SOSHUM
Jurnal Sosial dan Humaniora
[Journal of Social Sciences and Humanities]
Volume 12, Number 3, 2022
p-ISSN. 2088-2262 e-ISSN. 2580-5622
ojs.pnb.ac.id/index.php/SOSHUM/

Academic Dishonesty Identification through Gender and Grade Using Chi-Square Analysis

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Article Info

Article History
Received:
Nov 2021
Accepted:
Aug 2022
Published:
Nov 2022

Keywords:
Gender, Grade, Academic Dishonesty, Online Class, Chi-Square

ABSTRACT

Academic dishonesty, as a cheating act done by students, has always been a significant challenge in education. It reflects integrity and responsibility as the main element in character development. Many studies had done to identify variables behind students' dishonesty. Hensley (2013) said male students are likelier to cheat and plagiarise. This study measured further through a perspective questionnaire using a vignette test for vocational education during an online class. The variables were designed based on Maslow's hierarchy of needs with six dependent and five independent variables. The analysis of this study applied chi-square quantitative analysis. At the same time, the data was collected using random sampling from semesters 1,3 and 5 of the Informatics Engineering study program in Politeknik Negeri Jakarta. This study was conducted during COVID -19 Pandemic when all the teaching, learning and assessment processes were conducted online. This study showed that gender and grade did not affect students' motivation to cheat during online exams. At the same time, the chi-square analysis reflected the same result for both gender and grade analysis. They did not highly influence academic dishonesty in the online test. This study exposed us to varied insights into variables behind academic dishonesty, such as religiosity, lecturer and course and system. This finding triggered further study and evaluation of the institution system and human resource development since they had a role in shifting the phenomena.

INTRODUCTION

Academic dishonesty is a big concern in education since it relates to evaluation and assessment. The covid 19 pandemic forces the study to be done online because everyone has to follow health protocol and avoid meeting people face to face. This pandemic gives a new paradigm in education that makes technology possible to support education remotely. In the same way emerges a new challenge in the teaching process, including assessment and evaluation. Offline and online assessments give different treatments and provide different results. Many studies show that academic dishonesty is one key point in an online exam; when a teacher cannot take 100% control

students' honesty during the exam, more innovation should be taken to overcome it. Ozcan et al. (2019) categorized academic dishonesty as academic fraud and emerged as an ambiguous academic issue. It is identified as fraud because academic dishonesty is a manipulative action again the law so it can be categorized as an institutional crime. At the same time, another definition is stated by Baran (2020), who describes academic dishonesty as a psychological inhibition based on goal orientation. The reason behind students' academic dishonesty is in Maslow's hierarchy of Needs. This theory emphasizes that the highest levels of needs can only be gained if the lowest levels are completed. Students commit academic misconduct because of some variables triggered by self-esteem, self-actualization and belonging. Maslow's theory can be the answer to the students' cheating motivational perspective (Anitha & Suresh, 2021; Arshad, et. al., 2021).

The study of academic dishonesty in Indonesia can be seen by Herdian & Lestari (2018), who stated that almost all students ever try and ever witness any academic dishonesty. They mostly cheat in their mid-test and final test. This situation becomes significant attention since academic dishonesty is part of character building that frames someone's personality and performance. Another survey was also reported by Chirumamilla (2020), who confirmed that cheating was a common misconduct among students during an exam, and it is even more prevalent if they can open their devices with internet access.

Considering those previous studies, answered the previous study by Hensley (2013) about whether gender and grade were key indicators influencing students' academic dishonesty. He found that in terms of gender, a male was revealed more to plagiarism than a woman. At the same time, students with low grades are more likely to cheat than those with higher grades. This study also shared a similar result with Ozcan (2019), who said that most students, especially male students performed dishonesty in task submission, assignments, and projects. They reported less academic misconduct in the citation. It meant that in completing the test, students were more honest. Those findings set curiosity about whether those results are still compatible during the online test or not.

Set against the previous study, we measured Informatic Engineering students of the State Polytechnique of Jakarta using random sampling to answer questionnaires using vignette testing. Vignette testing is preferred because it will be used to measure students' intention and motivation in cheating as related to the study for measuring grade and gender as the primary variable in academic dishonesty. It is not seen as the measurement of cheating as output but as a preference and motivation. The vignette testing was created and designed using a motivational perspective and elaborated to measure other influential variables that potentially influence academic dishonesty, such as religion, teaching method, course material and test system. The variables were validated using Pearson validity testing and Spearman and Brown reliability.

This study aimed to enlighten a new point of view about academic dishonesty compared to the platform, system and environment. How can gender and grade intervene in electronic cheating in online classrooms and tests? Moreover, how can the new variables invent valid and reliable to measure academic dishonesty? The comparison study between offline and online testing will also challenge future education in the digital era as a challenge to answer industrial 5.0.

