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Students' Mathematical Literacy in The Context of Promotion Programs of Electronic Money

Nur Baiti Nasution¹, Padrul Jana^{2, a)}, Dewi Azizah¹, Hanindya Restu Aulia¹, and Amalia Fitri¹

¹Universitas Pekalongan, Jl. Sriwijaya No 3 Pekalongan, Jawa Tengah 5111, Indonesia

²Universitas PGRI Yogyakarta, Jl. IKIP PGRI I Sonosewu No.117, Sonosewu, Ngestiharjo, Kec. Kasihan, Bantul, Daerah Istimewa Yogyakarta 5518, Indonesia

a) Corresponding author: padruljana@upy.ac.id

Abstract. In the last few years, the number of people using e money has increased significantly. Moreover, by looking at the type of merchants using e money as payment method, it can be seen that most of the users are at young age such as high school and college students. To attract user to use e money as payment method, the company usually give promos or offer such as discount or cashback. The promos are usually presented in the infographics with attractive design. The aim of this article is to describe the college students literacy about promotion offered by e money providers presented in electronic flyer. There were 85 respondents participated in the study. The data was collected using test via Google form. The test consisted of 2 parts. The first part was meant to measured about students's literacy in reading information written in the ad promotion. The second part was meant to measure mathematical literacy written in the promotion and how they use them to solve a problem. The total score of each respondent is then categorized into 3 groups. The results shows that there were 49 students who categorized low, 16 students categorized fair, and 20 students categorized high. Particularly, there were 3 kinds of mistake that were shown in the study. They are 1) students do not quite understand the meaning of maximum cashback, 2) students usually do not think further about which offer is better, 3) students can't recognize that a certain promo can be tricky and actually only gives small advantage eventhough it comes with big percentage of discount or cashback.

INTRODUCTION

Financial technology is an innovation in the financial services industry that implements technology. Some example of financial technologies are the use of ATM, m-banking, and also e-banking. Over the years, financial technology has developed vary fast in order to make customers feel easier in their daily life that involving financial services. One of the most updated financial technology that has been grown is digital money. In order to create a cashless society, nowadays, we are encouraged to use digital money for every payment or purchase. There are several brands of digital money used in Indonesia. ShopeePay, Gopay, OVO, LinkAja are some of them. In order to use digital money (or e-money), we need to make a deposit in our e-money account. After that, using e money for payment or purchase is as easy as scanning a picture using our smartphones.

Even though, e money has offered a lot of benefits and advantages, research studies have reported that, the number of people using them is still relatively small [1–3]. To increase the number of customer (and of course the number of transaction using e money), the e money company give many offers. Those offers are usually called promotion program. The programs offers discounts or cashback for every payment or purchase. The programs are

offered massively through internet, newspaper, social media, and national TV stations which give positive results. People started to know about e money and use them in their daily transaction. Some people use e money because of its benefits, securities, and practicality [2, 4–6]. But some of them, especially, customer at young age, use e money because its promotion attraction [7, 8].

The promotion programs are usually presented in infographics or electronic flyer and shared to people across any social media. The flyers have to be not only attractive but also informative. Thus, they are designed using big pictures and relatively small size of writing. Other than that, the flyer sometimes contains many terms that are not familiar for common people such as “cashback”, “ongkir”, and “minimum transaksi”. An example of such flyer are shown in Figure 1.



FIGURE 1. An example of promo flyer of e money

Since there are a lot of information in a relatively small flyer, not many people fully understand the content. Many people can be easily confused about the promotion and do not intend to use it as a payment tool. This is a problem to be investigated. According to Alyahya [9], understanding and creating an infographics can be quite challenging even for college students. Using infographics as a media in classroom learning can support students reasoning ability [10], increasing students learning outcome [11], and also practicing students in learning with multiple representation [12]. Thus, understanding promo flyer can also be considered as an activity that support literacy. Literacy is the ability to read, write, and eventually using information as a means of making decision. In promo flyer, students can learn to know who is the promo holder; where, when, and how we can use the offer. Moreover, students can also practicing their problem solving ability by making decision based on the information included in flyer [13–15].

