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# ANALYSIS STUDENTS DIFFICULTY LEARNING DISCRETE MATHEMATICS

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***Keywords:***
analysis
mathematics discrete
types of errors

## ABSTRACT

The research is a discriptive analysis research, that aims to describe the difficulties faced by students while studying discrete mathematics and the factors that cause difficulties themselves. It is needs to be studied in depth so that discrete mathematics learning for the new smester the difficulties experienced by students can be minimized by the new teaching method by paying attention to class conditions during learning. The subjects of this study were information system student in second smesters (SI 2I), STMIK Royal Kisaran which numbered 33 people. This study aims to examine the results of students learning discrete mathematics, and examine what factors are causing students difficulty learning discrete mathematics. The methods used is a mix method which is qualitative methods and quantitative methods. Data collections as the result of discrete mathematics learning outcomes, and mathematical learning difficulty questionnaire data. The results showed that most students still had difficulty learning discrete mathematics. This is because an average value is 49,79 the value category is in a low range, which is less.

## INTRODUCTION

Mathematics is one of the disciplines that has a unique characteristic, which is full of concepts, ranging from simple concepts to complex and abstract concepts. Mathematics requires conceptual understanding, if a concept is not understood, then the next concept based on the previous concept will be difficult or even impossible to understand. System informations exposes students to mathematics discretes through theory and tutorial which focuses on other topics, standard forms of interpretation given can be in the form of words or verbs, writting, pictures, tables, graphics, concerete objects, mathematical symbol and others [1].

Mathematical problem and mathematical problem solving ability A situation is called a prblem when there is an awareness that the importance of carrying out an action but cannot immediately fulfill it. In the context of formal education, on mathematics are present in the form of question. These problems can be sourced from within mathematics it self, and can also be sourced from real life in volving facts that can be

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modeled in to mathematics. Mathematics education is devoted to understanding mathematical concepts and ideas which are then applied in routine and non routine problem solving through reasoning, communication, and connection development insed mathematics and outside mathematics it self [2].

Research counducted find students who have the basic ability level of the upper group, their visual representation ability is in the high category, their symbol representation ability is in the medium category, their verbalrepresentation abilityis in the low category. To find out the ability of informatics engineering students in thinking logically, critically, rationalist, efective, carefull and efective in solving mathematical problems, an analysis of mathematical reprenentation is needed [3].

Tabel 1. Indicator of Students Mathematical Representation Ability

| No | Aspects of Representation | Representation Ability Indicator |
|---|---|---|
| 1 | Visual Representation<br>Table Chart | Students restate data or information from a representation to a table representation<br>Students create charts to clarify problem and facilitate resolution |
| 2 | Symbol Representation | Student operate symbol and check how it is solved |
| 3 | Verbal Representation | Students answer question by explaining word or written text, the language used by students to explain something |

Mathematics teaching and learning process stressed on understanding of concepts and skills in basic mathematic discretes. Therefore understanding the basic mathematics discretes concepts is important in the process of students' learnings. This research is to determine, through students final examination answer scripts (FEAS).

## METHOD

The study used the descriptive techniq often include constructing tables of means and quantiles, measures of dispersion such as variance or standart deviation, and cross tabulations or crosstabs that can be used to examine many disprate hypotheses.. The researcher implemented the quantitative approach first, in order to identify the difficult item based on the data of the students responses toward the examination test item. Then, the researcher implemented the qualitative and quantitative methods. Data collection as the result of discrete mathematics learning outcomes, and mathematical learning difficulty questionnaire data, approach to identify the factors that chaused the difficulties for the students long with the strategies that may be suggested toward the lecture and students so that they master the difficult test items [4].

The were 33 mathematics dicretes students who seated for the final examinations. The students had been instructed to answer four from five questions in the final examinations. five questions were developed from all topics in the course and

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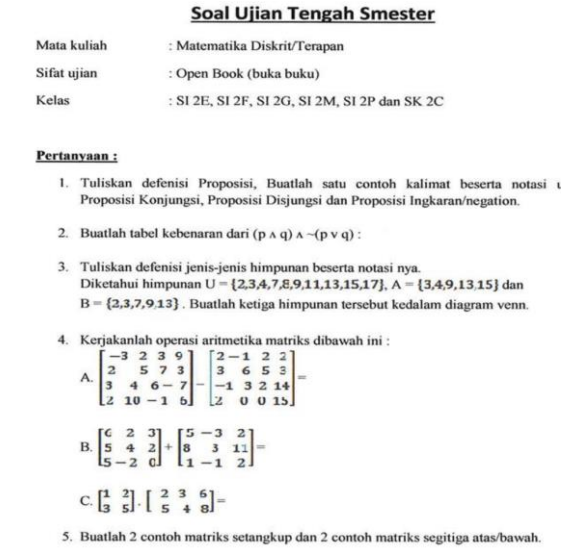
questions 1 based from basic mathematics discrete. From the sample, only 33 students class information system 2I or class SI 2I answered question were chosen as the respondents. The demographic profile of respondents. The analysis research, are focused to the difficulties faced by students while studying discrete mathematics and the factors that cause difficulties themselves, category of error which are in multiplying the devidend by the reciprocal of the divisor, error in adding mathematics discrete fractions with the one denominator as a multiple of the other denominator, error in adding mathematics discrete fractions with the same denominator and error in simplifying mathematics discrete fractions to the lowest fraction. The analysis also focused of error which are wrong concept, wrong mathematical operation and carelessness as factors thats cause difficulties themselve [5].



