Online Project-based Learning Integrated Quizizz as a Formative Assessment to Trigger High Order Thinking Skills

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A B S T R A K

Pandemi Covid-19 menimbulkan berbagai dampak dalam proses pembelajaran, salah satunya adalah learning loss. Learning loss secara langsung dan tidak langsung akan mempengaruhi keterampilan berpikir tingkat tinggi. Penelitian ini bertujuan untuk menganalisis perbedaan HOTS antara siswa yang mengikuti Online Project-based Learning terintegrasi quizizz sebagai asesmen formatif dengan HOTS siswa yang mengikuti pembelajaran online biasa. Penelitian ini melibakan populasi sebanyak 129 orang dan sampel sebanyak 39 orang yang ditentukan dengan teknik random sampling. Jenis penelitian ini termasuk penelitian ekspimen semu, dengan desain non equivalen control group design. Instrumen yang digunakan untuk menjaring data adalah tes HOTS dalam bentuk uraian. Data yang diperoleh dianalisis dengan menggunakan ANAVA satu jalur, yang sebelumnya dilakukan uji prasyarat. Semua analisis data menggunakan bantuan SPSS IBM for Windows 16.0. Hasil analisis data menunjukkan bahwa terdapat perbedaan HOTS antara siswa yang mengikuti Online Project-based Learning terintegrasi quizizz sebagai asesmen formatif dengan HOTS siswa yang mengikuti pembelajaran online biasa. Untuk itu, para guru diharapkan menerapkan Online Project-based Learning terintegrasi quizizz sebagai asesmen formatif dalam pembelajaran untuk memperoleh kemampuan berpikir tingkat tinggi yang lebih maksimal.

A B S T R A C T

The Covid-19 pandemic has caused various impacts in the learning process, one of which is learning loss. Learning loss will directly and indirectly affect higher order thinking skills. This study aims to analyze the difference in HOTS between students who take Online Project-based Learning integrated quizizz as a formative assessment and HOTS students who take regular online learning. This study involved a population of 129 people and a sample of 39 people who were determined by random sampling technique. This type of research is a quasi-experimental research, with a non-equivalent control group design. The instrument used to collect data is the HOTS test in the form of a description. The data obtained were analyzed using one-way ANOVA, which had previously been tested for prerequisites. All data analysis using the help of IBM's SPSS for Windows 16.0. The results of data analysis show that there are differences in HOTS between students who take Online Project-based Learning integrated quizizz as a formative assessment and HOTS of students who take regular online learning. For this reason, teachers are expected to apply Quizizz's integrated Online Project-based Learning as a formative assessment in learning to obtain maximum higher-order thinking skills.

1. INTRODUCTION

The outbreak of the Covid-19 case found in Wuhan, Hubei, China in 2019 changed all the order of life in the world (Balaji et al., 2020; Febryani et al., 2020; Hui et al., 2020; Şeker, 2022). Covid-19 has spread to Indonesia and peaked in March 2020 (Regus, 2022; Sinamo & Hanggraeni, 2021). The government has issued a work from home (WFH) policy so that this virus does not spread massively (Khasanah et al., 2020). The response from the world of education is to change the traditional education system to education technologies (EdTechs), where teaching and assessment is carried out online (Amit et al., 2020). Schools and campuses are all "closed" or switching to study on campus to home as a consequence of WFH's policy. With WFH, social and physical distancing can be implemented to reduce the spread of the virus. From kindergarten to university, online learning is carried out, starting from the 2020/2021 new school year. In elementary school education units (SD), teachers in online learning use several platforms or learning management systems (LMS) such as Zoom, Google Meet, Google Classroom, Moodle, etc. However, from the results of observations in the field, teachers tend to use WhatsApp (WA) social media in carrying out online learning. By forming a WA group with homeroom teacher and students, teachers use this group as a means of online learning. Beginning with uploading a learning video, students are asked to watch and continue

working on assignments, then parents send proof of completing the assignment via private message to the homeroom teacher (Mahendra, 2021). This online learning model is certainly less effective and has fatal consequences for students' high order thinking skills (HOTS). Students only watch videos and do assignments, students are less active, cannot be creative in the learning process. There are many complaints from parents, because the more active and as a teachers are the parents, while the teacher's job is only to upload assignments. This is in line with the findings of the Ministry of Education and Culture that the signs of "learning lost" have already begun to occur. This is based on the results of a diagnostic assessment carried out by teachers during the Covid-19 pandemic.

