

A Development of Moodle based Test Simulation for ZIDS-Exam

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Abstract: The certificate for Indonesian German students (ZIDS) has to be acquired by the German students at some universities in Indonesia. This test is carried out once a year in Department of German Language Educations. The participants of this test are German students in the 4th semester. Within the scope of the ZIDS test, the Department of German Language Education of the Faculty of Languages and Literature of the Pedagogical University of Indonesia (FPBS UPI) has offered an intensive one-month preparatory program. Based on their average score, which is 60-70%, the students show no excellent performance. Since the Curriculum 2013 of the UPI comes into force, this preparation program is being carried out regularly in a semester. As the present preparation program is less intensive than before, an innovation is needed to improve the performance of the students in the ZIDS test. The intended innovation is the development of the online ZIDS test simulation based on the LMS Moodle, which allows students to prepare themselves for the test alone or outside the classroom. The results of the study demonstrate that the ZIDS test stimulation has contributed to the performance improvement of the students in the ZIDS test.

1 INTRODUCTION

Since 2003, German language education departments in some universities in Indonesia have obligated their students to take the national German language examination, namely ZIDS (*Zertifikat für indonesische Deutschstudierende*). The acquisition of this certificate entails that the students are able to express themselves in German about everyday topics orally as well as written.

The test can be taken by German students at 10 universities, namely Universitas Pattimura Ambon, Universitas Pendidikan Indonesia, Universitas Negeri Jakarta, Universitas Negeri Malang, Universitas Negeri Manado, Universitas Negeri Medan, Universitas Negeri Surabaya, Universitas Negeri Makassar, Universitas Negeri Yogyakarta, and Universitas Nommensen Pematang Siantar. This examination is carried out once a year at the end of the 4th semester. At the German Department of Universitas Pendidikan Indonesia (UPI), the examination is carried out every year in June. To complete their studies, the German students must prove that they have earned the certificate of the ZIDS examination.

The program for the preparation of the ZIDS at the German Language Department of the FPBS UPI was

carried out intensively, but it was not yet an outstanding achievement. This can be seen from the annual result of the average grade of the students at ZIDS exam, which is 60-70 percent from the desired maximum marks. Even 10-20 percent of the students did not pass the ZIDS exam.

Compared to the old preparation program the quantity of the teaching sequence in the subject ZIDS preparation is less than before. Previously the students had 20 learning sequences within a month, but now only 14 to 16 learning sequences within a semester. This gives us cause for concern that in the future the performance of the students might be lower in ZIDS exam.

In order to overcome the concern, an innovation is needed to improve the result quality of the subject *ZIDS-Prüfungsvorbereitung* and to increase student performance during the ZIDS exam. The intended innovation is the optimal use of the internet, by creating an online test simulation to prepare the student facing the ZIDS exam. With this online program, the students are able to prepare themselves for the ZIDS exam without time and space limitations, so the problem about smaller quantity of the learning sequence would be solved.

Nowadays there are many available possibilities, whereby the optimization of the role of the internet in

lessons can be carried out. One of them is the use of the online learning application “Learning Management System” (LMS). LMS is an application with the purpose of managing, tracking, and reporting a series of online learning programs and activities (Ellis, 2009). This LMS allows users to create virtual learning environment and have access to the learning content and their administration actively and interactively.

One of the most frequently used platforms LMS is Moodle (Modular Object-Oriented Dynamic learning). Moodle is an open source product, developed by a broad community and constantly improved. These include developers, education experts, translators, and many more. There are numerous ways to join the community. Moodle offers different types of online learning modules in a way that can be easily adapted by the teachers in order to achieve the learning objectives. Because of its many learning modules, Moodle is recommended for Web-based teaching, according to Kaya (2012, p. 680). Sahin-Kizil (2014, p. 184) also notes that most learners reacted positively to the use of Moodle in the classroom, where they are more engaged in language learning.

In its official website (<http://docs.moodle.org>), it's stated that the design and the development of Moodle is guided by a “social constructionist pedagogy”. This concept is largely motivated by constructivism theory. A key point of constructivism is that meaning is actively constructed by learners and learning and development socially situated activities that are enhanced in the meaningful contexts (Kargiban and Kaffash, 2011).

This means its goal is to provide a set of tools that support an inquiry and discovery-based approach to online learning. Furthermore, it purports to create an environment that allows for collaborative interaction among students as a standalone or in addition to conventional classroom instruction (Kotzer and Elran, 2012).

Moodle has pedagogical advantages since it was built in accordance with the teaching approach which emphasizes the construction of knowledge through active and interactive learning and learning multi-sensory experience through multimedia (Kotzer and Elran, 2012).

