

# Proctoring and Non-proctoring Systems

## A Comparative Study of Online Exam Scores for an Arabic Translating Course

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**Abstract**—This research describes learning achievement assessment technology, especially proctor technology. This study compares and contrasts proctoring and non-proctoring procedures used for online exams. The sample case used was the test scores of students enrolled in Hasanuddin University's Indonesian Arabic translation course. The research method used was a non-experimental quantitative method that compared students' online test results using proctoring and non-proctoring systems during online exams. The test scores of 101 students (40 male and 61 female students) from two different classes were sampled. The results of the tests for both classes were collected six times: three times using the proctoring method and three times using the non-proctoring system. A trend analysis was performed on the data. SPSS 26 was used to analyze the data via the two-way ANOVA procedure. The results indicate that the online proctoring system resulted in lower test scores than the online non-proctoring system, while the variables of class and gender did not affect the learning results.

**Keywords**—Proctoring system; comparative study; Arabic translating course; online exam

### I. INTRODUCTION

Academic dishonesty has long been a concern of academicians. As the number of online courses offered by universities has increased dramatically, so too has academic dishonesty; due to the inherent chances for academic dishonesty that online courses present students. This includes students collaborating on individual assessments and students using sources during tests that are prohibited—e.g., using notes and/or the textbook during a closed-book exam. Internet plagiarism is also on the increase as a form of academic dishonesty [1]. Academic dishonesty is a global problem that affects universities in many places. Moreover, multiple studies have shown an increase in cheating and plagiarism over the last few decades, with various explanations and ideas. The rising market for online education is a relatively new element of both higher education and academic dishonesty. Online education has established a permanent presence in global education marketplaces over the last decade and is considered to present new chances and problems regarding academic dishonesty [2].

As online college courses grow more widespread, concerns about academic integrity continue to arise. The prevention of cheating during unproctored online exams has gained significant attention [3]. Academic dishonesty is unethical, and exam cheating is more dangerous than other forms [2], [4]–[8], [9]. Online education will continue to expand, posing new obstacles. One major issue in this is the validity of online

assessments. Questions concerning cheating arise, such as whether the individual taking the examinations is a registered student. Student self-reporting has been used to assess online assessment cheating. In a previous study, unproctored online students' exam results were found to be identical to other groups' scores, but their time spent on the exams was much more than that spent by the other groups. Due to the extra time spent by unproctored students, it is likely that they looked up answers during tests [10].

Integrity and adaptability are two of the most fundamental issues of real-time online examination monitoring systems. Several studies have been conducted to examine how dishonest students behave during remote assessments and possible safeguards against this. Reports and online submissions can help reduce academic dishonesty, according to Guangul and colleagues 2020 [6]. An optimization-based anti-collusion technique for distant online testing was developed by Li et al. [11] to minimize the benefits of collusion. A review published by Pettit and colleagues [12]–[14] provides advice on how to improve candidate authentication and prevent cheating.

Many methods exist to ensure the validity and reliability of online tests, such as deploying an on-site proctor or a real-time supervisor system [1], [15]–[22], [18]. One of these real-time online supervisor systems is Sikoola [23], which delivers real-time online monitoring services that take advantage of laptop webcams that students use in online exams. Sikoola, an online exam app that takes students through the exam procedure and monitors their progress, is used to connect students to the exam. Students are asked to log in according to the identity sent to their respective emails, usually one day ahead. After logging in, students must check the network to find out whether their internet access is good or not. If the student does not check the network, then the student cannot continue to the next stage. Next, students must check the laptop or PC webcam used for the exam. This webcam will record all the behavior of the examinees. If the webcam of the laptop or PC does not work, then the student cannot enter the online exam page. Students are expected to read all the rules of this online exam to avoid recordings that are considered dishonest in the exam.

The primary goal of this study is to compare the results of two different models of skills exams for translating Indonesian scripts into Arabic, namely, online exams using Sikoola, which utilizes an examinee dishonesty monitoring feature, and online exams using a Chamilo-based learning management system that is not equipped with a dishonesty surveillance feature.

To summarize the methods of this study, two websites, <https://ujian.sikoola.com> and <https://sikola.unhas.ac.id>, were employed in the investigation. The Sikoola tests utilize video surveillance tools and other features to detect and record dishonesty during online exams. While the URL [sikola.unhas.ac.id](https://sikola.unhas.ac.id) gives the exam questions, it does not include a function that tracks whether a student has been dishonest during the exam

Based on this explanation, the researcher wants to address the following research questions:

- 1) Is there a difference in test scores between students who use Sikoola and Sikola in translation courses?
- 2) Is there a difference in the mean of the two classes sampled in this study?
- 3) Is there a difference in the mean of the scores acquired by female and male students utilizing the two systems?

