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The effect of Kahoot! learning media on learning outcomes of German language students

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ABSTRACT

This study aimed to determine the effect of the Kahoot! educational game learning media on German language students' learning outcomes in the *Sprechfertigkeit* 2 course. The sample of this study consisted of 37 students. The test instruments were given during the pretest and posttest. The data were processed and analyzed by the SPSS program. The Cronbach Alpha validity test showed that the study had high validity (0.764). The instrument normality test shows the value of p> alpha (0.05). The statistical test resulted that the value of t-test=631 (>t-table=398). The study revealed a significant effect of the Kahoot! educational game learning media on learning outcomes of German students in *Sprechfertigkeit* 2.

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1. INTRODUCTION

The digital era 4.0 has penetrated almost all human activities in this era, which is inevitable. On the contrary, it makes everyone race to master it [1]. This development continues to demand the need to improve human resources quality [2]. Improving the quality of German language students deeply connected with the development of learning media, adequate, and quality teaching materials [3]. For a long time, German has been a staple for learning in Indonesia, it is taught as a foreign language in high school/vocational high school students and university students. This shows how important it is to master German. With good mastery of German, students can be helped to broaden their thinking horizons and at the same time increase their knowledge [4].

There are five reasons why studying German is essential: i) German language is an important trade language because Germany is the world's biggest exporter. It has a strong economy and is Indonesia's most important industrial-trade partner in the European Union. Moreover, German has become the regional lingua franca of Central and Eastern Europe in the last ten years. Today, cross-cultural talents are required for a successful business. Students who are fluent in German are better able to enter new markets and succeed in global business and the international labor market; ii) The German language holds an important place in knowledge and literature. Because it is the language of science and technology, German is an essential language in research and education. German occupied a prominent position in the globe as a language of knowledge and literature in the nineteenth century, ahead of French and, in some ways, English; iii) German, as a cultural language, helps broaden students' intellectual perspectives. German culture can be found in literature and music, theater and film, architecture, painting, philosophy, and art [5], [6]. Students who

understand German language can learn about one of Europe's great cultures in its original form [7]. In literature, Goethe, Schiller, Kafka, Grass; in music, Bach, Mozart, Beethoven, Wagner; in philosophy, Luther, Kant, Schopenhauer, Nietzsche; in psychology, Freud, Adler, Jung; and in study and knowledge, Kepler, Einstein, Röntgen, and Planck. The language of brilliant thinkers is German; iv) German opens the door to the rest of the world for students who study at a German institution. Although studying overseas in Germany permits students to study without knowing German, understanding the language will surely help pupils. If international courses are not offered, students must demonstrate that they have enough German language abilities before beginning college. As a result, mastery of the language will provide a larger range of courses; and v) German companies in Indonesia and international companies in Germany aim to hire professionals who speak German. German language experts have attractive training, study, and work options in the European Union [8]. Furthermore, as a tourism destination, Indonesia attracts a large number of foreign visitors, including those from Germany, Austria, and Switzerland [9]. German language skills are an excellent investment for anyone working in the tourism industry [10].

It is critical to understand and use German. However, the truth remains that the learning outcomes of German language students, particularly in the *Sprechfertigkeit* 2 course, are still poor [11]. The cause for this is a lack of appropriate learning media [12]. As a result, modifications must be made in order to increase the achievement of learning German through the use of adequate and relevant learning material [13].

Kahoot! educational game is a type of game-based learning, which is easy to create, share and play anywhere and anytime [14]. The Kahoot! educational game is an open learning technique. It can be played independently or played with other people (interactive). It is intended that it would aid pupils' mastery of Strukturen and vocabulary in German [15].

In the Kahoot! educational game application, students' full support is needed [16]. Meanwhile, educators expect high creativity and aggressiveness, particularly in regulating, developing, and continuing to design new Kahoot! game forms with the addition of Strukturen forms and new vocabulary, and regulating the course of the implementation of teaching and learning activities, so that the activity went off without a hitch [17]. In this situation, students are motivated to learn and are expected to support learning activities by providing energy, time, and thoughts and being ready to work together with fellow students in groups [18]. Based on the description, the purpose of this study is to examine the effect of Kahoot! educational game learning media on learning outcomes *Sprechfertigkeit* 2 in German language students.

