Student's critical thinking ability from gender and learning style using Edmodo E-learning

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Abstract

The Industrial Revolution 4.0 is synonymous by the Internet development; its presence is so fast. Many things that were not thought of before suddenly appear and become innovations, including in education. This study uses the online learning environment Edmodo to analyse student CTA in terms of gender and learning style. Descriptive quantitative research is the term for this kind of study. This study has a group post-test only design and is a quasi-experimental investigation. 75 kids from Mataram's junior high schools participated in this study. Data were collected on student's CTA using a description of five numbers. Identification was made by giving the sampled students a questionnaire to find their learning styles. Data analysis used descriptive statistics assisted by the Rash model. The findings indicated that there were few variations between male and female students' CTA. Furthermore, kinesthetic learners were better at CTA than auditory and visual learners.

Keywords: Critical thinking ability, Edmodo, gender, learning style, visual, auditory, kinesthetic;

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Introduction

Islamic education is instruction that is based from the core principles found in the Qur'an and Sunnah Khaidir & Suud, 2020; Tsoraya et al., 2022). Islamic education is also an education to develop human potential towards the formation of a true human being with an Islamic personality that is in accordance with Islamic values (Abbas et al., 2021; Rahmawati & Asbari, 2022). Islamic education in schools is expected to be able to make students independent, obedient, humble and highly social, so that they do not become angry and intolerant students among students and the Indonesian people and weaken the harmony of religious life and weaken national unity and integrity (Amiruddin et al., 2019).

Islamic Education Learning is a lesson that must be learned by students at all levels, including students at the junior high school level. There are three primary materials in learning Islamic Religious Education: faith, morals and worship (Zarkasyi et al., 2020). The purpose of learning Islamic in junior high schools, as stated in the 2013 curriculum, is to develop faith through giving, developing knowledge, fertilizing, understanding and experiencing students' experiences of the Islamic religion so that they become human beings who continue to build their faith and piety. Independent learning, students' necessary thinking skills are needed, and students can be directed or guided to ask questions about things considered standard (Paul & Elder, 2019).

The learning objectives of Islamic education have not been fully achieved (Wahyuni & Bhattacharya, 2021). The results of interviews show that learning Islamic Religious Education is often considered easy by students. In fact, many students still have learning outcomes below the average learning outcomes in schools. This causes students' critical thinking ability (CTA) to the problems presented in Islamic education learning are also not optimal. Students' CTA in learning Islamic education is still shallow. This is demonstrated by the fact that the students' knowledge of the presented information and the questions is lacking (Fatonah et al., 2022; Sartika et al., 2020). Islamic Religious Education students usually accept the material being presented without engaging in more thorough and sustained study (Mansir & Karim, 2020). Thinking critically is an essential ability student possess in solving problems in learning Islamic Religious Education (Bahtiar et al., 2018; Mispani et al., 2021). The student's CTA will not only make them have something they feel is given, but they will have confidence that the given turns out to have a strong reason. The importance of CTA is consistent with 21st century requirements for students, who need to possess the four 4C (Bahtiar et al., 2022; Jalinus, 2022; Kembara et al., 2019; Widiawati et al., 2018).

Many factors affect students' low CTA (Mulyanto et al., 2018; Bahtiar, et al., 2022). Interviews with teachers in Mataram City stated that the low CTA of students were caused by students being less enthusiastic about the learning being carried out, the problems raised by the teacher did not facilitate students to think critically, and the test questions given by the teacher does not contain the steps for students to think in more detail or critically. The inefficient educational process is one of the contributing causes (Leasa, 2018). Teachers must consider the platforms and methods used to distribute material to students (Winarto et al., 2020). Teachers must competent in selecting the suitable media to support learning process (Mustafa et al., 2019), such as Edmodo learning media (Wahyuningtyas, 2019).

Edmodo is an application for learning process with social elements similar to Facebook, but there is more excellent value in this social network-based educational application (Handayani et al.,

2019). Users of Edmodo can establish profiles and talk with other website visitors (del Valle Mejías, 2020; Sangeetha, 2016). Additionally, teachers can post student grades and tasks online, and students can ask them questions regarding grades or assignments (Oyelere et al., 2016).