With its numerous features, Moodle enables instructors to create test kits, that is secure and easy to set up. There are over 20 highly configurable activities available - for example, forums, glossaries, wikis, tasks, tests, databases and more. Interesting in this activity-oriented approach is the possibility to freely configure these activities regarding to the

combination and the sequence. Thus, the learners' learning path can be designed freely based on the learning objectives. Also, the results of the previous activities can be used for the next activities.

In addition to the standard modules of Moodle, there are also hundreds of third-party modules and plug-ins that can be installed according to the needs of learning. From a technical point of view, Moodle can run well with at least the Apache web server, PHP and MySQL Database or PostgreSQL. Moodle also supports multiple languages as the system language, including Indonesian and also German.

Another important feature of Moodle was the feedback capability. Students who participate in E-Learning environments often complain about the lack of feedback that is available in conventional classroom settings (Kotzer and Elran, 2012). In Moodle, almost all modules are designed to allow teachers or course participants to provide feedback in qualitative or quantitative form.

2 RESEARCH METHODOLOGY

This research conducted the *Research and Development* (R&D) approach with the steps define, design, develop, and disseminate (Borg and Gall, 1979). This research method aims to produce a product and to test its effectiveness (Sugiyono, 2011, p. 297). The product of this study is an online ZIDS exam simulation based on LMS-Moodle.

According to Sugiyono (2011, p. 289), the R&D research method comprises the following steps: (1) analysing potentials and problems; (2) gathering information; (3) designing the product; (4) validating the design; (5) revising the design; (7) conducting limited trial; (8) revising the product; (9) conducting larger trial; (10) revising the product; and (10) preparing the final product.

The research was carried out in two years and mainly took place at the German Department FPBS UPI. In the first year (2016) the research was focussed with the development of the product and consisted of field observations in order to analyse the problems and the existing potentials. The information used for the research was then collected. The simulation program was then developed and then validated according to the expert evaluation. After revision of the product, the limited trial was performed, the subjects of which were only UPI students. In the second year (2017) the research has focused on revising the product based on the results of the first /limited trial. At the end, the large sample was

conducted, the subjects of which were the UPI and UNJ students.

As already mentioned, the subject of this research were the German students of FPBS UPI and FBS UNJ, who participated in the ZIDS exam 2017. In total, they were 82 persons and have belonged to the sample group. The control group of this research was 83 German students of the FBS Unesa and FS UM. Only the students from the sample group practiced with the online simulation program which they could use several times according to their wishes. They also completed a questionnaire for the assessment of simulation program.

The students from the control group are considered as a comparison group. Their results of in the ZIDS exam 2017 were taken and statistically compared with the results of the sample group. These data were analysed by t-test to find out whether there is a significant difference between the results of the two groups. This difference could help to find the effectiveness of the simulation program for ZIDS exam.

3 RESULTS AND DISCUSSION

The main goal of this research is to develop an online ZIDS exam simulation based on Moodle. The ZIDS exam itself consists of five parts, namely reading comprehension (LV = *Leseverstehen*), grammar and vocabulary (SB = *Sprachbausteine*), listening comprehension (HV = *Hörverstehen*), written expression (SA = *schriftlicher Ausdruck*), and oral expression (MA = *mundlicher Ausdruck*). The examination parts developed in the simulation are only the written parts because it is technically not possible yet for us to carry out the oral exam online.

The development of this online ZIDS-exam simulation program fully utilizes the Quiz module provided by Moodle. The questions presented in this program are in the form of objective questions, that are made using the type of embedded answer (cloze) feature. These questions consist of a passage of text in Moodle format that has various answers embedded within it, including multiple choice, short answers and numerical answers.

The online ZIDS exam simulation is available at <http://jerman.upi.edu/zids>. Because it is based on Moodle, only the registered students or users can log in to the site. After confirmation, the students can simulate the ZIDS exam. There is a time limit of 150 minutes. However, the allowed attempt of the simulation is unlimited. This means that the students

can use this ZIDS exam simulator as many times they want.

Overall, this ZIDS exam simulation consists of 10 pages: a homepage, a results page, and eight test pages. There are hints for the simulation on the start page. Clicking the "attempt quiz now" button will bring the students to the exam page after confirming. Thus, the time of the simulation starts to run. The "submit" button is available on each page. This means that when the students click the button, their entries are temporarily stored on the page. At the end of the exam page, there is also the "submit all and finish" button, which means students can stop their attempts and they can no longer edit their answers. Then the results page appears and shows the students where they can improve their performance. The site navigation of the ZIDS exam simulation is shown in figure 1.