There are many mathematical information contained in promo flyer such as the price of the product, the discount, minimum transaction, and also the amount of the cashback. To get the benefit of the promo, customer needs to understand all of the terms literally and mathematically. The aim of this research is to identify college student understanding about such promos. To narrow our study, we will only discuss about mathematical information in the flyer promos and we will call the understanding about those information as mathematical literacy.

METHOD

This is a survey and descriptive study which involved 85 college students of The Faculty of Teacher Training and Education of Universitas Pekalongan. Data was collected using Google Forms that consisted of 3 parts. The first part asked about respondent’s behavior in using e money. The second part tried to reveal students understanding in promo flyer related in basic question which is 5W+1H. The third part asked about students understanding in mathematics information contained in the flyer. This paper will only discuss about the result of the third part, since we will only focused on the mathematical literacy. To develop the items of question, we analyzed several promo flyers and find the common component of each flyer to create the framework. From Figure 2, we found specific terms such as “minimum transaksi”, “maksimum cashback”, and also the percentage of the discount or cashback are used in most of the flyer. Thus from these terms, we created the framework.



(a)



(b)

FIGURE 2. Promo flyers used for creating framework

We followed the work of Tajudin [16] and Gittens [17]. In those works, it was told that the instrument for assessing mathematical literacy can be created using Bloom Taxonomy as the framework [16]. Moreover, we need to differ the difficulties of each item by using question for either lower and also higher order thinking skills. Particularly for HOTS item, we asked students to solve problems using information in the flyer given. The framework and the item we created are shown in Table 1.

TABLE 1. The instrument development framework

LOTS/HOTS	Aspect	Indicators
LOTS	Minimum transaction	Given a certain flyer and a case of purchase in which the minimum transaction has not met yet. Students are told to find the amount of the cashback
LOTS	Cashback Value	Given a certain flyer and a case of purchase. Students are told to find the amount of the cashback
LOTS	Maximum Cashback	Given a certain flyer and a case of purchase in which the maximum cashback has been reached. Students are told to find the amount of the cashback.
HOTS	Problem Solving	Given a certain flyer in which the merchant offered 100% cashback if the terms and condition are met. Students are told to argue whether the transaction will always be free or not.
HOTS	Problem Solving	Given 2 flyer for the same products. Students are told to argue which offer gives the best advantage.
HOTS	Problem Solving	Given a flyer in which the promo actually only offers a small amount of cashback but using 60% discount writing. Students are told to describe what they think about the flyer.

After collecting data, each response was graded with maximum score 4. The score for each respondent then are added up to find the grade percentage using the formula (1) and then are categorized into 3 groups using rules shown in Table 2.

$$p = \frac{(\text{the sum of the score})}{24} \times 100 \quad (1)$$

Finally, we will count how many respondents who are included in low, middle, and high categories. After the categorization, we also analyzed each aspect based on their average value and described the dominant responses qualitatively.

TABLE 2. Category for each value of percentage

Percentage Value	Category
0 – 60	Low
61 – 75	Fair
76 – 100	High

RESULT

The Respondents

Our respondents are all Universitas Pekalongan's students from Faculty of Teacher Training and Education. From 85 students, 68 from them are female and 17 are male students. In the first part of the instrument we asked about how frequent they use e money in their daily life. The students responded using Likert scale provided. The result of this question is shown in Figure 3. Here, we can see that our respondents are dominated by those who already know about e money and also know how to use them in any payment or purchase. Furthermore, we also asked about the reason why they are using them and the result are shown in Figure 4.