According to Wibowo and Astriawati (2020), students who learn using Edmodo e-learning achieve significantly superior learning outcomes than students who learn in a typical face-to-face setting with the control class. Use of Edmodo proved helpful in enhancing students' CTA, as demonstrated by Supriyatno et al. (2020).

Using learning a social network-based learning tool called Edmodo is designed with teachers, students and their parents in mind (Alqahtani, 2019; Lubis & Sari, 2019). Edmodo is an online learning platform that employs a simple, effective and enjoyable learning system (Turmini et al., 2019). Edmodo can make students and teachers enter forums to discuss with each other, do online quizzes and access learning materials anywhere and anytime (Wahyuni et al., 2020). Students can open discussion forums like social networks and about learning materials, just like classes in the real world, ranging from attendance, tests and quizzes, to contacts to collect homework (Gay & Sofyan, 2017).

Since every person has a unique learning style, the teacher should be given special consideration while assessing the CTA of the class. One of the key factors affecting how pupils comprehend schoolwork, particularly lessons in Islamic education, is their learning style (HR, 2018). To implement effective learning for pupils, teachers must evaluate the learning style of their students. Teachers must provide an environment where students can engage in real-world experiences, observe and reflect on those experiences from a variety of perspectives, build abstract notions and generalize them into theories, and then actively engage with these theories and test what has been taught. They pick things up in challenging circumstances (Shanti Manipuspika, 2020). DePorter et al. (2010) classify learning styles into three types: Auditorial, Visual and Kinesthetic.

There are three main reasons for the need for this research to be carried out, the first to determine the ability of students to think critically both from gender and learning style, secondly as teacher knowledge and information in determining the model and approach, the third as an alternative for teachers in selecting information technology-based learning media. Therefore, this study aims to analyse students' CTA in terms of gender and learning style using Edmodo in Islamic Religious Education.

2. Reserch Method

2.1. Research design

This research methodology was quantitative research with uses a group post-test as the only measurement method in a quasi-experimental setting. The following describes the research's design.

Table 1. One Group Post-Test Only Design

Treatment	Postest
E-learning-based Edmodo learning	CTA test
	Student learning style questionnaire

2.2. Participants

A population is a collection of individuals who share certain traits. 270 Grade VII students from SMPN 1 Mataram, SMPN 15 Mataram and SMPN 2 Mataram made up the study's sample. In contrast, the sample is part of the population with the same characteristics. Purposive sampling was used as the sample method in this study. The sampling considerations in this study were the Islamic Religious Education learning schedule at different times/hours between the three schools, adjacent schools and students who had not studied the material for commendable behaviour, so the sample used was 75 people.

2.3. Research procedures

This research was conducted from February to April 2022 at junior high school of 1 Mataram, 2 Mataram, dan 15 Mataram. This research was conducted concerning the following research procedures.

Table 2. Research Procedure

No.	Stages	Activity
1	Stages of research preparation	Research design
		Study of literature
		Observing the school environment
		Preparing Edmodo E-learning media
		Making a CTA test instrument
		Making a learning style questionnaire
2	Stages of research implementation	Validating instruments about CTA and learning style questionnaires
		Edmodo E-learning
		Carry out post-test
3	Final stages of research	Perform data processing and analysis
		Make a discussion of the research results
		Making research conclusions

2.4. Instruments

CTA tests and surveys on students' learning styles were the instruments employed in this study. The essential thinking ability instrument was used as written test questions describing 5 numbers. In contrast, the learning style questionnaire was used as positive and negative statements of 50 statements. The following is a grid of CTA and learning style questionnaires are presented in Tables 3 and 4.