2. LITERATURE REVIEW

2.1. *Sprechfertigkeit* learning outcomes

In a systematic process, learning outcomes cannot be separated from learning activities. Meanwhile, success is the result of a learning process. When someone learns, their behavior changes, for example, from not knowing to knowing and from not understanding to understanding [19]. Learning outcomes are abilities that students acquire as a result of their education and can be observed through student performance [20]. Learning outcomes are defined as changes that occur in individuals who learn to build skills, habits, attitudes, comprehension, mastery, and appreciation of individuals who learn [21]. Learning outcomes are the skills that students acquire as a result of their learning experiences [22]. Learning outcomes are information, abilities, and competences that students can exhibit at the completion of a formal, non-formal, or unstructured learning process [23].

Speaking is a method for transmitting structured and developed ideas that are tailored to certain demands [24]. The speaker must grasp pronunciation, structure, and vocabulary in order to speak appropriately. Furthermore, mastery of the problems and ideas offered, as well as understanding of the speaker's language, are required. Ability to enunciate or pronounce words is required to express, convey thoughts, ideas, and feelings. Speaking fluently in the language being studied allows students to put distinct vocabulary and language structures into practice, resulting in dialogue between peers and between students and professors. Speaking is a person's attempt to express information, ideas, and concepts by the use of symbols, words, and images [25]. Based on the theoretical explanation, it is possible to conclude that the outcomes of learning German are changes in students' knowledge, attitudes, and skills obtained after participating in the learning process in class, which includes four basic skills, namely hearing (*Höverstehen*), speaking (*Sprechfertigkeit*), reading (*Leseverstehen*), and writing (*Schreibfertigkeit*) [26]. The findings of this study were derived from students' final grades after completing the learning and testing or evaluation processes.

2.2. Kahoot! educational game learning media

Kahoot! educational game in education is one sort of learning that is designed and organized around games that are simple to develop, distribute, and play anywhere, at any time, and by anybody [27]. The Kahoot! educational game, as one of the media-based learning strategies, is open, may be played solo, or

with others, and is anticipated to help students gain knowledge [28]. In its application as a learning medium, the game Kahoot! can serve to broaden and clarify the message or information presented in order to smoothen and improve the learning process and results. It is also beneficial to improve and direct student attention so that they are motivated to learn, which has an impact on learning outcomes [29].

Students' complete support is required in the Kahoot! educational game application, which includes offering energy, time, and thoughts, as well as being willing to work in groups with other students. Meanwhile, educators are expected to be highly creative, particularly in the provision, development, and design of new Kahoot! game forms with the addition of Structuren forms and new vocabulary, as well as in regulating the course of the implementation of teaching and learning activities, so that activities progress smoothly and without interruption. Students are motivated to learn consistently in this setting. A lecturer must have certain innovations in learning media and the evaluation model while executing the learning process, because assessment is a benchmark used to quantify the success of a lesson. A lecturer or teacher uses Kahoot! to present a game on a computer. The participants will then respond through mobile. The code generated by Kahoot! will be linked to the participant's mobile. Each participant will respond to the questions posed.

Kahoot! is a type of game application with two distinct URL addresses as https://Kahoot!.com/ is for teachers, whereas https://Kahoot!.it/ is specifically for students. "Kahoot!" and all of its features are completely free to access and utilize. The "Kahoot!" platform can be used for a variety of evaluation types, such as online quizzes, surveys, and debates. Students of course, require an internet connection to learn and play this game in the application.

3. RESEARCH METHOD

This study was a quasi-experimental study with a pre-test and post-test group design. It investigated the influence of the Kahoot! educational game application on the learning outcomes of *Sprechfertigkeit* 2 course German language students. This study comprised two variables: the *Kahoot!* game learning medium as the independent variable and the *Sprechfertigkeit* 2 learning outcomes as the dependent variable.

The research population consisted of second-semester German language students from Pattimura University's teacher training and education faculty. While the sample included 37 students who completed the *Sprechfertigkeit* 2 course. The study instruments were collected through the pre-test and post-test, which were undertaken to test and verify whether utilizing the Kahoot! educational game had an influence on the learning outcomes of *Sprechfertigkeit* 2.

