

Application Of Easy COA On Android To Improve Understanding Of Learning Chart Of Accounts

Riani Tanjung ¹, Mohamad Nurkamal Fauzan ², Nyi Mekar Saptarini^{3*}

¹ Department of Accounting, Faculty of Applied Program, Pos Indonesia Polytechnic, Bandung, Indonesia.

² Applied Bachelor Program of Informatics Engineering, Faculty of Applied Program, Pos Indonesia Polytechnic, Bandung, Indonesia.

^{3*} Department of Pharmaceutical Analysis and Medicinal Chemistry, Faculty of Pharmacy, Universitas Padjadjaran, Jatinangor, Indonesia. Email: nyi.mekar@unpad.ac.id

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Abstract

Understanding of the Chart of Accounts (COA) is the basic capital and has an important essence in the preparation of financial reports. In the D3 Accounting Study Program, Pos Indonesia Polytechnic, based on the processed quiz scores, shows that students' understanding of COA material is still lacking. For this reason, other facilities are needed, so that students can study anywhere and anytime. Currently, Android smartphones can be used as a learning tool. Learning content can be in the form of images, sounds, videos, etc. Easy COA is an android application related to COA. This study aimed to analyze before and after the implementation of Easy COA using paired sample test, to analyze student clusters after implementing Easy COA using the DBSCAN method, and to analyze the effect of Easy COA implementation on the final grades of students using linear regression. The results showed that there was an improvement in the mean value of 2.89%. The distribution of the cluster pattern using the DBSCAN method was interpreted that the Easy COA score was directly proportional to the final score. The effect of Easy COA with the final value had given the linear regression correlation. It concluded that Easy COA can be implemented to improve understanding of learning COA.

Keywords: Accounting, Android, Paired-sample test, DBSCAN, Linear regression, Improved understanding.

INTRODUCTION

The very fast business world in this modernization era has resulted in the availability of a workforce who understands and can compile financial reports following the qualitative characteristics of financial reports according to Financial Accounting Standards (Standard Akuntansi Keuangan, SAK). SAK must be relevant, accurate, reliable, and understood easily by readers of financial statements. So, to produce financial reports that have these criteria, a correct understanding of the preparation of financial statements is required and follows the applicable SAK, namely the converged Financial Accounting Standards IFRS (International Financial Reporting Standard) [1]. SAK learning and discussion can be obtained through education in the Accounting study program at various universities in Indonesia. Learning and discussion of the preparation of financial statements begin in an introductory course in level one accounting. Through this course, students will have a good understanding of the basic concepts of accounting, especially regarding the preparation of financial reports. There are three main topics regarding basic accounting concepts that students must understand in an introductory accounting course, i.e. understanding of assets, liabilities, and equity (Chart of Account, COA) [2]. Understanding of COA is the basic capital and has an important essence in the preparation of financial reports under the convergence of IFRS.

The students of the Accounting Study Program, Pos Indonesia Polytechnic, West Java, Indonesia, come from various educational backgrounds, consisting of the vocational school with various majors, for example, accounting, computer, and network engineering, aviation engineering, etc. Other students come from the public high school and *madrasah aliyah*, majoring in social sciences and natural sciences. Students from the vocational school in the accounting program have in-depth accounting knowledge, while students from social sciences and natural sciences programs only have basic accounting knowledge. The difference in the student educational background gives different mindset, habits, and catching power in receiving learning material, especially understanding COA in an introductory accounting course. This can be proven from the students' quiz scores in the class 1A and 1B of 2018 Accounting D3 student of Pos Indonesia Polytechnic. Total students were 36, with

only 3 students having 81-100 score, 7 students having 61-80 score, 10 students having 41-60 score, and 16 students having score ≤ 40 . It can be concluded that students' understanding of COA material is lacking. COA or a list of accounts sounds very difficult to interpret, so to support students' understanding, the lecturers use the COA learning media in an android application called Easy COA.

Easy COA is an android application with an encyclopedia and quiz about accounting terms in Indonesian or English per IFRS convergence financial accounting standards along with examples. This learning media is used so that students can easily remember and classify the accounting terms to prepare the financial reports. This application is important so that students can follow IFRS standards. The target user of this application is the general public, especially those who study accounting. Easy COA is the first application in the world that has been published on the play store and has received copyright recognition from the Directorate General of Intellectual Property, Ministry of Law, and Human Rights of the Republic of Indonesia. This study aimed to analyze before and after the implementation of easy COA using paired sample test, to analyze student clusters after implementing easy COA using the DBSCAN method, and to analyze the effect of easy COA implementation on the final grades of students using linear regression.

