The differences of achievement of the national olympiad in chemistry at the public and private senior high school by utilizing quizizz media

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Abstract: This research is a quantitative study which aims to determine the results differences of the 2nd National Chemistry Olympiad at the public and private senior high school using quizizz media. All participants of the population were sampled in the determination, the sampling technique used was saturated samples. The results of the prerequisite test on the data from this study showed that the data were normally and homogeneous. For normality and homogeneity tests, obtained sig > 0.05. Data analysis using SPSS 24, carried out One Way Anova test, obtained sig.0.01 with a significance level of 5%, these results indicate that there are differences in the results of the 2nd National Chemistry Olympiad (OKN) level is low, the public high school participants results with an average score of 59.48 and private high schools with an average score of 41.95 by utilizing Quizizz media.

Keywords: Chemistry, Olympics, Learning, Quizizz

1. Introduction

Living in the era of the Covid-19 pandemic has not reduced the spirit of student competition in the world from various forms of schools to make achievements. This can be seen in the number of participants and countries participating in the prestigious International Chemistry Olympiad (IChO). In 2019, the number of IChO participants was 300 students from 80 countries around the world (Nan & Zhang, 2019). Based on data obtained by Bukleski (2021), in 2020 there were only 235 students from 60 countries (Bukleski, 2021). The decrease in the number of participants from 2019 to 2020 was 65 participants and 20 countries.

Indonesia, is not only consistent as an IChO participant in 2019 and 2020, but also consistent in making achievements. In 2019, before the Covid-19 pandemic, four Indonesian students who took part in the prestigious 51st International Chemistry Olympiad (IChO) in Paris, France, presented four medals. Two silver medals were won by students from BSMA Semesta BBS Semarang on behalf of Akuh Danang Setyo Budi and from SMAK Petra 2 Surabaya on behalf of Winston Cahya. Two bronze medals were won by students from SMAK BPK Penabur Gading Serpong on behalf of Jessica Marry Listijo and from SMAN 2 Tangerang Selatan on behalf of Bayu Dwi Putra. At the start of the Covid-19 pandemic, in 2020, Indonesian students consistently made achievements. At the 52nd International Chemistry Olympiad (IChO) or the 52nd International Chemistry Olympiad which was held online, four Indonesian students managed to make achievements. Two silver medals were won by Mark Susanto from SMAK BPK Penabur 1 Jakarta and Ivan Candra Gunawan from SMAK Petra 2 Surabaya, and two bronze medals were also won by Rifqi Naufal Abdjul from SMAN 81 Jakarta and Steven William from SMAK Petra 1 Surabaya (Kemdikbud, 2020).

Each year, participants who win medals at the National Science Olympiad (OSN) Chemistry will take part in three stages of the National Training Team. Pelatnas I was carried out by providing materials and tests. If they pass, then the participants are entitled to take part in training activities in the form of deepening the material and giving tests to the National Training Center II Participants who pass the National Training Center II, are entitled to take part in the National Platnas III and subsequently the results of the III National Plates will determine which participants will become representatives of Indonesia to take part in the IChO (Hakim et al. 2019).

Universitas Kristen Indonesia (UKI) has a Teaching and Education Faculty (FKIP), which consists of eight study programs. One of the study programs at FKIP UKI is the Chemistry Education study program. In the curriculum, this study program has a chemical Olympism course. With the provision of chemical olympism for one semester and the use of online chemistry learning media, the output of this course is that students are able to carry out a national chemistry Olympiad with a minimum target of 100 participants who are high school equivalent students in Indonesia (Purba, 2019).

The National Chemistry Olympiad (OKN) which was held by Chemistry Education students of FKIP UKI was already the 2nd OKN, after the first OKN took place in 2018. This OKN is a forum for Indonesian students to grow their competitiveness and hone and channel their abilities in the field of Chemistry. The implementation of the Olympics on January 29-30, 2021, still during the Covid-19 pandemic, encourages the committee to continue to implement this OKN creatively, honestly and fairly.

By using technology (virtual laboratories) to improve student skills in the industrial field 4.0 (Panggabean et al. 2019; Namira et al. 2020; Rahman et al. 2020). UKI chemistry education students in the implementation of the Olympics are

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encouraged to take advantage of online learning media as an effort to keep up with technological developments in carrying out the Olympics in current conditions. One of the online learning media that is effectively used as an evaluation medium is the quizizz learning media (Purba, 2019). Likewise, the use of interactive quiz quizzes as a medium for evaluating on-line learning in physical chemistry 1 subjects is effective for student learning outcomes (Purba, 2020).