Table 3. Grid of CTA

No.	Sub Material	CTA Indicator	No. Item
1.	Hard work	Elementary clarification	Q1
2.	Persistent	Basic support	Q2
3.	Persistent	Inference	Q3
4.	Tenacious	Advanced clarification	Q4
5.	Be careful	Strategy and tactics	Q5

Table 4. Grid of Learning Style Questionnaire

No.	Types of learning style	Statement		Total
		Positive	Negative	
1.	Visual learning style	P1, P2, P4, P6, P9	P3, P5, P7, P8, P10, P11, P12, P13, P14	14
2.	Auditorial learning style	P15, P17, P18, P19, P20, P22, S23, S25, S27, S28	P16, P21, P24, P26, P29	15
3.	Kinesthetic learning style	P30, P31, P33, P34, P37, P38, P39, P40, P43, P44, P45	P32, P35, P36, P41, P42, P46, P47, P48, P49, P50	21
		Total		50

2.5. Data analysis

Under the type of research, descriptive statistics assisted by the Rash Model were used in the data analysis. Data analysis consisted of instrument feasibility analysis (validity, reliability and problem difficulty), data analysis of CTA and student learning style questionnaires. Data analysis using Rash Model software with the mathematical equations are as follows:

$$P_{ni}\left(x_{ni} = \frac{1}{\beta_n}, \delta_i\right) = \frac{e^{(\beta n - \delta_i)}}{1 + e^{(\beta n - \delta_i)}}$$

3. Results and discussion

3.1. Results

3.1.1. Analysis of CTA question instruments

The following describes the results of the instrument analysis on CTA.

Table 5. Item Fit Order

```
-------------------------------------------------------------------------------------
|ENTRY   TOTAL   TOTAL           MODEL|   INFIT   |  OUTFIT  |PTMEASUR-AL|EXACT MATCH|      |
|NUMBER  SCORE   COUNT  MEASURE   S.E. |MNSQ  ZSTD|MNSQ  ZSTD|CORR.   EXP.| OBS%  EXP%| Item |
|------------------------------------------+-----------+----------+-----------+----------+------|
|   5      74      30    -.29     .20|1.52  1.77|1.66  1.81|A .60   .79| 30.0  45.7| Q5   |
|   3      88      30    -.95     .23|1.33  1.09| .86  -.24|B .86   .81| 56.7  54.1| Q3   |
|   1      76      30    -.38     .21| .89  -.32| .79  -.60|C .82   .80| 46.7  45.6| Q1   |
|   4      40      30     .97     .19| .81  -.70| .78  -.37|b .66   .64| 43.3  43.8| Q4   |
|   2      49      30     .65     .19| .74 -1.04| .62  -.96|a .77   .69| 43.3  44.7| Q2   |
|------------------------------------------+-----------+----------+-----------+----------+------|
| MEAN    65.4    30.0    .00     .21|1.06   .2| .94  -.1|           | 44.0  46.8|      |
| P.SD    18.0     .0     .71     .02| .31  1.1| .37  1.0|           |  8.5   3.7|      |
-------------------------------------------------------------------------------------|
```

Table 5 output for the suitability of the items shows that the Outfit Means square value for items Q1 to Q5 is 1.66, respectively; 0.86, 0.79, 0.78 and 0.62. The Outfit Z-standard value for items Q1 to Q5 is 1.81, respectively; −0.24, −0.60, −0.37 and −0.96. Table 5 also shows that the Point measure correlation value for items Q1 to Q5 is 0.60, 0.86, 0.82, 0.66 and 0.77. These values indicate that none of the items together are outside the criteria of the Outfit Means square $[(0.5 < mnsq < 1.5)$, Outfit Z-standard $(-0.2 < ZSTD <$

+2.0) and Point measure correlation($0.4 < Pt\ Measure\ Corr < 0.85$)] (Amin & Ikhsan, 2021; Hagquist & Andrich, 2017).

Detecting the existence of biased items is also one way to determine the validity of an item. Good items are items that do not contain bias—in Rash modelling, detecting the existence of items can be called differential item functioning (DIF) detection. The following is the output of DIF detection.

Table 6. DIF Class Specification

```
-------------------------------------------------------------
| Person    SUMMARY DIF            BETWEEN-CLASS/GROUP Item  |
| CLASSES   CHI-SQUARED  D.F.  PROB. UNWTD MNSQ  ZSTD  Number Name |
|-----------------------------------------------------------|
|    4        1.4359      3   .6965    .6093    -.29    1 Q1 |
|    4        2.8707      3   .4108   1.3352     .64    2 Q2 |
|    4        1.5254      3   .6757    .5649    -.36    3 Q3 |
|    4        1.3791      3   .7099    .5629    -.37    4 Q4 |
|    4        6.2353      3   .1000   2.9350    1.86    5 Q5 |
-------------------------------------------------------------
```

Table 6 shows that the item probability values for Q1 to Q5 are 0.6965, respectively; 0.4108, 0.6757, 0.7099 and 0.1000. The item's probability value is more than 5% (0.05). This indicates that there are no biased items. One indicator of the measurement of useful items is also the items used are reliable. Table 7 presents the reliability output of the items.