METHODS

The study is answering the following hypothesis:
H0 gender and grade are not dominant variables in academic dishonesty
H1 gender and grade are the dominant variables in academic dishonesty

The hypothesis is determined by the previous study by Hensley (2013), who said that male students mostly confirmed academic dishonesty compared to females, and higher grades were dominant in cheating. It triggered my curiosity to apply the exact measurement to higher vocational education majoring in Informatic Engineering.

Cheating and plagiarism became a big issue during covid -19 pandemic during online exams, and less control from the authority presented students' academic dishonesty performance.

Other variables should be measured to see the students' motivation in learning and exam, combined with Maslow's need analysis (Retinger, 2010). This study will prove that other variables will determine academic dishonesty more than that grade and gender in the online exam.

This study was initiated by variables analysis, validity and reliability testing by Kurniawati (2021). She identified the Maslow analysis through the safety stage, belonging, esteem and self-actualization. Most motivations that appear are esteem and self-actualization. Furthermore, in her study, she found five dependent variables.

(Motivation, Value, Religiosity, Lecturer/ Course Content and System) and six types of independent variables (cheating, conspiracy, duplicate submission, academic misconduct, improper online web and plagiarism) of Academic dishonesty. Those variables will be measured using the Chi-Square equation to prove that gender and grade dominate in defining the result of that identification.

This study is a quantitative research using chi-square analysis to measure the validity of the χ^2 test with the null hypothesis. This study hypothesizes that gender and grade will play a role in defining students' Academic dishonesty. The Chi-square equation can be seen below:

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

χ^2 = chi squared
O_i = observed value
E_i = expected value

Formula 1: Chi-square equation

The Chi-square formula is a statistical formula to compare two or more statistical data sets. It is used for data that consist of variables distributed across various categories and is denoted by χ^2. The chi-square formula is $\chi^2 = \sum(O_i - E_i)^2/E_i$, **where O_i = observed value (actual value) and E_i = expected value**.

The instrument for this research is a vignette model questionnaire with 30 questions, developed by five independent variables: motivation, religiosity, lecturer, content /lecture and system/platform. Six types of academic dishonesty will describe those five variables in detail. In comparison, the instruments themselves thought through Maslow's hierarchy of needs. The instrument was validated using Pearson validity and Spearman-Brown reliability. The equation can be seen as follow:

$$r_{xy} = \frac{n\sum_{i=1}^{n} x_i y_i - \sum_{i=1}^{n} x_i \sum_{i=1}^{n} y_i}{\sqrt{\left(n\sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2\right)\left(n\sum_{i=1}^{n} y_i^2 - \left(\sum_{i=1}^{n} y_i\right)^2\right)}}$$

RX = correlation coefficient
n = respondent
X = per item score
Y = total score
Formula 2: Pearson Validity Equation

Validity coefficient values	Interpretation
0,8 – 1,0	**Strongly Valid**
0,6 – 0,8	**Valid**
04, – 0,6	**Likely to be Useful**
0,2 – 0,4	**Depend on circumstances**
0 – 0,2	**Unlikely to be Useful**

Table 1: Interpretations of validity coefficients

While the reliability score is measured using a split-half technique by Spearman-Brown as below:

$$r_{11} = \frac{2r_{\frac{1}{2}\frac{1}{2}}}{1 + r_{\frac{1}{2}\frac{1}{2}}}$$

r11 = Reliability instrument
r1212 = Correlation Index
Formula 3: Spearman-Brown Reliability Equation

Internal consistency reliability coefficient value	**Interpretation**
0,8 – 1,0	**Excellent**
0,6 – 0,8	**Good**
0,4 – 0,6	**Adequate**
0,2 – 0,4	**Less Applicable**

Table 2: Interpretations of internal consistency reliability coefficients

The instrument was delivered to all Informatic Engineering programs of the State Polytechnique of Jakarta using random sampling. Among all total students, the chi-square analysis was given again for semesters 1, 3 and 5 students with a random sampling of 69 respondents.

The distribution among respondents reported that males were 48 and females were 21. The research was conducted during the COVID-19 pandemic when everything was conducted online: the learning process and the assessment.