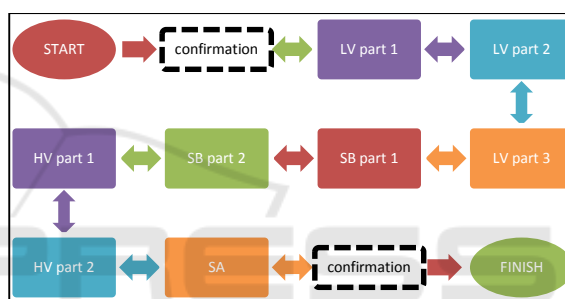


Figure 1: The flow chart of the navigation of ZIDS exam simulation.

As long as the simulation test time is still running, the students can navigate from one page to another page. This is useful when students want to check their answer. When the time has elapsed, the system closes automatically and any open attempts are submitted. The system then shows the results page.

The tasks in the ZIDS exam simulation come from several exam preparation books and web pages. A number of tasks have also been modified and / or reworded to suit the design of the ZIDS exam and the students' language level. Currently, there are more than four test sets for each test piece in the simulation program for ZIDS exam.

Because there are more than one sets for each test, it allows the question to be randomized for each students. It is also to be expected that each student gets different test sets. They could also have a different test set on the next attempt. Nevertheless, it might also be possible for students to answer the same questions. In order to get a better online test simulation, it is therefore necessary to add more test sets to the task collection.

3.1 Statistical Analyse of Attempts Made in ZIDS Exam Simulation

Moodle provides the reporting function of statistical analysis of all attempts made by the students. This report provides a statistical evaluation of the test, and the questions within it. With this statistical analyse, one can determine whether the questions in the test are suitable or not. Table 1 provides general statistical information about the online ZIDS exam simulation.

Table 1: Basic statistical information about ZIDS exam simulation as a whole.

Statistical Information	Result
Number of complete graded first attempts	82
Total number of complete graded attempts	223
Average grade of first attempts	75,71%
Average grade of all attempts	76,26%
Average grade of last attempts	79,80%
Average grade of best attempts	83,09%
Median	77,50%
Standard deviation	13,60%
Score distribution skewness	-0,3701
Score distribution kurtosis	-0,4967
Coefficient of internal consistency	60,51%
Error ratio	62,84%
Standard error	8,55%

The table 1 indicates that the number of first attempts is 82, that means all the students in the sample group have engaged with the simulation program. They have even worked with this program more than once; it could be two or three times. This can be seen in the total number of all attempts, which show the number 223.

The average grade of the students in the first attempt is 75.71 and the last attempt is 79.8. From this grade difference, it can be seen that the students have received better grades in the last attempt. The above table also shows that the average grade of all attempts is 76.26 and the average grade of the best test is 83.09. The grades show that the students were able to cope well with the tasks of the simulation program.

The score of the coefficient of internal consistency is 60.51%. This coefficient, which is also called Cronbach Alpha, is a measure of whether all the items in the test are testing basically the same thing. It measures the consistency of the text, which is a lower bound for the validity. Higher numbers are better here. The points 60.51% are interpreted as "questionable". This means that the test in this online ZIDS exam simulation is not acceptable yet, but it is also not bad.

The error ratio shows the relationship between random differences and performance-related differences in the grading. The smaller the error ratio, the less the random difference and thus the better the test reflects the actual knowledge. The error ratio for this online ZIDS exam simulation is 62.84% and is unfortunately not low enough. This means that in this ZIDS exam simulation there are still many random differences in grading.

The standard error is a parameter derived from the error ratio, and is a measure of how much random variation there is in the test grade. The standard error of this test simulation is 8.5%. That is, if a student has reached 70% in the exam simulation, the student's actual ability is probably between 78.5% and 61.5%.

In addition to the general statistical information, statistical analysis of the individual test questions is also available. The result of this analysis also serves as a measure of whether a questions can be posed. The statistical analyse of the individual test questions is shown in the table 2.

Table 2: Test structure analysis.

Test Name	Facility index	Standard deviation	Discrimination index
LV1	81.79%	20.28%	19.31%
LV2	71.93%	26.90%	31.04%
LV3	77.98%	19.31%	35.12%
SB1	66.46%	28.56%	43.90%
SB2	77.26%	22.16%	43.63%
HV1	72.02%	29.27%	42.46%
HV2	79.55%	20.48%	38.36%
LV1	81.79%	20.28%	19.31%

Table 2 shows that facility index shows the percentage of students that answered the question correctly. This number shows the difficulty level of the task in the test. The table above shows that the general facility index of this ZIDS exam simulation program is between 60% and 80%. Based on the interpretation table of the possibility index (see http://docs.moodle.org/dev/Quiz_report_statistics), this option index belongs to the category "fairly easy".