Table 7. Item Reliability

```
-------------------------------------------------------------------
|         TOTAL                    MODEL      INFIT       OUTFIT   |
|         SCORE   COUNT   MEASURE   S.E.   MNSQ   ZSTD   MNSQ   ZSTD |
|-----------------------------------------------------------------|
| MEAN    65.4    30.0      .00     .21    1.06   .16    .94   -.07 |
| SEM      9.0     .0       .35     .01     .15   .54    .18    .49 |
| P.SD    18.0     .0       .71     .02     .31  1.08    .37    .97 |
| S.SD    20.1     .0       .79     .02     .35  1.21    .41   1.09 |
| MAX.    88.0    30.0      .97     .23    1.52  1.77   1.66   1.81 |
| MIN.    40.0    30.0     -.95     .19     .74 -1.04    .62   -.96 |
|-----------------------------------------------------------------|
| REAL RMSE   .22 TRUE SD   .67  SEPARATION 2.99 Item  RELIABILITY .90 |
| MODEL RMSE  .21 TRUE SD   .68  SEPARATION 3.29 Item  RELIABILITY .92 |
| S.E. OF Item MEAN = .35                                          |
-------------------------------------------------------------------
```

Output of Table 7, it is known that the reliability of the items is 0.90. This indicates that the level of reliability of the things is good.

3.1.2. Analysis of learning style questionnaire instruments

Three experts validated the learning style questionnaire instrument. The validation of the learning style questionnaire aims to ensure that the questionnaire used is appropriate and following the characteristics of junior high school students. The aspects that the experts validated in the learning style questionnaire consisted of the suitability of the indicators with the statement, the scope of the information, the construction of the word and the linguistic aspect. The outcomes of the questionnaire validation by experts are seen in Figure 1.
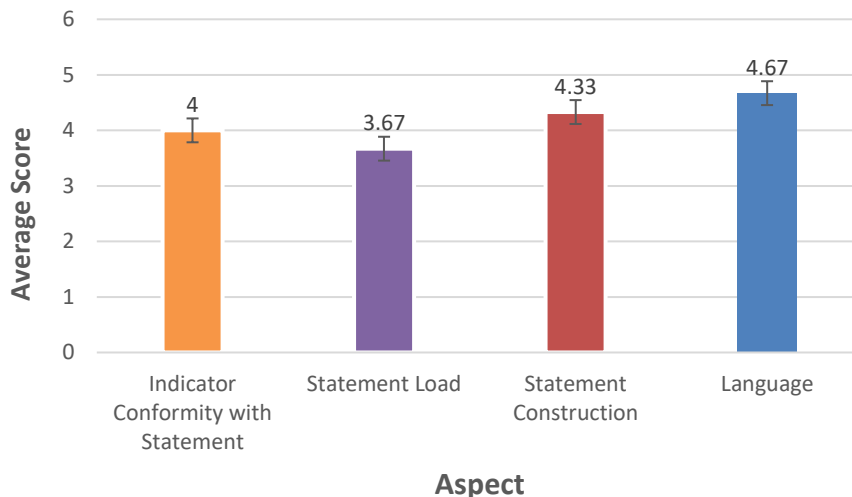
Figure 1. Expert Validation Results on Learning Style Questionnaire

Based on Figure 1, the student learning style questionnaires are different. The average score of the three experts on the conformity aspect of the learning style aspect with the statement got an average score of 4.00 in the excellent criteria; the statement load is 3.67 with a reasonably good criteria; the statement construction aspect is 4.33 with good critetia, and the language aspect is 4.67 with good criteria.