The test materials utilized in this study belong to the category of tests with the highest content validity. The Wilcoxon comparison test was used to analyse and evaluate the data. The above-mentioned reliability test analysis using Cronsbachalpha yielded a value of=0.764>0.60, as shown in Table 1. Thus, it can be inferred that the testing of this instrument is credible since, with n=37 and a confidence level of.=0.05, the value derived from the table r=0.764, indicating that the table alpha value>r cronbach. The normality test results by Kolmogorov Smirnov as shown in Table 2, show the results of Sig. (p-value) >alpha (5%).

Table 1. Reliability test

Cronbach's Alpha	Cronbach's Alpha based on standardized items	N of items
.764	.774	2

Table 2. Tests of normality

	Kolmogorov-Smirnova		
	Statistic	df	Sig.
Pre-Test	.132	37	.103
Post-Test	.133	37	.095
Lilliefors significance correction			

This study used a single group design with pre-test and post-test procedures. The following were the implementation steps: First, students were given the *Sprechfertigkeit* 2 lecture content without following the procedures of the educational game learning model "Kahoot!" The second step was to administer a pre-test to assess *Sprechfertigkeit* 2. The final task was to provide students with learning resources for the *Sprechfertigkeit* 2 course by using the educational game "Kahoot!" The fourth step was to carry out the post-testing. The difference between the pre-test and post-test findings was calculated using the test (t-test). If the value of t>t table, it can be stated that the difference between the pre-test and post-test is substantial.

4. RESULTS AND DISCUSSION

The data for this study were student learning results, which were utilized as samples in the *Sprechfertigkeit* 2 course before and after the deployment of the educational game learning model "Kahoot!,"

which was done via pre-test and post-test. The study data were processed and analyzed using the Wilcoxon test to quantify the difference between the learning results of the two tests in order to prove the research hypothesis. The results of processing and data analysis with different Wilcoxon tests can be implemented in Table 3 and Table 4.

Table 3. *Sprechfertigkeit* test for pretest

Classes	Number of samples	Student initial ability score		Average
		Highest	Lowest	
Experiment	37	86	56	70.43

Table 4. *Sprechfertigkeit* test for posttest

Experiment worksheet	N	Mean	Minimum	Maximum
Experiment	37	88.80	69.00	87.67

The Paired Sample Test Table was the major output table that displayed the results of the tests. The 2-tailed value in the table demonstrates this. In this situation, the 2-tailed value is 0.000 (p 0.05). As a result, the pre-test and post-test findings differ significantly (meaningful). Data analysis as shown in Table 3, reveals that the value is 70.43 prior to using the educational game learning paradigm "Kahoot!." The value is 87.68 after using the "Kahoot!" educational game. This difference is significant since the p-value is 0.05=p=0. According to data research, the educational game "*Kahoot*!" improves learning results in the *Sprechfertigkeit* 2 course. This demonstrates the stability of the educational game "Kahoot!" application. This also boosted students' comprehension of the lecturer's learning content. This outcome was achieved with the use of the educational game "Kahoot!." Students study autonomously, compete, and are pushed to enhance their learning accomplishment by lecturers since lecturers are learning "motivators" for students [30]. Learning using the educational game "Kahoot!" stresses freedom and a competitive mentality to reach learning goals via individual effort and healthy competition. It is stated that this is because the educational game "Kahoot!" encourages pupils to study aggressively and creatively, not only as an object of learning, but as a topic of learning with maximal inventiveness and healthy rivalry in learning, as shown in Tables 5-8.