## II. MATERIALS AND METHODS

The research method used herein is a non-experimental quantitative method that compares students' online test results using proctoring and non-proctoring systems during online exams in Arabic Translation Skill.

### A. Population and Sample

The experiment was carried out within Hasanuddin University's Arabic Language Study Program, part of the Faculty of Cultural Sciences. The participants were second-year students. In this inquiry, two different classes of academic levels are portrayed. These students were responsible for programming the Indonesian–Arabic Translation course in the last semester of the 2021/2022 academic year. At the time of the experiment, they were all between the ages of 19 and 21. The first class had a total of 52 students, with 20 men and 32 women in attendance. The second class was limited to 20 men and 29 women, with a total of 49 students.

Exams were held six times over the course of three successive weeks. Tests were administered every week following the lecture schedule. The supervised test was administered at the beginning of the lecture, and the unsupervised test was administered at the end of the session. Thus, students were required to take a test twice a week on the two different systems.

The initial test materials included the criteria for translating complete sentences in Arabic, known as *al-mubtada wal khabar* in Arabic. The second piece of exam content focused on the Arabic *ash-shifah wal maushuf*, which translates as "the adjective phrases." The third and final test's material was a sentence that contains the Arabic term for possessive phrases, *al-mudhaf wa mudhaf ilaih*, which is referred to herein as the third test material

### B. Study Design

Tests were administered six times. Each class was tested three times on the website <https://ujian.sikoola.com>, which contains the camera surveillance function and other elements that record dishonesty during the exam, and three times on the website <https://sikola.unhas.ac.id>, which does not utilize

dishonesty recorders. There were 10 questions for each exam and a maximum score of 100. Ten points were given to each item. It should be noted that this exam was conducted online. Students were permitted to take the exam from any location with an adequate internet connection.

Even though these students were already aware of the two websites used in this research, they were reminded to adhere to exam procedures. The lecturer repeatedly encouraged students to check their network connections throughout the online exam before starting the exam. Additionally, students were required to utilize a laptop/PC equipped with a camera. If a student's laptop/PC camera was not functional, they would be unable to take the online exam.

Students must check the network and camera function on the website equipped with a dishonesty recording feature before the exam. If the internet network is not good, students cannot continue to check the camera. Checking the internet network is an absolute requirement in online exams to reduce complaints from examinees. Some examinees or students sometimes do not realize that their internet network connection is poor. Students or examinees should find an excellent place to access the internet with the internet network checking feature.

In the screenshot of Fig. 1, the instruction language used is still in Indonesian. The use of Indonesian is prioritized considering that students are not familiar with English and it is not the official language.

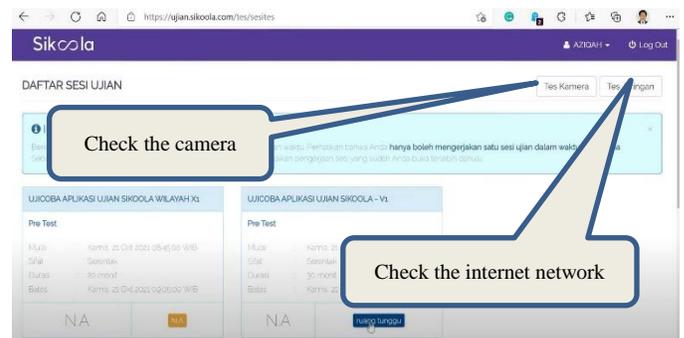


Fig. 1. A Screenshot of What Students See when they enter the Exam Question Room.

Examinees who have verified their network and camera will be taken directly to the exam page. This page contains critical information, including questions, question numbers, cameras, and remaining time information, as shown in Fig. 2.

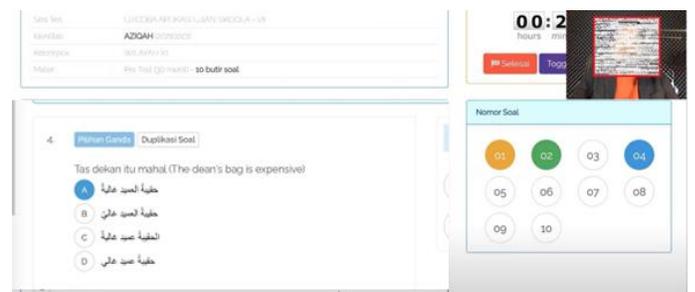


Fig. 2. An Image of the Questions on the Exam.

