikTok* learning media with the PBL learning model. The research location is at the State University of Malang, Department of Chemistry, with two weeks starting from September 26 to October 8, 2022. In this study, two meetings were used in each class, with 100 minutes per meeting duration.

The learning outcomes test used an instrument to collect data in 7 multiple-choice questions and two description questions given after students were taught the qualitative analysis material.

Analysis

The data obtained were pretest and post-test scores, which continued with normality, homogeneity and hypothesis testing. The data obtained were analyzed using quantitative and qualitative data analysis techniques. Quantitatively the data obtained were tested for normality and resulted in abnormal data, so to test the hypothesis, a non-parametric test was used, the Mann-Whitney test.

Data Analysis

In this research, two raters were used to look at the content of NoS in textbooks on the topic of acid-base balance. Some aspects include quoting sentences, paragraphs, tables, pictures, graphs, and student activities related to one or more aspects of NoS. The quotations obtained were analyzed based on the way they were presented, which consisted of 4 categories: explicit-true, implicit-true, implicit-false, and explicit-false, as shown in Table 2. Then these quotations were scored according to the scoring rubric in Table 3 [14].

RESULTS AND DISCUSSION

Result

Learning activities with the PBL learning model using *Instagram* and *TikTok* learning media is one learning innovation that takes advantage of current trends. The implementation of problem-based learning in the direct learning process was observed at each meeting for researchers and students. Based on the teacher activities that have been carried out, it can be seen that the implementation of learning using the PBL model is carried out well by using social media in its application.

The recapitulation of research data results can be seen in Table 1 below.

Table 1. Recapitulation of Research Data Result

	Control class		Experiment class	
	Pre	Post	Pre	Post
Average	50	70	49	76
Score ≥ 75	2%	39%	0%	58%
Score ≤ 75	98%	61%	100%	42%

Source: data processing results (2022)

Based on these data, it was obtained that the pretest results of students in the control class had an average score of 50, while in the experimental class, it was 49. After the learning activities were carried out, the learning outcomes of students experienced an increase in both groups.

However, the increase in the average post-test score in the experimental class was higher than in the control class. The data obtained is compared between the control and experimental classes. It proves that using *Instagram* and *TikTok* learning media with the PBL learning model can improve student learning outcomes.

The results of the descriptive analysis of student scores in the control class and experimental class can be seen in Table 2 below:

Table 2. The result of Descriptive Analysis

the value of learning outcomes	Control class	Experiment class
subject	44	50
ideal score	100	100
total score	3088	3823
acquisition		
highest score	85	98
lowest score	40	60
average	70	76
median	72	77
mode	80	80

Source: data processing results (2022)

Table 2 shows the highest score achieved by students in the experimental class was 98.00, and the lowest was 60.00 with a median of 77, mode 80 and an average of 76 with a total of 50 students. Then a hypothesis test was carried out to determine the students' cognitive abilities achieved in experimental and control classes.

Table 3. The Result of Data Analysis

Test	Control class	Experiment class
Normality Test	Pre : 0.015 Post : 0.000	Pre : 0.000 Post : 0.200
Homogeneity Test	0.903	0.281
Hypothesis Test (Mann Whitney)	0.021	

Source: data processing results (2022)

Based on the table above, we know that the normality test results were obtained with a significance value for the control class at the pretest and post-test, respectively 0.015 and 0.000, which showed that the pretest and post-test values for the control class were < 0.05. So the results of the pretest and post-test values for the control class are not normally distributed. While the normality test in the experimental class obtained a significant value in the pretest and post-test values, respectively 0.000 and 0.200, indicating that only the post-test scores are normally distributed. Furthermore, for the homogeneity test results using the Levene Test calculation, the p-value sig in control and experimental classes showed a value of >0.05 for all variables. This indicates that the variance of all variables is homogeneous.

The hypothesis test uses a non-parametric test because based on the preliminary test, it is found that one of the data is not normally distributed. The hypothesis test used is the Mann-Whitney test. Based on the results of the Mann-Whitney test, the Asymp Sig. (1-tailed) value was obtained of 0.021. This number represents the Asymp. Sig. (2-tailed) < 0.05 so that it shows acceptance of the hypothesis.

Discussion

Based on the study results, the things that were measured are increased learning outcomes. The following are the learning outcomes of the Qualitative Analysis of cations groups 1 and 2 of a 2nd-year undergraduate student who did pretest and post-test in the control and experimental classes.

The analysis showed that the learning outcomes of classes taught with Instagram and TikTok learning media with the PBL learning model have higher results and improvements than those not taught with these models. For example, Table 1 shows that more than 50% of the students experienced increased learning outcomes after being taught using *Instagram* and *TikTok* learning media with the PBL learning model. Therefore, it can be concluded that there is a significant influence of the use of social media based on *Instagram* and *TikTok* integrated into the PBL learning model on the learning outcomes and cognitive abilities of a 2nd-year undergraduate student in the qualitative analysis of cations.

Qualitative analysis of cations is one of the topics on the basics of analytical chemistry. Several cations are discussed, but this study focuses only on group I and II cations. Group I and II cations can be identified using several laboratory tests. In addition, the *Instagram* and *TikTok* learning media show several ways of identifying group I and II cations.