Materials and Methods

Data collection was conducted by observing [3] of students of accounting level I with the implementation of encyclopedia and quizzes of Easy COA. Applications built with UML design [4] and waterfall software development techniques [5]. The program code was written in Java on Android studio. This application requires the internet to store questions, user accounts, and user quiz scores. The encyclopedia is a description of the COA. There are 52 COA descriptions, the user can swipe right or left the COA encyclopedia based on what you want to display. The quiz consists of 70 questions, and each question has a time limit of 60 sec. There was a top-ranking of all players. Player scores will be analyzed using the paired-sample test method [6] using PSPP version 1.2.0 to determine the effect of implementing Easy COA before the mid-exam on the first and second quizzes and the DBSCAN method [7] using the Weka version 3.8.1 program to interpret the data pattern until the final test. The preprocess activity will select attributes. Attributes will be determined using the Pearson [8] correlation test method to a certain ranking limit. Regression between Easy COA and the final value will be tested using the linear regression method.

Results and Discussion

In the first experiment, data were collected before the mid-exam, i.e. compare the quiz scores before (first quiz) and after (second quiz) the Easy COA implementation on 71 students of D3 and D4 Accounting class 2019/2020. Two data attributes were observed, i.e. before Easycoa ('sebelumEasycoa') and after Easycoa ('sesudahEasycoa'). This stage was used to analyze the distribution normality, which uses the Kolmogorov-Smirnov normality test method. The hypothesis was H_0 if data follow normal distribution and H_1 if data does not follow the normal distribution.

Distance test (D), where D was the distance between normal and empirical. Test criteria: H_0 was rejected if $D > D^*(\alpha)$, with level of significance = 0.05. For attributes 'sebelumEasycoa': the calculated D value was 0.10 and the D^* value ($\alpha = 0.05$, $n = 71$) was obtained from the statistical table of the Kolmogorov-Smirnov Test Critical Value Table was 0.160. Because $0.10 < 0.160$ or $D < D^*(\alpha)$, then H_0 was accepted, which means the data follows a normal distribution. For attributes 'sesudahEasycoa': The calculated D value was 0.11 and the D^* value ($\alpha = 0.05$, $n = 71$) was obtained from the statistical table of the Kolmogorov-Smirnov Test Critical Value Table was 0.160. Because $0.11 < 0.160$ or $D < D^*(\alpha)$, then H_0 was accepted which means the data follows a normal distribution.

The Kolmogorov-Smirnov Z test was similar to the value of the D test, the difference was by using the standard normal distribution table, which H_0 was rejected if Z-count (Kolmogorov-Smirnov) $>$ Z-table at the level of significance. For attributes 'sebelumEasycoa', Z-count (Kolmogorov-Smirnov) = 0.86 by selecting the level of significance $\alpha = 0.05$ at the two ends of the critical region (the two-sided critical region), Z-table in the standard normal distribution table was 1.64. Because $0.86 < 1.64$ or Z-count (Kolmogorov-Smirnov) $<$ Z-table, then H_0 was accepted, which means the data follows a normal distribution. For attributes 'sesudahEasycoa', Z-count (Kolmogorov-Smirnov) = 0.96 by selecting the level of significance $\alpha = 0.05$ at the two ends of the critical region (the two-sided critical region), Z-table in the standard normal distribution table was 1.64. Because $0.96 < 1.64$ or

Z-count (Kolmogorov-Smirnov) < Z-table, then H_0 was accepted which means the data follows a normal distribution. The level of significance was $\alpha = 0.05$. In the attribute 'sebelumEasycoa', p-value = 0.449, so p-value > α , so it concluded that the data follows a normal distribution. In the attribute 'sesudahEasycoa', p-value = 0.314, so p-value > α , so it concluded that the data follows a normal distribution. From the D test, Kolmogorov-Smirnov Z and the level of significance showed that H_0 was rejected, which means the data was normally distributed. The homogeneity test resulted in a significant level = 0.961, because $0.961 > 0.05$, then the data proved to be homogeneous.

The paired-sample t-test was carried out to compare the means of two scores taken from the same individual. The scores were taken at two different activities, i.e. before and after Easy COA. The hypothesis was H_0 if no difference before and after Easy COA and H_1 if there was a difference before and after Easy COA. The results of PSPP software processing, paired sample statistics showed the mean value before using Easy COA was 62.14 and the mean value after using Easy COA was 63.93 or an increase of 1.79 (2.89%) with a standard deviation of 2.08.