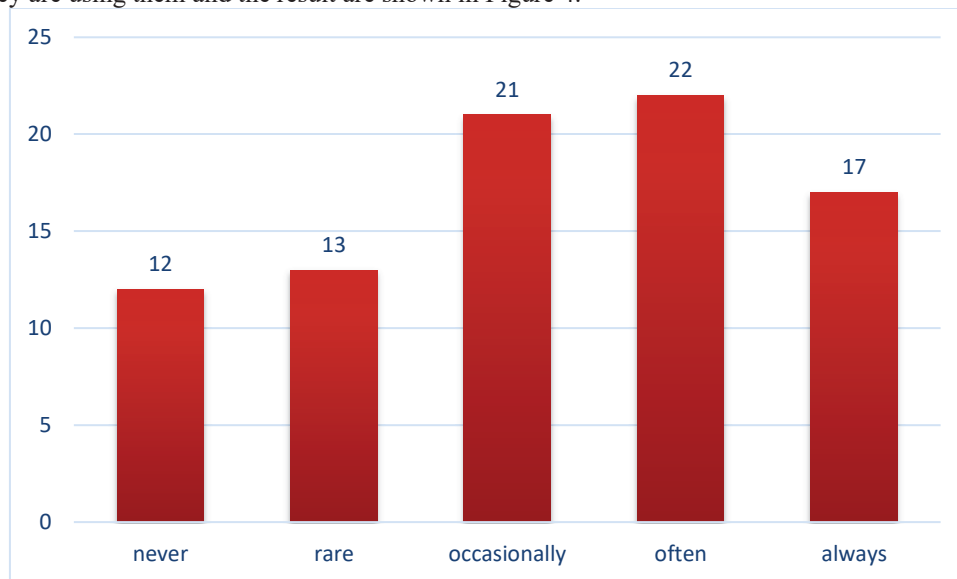


FIGURE 3. Student's frequency in using e money

From Fig. 4, we can see that the reason why respondents use e money is because they can get promos and cashback. From here, our conjecture is that most of the respondents (as many as 58 people) were already know how to use the e money. Moreover, we can hoped that they already familiar with the way of promos and cashback work. In other word, we can hoped that they have full understanding about e money promos.

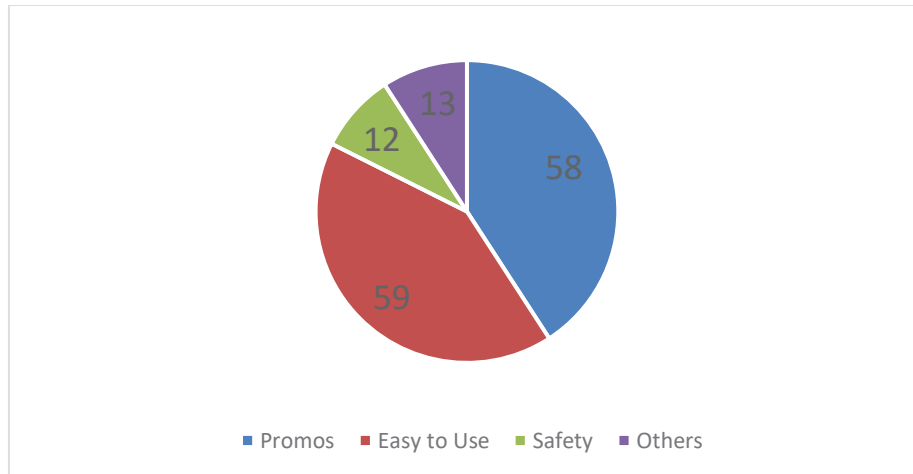


FIGURE 4. Student's reason why using e money

Results

The score that students get for each question are summed up and analysed. The descriptive result can be seen in Table 3. From Table 3, we can see that since the standard deviation is very high. Also, the range of maximum and minimum score are very wide. From these facts, we can conclude that the score varies for each respondent. In other words, it can be said that level of understanding of each students also varies greatly.

TABLE 3. Descriptive Statistics for overall score

Statistics	Value
Maximum	100
Minimum	0
Average	54.31
Standard Deviation	24.91
n	85

Furthermore, we tried to analyse in which question did the respondents make mistakes or get wrong understanding. For doing this, we counted the average of each question and get results as is shown in Tabel 4. From Table 4, we know that students have better understanding in question number 1 and 3 for the average scores of those questions are above 3. Also, they tended to make mistakes in question number 5 and 6 for the average scores are under 2.