**Soal Ujian Tengah Smester**

Mata kuliah : Matematika Diskrit/Terapan
Sifat ujian : Open Book (buka buku)
Kelas : SI 2E, SI 2F, SI 2G, SI 2M, SI 2P dan SK 2C

**Pertanyaan :**

1. Tuliskan defenisi Proposisi, Buatlah satu contoh kalimat beserta notasi ι Proposisi Konjungsi, Proposisi Disjungsi dan Proposisi Ingkaran/negation.
2. Buatlah tabel kebenaran dari $(p \wedge q) \wedge \sim(p \vee q)$ :
3. Tuliskan defenisi jenis-jenis himpunan beserta notasi nya. Diketahui himpunan U = {2,3,4,7,8,9,11,13,15,17}, A = {3,4,9,13,15} dan B = {2,3,7,9,13} . Buatlah ketiga himpunan tersebut kedalam diagram venn.
4. Kerjakanlah operasi aritmetika matriks dibawah ini :
   A. $\begin{bmatrix} -3 & 2 & 3 & 9 \\ 2 & 5 & 7 & 3 \\ 3 & 4 & 6 & -7 \\ 2 & 10 & -1 & 6 \end{bmatrix} - \begin{bmatrix} 2 & -1 & 2 & 2 \\ 3 & 6 & 5 & 3 \\ -1 & 3 & 2 & 14 \\ 2 & 0 & 0 & 15 \end{bmatrix} =$
   B. $\begin{bmatrix} 6 & 2 & 3 \\ 5 & 4 & 2 \\ 5 & -2 & 0 \end{bmatrix} + \begin{bmatrix} 5 & -3 & 2 \\ 8 & 3 & 11 \\ 1 & -1 & 2 \end{bmatrix} =$
   C. $\begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix} \cdot \begin{bmatrix} 2 & 3 & 6 \\ 5 & 4 & 8 \end{bmatrix} =$
5. Buatlah 2 contoh matriks setangkup dan 2 contoh matriks segitiga atas/bawah.

Image 1. Examine UTS (Examine midle smester)

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SISTEM INFORMASI
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Website: www.stmik.royal.ac.id, Email: prodisi.stmikroyal@gmail.com

**Ujian Akhir Smester**

Mata kuliah : Matematika Diskrit/Terapan

Sifat ujian : open book (buka buku)

Dosen Pengampu : Syartika Anggraeni, S.T., M.Si.

**Pertanyaan :**

1. Sebutkan sifat-sifat relasi dan tuliskan defenisinya.
2. Selesaikan perkalian operasi aritmatika matriks dibawah ini :
   a. $\begin{bmatrix} 4 & 2 \\ -3 & 1 \end{bmatrix} \cdot \begin{bmatrix} 2 & 5 & 0 \\ 8 & 7 & 5 \end{bmatrix} =$
   b. $\begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix} \cdot \begin{bmatrix} 2 & 3 & 6 \\ 5 & 4 & 8 \end{bmatrix} =$
3. Jika R = {(a,2), (a,6), (b,4), (c,4), (c,6),(c,8), (d,10)} dan S= {(2,1), (4,2,(4,3),(6,3),(8,1),(10,2)}. Tentukan S o R dan buatlah diagram panah nya.
4. Jika P = {2,3,4} dan Q = {2,4,8,9,15}, Dimana (p,q) ϵ R jika q kelipatan dari p. Buatlah hasil relasinya
5. Diketahui fungsi f (x) =4 x-1 dan g(x)= $x^2$ + 1. Tentukan f o g dan g o f

Image 2. Examine UAS (Examine last smester)

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## Data

The data in the study were the mathematics discretes examinations test items sets and their responses, the factors that chaused the students difficulties in completing the difficult test, items along with the strategies that the lecture and students may implemented in order to overcome the difficulties

The objective of this research is to determine, through students final examination answer scripts (FEAS), the erorr created by students as the are engaged in solving basic mathematics discretes problems. The researchers are to identify students erorrs when multyplying the dividend by the reciprocal of the devisor, adding discretes fractions with the denominator as a multiple of the other denominator, adding fractions with the same denominator and simplifying discretes fraction to the lowest fraction. The researchers also would like to find the types of errors made by students in solving the questions.