The instrument was created and designed based on Maslow's Hierarchy of Needs. The instrument had five independent variables and was detailed by six types of academic dishonesty. The questions themselves will be identified based on the following Maslow analysis and plan:

Motivation	**Need**	**Religiosity**	**Need**	**Lecture and Course Content**	**Need**	**System**	**Need**
Q1	Esteem	Q7	Safety	Q13/Q19	Safety	Q25	Belonging
Q2	Self-Actualization	Q8	Esteem	Q14/Q20	Belonging	Q26	Belonging
Q3	Self-Actualization	Q9	Safety	Q15/Q21	Belonging	Q27	Belonging
Q4	Self-Actualization	Q10	Safety	Q16/Q22	Belonging	Q28	Belonging
Q5	Esteem	Q11	Safety	Q17/Q23	Belonging	Q29	Belonging
Q6	Self-Actualization	Q12	Esteem	Q18/Q24	Safety	Q30	Belonging

Table 3: Needs distribution

The instrument showed that it was valid and reliable with a 0,6 average, and some questions were 0,3 applicable if it is purposely aimed for the measurement. From the reliability, is it also reliable with calculation result 0,9 meant excellent and applicable? From that result, this instrument can be used to collect data. The summary of instrument validity and reliability can be seen in the following result.

No	Dependent Variable	Validity Value					Reliability Value
		Motivation	Religiosity	Lecturer	Course Content	System	
1	Cheating	0,699	0,754	0,672	0,406	0,79	0,94442589
2	Conspiracy	0,695	0,769	0,422	0,755	0,848	
3	Duplicate submission	0,397	0,483	0,309	0,441	0,711	
4	Academic Misconduct	0,609	0,515	0,658	0,537	0,624	

5	Improper online web	0,765	0,567	0,745	0,686	0,736
6	Plagiarism	0,556	0,634	0,542	0,552	0,688

Table 4: Validity and Reliability Coefficient Value

Note: The analysis is from a Motivational perspective on students cheating during the COVID-19 pandemic as the essential variable for creating a research instrument by Kurniawati (2021). *Journal of Applied Studies in Language*, Volume 5 Issue 2 (Dec 2021), p. 282—290

The independent variables are those six types of academic Dishonesty that can be changed by dependent variables that are derived based on Maslow's need analysis. For academic dishonesty during online exams, the variables that most appear are self-motivation, religiosity, lecturer / human resource value, course content and the online exam system used by the author.

Those variables are combined and identified using the vignette test. The instrument was elaborated using a vignette test to measure students' intention in doing academic dishonesty. This technique was applied because it will indirectly impact emotion through a situational case study (Skilling, 2018). An example of the question can be seen in the following and in detail from Kurniawati (2021).

Independent Variable : Religiosity
Dependent Variable : Cheating
Question : One semester student had difficulty completing an online test, so he copied his friend's work to gain a high score. He realized it was academic misconduct and forbidden in his religion.
Answer : 1 2 3 4 5 (disagree-totally agree)

RESULTS AND DISCUSSION

The Chi-Square analysis measured gender and grade could significantly influence academic dishonesty among college students. This result aimed to answer H0 and H1. The gender chi-square analysis can be measured from 48 males and 21 females.

The calculation of each hypothesis variable can be senior the following table:
The first result shows Gender Chi Square Analysis, while the second table shows the grade chi-square analysis.

Gender	**Motivation**	**exp Motivation**	**Religiosity**	**exp religiosity**	**Lecturer**	**Exp Lecturer**	**Content**	**Exp Content**	**System**	**Exp System**	**SUM**
Male	38	37.951	21	20.381	48	48.49	30	30.220	38	37.95	175
Female	16	16.048	8	8.6184	21	20.506	13	12.779	16	16.04	74
	54	54	29	29	69	69	43	43	54	54	249

x^ 2	0.086	x^2 < x^2 table means, Ho is accepted
x^2 table	9.488	Gender is rejected

Table 5: Gender Chi-Square Analysis

Among the 30 questions and 69 respondents, the result showed x^2 < x^2 table.

The gender chi-square analysis reflected the response between the male and female respondence that indicated H0 was accepted, and gender was identified as a not dominant variable in Academic dishonesty.

The subsequent analysis is a grade chi-square analysis that can be seen from the following result:

Grade	Motivation	exp Motivation	Religiosity	exp religiosity	Lecturer	Exp Lecturer	Content	Exp Content	System	Exp System	SUM
Semester 1	26	28.623	15	15.373	36	36.578	25	22.795	30	28.626	132
Semester 3	3	3.036	1	1.63	4	3.879	3	2.417	3	3.036	14
Semester 5	25	22.337	13	11.995	29	28.542	15	17.787	21	22.337	103
	54	54	29	29	69	69	43	43	54	54	249

X^2	1.853	x^2 < x^2 table means, Ho is accepted
X^2 table	15.507	Grade is rejected

Table 6: Grade Chi-Square Analysis

Table 6 describes the Grade Chi-Square analysis distributed to semesters 1, 3 and 5. x^2 < x^2 indicates that H0 was accepted, and the grade was rejected as the academic dishonesty dominant vital variable.