On the right, each question number has a color. The blue color shows the number of the question being worked on. The yellow color means that the question has been answered, but the examinee is still unsure of their answer. Therefore, examinees can reread the questions and revise their answers. The green color means that the question has been answered, and the examinee is sure that their chosen answer is correct. The white color represents a question that has not been answered. The Sikoola application allows examinees to work on questions in any order. Examinees can work on the questions they think are easy first and then answer the remaining questions. The color on the number is beneficial for examinees in solving each of these exam questions.

The above Fig. 2 also shows the Arabic exam questions and the number of each question. The exam questions were almost the same, but the words that made up the sentences were different only in alif-lam (mainly like “the” in English) and harakat (marking). Many things can change the meaning of a word, like where alif-lam is and how each last letter is marked. Therefore, students need to pay close attention to each word to find the best translation.

A camera view is displayed at the top right of the examinee's monitor screen. This live recording is transmitted to the online exam supervisor for review as can be seen in the following Fig. 3. The Sikoola application takes screenshots of events every five seconds. Sikoola saves the screenshots to its server.

If an examinee opens another browser or taps on a page other than the exam page during the exam, the Sikoola system will deliver a warning. This warning will occur after 20, 30, or even more seconds, depending on the test parameters. As long as a notification appears on the screen, the examinee's mouse and keyboard are rendered inoperable. After the warning period has expired, the OK button will become active. If the examinee hits the OK button, the warning will be removed.

Online exam designs with dishonesty recording features are likely to be a helpful tool for monitoring online exams, especially when the exam participants number in the hundreds.

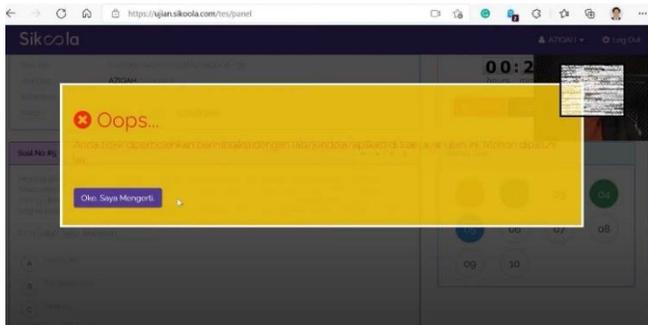


Fig. 3. An Example of a Warning from the Sikoola System when a Student Opens another Browser or uses the Keyboard to Copy–Paste.

C. Statistical Analysis

SPSS 26 was used for statistical analysis. The Wilson score interval method was used to obtain the 95 percent confidence intervals for prevalence estimations. Pearson's Chi-squared test was used to compare categorical factors. The Shapiro–Wilk test for normality and Levene's test for homogeneity were employed to determine whether there was a statistically significant difference in the variances of the two systems. To evaluate the variations in scores, a General Linear Model was used. The variables analyzed were the exam system, the student's gender, and their interactions. The mean and standard deviation were used to express the data (SD). A p-value of 0.05 was used to indicate statistical significance.

III. RESULT

The researcher conducted this analysis via the two-way ANOVA test using SPSS 26. As a result, the researcher first determined the normality and homogeneity of the data. As shown in the Table I, the value of Sig. 0.164 > 0.05 indicates that the standardized residual was normal. The findings indicate that the data are normally distributed, as illustrated in Table I.

TABLE I. TEST OF NORMALITY

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Standardized Residual for SCORE	0,05	202	,200*	0,99	202	0,164
* This is a lower bound of the true significance.						
a Lilliefors Significance Correction						

Concerning the variance of the examined variables, it should be noted that Sig 0,103 > 0.05 indicates that the variance is homogeneous, as referred in the Table II.

Additionally, as evidenced by the data in the Table III, there are two system variables, two class variables, and two gender variables.