Another learning medium similar to quizizz is Kahoot!. Its use helps increase students' motivation to learn chemistry when applied to learning (Purba et al. 2019). However, in the implementation of this 2nd Olympiad, the committee used quizizz because they were more accustomed to using it than kahoot. The use of quizizzes as a medium for the implementation of OKN has helped the pantia to carry out competitions by considering two things, namely speed and accuracy in processing questions (Purba, 2019). The results of the research Harefa et al. (2020), 76.32% of students think using quizizz learning media. A study conducted by Zhao (Zhao, 2019), concluded that the use of quizizzes creates a pleasant learning atmosphere.

In competition, judgments must be fair and objective. In the implementation of this OKN, it can be ascertained that the assessment is fair and objective because the use of the quizizz application can be directly downloaded in excel form and sent to participants (Farida et al. 2020). According to Suharsono & Uluwiyah, the use of quizizz is effective in the implementation of OKN, considering that the millennial generation, like high school students at this time, has begun to shift to sociality 5.0 (Suharsono & Uluwiyah, 2020). Similar to Safarati & Rahma, quizizz educational game media was used by one of the online learning media during the Covid-19 pandemic in applied physics courses, the 2nd OKN committee, namely Chemistry Education students, FKIP UKI also used quizizzes in the implementation of the national chemistry Olympiad (Safarati & Rahma, 2020).

The 2nd OKN participants were 92 people from several regions in Indonesia, such as Kalimantan, Nias, NTT, Yogyakarta, Banten, Semarang and Jakarta and its surroundings. Participants came from various private and public schools. The results of the accumulated scores of participants that have been obtained can be grouped (Noor, 2020). The grouping of values is divided into two parts, namely participants from private and state schools to study the differences in the results of their OKN, so that they may become input for stakeholders in the world of education.

2. Methods

This research is aquasi-experimental research, which involves three variables, namely the use of online learning media quizizz SMA Negeri and the use of online learning media quizizz SMA Private as independent variables; the results of the student national chemistry olympiad as the dependent variable. The population in this study were participants in the 2nd national chemistry Olympiad held by Chemistry

Education students, FKIP UKI. Because the number of participants in the 2nd OKN as a population is small, namely 92 high school students / equivalent in Indonesia, in this study all members in the population were sampled. This sampling technique is referred to as saturated sampling (Simatupang and Sormin, 2020). The research design uses a 2 x 1 factorial design (Ahmad, 2018), that show at Table 1.

Table 1

Research Design

Utilization Ability	Quizizz Online Learning Media at Public High Schools (X1)	Online Learning Media Quizizz in Private High School (X2)
2nd OKN Result (Y)	X1Y	X2Y

Note:

X1 : A group of students from Public High Schools who take the 2nd OKN by utilizing Quizizz Online Learning Media

X2 : Groups of students from private high schools who take the 2nd OKN by utilizing Quizizz Online Learning Media

B : 2nd OKN Result

X1Y : Results of the 2nd OKN of participants from Public High School students

X2Y : Results of the 2nd OKN participants from private high school students

The data collection technique in this study used a test question (Barlian, 2018) in the form of multiple choice of 40 items with 5 options for each question, namely options A, B, C, D and E. The questions used first were validated by the expert. namely the face and content validity (Afriansyah et al. 2020) by the validator according to the field of study at the Olympics.

Table 2

Test score criteria

Score	Category
<45	Very less
≥ 45 - <65	Less
≥ 65 - <75	Enough
≥ 75 - <90	Good
≥ 90 - <100	Very good

The data were obtained by downloading excel after all the 2nd OKN participant students worked on the questions on the online quizizz learning media application. To test whether there are differences in the results of the National Chemistry Olympiad by utilizing online learning media for participants from public high school students and private high school students (H0 = No difference, Ha = There is a difference), the researcher used data analytics with inferential statistics, namely *One*

Way Anova, with a level of confidence (*p-value*) of 95% (α = 0.05) which was tested using the application *SPSS 24.* Furthermore, to see the level of ability of the students' national chemistry Olympiad results, the data were analyzed descriptively. The level of the results of the National Chemistry Olympiad refers to the test score criteria in Table 2. In accordance with the statement of Haniah (2014), to determine the spread of data distribution, whether the data spreads normally or not (Haniah, 2014).

3. Results and Discussion

The research data were obtained from the output of the 2nd national chemistry Olympiad held by the UKI FKIP Chemistry Education Study Program on January 29-20, 2021. The data obtained were grouped into two, namely the group of participants who were students of public high schools and private high schools. The results of descriptive data processing are presented in Table 3.