3.1.3. Description of data on gender and student learning style

This study involved 75 Class VII junior high school students in Mataram City. The students are divided into three classes, where one type at SMPN 1 Mataram has 25 students, one class at SMPN 2 Mataram has 27 students and SMPN 15 Mataram has 23 students. The students were identified in terms of gender and learning style data. The identification data showed that there were 27 male students and 48 female students. Student data by gender is presented in Figure 2.
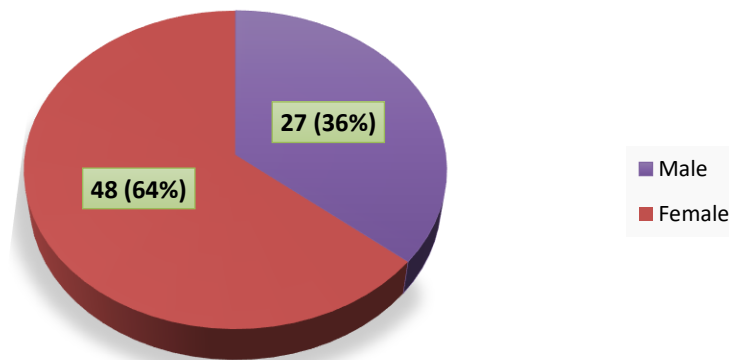

Figure 2. Research Sample Data Based on Gender

The researchers identified the learning styles of each student by giving a questionnaire. The learning style questionnaire uses a Likert Scale with five alternative answers with a vulnerable score of 1-5 per statement item. The questionnaires were distributed evenly to 75 grade VII students of SMPN 1 Mataram, SMPN 15 Mataram and SMPN 2 Mataram. Data analysis related to student learning styles are presented in Figure 3.
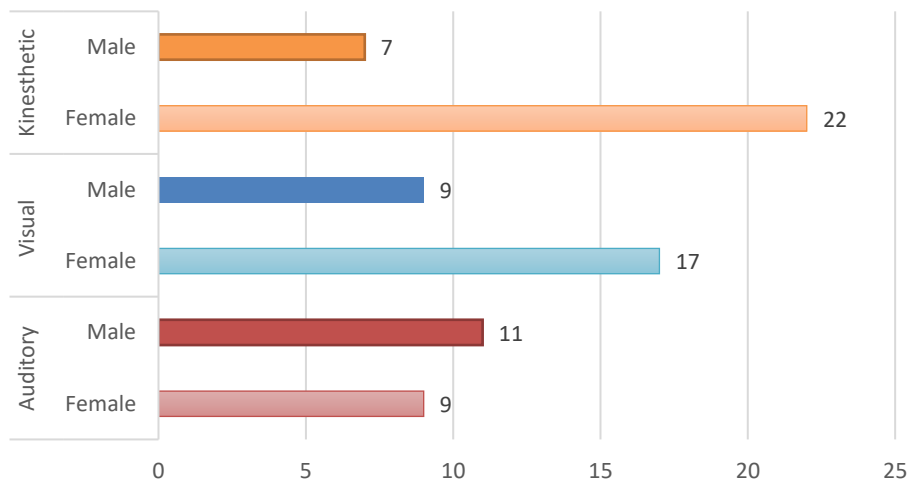

Figure 3. Research Sample Data Based on Learning Style

Figure 3 shows that students' learning styles are different. There are 20 students whose learning style is Auditory, namely nine female students and 11 male students. Figure 3 also shows 26 students whose learning style is Visual, namely 17 female students and nine male students. The data above also indicates that there are 29 students with kinesthetic learning styles, namely 22 female and 7 male students.