Research Question

1) What is students erorr in adding mathematic discretes fractions with the one denominator as a multiple of the other denominator ?
2) What is the students error in adding mathematics discretes fractions with the same denominator ?
3) What is the students erorr in simlifying mathematics discretes fraction to the lowest fraction?
4) What are the types of errors made by students?

Examinition value students UTS discretes mathematics include independent task and quiz.

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**( STMIK ) ROYAL**

**DAFTAR NILAI UJIAN TENGAH SEMESTER TA GENAP 2018/2019**

MATA KULIAH : SIKK207 - Matematika Diskrit (2 SKS)
DOSEN : SYARTIKA ANGGRAINI, ST., M.SI
SMSTR / KELAS : 2 / SI S1 2I
PROGRAM STUDI : Sistem Informasi(S1)
HARI : Selasa
WAKTU : 09:55 - 11:35
RUANG : T3
UJIAN / PERTEMUAN : UTS / 7

| No | NIM | Nama Mahasiswa | Tanda Tangan | TUGAS | QUIZ | UTS |
|---|---|---|---|---|---|---|
| 1 | 18220140 | ADE MEILINDA SARI | 1. | 80 | 80 | 75 |
| 2 | 18220249 | AMANDA | 2. | 80 | 80 | 70 |
| 3 | 18220226 | ANISAH FITRIAH | 3. | 80 | 80 | 85 |
| 4 | 18220227 | ARISANDI | 4. | 80 | 80 | 45 |
| 5 | 18220237 | AYU RAHMADANI | 5. | 80 | 80 | 45 |
| 6 | 18220407 | CANTIKA CHAIRITA | 6. | 80 | 80 | 60 |
| 7 | 18220243 | CICI SENTIKA PUTRI | 7. | 80 | 80 | 50 |
| 8 | 18220228 | DANIL ADHA HASIBUAN | 8. | 80 | - | 70 |
| 9 | 18220238 | DINDA AFRILLIA | 9. | 80 | 80 | 65 |
| 10 | 18220244 | DWI ASWINA ASMI SIRAIT | 10. | 80 | 80 | 65 |
| 11 | 18220229 | DWI FEBRIYANTI | 11. | 80 | 80 | 55 |
| 12 | 18220246 | DWI PUTRI | 12. | 80 | 80 | 60 |
| 13 | 18220230 | EBEN EZER SINAGA | 13. | 80 | 80 | 80 |
| 14 | 18220405 | FIFI EFRISYAH HANDAYANI | 14. | 80 | 80 | 55 |
| 15 | 18220406 | HADI DWI PUTRA PANE | 15. | 80 | 80 | 80 |
| 16 | 18220221 | HANIF SYAHFITRI | 16. | 80 | 80 | 35 |
| 17 | 18220245 | HIDAYAT | 17. | 80 | 80 | 60 |
| 18 | 18220222 | IRNA DEWI | 18. | 80 | 80 | 75 |
| 19 | 18220126 | ISNAINI ARDHANA PUTRI | 19. | 80 | 80 | 85 |
| 20 | 18220223 | LISMA HAWARNI | 20. | 80 | 80 | 55 |
| 21 | 18220231 | MALIKA SARI | 21. | - | 80 | 55 |
| 22 | 18220250 | MARIANA | 22. | 80 | 80 | 60 |
| 23 | 18220232 | MHD.HAFIZ ANSHORI | 23. | 80 | 80 | 75 |
| 24 | 18220233 | MUHAMMAD RANDY PRATAMA PASARIBU | 24. | 80 | 80 | 55 |
| 25 | 18220224 | MUHAMMAT AFRIZAL | 25. | 80 | 80 | 70 |
| 26 | 18220225 | NURHAYATI | 26. | 80 | 80 | 55 |
| 27 | 18220615 | RIAN BARIALDI | 27. | 80 | 80 | 95 |
| 28 | 18220240 | RIZWAN SAI | 28. | 80 | 80 | 70 |
| 29 | 18220234 | SITI FATIMAH | 29. | 80 | - | 85 |
| 30 | 18220241 | SRI WAHYUNI | 30. | 80 | 80 | 95 |
| 31 | 18220408 | YUDHA MAULANA | 31. | - | - | - |
| 32 | 18220236 | ZEFRI YANDI | 32. | 80 | 80 | 70 |
| 33 | 18220242 | ZIKI SUMANTO | 33. | 80 | - | 50 |