Learning lost is the loss of students' abilities and learning experiences. Most of the teachers assessed that half of the students did not meet the competency standards based on the diagnostic assessment carried out. In percentage terms, 47 percent of schools/teachers said that only 50 percent of students met the competency standards. In addition, as many as 20 percent of schools/teachers assessed that a small percentage of students met the competency standards. This means that students who meet competency standards are only under 50 percent. Meanwhile, as many as 31.9 percent of schools/teachers assessed that most of their students had met the competency standards. If most teachers assess their students do not meet the competency standards, it means that there is a tendency for learning lost to occur. This leaning loss will also have an impact on the declining HOTS of students.

If this is allowed, of course it will not be good for learning development, especially HOTS students. An online learning approach is needed that is able to increase the active role of students, so that it leads to increasing student' HOTS. An online learning model that can improve students' higher-order thinking skills is online project based learning (OPjBL). Learning will be more effective by doing projects and students being actively involved in tasks that are inseparable from inquiry in real-world contexts (Bailey et al., 2013; Bryce et al., 2001). Assignments in the form of real projects play an important role in learning, because they can motivate and improve cognition (Blumenfeld et al., 1991). Several studies have shown the advantages of PjBL over conventional learning. Students who take PjBL have higher learning outcomes than students who take conventional learning (Marx et al., 2004; Rivet, A., & Krajcik, 2004).

The implementation of OPjBL is alleged to provide maximum results when combined with an appropriate online formative assessment. However, in addition to the problem of online learning, many questions have arisen about the quality of the assessment carried out by teachers, due to the lack of teacher information about assessment patterns and online assessment platforms (Amit et al., 2020). Whereas a well-designed and appropriate assessment can produce benefits for students' employability and the development of other important skills (Thompson & McGregor, 2009). This online assessment is used to improve students' higher order thinking skills, especially in understanding the material presented. One of the online assessment platforms that teachers can use is Quizizz. With this platform students engage in interactive lessons and quizzes. Several studies show that the use of Quizizz can increase learning motivation (Fauziyyah, 2019; Rosiyanti et al., 2020; Solikah, 2020), learning activity (Pitoyo & Asib, 2020), and student learning results (Cristiyanda & Sylvia, 2021; Kurniawan & Huda, 2020). There has been no research on the combination of the application of project-based learning and online formative assessment in its effect on students' HOTS. Therefore, this study aims to determine the advantages of using project-based learning integrated formative assessment online in improving students' HOTS.

2. METHOD

This study uses a quasi-experimental type of research which has a control group, but cannot fully control the external variables affecting the implementation of the experiment (Sugiyono, 2016). This study aims to determine the difference in higher order thinking skills (HOTS) between students who take part in online project based learning (OPjBL) integrated with quizizz as a formative assessment with higher order thinking skills (HOTS) of students who take regular online learning in sixth grade elementary school students. The population in this study were all 6th grade elementary school students in cluster III Marga District, Tabanan Bali as many as 129 people and involving a sample of 39 people using simple random sampling technique, but randomized classes.

The learning approach is divided into two, namely OPjBL integrated Quizizz as a formative assessment and the usual online learning approach is an independent variable. While the dependent variable is students' HOTS. To collect HOTS data, students use a test in the form of an essay. The HOTS test consists of 5 essay questions which have previously been tested for validity using the Pearson formula (Ghozali, 2018; Nurkancana, 1986; Sugiyono, 2016). While the reliability test used the Cronbach Alpha formula (Hair et al., 2017; Puspitasari et al., 2015). The collected data were analyzed using 1-way ANOVA parametric statistics, which previously were prerequisite tests in the form of normality test of data distribution, homogeneity of variance test. All data analysis uses SPSS IBM for Windows version 16.0.