TABLE II. LEVENE'S TEST OF EQUALITY OF ERROR VARIANCES A,B

		Levene Statistic	df1	df2	Sig.
SCORE	Based on Mean	1,734	7	194	0,103
	Based on Median	1,619	7	194	0,132
	Based on Median and with adjusted df	1,619	7	164,944	0,133
	Based on trimmed mean	1,78	7	194	0,093
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.					
a Dependent variable: SCORE					
b Design: Intercept + MEDIA + CLASS + GENDER + MEDIA * CLASS + MEDIA * GENDER + CLASS * GENDER + MEDIA * CLASS * GENDER					

TABLE III. BETWEEN-SUBJECT FACTORS

		Value Label	N
MEDIA	1	SIKOOLA	101
	2	SIKOLA	101
CLASS	1	CLASS A	104
	2	CLASS B	98
GENDER	1	Male	80
	2	Femle	122

Also, descriptive statistics are presented in Table IV.

TABLE IV. DESCRIPTIVE STATISTICS

MEDIA			Mean	Std. Deviation	N
SIKOOLA	CLASS A	Male	78,90	3,216	20
		Femle	79,69	3,423	32
		Total	79,38	3,335	52
	CLASS B	Male	78,07	4,569	20
		Femle	78,50	3,181	29
		Total	78,33	3,770	49
	Total	Male	78,48	3,923	40
		Femle	79,12	3,336	61
		Total	78,87	3,575	101
SIKOLA	CLASS A	Male	89,45	2,934	20
		Femle	89,54	2,751	32
		Total	89,51	2,795	52
	CLASS B	Male	92,28	2,561	20
		Femle	93,17	2,858	29
		Total	92,81	2,749	49
	Total	Male	90,87	3,074	40
		Femle	91,27	3,327	61
		Total	91,11	3,219	101
Total	CLASS A	Male	84,17	6,146	40
		Femle	84,61	5,844	64
		Total	84,44	5,936	104
	CLASS B	Male	85,18	8,073	40
		Femle	85,84	7,982	58
		Total	85,57	7,985	98
	Total	Male	84,68	7,147	80
		Femle	85,20	6,941	122
		Total	84,99	7,010	202

To address the research questions, the Table V summarizes the findings of the two-way ANOVA statistical test:

1) Sig 0.000 < 0.05 means that there were significant differences in the test output results based on the SYSTEM variable used in this study. In other words, there were differences in student test scores in the exam when using the

system <https://ujian.sikoola.com> as a proctoring system or the system <https://sikola.unhas.ac.id> as a non-proctoring system;

2) As evidenced by the value of Sig 0.071 > 0.05, there was no variation in student test scores based on class variables;

3) Similarly, there was no difference in scores between male and female students, as evidenced by Sig 0.234 > 0.05.

TABLE V. TESTS OF BETWEEN-SUBJECT EFFECTS

Dependent Variable: SCORE					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7885,882a	7	1126,555	109,76	0
Intercept	1393397,684	1	1393397,684	135758,527	0
MEDIA	7328,828	1	7328,828	714,047	0
CLASS	59,802	1	59,802	5,827	0,071
GENDER	14,658	1	14,658	1,428	0,234
MEDIA * CLASS	216,881	1	216,881	21,131	0
MEDIA * GENDER	0,179	1	0,179	0,017	0,895
CLASS * GENDER	0,603	1	0,603	0,059	0,809
MEDIA * CLASS * GENDER	3,974	1	3,974	0,387	0,535
Error	1991,176	194	10,264		
Total	1468975,179	202			
Corrected Total	9877,058	201			

a R Squared = ,798 (Adjusted R Squared = ,791)

Some examinees' attempts to unfocus or engage in academic dishonesty are revealed via proctored online examinations. Unethical conduct includes opening the website and hitting the keyboard, which is deemed an attempt to access another application besides the opened exam page, as seen in Table VI.

TABLE VI. ACADEMIC DISHONESTY

Classes	Gender	Unfocus	Efforts
CLASS A	Male	16	18
	Female	17	18
CLASS B	Male	17	18
	Female	15	19

#### IV. DISCUSSION

The COVID-19 pandemic has compelled teachers and students to alter their academic activities, one of which is assessing a student's acquired knowledge. According to certain studies, the acceptability of new approaches has been consistent across countries [24]–[26]. The primary reasons for

student opposition (to the online format) varied in various studies but included the risk of cheating or even receiving lower grades due to a lack of concentration [27], [28]. The former of these is easily overcome by employing a proctoring system during the remote electronic examination (like Sikoola, as was used in this study).

Sikola [29] is the website used to administer online exams without proctoring features in this study. This webpage is based on Chamilo [30]. Similar to other Learning Management systems (LMS), the LMS Chamilo application has an exercise menu. This menu has a variety of questions ranging from conventional types like multiple-choice questions to multiple-choice questions that force examinees to think more carefully in deciding their responses, such as multiple-choice questions with a degree of certainty.