Table 5. Summary item statistics

	Mean	Minimum	Maximum	Range	Maximum/Minimum	Variance	No. of items
Item means	79.054	70.432	87.676	17.243	1.245	148.665	2
Item variances	73.072	58.114	88.030	29.916	1.515	447.481	2
Inter-item covariances	45.144	45.144	45.144	.000	1.000	.000	2
Inter-item correlations	.631	.631	.631	.000	1.000	.000	2

Table 6. Comparative pre-post test paired sample t-test

		Paired samples statistics			
		Mean	n	Std. Deviation	Std. Error Mean
Pair 1	Pre-test	70.43	37	9.382	1.542
	Post-test	87.68	37	7.623	1.253

Table 7. Paired samples correlations

		n	Correlation	Sig.
Pair 1	Pre-Test & Post-Test	37	.631	.000

Table 8. Paired samples test

	Paired Differences							
	Mean	Std. deviation	Std.Eeror mean	95% Confidence inteval of the difference		t	df	Sif.(2-Tailed)
				Lower	Upper			
Pair Pre-test-Post-tes	-14.00000	9.32183	1.70193	-17.48083	-10.51917	-8.226	29	.000

Furthermore, due of their eagerness to work independently and competitively, students are more comfortable in expressing and actualizing the contents of their thinking in German. Thus, the use of the

educational game "Kahoot!" has instilled in students a communicative, energetic, and competitive attitude. The use of the educational game "Kahoot!" assists students in reducing or eliminating boredom in studying while offering positive values to students in order to continue to support the outcomes of their learning efforts. Student learning results in the *Sprechfertigkeit* 2 course were very low prior to the implementation of the educational game "Kahoot!" since the learning techniques used did not change. As a result, pupils were bored, uninterested in learning, and unmotivated to study hard. Students are motivated to continue learning when the educational game "Kahoot!" is used, which leads to continuous improvement in student learning outcomes, proving that the educational game "Kahoot!" has a significant impact or influence on student performance in the *Sprechfertigkeit* 2 course. The educational game "Kahoot!" has an advantage in the learning process since the learning model changes greatly in the application. In tackling learning issues, students are extremely motivated, energetic, autonomous, eager, and competitive. The learning approach in the *Sprechfertigkeit* 2 course is designed to maximize students' capacity to grasp and master German grammar, master enough German vocabulary, be able to pronounce German words correctly, dare to communicate thoughts, and dare to realize oneself to others.

The findings of this study do not differ significantly from the findings of previous comparable investigations. One example is a quasi-experiment in which students who engaged in technology-supported learning utilizing PowToon, Blendspace, and Kahoot! outperformed those who followed traditional instruction on mean test scores in learning [31]. Similarly, quasi-experiments in programming learning that compare the impact of traditional vs gamified instruction utilizing Who-Wants-To-Be-A-Millionaire, Kahoot! and Code academy programming [32] shown various advantages for the gamified method, including increased class attendance, fewer late arrivals, more course material downloads, enhanced classroom dynamics, and marginally higher grade (61% for gamified vs. 53% for traditional). Another example is a quasi-experiment in which one group underwent traditional paper teaching while one group received technology-supported learning with Voki, Buncee, Kahoot!, and Answergarden [33]. Both groups fared similarly on the pre-test, but the technology-supported learning group outperformed those on paper on the post-test (90% score) (75% score). Several researches looked at learning effects when Kahoot! was used alone for instruction. These investigations are both qualitative and quantitative, with the bulk being quasi-experimental. Language (English and Chinese), Mathematics, Vocational Training, Information Technology, Bio-Engineering, Media and Communication, Electrical Circuits, Academic Writing, Business, Physics, Chemistry, Animal Science, Educational Technology, Nursing, Programming, Control Systems, and Earth Sciences are among the subjects studied. Compared to other teaching methods, Kahoot! significantly increases final scores or test outcomes in 70% of studies using statistical significance testing on learning effects. There are, however, a few exceptions. Kahoot! did not result in a substantially higher learning impact than the paper quiz and Clicker student response system in the trial in the Information Technology course [34].