3. RESULT AND DISCUSSION

Result

The object of this research is the difference in students' HOTS as a result of treatment between Quizizz-integrated OPjBL as a formative assessment and regular online learning. The learning of the experimental group and the control group was carried out online, the only difference being the learning model and formative assessment used. So that the research design used is a non-equivalent control group design with 1-way ANOVA as a data analysis tool (Field, 2013). The data in this study are grouped into, namely: 1) the higher-order thinking skills of students who follow the Quizizz integrated OPjBL learning model as a formative assessment (Y1), and 2) the higher-order thinking skills of students who take regular online learning (Y2). The results of the analysis of the size of the data concentration (mean, mode, median) and the size of the data spread (variance and standard deviation) of the students' higher order thinking ability can be seen in Table 1.

Table 1. Recapitulation of the Analysis Results of Students' HOTS Scores

Statistics	$Y_{control}$	$Y_{experiment}$
Mean	68.0556	81.1905
Median	72.0000	82.0000
Mode	53.00	86.00
Std. Deviation	11.52732	8.46534
Variance	132.879	71.662
Range	40.00	36.00
Minimum	46.00	62.00
Maximum	86.00	98.00
Sum	1225.00	1705.00

The normality test in this study used the Kolmogorov-Smirnov data on both groups of students' higher-order thinking skills (Field, 2013). Kolmogorov-Smirnov test analysis showed that sig. > 0.05 of 0.99 and 0.87 respectively for the two groups of data, namely data on higher order thinking skills in the experimental group and the control group. This means that H0 is accepted (failed to be rejected), both sample groups are normally distributed. The homogeneity of variance test in this study was carried out using the Hartley test (Field, 2013). From the results of the analysis of the homogeneity test of the data variance of the students' higher order thinking skills, they came from a homogeneous population with sig values. 0.320 on the statistic based on the mean which is more than 0.05. Based on the results of the prerequisite tests, namely the normality test of the data distribution and the homogeneity of variance test, it can be concluded that the students' higher order thinking ability data comes from a population that is normally distributed and has the same or homogeneous variance. Therefore, hypothesis testing with 1-way ANOVA can be done. The hypothesis test in this study used the variance test (1-way ANOVA), while the results of the 1-way ANOVA analysis can be seen in Table 2.

Table 2. Recapitulation of hypothesis test results using 1-way ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1461.056	1	1461.056	11.972	.001
Within Groups	4515.611	37	122.044		
Total	**5976.667**	**38**			

The results of the analysis show that the F-count value is 11.972 with a sig value. of 0.001. It turns out that the value of sig. <0.05 this means that H0 is rejected and Ha is accepted, so it can be said that there is a difference in high-level thinking skills between students who take OPjBL integrated quizzz as a formative assessment and students who take regular online learning. In other words, there is an effect of implementing Quizizz's integrated OPjBL as a formative assessment of the HOTS of grade VI students in cluster III Marga, Tabanan, Bali. The results of data analysis also showed that the group that took the Quizizz integrated OPjBL as a formative assessment had an average high-order thinking ability score of 75.7083; while the group taking regular online learning had an average higher order thinking skills score of 64.00.

https://doi.org/10.23887/ijee.v6i2.45336Discussion

The results of data analysis using 1-way ANOVA showed that the difference in HOTS between students who took OPjBL integrated quizzz as a formative assessment and students who took conventional

online learning. This shows that so that students' higher order thinking skills can be relied on, it is necessary to improve the quality of learning in this case the learning used. The advantages of OPjBL compared to conventional online learning can be seen from the average HOTS of students. Higher order thinking skills are thinking skills that train students' cognitive abilities at a higher level, that is students are able to combine facts and ideas in the process of analyzing, evaluating to the stage of making in the form of providing an assessment of a fact being studied or being able to create from something that has been studied creatively.