The proctored website for online examinations is Sikoola. Sikoola is a program built exclusively for tests. The website Sikola's online exam elements are likewise owned by Sikoola. The only difference between the two is the proctoring system capabilities in terms of online examinations.

The statistics in this study demonstrate that student test scores were lower when distant electronic examinations were proctored. The proctoring system's documentation of the online exam process revealed that some students were flagged as dishonest throughout the exam. The information gathered was the appearance of notifications from examinees who wished to access a website other than the exam page. Another piece of information supplied by the system is the copy-paste usage of the keyboard. It is natural for the test taker's score to be lower when the exam is proctored. Additionally, the research indicated no difference in test scores when considering the class and gender variables.

The employment of a proctoring system during remote electronic examinations does assist institutions in educating students to always be truthful throughout exams. However, examinees complained that the employment of a proctoring system during the remote electronic examination drained a significant amount of credit from them; however, this assertion was not backed up by reliable statistics. Another student complaint apart from credit is the internet network. Some students who live outside the city frequently express dissatisfaction with the city's internet network. Students report having difficulty taking online tests due to insufficient internet availability. Students who experience this difficulty frequently want a policy requiring them to take a follow-up exam.

Therefore, under these conditions, the researcher took the initiative to prepare an online exam model for Arabic translating skills by utilizing an application to monitor student's behavior during online exams. The internet access check tool, the PC/laptop camera, and keyboard usage monitoring are just a few of the features required to monitor the translation skills test from the application. This program is anticipated to determine the strength of a student's internet connection. This feature's purpose is to educate students about the status of their internet access. Thus, if internet access is inadequate, the instructor is no longer held responsible for slow loading of the substance of the questions being worked

on. The difficulty, however, returns to students who are unprepared for online exams.

Another must-have feature is a surveillance camera. Every modern laptop, by and large, is equipped with a camera. This camera can be used when the owner is taking an online exam; for example, the camera can be compelled to turn on to capture the laptop's owner sitting in front of the screen. This online exam application system can periodically record the behavior of the laptop owner.

Additionally, an application that can monitor students' laptop keyboard usage is considered necessary for online tests. This cheating tracking tool instantly tells the laptop/PC owner if someone attempts to use the keyboard during an online exam. Thus, if students try to open another browser (new window) to search or copy and paste, the proctoring system will block the examinee's screen. As a result, students who attempt to cheat on online tests will be identified and may face disciplinary action.

The following Table VII summarizes the elements of Sikoola that enable it to monitor and record dishonesty during online exams.

TABLE VII. LECTURERS CAN SELECT FROM THESE VARIOUS FEATURES WHEN PRAPARING FOR ONLINE EXAMS

FEATURE	CHOICES		DESCRIPTION
Is time flexible?	No	Yes	A flexible period can be set if the participants do not begin the exam simultaneously. Participants can begin the exam within the chosen time range using flexible mode.
Minimum completeness criteria	Filled with a minimum passing grade		Minimum requirements for completion are used to determine whether or not a participant passes the exam. If the lecturer is going to do remedial work, only examinees who do not meet the passing grade are permitted to take it.
Stop the timer when offline?	No	Yes	When the examinee cannot connect to the server, for example, during a power outage, the countdown timer can be paused to ensure that processing time is not shortened when the participant reconnects.
Activate test tokens?	No	Yes	The organizer may need activation of the test token. Participants who do not know their exam token are unable to begin the examination. The institution's supervisor/admin can view the exam token. Every 30 minutes, the exam token will change.
Require camera?	No	Yes	If you select YES, all participants must consent to camera access. If this is NOT permitted, the participant will be unable to continue the examination. Ascertain that all examinees comprehend how to use the browser's camera.