Table 1. The Result of Paired Samples Test

	Paired Differences					Sig. (2-tailed)
	Mean	SD	SEM	t	df	
sebelumE asycoa sesudahE asycoa	-1.79	2.08	0.25	-7.23	70	0.000

The t-value (**Table 1**) was measured the size of the difference relative to the variation in sample data. If the value of t count > t table, then H_0 was rejected. The result was t count = 7.23, t table (df = 70, $\alpha = 0.05$, two-tails) = 1.990. The value $7.23 > 1.990$. Likewise with a significant value of 2 tailed = $0.0001 < 0.05$, so H_0 was rejected, there was a significant difference between the means before and after Easy COA was applied.

This result was in line with Wijaya's result, i.e. the post-test score was higher than the pre-test score with an increase of 35.9 in the implementation of Android-based vocabulary learning [9]. Suartama et al.'s study on mobile blended learning in higher education showed that cellular technologies offer new opportunities to integrate face-to-face learning and online learning methods [10]. Sung et al. also concluded that mobile device usage in education has a moderate effect on learning achievement, i.e. 69.95% of the student with mobile devices performed significantly better on the dependent variable related to cognitive achievement than one's without mobile devices [11]. Chang et al. concluded that through cellular technology and network communication, learning guidance and support can be provided without being limited by time and space, which implies that more learning opportunities and resources can be offered to facilitate learning and suggests that smartphones and tablet computers appear to be becoming the best choice at this moment [12]. Lestari's result showed that the application of mobile learning affects student academic achievement so that the industrial era 4.0 mobile learning conceptual model for learning in higher education is obtained [13]. Testing the mobile application developed by Keegan on students before and after using the application and testing the paired t-test showed that nursing students who completed the early class simulation EFM mobile devices outperformed students who were given traditional reading tasks [14]. According to Feraco's results of the linear model showed that the quizzes have a positive effect on performance in the final exam [15]. Khanifa's study on the COA utilization as a learning media using the ADDIE method concluded that COA was rated "very appropriate" as a learning medium for accounting subjects [16]. According to Durso et al., the introduction of a gamified course in the curriculum presents an interesting potential for accounting students [17].

In the second experiment, the data were collected until the final exam (UAS). The values were recorded in an internet database via the Easy COA application. The data were a combination of the Easy COA score and the lecture score. The attributes of the merged result were NO, NPM, NAMA MAHASISWA, Tugas, UTS, UAS, NA, HM, and Easy COA. The Pearson correlation test attributes NA, UTS, UAS, Easy COA, NAMA MAHASISWA, NPM, NO, and Tugas to HM showed the rank. The correlation between NA and HM was 0.4579, between UTS and HM was 0.4077, between UAS and HM was 0.3638, between Easy COA and HM was 0.3393, and between NAMA MAHASISWA and HM was 0.1004. This study was limited attributes with a correlation

value greater than 0.3, so the NAMA MAHASISWA attribute with a value of 0.1004 was not used. The attributes of UTS, UAS, and Tugas were not used, because they are represented by the NA attribute. So, the chosen attributes were NA, HM, and Easy COA.

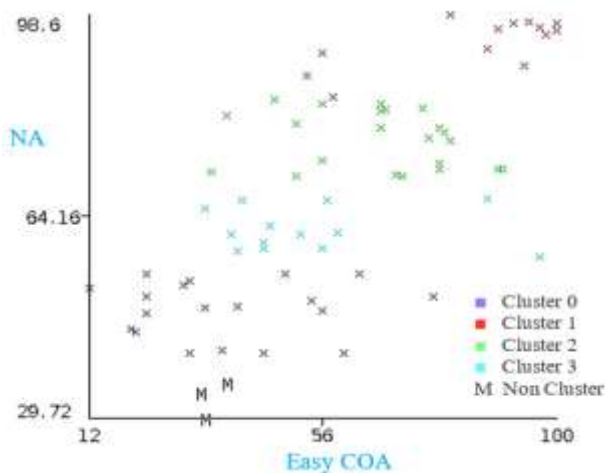


Figure 1. There were 4 clusters (0, 1, 2, 3) and non-clustered data

Data distribution was processed using the DBSCAN clustering method with epsilon 0.9, minPoints 6, and Euclidean parameters for 71 data (Figure 1). Figure 1 showed that cluster 0 was 19 (26.8%), cluster 1 was 13 (18.3%), cluster 2 was 23 (32.4%), cluster 3 was 13 (18.3%), and non-cluster was 3 (4.2%). The second data was interpreted using the DBSCAN method (Figure 1) showed that the Easy COA score was directly proportional to the NA score, students with high Easy COA scores will have high final scores. This pattern was following Fernández et al. with the same method. It was interpreted that the crowds' movement data density distribution using Twitter [18].