Higher order thinking skills (HOTS) is a thinking process that requires students to manipulate information and ideas in certain ways that give them new meanings and implications. This is in accordance with the characteristics of OPjBL which provides a challenging learning atmosphere, provides motivation, and responsibility and encourages students to work independently (Sugihartono et al., 2020). So with OPjBL students are more creative and challenged in learning. Through the learning syntax, OPjBL activities have stimulated students to optimize students' higher-order thinking skills (Fitri et al., 2018). Furthermore, it is said that the OPjBL syntax which consists of raising an initial problem, designing project activity plans, scheduling project activities, monitoring the implementation of project activities, evaluating project activity results, and evaluating project activity experiences requires students to always think critically and creatively. Where critical and creative thinking skills are part of higher order thinking.

At the elementary level in general, training for low-level thinking skills consisting of C1-C3 namely knowledge, understanding and application has been going well. However, for further thinking skills, namely C4-C6 which consists of analyzing, evaluating and creating or often called higher-order thinking skills, students have not been trained intensively. In fact, students are not used to higher-order thinking, and are less skilled in developing their own knowledge concepts. For that we need a learning approach that is able to train students' HOTS intensively. One such learning approach is project-based learning (PjBL). This approach adheres to a constructivist understanding, which provides flexibility for students to construct their knowledge through the learning experiences gained. Learning with OPjBL requires students to be active in solving problems by initiating an idea that can be generalized into a product as a result of project activities. In this case, students can practice their higher order thinking skills (Fitri et al., 2018). The results of this study are in line with research which showed that project-based learning can train students in improving 4C skills (Creativity, Critical Thinking, Collaborative, Communication) (Purbosari, 2016; Setyowati & Mawardi, 2018). Besides that, what is also important is the ability to think at a higher level. The advantages of OPjBL with ordinary online learning cannot be separated from the formative online assessment used. With quizizz as a form of continuous practice, each meeting provides conducive and fun learning conditions for students (Bury, 2017). In addition, the form of practice questions in the quizizz platform is interactive and interesting for elementary school students (Bicen & Kocakoyun, 2018). So it is not surprising that the combination of OPjBL with Quizizz formative assessment is the perfect combination in improving students' higher order thinking skills.

4. CONCLUSION

With regard to the research results obtained several suggestions that can be put forward are as follows. 1) online learning project based learning (OPjBL) by integrating formative assessment needs to be applied in learning mathematics in elementary schools (thematics), and reducing the application of online conventional learning in order to obtain better higher order thinking skills, and 2) Further research related to Quizizz-integrated project-based online learning (OPjBL) as a formative assessment involving variables and other materials and involving a larger sample.

5. REFERENCES

Amit, J., Muddu, V., & Preeti, B. (2020). Impact of coronavirus pandemic on the Indian education sector: perspectives of teachers on online teaching and assessments. In *Interactive Technology and Smart Education: Vol. ahead-of-p* (Issue ahead-of-print). https://doi.org/10.1108/ITSE-06-2020-0087.

Bailey, B., Spence, D. J., & Sinn, R. (2013). Implementation of discovery projects in statistics. *Journal of Statistics Education*, *21*(3). https://doi.org/10.1080/10691898.2013.11889682.

Balaji, A., Maurya, S., & Kumar, S. (2020). Smartphone-based electrochemical sensor for assessing COVID-19 infected patients. *International Journal of Pervasive Computing and Communications*, *1*(1). https://doi.org/10.1108/IJPCC-10-2020-0169.

Bicen, H., & Kocakoyun, S. (2018). *Perceptions of Students for Gamification Approach : Kahoot as a Case Study*. 72–93.

Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., & Palincsar, A. (1991). Motivating Project-Based Learning: Sustaining the Doing, Supporting the Learning. *Educational Psychologist*, *26*(3–4),

369–398. https://doi.org/10.1080/00461520.1991.9653139.