Using *Instagram* and *TikTok* as learning media has quite good results in learning the basics of analytical chemistry, especially in qualitative analysis material. This is indicated by the results of the data that has been processed. For example, in Table 1, the learning outcomes in the experimental class give better results than the control class. Furthermore, research [14-20] also shows a positive influence between the use of social media *Instagram* and *TikTok* on student learning outcomes.

The increase in students' cognitive abilities in the experimental class was influenced by using *Instagram* and *TikTok* learning media with the PBL learning model. The PBL learning model uses problems that students often encounter in daily life as the initial concept of learning, the aim is for students to easily apply what students have learned in class to daily life, and the learning is not abstract. Then students are encouraged to be actively involved in solving the problems given.

Using *Instagram* and *TikTok* learning media with the PBL learning model can also encourage students' critical power to think creatively and innovatively in formulating several solutions to the problems presented by researchers [16-21]. Students compiling findings and solutions to the problems made them take a lot of literature studies to become more frequent and read. This is an example of a screen display from *Instagram* and *TikTok* used in learning shown in Figures 1 and 2.

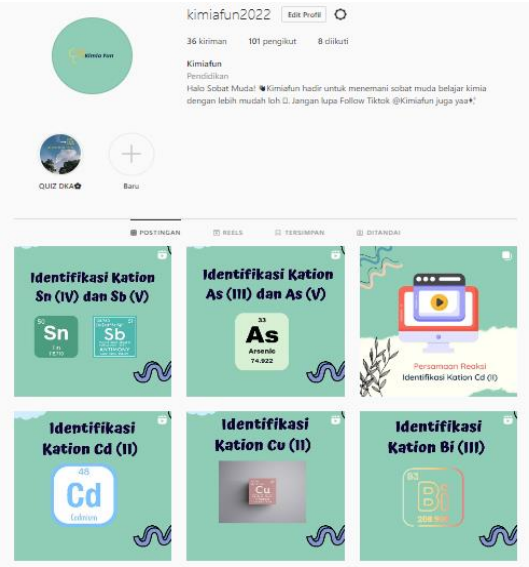

Figure 1. Screen Displays from *Instagram*

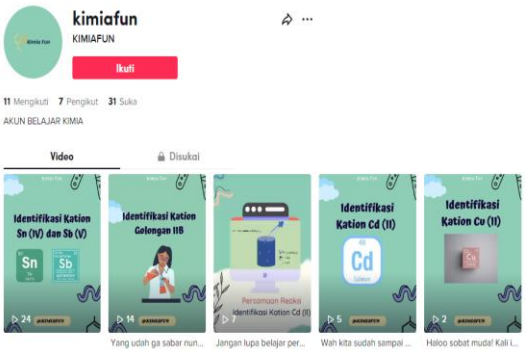

Figure 2. Screen Displays from *TikTok*

The results of the qualitative analysis of the data carried out aim to show that using *Instagram* and *TikTok* based on the PBL learning model can improve learning outcomes and critical thinking skills of 2nd-year undergraduate students, especially there is the qualitative analysis of cations. Based on the picture, the learning material that will be provided is packed as material explanation video content and uploaded to the *Instagram* and *TikTok* feeds. It is intended that the topic provided seems more interesting and easily understood by students.

Many students use *Instagram* and *TikTok* social media to find information about knowledge and make it easier to do assignments [14-16]. And it's also not uncommon for content creators of *Instagram* and *TikTok* to keep up with the times. They packaged some chemical materials in such a way as to give a more interesting impression and make it easier for the audience to understand. Thus, if students and students use *Instagram* and *TikTok* social media as learning media, they may awaken their learning motivation to get maximum learning outcomes. Based on the results of hypothesis testing, there is a positive and significant impact of the use of *Instagram* and *TikTok* learning media with the PBL learning model on student cognitive learning outcomes.

Based on the discussion above, shows that the use of *Instagram* and *TikTok* can be used as learning media along with learning methods, one of which is the PBL learning model. Various features, attractive appearance, ease of operation and wide reach are the strengths of *Instagram* and *TikTok* as learning media. However, this does not rule out the possibility of a shortage of media. Using *Instagram* and *TikTok* in learning media requires an internet network, so it is not uncommon for students to spend a lot of quotas. In this case, the display of information in video has a limited duration.

Those are the advantages and disadvantages of using *Instagram* and *TikTok* learning media with the PBL learning model. Hopefully, this learning media can be applied to other learning materials in the future.

CONCLUSION

Based on hypothesis testing, it can be concluded that the learning process based on IG and Tik Tok social media integrated with the PBL model can improve student learning and cognitive outcomes. Integrating social media IG and Tik Tok, the PBL model is feasible to be implemented in learning activities, especially at the tertiary level. Integration can be a solution for lecturers who can establish student participation so that they can solve real problems in their lives, especially active participation is required. Besides that, there will be a reciprocal interaction between lecturers and students . Using social media as a learning media is one

of the efforts to reduce the negative impact of using social media. In addition, learning innovations like this can make students not bored quickly and quickly understand the material because they are familiar with social media users.

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