The standard deviation shows us how large the deviation of the individual scores from the average score was. The lower the standard deviation, the smaller is the deviation of the individual scores from the average score. Low standard deviation shows that the abilities of the sample group are diverse. The smallest possible value for the standard deviation is 0, and this occurs only in staged situations where each individual number in the record is exactly the same, that is, there is no deviation. In the table above, it can

be seen that the value of the standard deviation from this simulation program is rather low. It is less than 30%. This means that students' ability to perform in this ZIDS exam simulation was rather homogeneous.

The discrimination index is a parameter for the correlation between the achieved score for the question and the score achieved in the test as a whole. In the case of a "good" question, the participants who achieved a high score in this question should also have achieved a high score in the test. Here, it is expected that the score of the discrimination index is large. It can be seen in the table that the discrimination index of all tests in this simulation program is less than 50%. This means that the questions of the tests do not have so strong discrimination index. Thus, the questions could not distinguish the abilities of the students. This means that the questions research must be revised.

3.2 The Result of the Experiment

To find out the effectiveness of the online ZIDS exam simulation program, the statistical assessment of the grades of the two groups in ZIDS exam 2017 was required. The t-test was used to see if the mean scores of the sample group and the control group had a significant difference. Before the t-test, the normal distribution test and the variance equality test were performed. The tests resulted that the distribution to be tested has normal distribution; and that the equal variances are assumed.

After conducting the above tests, which serve as the prerequisite test for data analysis, the independent-sample T-test was carried out. The leading point for interpretation of the t-test is if the significance value is lower than 0.05, then there is a significant difference on the 5% significance level. The result of the t-test showed the significance value of 0.048. This value is lower than 0.05, so it can be said that the average scores of the two groups have a significant difference.

Because there is a significant difference between the scores from the sample group and the control group, the effectiveness of the online ZIDS exam simulation program can be found by comparing the average scores of the two groups. The average scores on scale 100 from both groups are as shown in table 3.

Table 3: The average score of the two groups in ZIDS exam 2017.

Group	Average	Std. Deviation
Sample	61.72	8.28
Control	60	7.77

From table 3 it can be seen that the two groups have received almost the same average score, which is 60% - 70%. According to the grading criteria of Nurgiyantoro (2009, p. 399), these grades belong to the "sufficient" category. Nevertheless, the mean score of the sample group was higher than the control group. This shows that the online ZIDS exam simulation was effective. The effectiveness was also confirmed by the correlation test which measured the relationship between the scores of the sample group during the simulation and the test. The correlation test has shown that there is a relationship between the simulation score and the test results that is at the significance level of 0.005 with the correlation coefficient 0.46. Based on the interpretation criteria of the correlation coefficient according to Sugiyono (2011, p. 183), this correlation is one of the middle category.

The survey among students from the trial group showed that 46% of the students felt that the questions in the ZIDS exam simulation program matched their abilities. 44% of students have hesitated, whether the questions were according to their abilities. This can be seen in the answer to the question of the degree of difficulty of the tasks. 70% of the students have confirmed that the tasks have moderate difficulty. 16% of whom said the tasks were difficult, and 14% felt that the tasks were too simple.

The results of the survey also show that most students (73.4%) find that this simulation program has helped them prepare the ZIDS exam. They used this program by practicing for the exam and familiarizing themselves with the design of the ZIDS exam. Although most students (66%) had no previous experience with online learning, 73% of them have confirmed that dealing with this simulation program has not caused any difficulties.

4 CONCLUSIONS

The online ZIDS exam simulation, available at <http://jerman.upi.edu/zids>, could bring benefits to the learner, namely: (1) they can familiarize themselves with the exam format; (2) the assessment is close to the result of a real ZIDS exam, so they can be realistic in assessing their preparation level; (3) the results page shows them where they can improve their

performance; (4) they can practice again and again and improve themselves. As it is online, the students would have more possibilities to access the ZIDS exam simulator without time and space barriers.

The result of the statistical evaluation has pointed out, however, that this online ZIDS exam simulation still contains some questions with unsuitable difficulty level. But on the basis of the results of the experiment it was shown that the online ZIDS test stimulation contributed to the improvement in student performance during the ZIDS examination and that there was a moderate correlation between the simulation score and the grade of the ZIDS exam. At this point, further research is recommended that involves a larger sample and more questions so that the questions available in the online ZIDS exam simulation might have higher validity and reliability.

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