Bryce, G. R., Gould, R., Notz, W. I., & Peck, R. L. (2001). Curriculum guidelines for bachelor of science degrees in statistical science. *The American Statistician*, *55*(1), 7–13. https://doi.org/10.1198/000313001300339879.

Bury, B. (2017). Testing goes mobile–Web 2.0 formative assessment tools. *Conference Proceedings. ICT for Language Learning*, 87–91.

Cristiyanda, G., & Sylvia, I. (2021). Pengaruh Penggunaan Webquiz Quizizz Terhadap Hasil Belajar Sosiologi Siswa di SMA N 16 Padang. *Jurnal Sikola: Jurnal Kajian Pendidikan Dan Pembelajaran*, *2*(3), 174–183. https://doi.org/10.24036/SIKOLA.V2I3.110.

Fauziyyah, U. (2019). *Pengaruh Media Quizizz Terhadap Motivasi Belajar Peserta Didik Dalam Pembelajaran PKN (Quasy Experiment Di SMA Negeri 1 Majalaya Kab. Bandung)*. UNPAS.

Febryani, D. R., Rahmi, Z., & Ibrahim, L. (2020). Kepedulian Masyarakat Pedesaan dalam Upaya Mencegah Penyebaran Covid-19: Studi Kasus di Dua Desa Aceh Besar. *Jurnal Riset Dan Pengabdian Masyarakat*, *1*(2), 158–169. https://doi.org/10.22373/jrpm.v1i2.713.

Field, A. (2013). *Discovering Statistics Using IBM SPSS Statistics*. SAGE Publications Ltd.

Fitri, H., Dasna, I. W., & Suharjo, S. (2018). Pengaruh Model Project Based Learning (PjBL) Terhadap Kemampuan Berpikir Tingkat Tinggi Ditinjau dari Motivasi Berprestasi Siswa Kelas IV Sekolah Dasar. *Briliant: Jurnal Riset Dan Konseptual*, *3*(2), 201–212. https://doi.org/10.28926/BRILIANT.V3I2.187.

Ghozali, I. (2018). *Aplikasi Analisis Multivariate dengan Program IBM SPSS 25* (9th editio). Badan Penerbit Universitas Diponegoro.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. SAGE Publications Ltd.

Hui, D. S., I Azhar, E., Madani, T. A., Ntoumi, F., Kock, R., Dar, O., Ippolito, G., Mchugh, T. D., Memish, Z. A., Drosten, C., Zumla, A., & Petersen, E. (2020). The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health — The latest 2019 novel coronavirus outbreak in Wuhan, China. *International Journal of Infectious Diseases*, *91*, 264. https://doi.org/10.1016/J.IJID.2020.01.009.

Khasanah, D. R. A. U., Pramudibyanto, H., & Widuroyekti, B. (2020). Pendidikan Dalam Masa Pandemi Covid-19. *Jurnal Sinestesia*, *10*(1), 41–48. https://sinestesia.pustaka.my.id/journal/article/view/44.

Kurniawan, M. C. D., & Huda, M. M. (2020). Pengaruh penggunaan quizizz sebagai latihan soal terhadap hasil belajar siswa kelas V SD. *Jurnal Pena Karakter*, *3*(1), 37–41. https://e-journal.hikmahuniversity.ac.id/index.php/jpk/article/view/14.

Mahendra, I. W. E. (2021). Triging Student Learning Results with Utilizing Google Classroom and Zoom Platform. *Jurnal Ilmiah Sekolah Dasar*, *5*(2), 326–333. https://doi.org/10.23887/jisd.v5i2.34900.

Marx, R. W., Blumenfeld, P. C., Krajcik, J. S., Fishman, B., Soloway, E., Geier, R., & Revital, T. . (2004). Inquiry-based science in the middle grades: Assessment of learning in urban systemic reform. *Journal of Research in Science Teaching*, *41*(10), 1063–1080. https://doi.org/10.1002/tea.20039.

Nurkancana, W. (1986). *Evaluasi Pendidikan*. Usaha Nasional.