TABLE 4. Average score for each question

No	Aspect	Score means (Using a scale of 4)
1	Understanding the meaning of minimum transaction	3.4
2	Understanding the meaning of maximum cashback	2.05
3	Understanding the way to calculate the cashback	3.2
4	Understanding the meaning of 100% cashback	2.08
5	Making decision between 2 offers	1.56
6	Making analysis about an offer that gives minimum advantage	0.65

After we counted the average of the score of each question, then we categorized the accumulation score based on criteria in Table 2. The result is shown in Table 5. From Table 5, it is known that as many as 49 people are still in

low category. This contradicts our conjecture before about the student's understanding about e money. It turns out that many students still have difficulty understanding the meaning of the sentences written in the promo.

TABLE 5. Categorization

Category	Quantity
Low	49
Fair	16
High	20

Discussion

In this section, we described the mistakes made by respondents for each question. Using this way, we could see in which part of the promos that students do not fully understand. For the first question, the students are asked to find the amount of cashback in a case of purchase in which the minimum transaction has not met yet. Most students (85%) answered this question correctly. However, there were 6 students who didn't answer correctly because they did not pay attention about the minimum transaction. They simply thought that to get the amount of the cashback, they only needed to multiply the amount of the price with the percentage of the cashback.

For the second question, the students are asked to find the amount of cashback in a case of purchase or payment. The case that was given to the students are the kind of case in which the minimum transaction has been met. Thus, the way to find the amount of the cashback is simply by multiplying the percentage by the amount of the price that needs to be paid. In this question, 81% of the students answered correctly. There were 3 students who answered incorrectly. They misunderstood the definition of minimum transaction as the amount of the cashback. So, they did not count the multiplication between percentage and the price. Instead, they simply write the minimum transaction as the amount of the cashback.

For the third question, the students are asked to find the amount of the discount in a case of purchase or payment in which the maximum discount has been reached. Maximum discount is the amount of discount that can be claimed by user. If the price of the products has been high enough so that the maximum discount is reached than the user can get discount only as much as the maximum discount. In this question, only 51% of the students answered correctly. The rest of them think that if the maximum discount has been passed then they will not get any discount at all.

From the first until the third question, we found that the mistakes were made because the students do not pay enough attention to the information written in the infographics. It can be seemed that students gave limited attention to visual information represented by the infographics as it was found by Alyahya [9]. Also, it was not because the lack of the students computation skill as it was said by Gittens [17]. However, it was because that college student have minimum financial literacy especially related with the using of e money. In other words, it can be said that student's literacy especially the one related to financial are still considered low [18].

The fourth until the sixth question asked students to solve 3 certain problems. The first problem asked the students to determine whether a transaction will be free or not if the promo offered 100% discount with some terms and condition. For this question, there are only 52% of the students who answered correctly. The rest of them did not pay attention about the terms and condition and gave the wrong answers.

In the fifth question, we gave students a certain condition in which they were told to choose which offer was the best. For this question, there were 39% of the students who answered correctly. Most of the students gave the wrong answer since they did not bother to calculate the exact discount and only relied on the percentage of discount. Students usually do not think further about which offer is better. They only judge from presentations and tends to give wrong decision [15].

For the last question, we gave a case in which the students are told to argue whether the offer gives us the most benefit or not. This last question was actually a tricky one. In this question, we gave a flyer that actually gives only a small amount of cashback but presented in a big amount of percentage. There were only 16% who answer correctly for this question. It can be concluded that students can't recognize that a certain promo can be tricky and actually only gives small advantage eventhough it comes with big percentage of discount or cashback. This shows that students still have limited level of numeracy and literacy. Also, it showed that e money especially its promo can be considered as the media for increasing students financial literacy and also numeracy as it was said by Sugiarti [19]. Other than this results, mathematics teacher can also use e money as a context for teaching mathematics. This can be also used to increase students literacy and numeracy [16]. Moreover, it can also be media for teaching mathematical

reflective thinking ability, since mathematical reflective thinking is the consideration of a conviction, the reason that supports the knowledge, and the conclusion which is the estuary of knowledge [20, 21].

CONCLUSION

From the analysis result we can conclude that students mathematical literacy especially in the context of e money promo are still limited. Since e money and many marketplace application is now parts of our daily lives, it would be useful if we put them in our lesson material. So, that students can get better insight about the technology and gain better problem solving ability.

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