In a quasi-experiment comparing Kahoot! and Survey Monkey in an experiment comparing PowerPoint and Kahoot! [35], similar results were obtained. In a quasi-experiment in high school, Kahoot! vs. conventional education is investigated [36], as are trials comparing traditional teaching with Quizizz and Kahoot! (three experimental groups) [37]. In a research that employed Kahoot! to teach Mandarin, there was a substantial gain in reading and speaking competency but not in listening or vocabulary [38]. Another experimental investigation found that employing Kahoot! in classroom education increased learning by a statistically significant amount. These three studies look at ways to utilize Kahoot! to improve learning in the flipped classroom. A post-test in a quasi-experiment with 44 students in an English course in Taiwan revealed that the experimental group utilized Kahoot! had a mean score of 86.18 compared to 77.45 for the control group that did not use Kahoot! (p=.007, large effect size) [39]. Similarly, another quasi-experiment on utilizing Kahoot! in a flipped classroom reveals that using Kahoot! improves speaking abilities significantly (p=.010, strong effect) [39]. An Austrian study involving 60 students in a C programming course found that employing Kahoot! in the setting of a flipped classroom raised grades by 12% [40]. Through pre- and post-tests on theoretical and practical themes, a quasi-experiment with 400 students in an Education technology course at the University of Florence was compared against traditional game-based teaching utilizing Kahoot! The results revealed that using Kahoot! increased from pre-to-test for all themes (p=.001, strong effect), but when compared to the traditional technique, the Kahoot! group fared considerably better on theoretical issues (p=.0001, small effect size) but not on more practical topics.

Another study employed Kahoot! for seven weeks with 96 students at Purdue University in the United States. The results indicated that the experimental group fared much better on the final test (79.56 vs. 56.83 for the control group) (p.0001, the effect size is large). Similarly, in a quasi-experimental study of 67 Greek university students studying electric circuits, the experimental group scored 59.93% compared to 51.72% for the control group (p=.001). A quasi-experiment at La Salle University with 98 nursing students

looked at how four 20-minute Kahoot! sessions might affect final exam grades. According to the findings, including this Kahoot! session had a substantial influence on final test performance (p=.005).

A case study of 324 university students in Portugal found that Kahoot! increased mean scores by 6.4% when compared to traditional education, that poorer students improved their marks by 12%, and that fewer students failed courses [41]. Similarly, as compared to other groups, medium and beginner students in Taiwanese high schools studying Chinese improved significantly on the post-test utilizing Kahoot! (p.028) [42]. Another research found that college students who used Kahoot! performed 12% better on tests than those who received traditional instruction (p=.039, small effect size) [43]. Then, with 96 students, the average final test score for students taught using Kahoot! was 79.56, compared to 56.83 for those taught using traditional methods (p.0001, high impact size).

Regarding Kahoot!, there is also various additional research about learning. It does not, however, compare the results of learning Kahoot! to those of other learning methods. An essay on how the learner is a leadership approach is one example. The fact that students construct and host their quizzes in Kahoot! has an impact on the learning outcome [44]. The key conclusion was that the learner as leader technique improved group conversations, particularly in the leadership group, and benefitted those who functioned as leaders. Another study found that the amount of Kahoot! quizzes students took influenced their final grade, with the more quizzes they took, the better they fared on the final exam [45]. Similarly, a study that found a positive relationship between Kahoot! game scores in a class and final grade revealed a significant link (p=.005, strong effect). A Malaysian case study examined how effectively Kahoot! supported Nicol and Milligan's standards for appropriate feedback practice and discovered that Kahoot! meets four of the seven principles [46]. The highlighted feedback techniques that Kahoot! did not completely support were: i) Ability to aid in articulating what excellent performance is; ii) Ability to offer high-quality information to students about their learning; and iii) Ability to foster teacher and peer discourse around learning. Finally, a pilot research conducted with 51 university students in South Korea discovered that Kahoot! promotes vocabulary retention while promoting a happy learning atmosphere and a meaningful learning experience.

5. CONCLUSION

The major findings of the studies presented imply that Kahoot! can improve learning when compared to other tools and techniques in different situations and domains. This means that German student learning outcomes, particularly in the *Sprechfertigkeit* 2 course using the Kahoot! Educational Games application, are excellent because the various educational games in Kahoot! increase student learning outcomes, resulting in students who are highly motivated, active, independent, passionate, and competitive in solving learning problems. Based on the findings of the preceding statistical calculations, data analysis, discussion, and relevant research studies, it is determined that the educational game "Kahoot!" has a very substantial influence on the learning outcomes of *Sprechfertigkeit* 2 German pupils. Similarly, the Kahoot! educational game may be recommended as a medium of learning for increasing learning quality in both schools and universities.

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