Table 2. Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.70	0.50	0.49	13.09

Table 3. Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	11612.93	1	11612.9	67.74	0.000
Residual	11828.34	69	3		
Total	23441.27	70	171.43		

Table 4. Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	35.48	4.22	0.00	8.41	0.000
EasyCOA	0.55	0.07	0.70	8.23	0.000

In the third experiment, the data were the same as in the second experiment. The R-value was 0.7 (the "R" column) and showed a simple correlation, which indicates a degree of correlation. The R² value (the "R Square" column)

showed the total variation in the dependent variable (NA) can be explained by the independent variable (Easy COA), i.e. 50% (**Table 2**) in this study. ANOVA table (**Table 3**), showed how well the regression equation fit the data (i.e. predict the dependent variable). The value of the degree of freedom (DF) regression was (attribute NA + intercept -1), so $1+1-1=1$. The residual degrees of freedom was the DF total minus the DF model, i.e. $70 - 1$ was 69. Mean squares, the sum of squares divided by their respective DF. For the regression, $11612.93/1 = 11612.93$ and for the residual $11828.34/69 = 171.43$. The F-value was the Mean Square Regression (11612.93) divided by the Mean Square Residual (171.43), the yield was $F=67.74$. The p-value associated with this F value was very small (0.00001) (**Table 3**).

Table 4 showed that the regression model predicts the dependent variable significantly well. The "Sig." column showed the statistical significance of the regression model that was run. Here, $p < 0.0005$, which was less than 0.05, so the regression model statistically significantly predicts the outcome variable (i.e. it was a good fit for the data). **Table 4** showed the necessary information to predict NA from Easy COA, as well as determine Easy COA contribution to statistically significantly to the model (showed in "Sig." column). The values in the "B" column under the "Unstandardized Coefficients" column were used to make a linear equation, i.e. $NA = 0.55 \cdot \text{EasyCOA} + 35.48$. **Figure 2** showed the predictive value (red line) to the NA value of the training data (blue line). A similar study by Sriyono et al. on the effect of emotional intelligence (X1) and interest in learning (X2) on achievement (Y) showed linear regression [19].

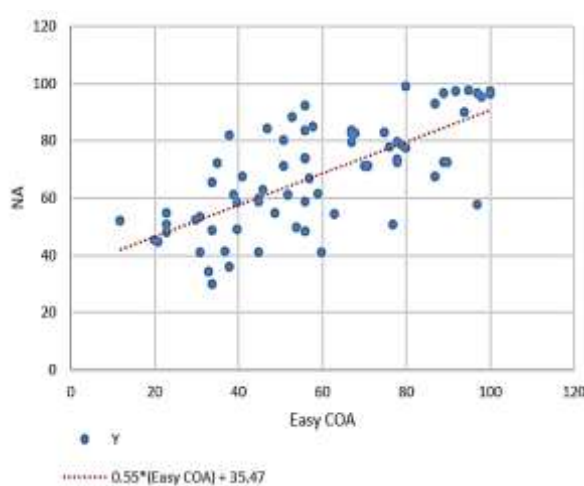


Figure 2. Comparison of Easy COA attribute values to the linear regression model

Suggestions for getting the optimal application of the Easy COA learning method in the further study can be implemented in the design thinking method, such as in Tu's findings that design thinking can improve teaching. It can increase student participation through training in class interviews during the empathy stage [20]. On the technological side, the concept of augmented reality, according to Huang, can be a more effective medium for conveying auditory information through spatial presence paths [21].

Conclusion

Easy COA learning media in studying COA has been successfully implemented in the form of an android application. There was a difference between before and after using Easy COA, with an improvement in the mean value of 2.89%. The distribution of the cluster pattern showed that the Easy COA score was directly proportional to the final score. The effect of Easy COA with the final value can be written with the linear equation, i.e. $NA = 0.55 \cdot \text{EasyCOA} + 35.48$. It concluded that Easy COA can be implemented to improve understanding of learning COA.

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Ethics statement: None.

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