This study's finding depicted the opposite of Hensley's (2013) result in the case of the gender chi-square analysis and grade chi-square analysis. Suppose the previous study mentioned that male students did more academic dishonesty compared to female students, and low-grade students preferred cheating. In that case, this study could not approve the higher level. From the data above, we can conclude that Ho was X=0 meant that There was not any significant between gender with academic dishonesty.

The calculation can be seen below:

			x^2 < x^2 table, means :
x^2	0,085925	::	Ho is accepted
x^2 tabel	9,488	>>>	Gender is rejected

A similar result also was presented by Grade chi-square analysis. This grade chi-square analysis, represented by semester1, semester three and semester 5, could not confirm students' Academic dishonesty.

The calculation can be analyzed as below:

			x^2 < x^2 table, so :
x^2	1,85261	::	Ho is accepted
x^2 table	15,507	>>>	Grade is rejected

Hansley represented the different behaviour in the case of the method and instrument. Harsley developed the instrument through 4 independent variables: academic dishonesty, cheating on tests, plagiarism, and false excuse-making. The population of his study was 292 students of a public university in the USA, and the learning process technique and the assessment were offline. While in this study, the independent variables were developed based on Maslow's need analysis consisting of six types of academic dishonesty: cheating, conspiracy, a duplicate submission, academic misconduct, improper online web, and plagiarism. The five dependent variables, Motivation, Value, Religiosity, Lecturer/ Course Content and System were used to give situational vignette tests that allowed them to rely on it into the fact for the online exam.

The vignette testing characteristic to provide the third-party situational story could also trigger the students to be more honest. Vignette testing can be defined as a short story about what the third person ought to do in a particular situation and condition to give a respondent's point of view, belief and attitude (Hughes 1998, p. 381). If Hensley reported that the low level did more cheating than the higher level in online tests, the grade was not a significant element in differentiating students' attitudes and behaviour toward academic dishonesty.

The other result from this study showed that 100% of students experienced academic dishonesty. Academic dishonesty became part of the student's experience in the learning process. Maynon (2015) stated that academic dishonesty was an omnipresent issue in education. Another researcher, Wangaard and Stephens (2011), reported that 95% of all students admitted to cheating at their high school. From those two previous studies, we can understand students' interpretation of Academic dishonesty since almost everyone has experienced it, so some of them would consider it as something normal. They would never feel guilty and did not attach to the religiosity variable of something done massive among the group and conducted as a habit.

The system also influenced students' consideration of cheating; offline tests with full supervision do not give any opportunity for any academic dishonesty. On the different side, online tests with open-access platforms like google-form make it possible for students to engage in web misconduct. The authority's loose power to control can let students admit more academic dishonesty with no gender differences because both male and female students have an equal chance to do it without being recognized.

Relating to the instrument, the vignette test with 'real-life' experience of academic dishonesty without multiple judgmental choices was an effective instrument to dig for more honest responses from the students. Sampson (2020) also supported that the vignette test engages openness among the students to give the real experience through their responses so that the data will be more valid and actual. The instrument used to collect the data was based on a situational scenario that could reflect the students' real-life experiences from elementary school into college. The option was

made in the range 1-5, while for the chi-square, we use one as unfavourable and five as affirmative. This type of question motivated them to give honest responses.

From the discussion, we could infer that there was no impact on grade and gender in academic dishonesty, while the challenge of technology as a new media to support academic dishonesty should be improved into a more restricted system.

CONCLUSION

In brief, this study gives us a new overview that previous studies done back then can be different from today's updated research, especially relating to students' psychological development. It is because behaviour can be defined by opportunity, environment, and situation. The higher technology we have in the digital era provides more challenges in managing academic dishonesty. The five independent variables measured the students' real experience with detailed elaboration on 6 types of academic dishonesty. The vignette test developed by real-life scenarios also proves the effectiveness of non-judgmental statements to engage honesty among respondents. The major finding of the studies is that gender and grade do not determine students' academic dishonesty. The result from the gender chi-square analysis can be $0{,}08 < 9{,}4$, while the grade chi-square analysis can be seen from this equation as $1{,}8<15$. It can be concluded that both male and female students share equal opportunity, and so does the grade. Although this study provides more understanding of the behaviour shift influenced by digital technology, this study is still needed to be improved to be conducted for a more varied and larger population with different education levels. 69 population is the beginning of the more complex study and informatics engineering department as the area of limitation should be broadened into all departments in the state Polytechnique of Jakarta for getting more comprehensive results.

A**CKNOWLEDGEMENTS**

This study is funded by Research and Community Service Unit and Informatics and Computer Engineering Department Politeknik Negeri Jakarta. Any opinion, finding, conclusion, and recommendations stated in the article are authentic by the author and have not been published before.

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