Enable network checker?	No	Yes	If you select YES, all participants will be required to click the network check button. If NO, the individual is unable to proceed with the examination.	Limit participant browser?	No	Yes	This restriction only allows specific browsers to be used. Specify the allowed browsers, e.g., Edge, Chrome, Safari, etc.
Enable snapshots?	No	Yes	If this option is enabled, when the examinee's webcam is recognized as being out of focus in front of the exam screen, a snapshot from the examinee's webcam is saved and can be downloaded in .zip format once the test concludes (up to 7 days after the exam, after which the system will delete it). Please keep in mind that this option is only effective if your examinee is obliged to stare at the exam screen constantly. If your examinee needs to draw on paper, keeping their face down, this option should not be activated.	Limit internet provider	Specify the allowed internet provider		If the test is not being run in a dedicated room or no IP address limitations are required, leave the room selection blank.
Enable Live Score?	No	Yes	By enabling Live Score, institutions can track test taker acquisition in real time via the session administration menu. Please utilize this function only when necessary. If it is not critical to the institution, we recommend that it is disabled. Important! For the time being, the maximum number of participants in a session that can activate this function is 500, and the sessions must be concurrent.	Show final result?	No	Yes	If desired, the outcome (points gained) will be shown to participants. Additionally, improper problem solutions will be revealed if this option is enabled. These displays are offered to participants only after completing their work on the questions.
Screen block duration	No	Yes	When participants engage with other tabs/windows/applications outside the test screen display, their screen may be blocked (they will be unable to answer/change questions). Enter the duration in seconds during which the participant will be blocked. If it is set to 0, no screen blocking occurs. Take note that this approach of screen blocking is relatively basic but quite successful for participants in general.	Show rank?	No	Yes	This feature will display the ranking order of participants.
Check screen ratio?	No	Yes	If the screen ratio check is performed, the system will verify the participant's browser size every three seconds. If the screen size is deemed unsuitable, the test page will be blocked briefly. Before participants can proceed with the exam, they must alter the screen size. This method is intended to minimize the likelihood of participants exploiting the split-screen feature to launch additional windows/applications.	Show errors?	No	Yes	This feature will indicate whether the participant's response was incorrect. Caution should be exercised when activating this function, as it may create stress for individuals.
Allowed devices	PC/ laptop	Mobiles or tablets	The type of gadget that participants may use to work on this session is entirely up to them. Leave it as-is for unlimited access from any device.	Show discussion?	No	Yes	This setting is only available if displaying errors is also enabled. After the test/test period is declared complete by the system, incorrect answers will be revealed along with the answer key and discussion (if applicable).
				Show Done button?	No	Yes	This button allows the participant to exit the exam/test even if there is still time remaining.
				Thorough discussion?	No	Yes	When the complete discussion option is enabled, all answers are shown to participants at the conclusion of the test, regardless of whether they were answered correctly or wrongly.
				Engaged teachers	Fill in the teacher's name		This field is optional. The test session outcome report is accessible solely to the specified teacher when completed. However, if it is left blank, no teacher will be able to view the test results.
				Supervisors involved	Filled with the supervisor's name		This field is optional. Supervisors may be assigned only to monitor the exam's progress.
				Report model	Selected from the provided options, including standard reports, sorting, personality		If you are unsure, use the Standard report model. Specific report models require the development of a question package to meet specific criteria; please consult us if your institution requires this.
				Additional information	Filled with additional information		Fill in the required information that has not been provided in the online exam system.
				Show feedback form?	No	Yes	This feature will display feedback from the answers given by the examinees.

Based on the facts, it was discovered that students were murmuring while taking online tests. This behavior is regarded abnormal, and as a result, the lecturer talks with the mumbling examinee by asking about his or her mouth. Evidently, the response to the inquiry was unexpected; hence, he had to read with his mouth jumbled to comprehend what he was reading. Obviously, this is an entirely different explanation from the lecturer's opinion that the student was muttering because he was reading the exam questions to his colleague standing in front of him, even though the PC/laptop used for the exam was not recorded. This fact also demonstrates that Sikoola's proctoring method must be improved, particularly in capturing students' voices during online exams.

## V. CONCLUSION

A proctoring system is a web-based program that assists instructors and students with online exams. In the case of Arabic translation examinations, the test scores of students who utilized the proctoring system were lower than the test scores of students who took the exam without using the proctoring system. Additionally, this study established that class and gender variables did not affect test scores. The online exam system variable—more precisely, the proctoring method used during the online exam—impacted the test score. A proctoring system in online exams can keep the examinees from engaging in dishonest behavior. Further improvements can be made to the proctoring system program to enhance its capabilities to record and track dishonesty during online exams.

According to recent findings, academic dishonesty appears prevalent among students enrolled in Arabic Translation courses. It is believed that, with the implementation of the proctored system, this unethical behavior among students would be eliminated in the future. One of the functions of higher education is to instill values in students, instilling the belief that academic dishonesty is unethical and should be avoided at all costs.

## ACKNOWLEDGMENT

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