Pitoyo, M. D., & Asib, A. (2020). Gamification-Based Assessment: The Washback Effect of Quizizz on Students' Learning in Higher Education. *International Journal of Language Education*, *4*(1), 1–10. https://eric.ed.gov/?id=EJ1249875.

Purbosari, P. M. (2016). Pembelajaran berbasis projek membuat ensiklopedia Ilmu Pengetahuan Alam (IPA) untuk meningkatkan academic skill pada mahasiswa. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *6*(3), 231–238. https://doi.org/10.24246/j.scholaria.2016.v6.i3.p231-238.

Puspitasari, N. L. P. L., Adiputra, I. M. P., & Sulindawati, N. L. G. E. (2015). Pengaruh Belanja Modal terhadap Pertumbuhan Kinerja Keuangan Daerah dengan Pendapatan Asli Daerah sebagai Variabel Intervening (Studi Kasus di Kabupaten Buleleng). *JIMAT (Jurnal Ilmiah Mahasiswa Akuntansi) Undiksha*, *3*(1). https://doi.org/10.23887/jimat.v3i1.4721.

Regus, M. (2022). Regulating religion in a time of COVID-19 pandemic in Indonesia: context, dynamics, and implication. *International Journal of Sociology and Social Policy*, *42*(3/4), 313–331. https://doi.org/10.1108/IJSSP-07-2020-0321.

Rivet, A., & Krajcik, J. (2004). Achieving standards in urban systemic reform: An example of a sixthgrade project-based science curriculum. *Journal of Research in Science Teaching*, *41*(7), 669–692. https://doi.org/10.1002/tea.20021.

Rosiyanti, H., Widyasari, R., Ardiansyah, A. F., & Istiqomah, S. (2020). Pengaruh Pemberian Soal Pemahaman Berbantuan Media Quizizz Terhadap Motivasi Belajar Siswa SMP Labschool FIP UMJ. *Prosiding Seminar Nasional Penelitian LPPM UMJ*. https://jurnal.umj.ac.id/index.php/semnaslit/article/view/7906.

Şeker, A. (2022). The Effects of COVID-19 Pandemic on International Trade and Production in the Age of

Industry 4.0: New Evidence from European Countries. *Industry 4.0 and Global Businesses*, *1*(1), 125–136. https://doi.org/10.1108/978-1-80117-326-120211009.

Setyowati, N., & Mawardi, M. (2018). Sinergi Project Based Learning dan Pembelajaran Bermakna untuk Meningkatkan Hasil Belajar Matematika. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *8*(3), 253–263. https://doi.org/10.24246/j.js.2018.v8.i3.p253-263.

Sinamo, T. M., & Hanggraeni, D. (2021). Demand or supply shock during the COVID-19 crisis: empirical evidence from public firms in Indonesia. *Journal of Asia Business Studies*, *x*(x). https://doi.org/10.1108/JABS-01-2021-0030.

Solikah, H. (2020). Pengaruh penggunaan media pembelajaran interaktif quizizz terhadap motivasi dan hasil belajar siswa pada materi teks persuasif kelas VIII di SMPN 5 Sidoarjo tahun pelajaran 2019/2020. *Jurnal Mahasiswa UNESA*, *7*(3), 1–8. https://ejournal.unesa.ac.id/index.php/bapala/article/view/34508.

Sugihartono, T., Sutisyana, A., & Sugiyanto, S. (2020). Produktivitas Lembar Kerja Peserta Didik (LKPD) Pjok Dengan Penerapan Model Projek Base Learning Pada Prodi Penjas FKIP UNIB. *Kinestetik: Jurnal Ilmiah Pendidikan Jasmani*, *4*(1), 63–72. https://doi.org/10.33369/jk.v4i1.10407.

Sugiyono. (2016). *Statistika untuk Penelitian*. Alfabeta.

Thompson, D., & McGregor, I. (2009). Online self- and peer assessment for groupwork. *Education + Training*, *51*(5/6), 434–447. https://doi.org/10.1108/00400910910987237.