Paraf Dosen Pengawas

Diketahui,
SYARTIKA ANGGRAINI, ST., M.SI
Dosen Penanggung Jawab

Kisaran, ____ / 2019
Ttd.
DR. H. MUH. SALEH MALAWAT, SE., MMa.
Ketua

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Image 3. Value Examine UTS

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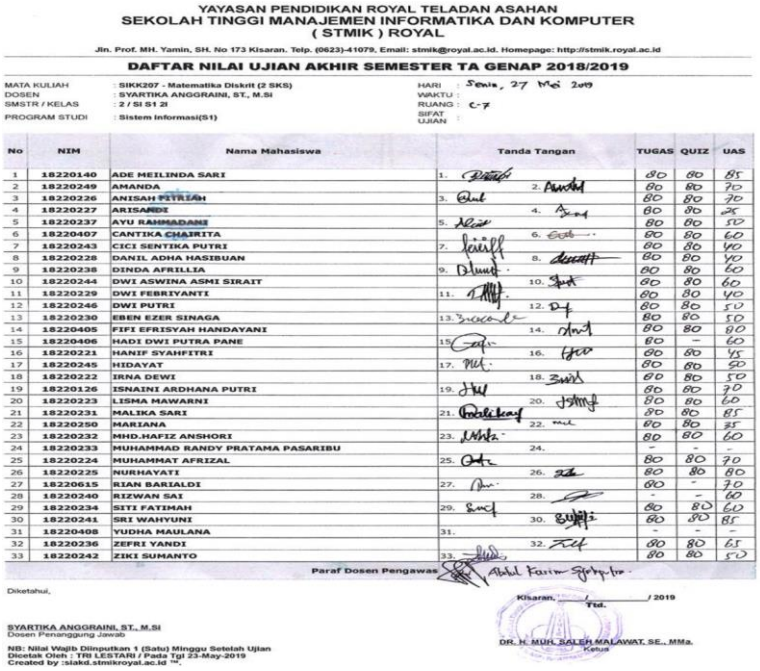
Examinition Value students UAS discretes mathematics include independent task and quiz.



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Jln. Prof. MH. Yamin, SH. No 173 Kisaran. Telp. (0623)-41079, Email: stmik@royal.ac.id. Homepage: http://stmik.royal.ac.id

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HARI : Senin, 27 Mei 2019
WAKTU :
RUANG : C-7
SIFAT UJIAN :

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| 14 | 18220405 | FIFI EFRISYAH HANDAYANI | 14. | 80 | 80 | 80 |
| 15 | 18220406 | HADI DWI PUTRA PANE | 15. | 80 | - | 60 |
| 16 | 18220221 | HANIF SYAHFITRI | 16. | 80 | 80 | 45 |
| 17 | 18220245 | HIDAYAT | 17. | 80 | 80 | 50 |
| 18 | 18220222 | IRNA DEWI | 18. | 80 | 80 | 50 |
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Image 4. Value Examine UAS

## RESULT AND DISCUSSION

Data were data were analysis using descriptive statistics to calculate percentage. Item analysis, to answer the first and fourth research questions which are what is the students error in multiplying the devidend by the reciprocal of the divisor and what is the students error in simplifying mathematics discretes fraction to the lowest fraction, the results as following :

$$Uw/\imath^2 : uw^2v/t \qquad (1)$$

Solving method from the final examinations schame:
Step 1 : $Uw/\imath^2 : uw^2v/t$
Step II : $\imath^2/t$
Answer : $t/w\imath^3$

Tabel 2. Analysis outcome students study disceretes mathematical information system

| Method Value | Means Value | Category |
|---|---|---|
| Independent task | 38.36 | Less |
| Quiz | 32.07 | Very less |
| UTS | 36.57 | Less |
| UAS | 49.79 | Less |

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## CONCLUSION

Based on the results of the discretes, it can be concluded that the mathematical representation of high, medium and low ability students of the information system study program, STMIK ROYAL in solving assignment problems in the discretes course is that high ability students can complete multiple representation, matrix using visual and symbolic proposision and arithmetic. and well, but lacks in verbal representation. Likewise for the discretes mathematical representation ability of students with moderate abilities is having multiple representation, doing well in visual and symbolic representation, but there are steps in solving that have been missed and still lacking in the implimentation of the final result which lies in the verbal

As a conclusion, finding from the reaserch indicate that lecturers have to emphasize more on simplifying basic mathematic discretes concept during delivering of lectures.

This research also is a expacted to help the lecturer in varying effective teaching techniques and explaining to the students about types of errors should be avoided when solving mathematic discretes fraction problem.

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