Table 3

Description of research data

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Public High School	45	59.48	27.45130	4.09220	51.241	67.7362	.00	100.00
Private High School	47	41.95	21.87510	3.19081	35.534	48.3802	.00	92.00
Total	92	50.53	26.15148	2.72648	45.116	55.9484	.00	100.00

A total of 45 samples from public high schools obtained an average score of OKN results 59.48 on a scale of 100, with a minimum value of 0.00 and a maximum value of 100.The average OKN value for ampeles from private high schools, amounting to 47, is 41.95 on a scale of 100, with a minimum value of 0.00 and a maximum value of 100.The average value for public SMA is included in the category less and for private SMA including very less category. This is an illustration of the achievements of high school students in Indonesia in the field of Chemistry. The results of the international chemistry Olympiad, which were won by student representatives from Indonesia, are a reflection of the educational conditions or competence of students in Indonesia (Kurniawati, 2014). According to him, there are public SMA OKN scores that reach the maximum score and there are also the minimum scores, the same goes for the private SMA OKN scores. It is ondepict in Fig 1.

The data to be analyzed was conducted through a prerequisite test, namely the normality and homogeneity test. The results of the normality test are presented in Table 4.
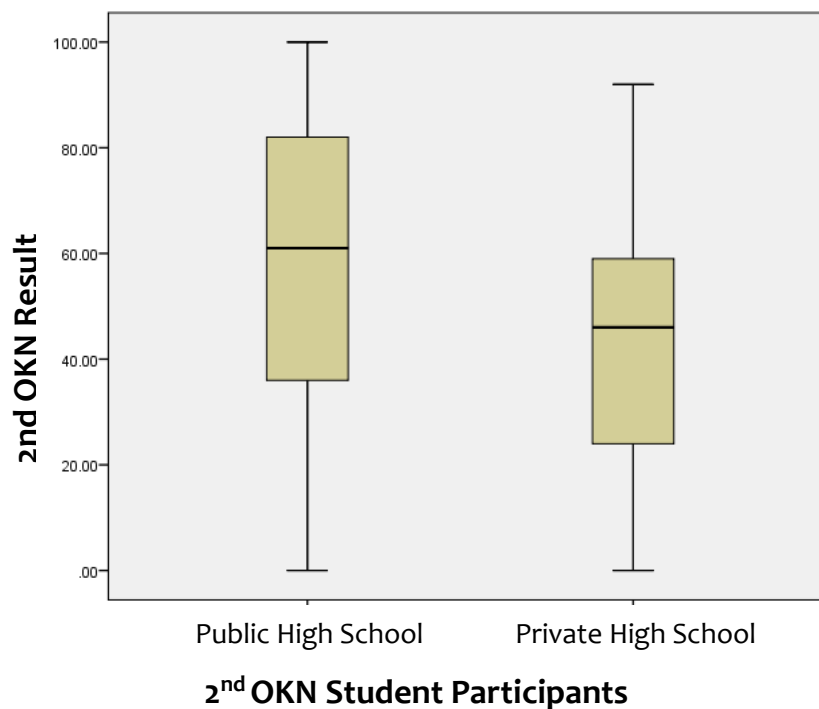
2nd OKN Student Participants

Fig 1. Results of the 2nd OKN of public and private high school students

Table 4
Normality test results

	Shapiro-Wilk		
	Statistics	df	Sig.
Public High School	.950	45	.053
Private High School	.975	47	.415

The results of the normality test at SMA Negeri sig. 0.053 (sig > 0.05) and at private high school sig.0.415 (sig > 0.05), then the OKN result dataThis study is normally distributed. In addition to the normality test, in this study the results of the homogeneity test are presented in Table 5.

By comparing the results of the homogeneity test with The significance level of 0.05 in this study, the result is that the research data is homogeneous. This can be seen from the results of the homogeneity test, sig. 0.059 (sig> 0.05). Furthermore, hypothesis testing is done with *SPSS 24,* One way ANOVA descriptive analysis. The results of hypothesis testing are presented in Table 6.

Table 5
Homogeneity test results

Levene Statistics	df1	df2	Sig.
3.664	1	90	.059

Table 6
One way anova results

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7065.743	1	7065.743	11.527	.001
Within Groups	55169.159	90	612.991		
Total	62234.902	91			

Based on the table above, obtained sig.001 (sig <0.05), meaning that Ho is rejected and Ha is accepted. Thus, the researchers concludedThere is a difference the results of the national chemistry olympiad by utilizing online learning media quizizz participants from state high school students and public high school students. The difference in OKN results is influenced by various factors both externally and internally (Setiyoningtyas, 2020). When examined further, what affects this difference is that private students who participate in the 2nd OKN come from areas that have difficulty reaching a stable internet network, while public students generally come from the surrounding Java areas that easily get a stable internet network. Thus, the researcher suggests the next researchers to focus on applying Quizizz to the learning evaluation process with a larger and more representative sample of the population.

4. Conclusion

Based on the results and discussion above, the researcher concluded that there were differences the results of the national chemistry olympiad by utilizing online learning media quizizz participants from state high school students and public high school students with a difference in the average score of 17.53.

Acknowledgment

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