3.1.4. Analysis of students' CTA judging by gender

The results of analysing students' necessary thinking abilities after learning to use Edmodo based on E-Learning.
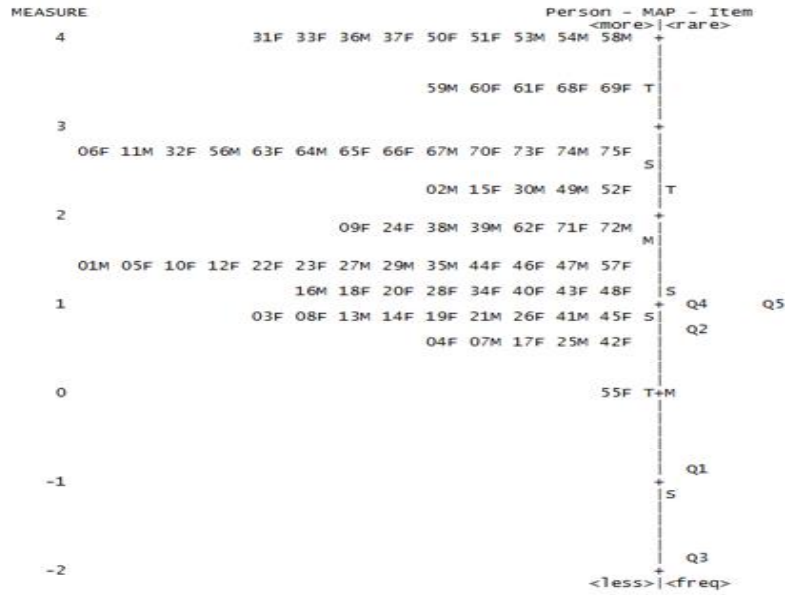
Figure 4. Wright Peta Map

Figure 4 shows that the data on the left is the students thinking ability based on gender, while the right is the items (Q1–Q5). The Wright Map on the left, which describes the student's abilities shows nine students with the highest CTA, namely students with codes 31F, 33F, 36M, 37F, 50F, 51F, 53M, 54M and 58M. The logit value of these students is the same, namely +4.56. Meanwhile, students with the lowest CTA are with Code 55F, with a logit value equal to 0.00. For more details, data on students' CTA are also presented in Figure 5.
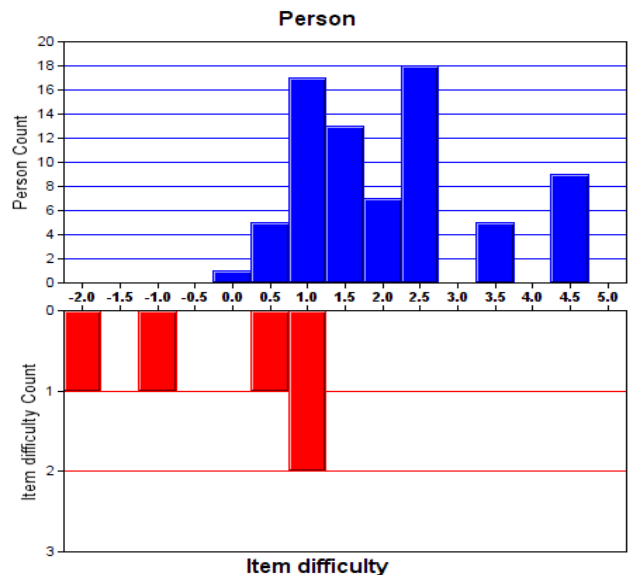

Figure 5. Distribution of Students' CTA and Level of Problem Difficulty

Figure 5 shows the distribution of students' CTA with a logit value of more than 0.00. The data is shown in the following graphic to help you see more clearly how the CTA of male and female students differ.
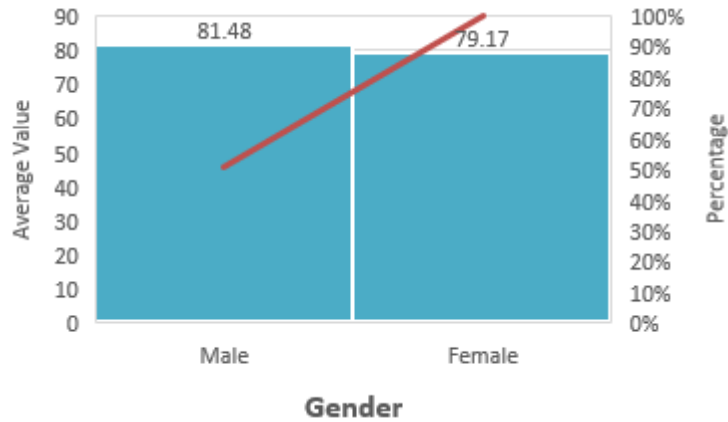

Figure 6. Differences in Students' CTA

Figure 6 shows that the CTA of male students is 81.48% while female students are 79.17%. Indicators also carry out analysis of necessary CTA. This is done to compare the CTA of male and female students. Following are the findings of the analysis.
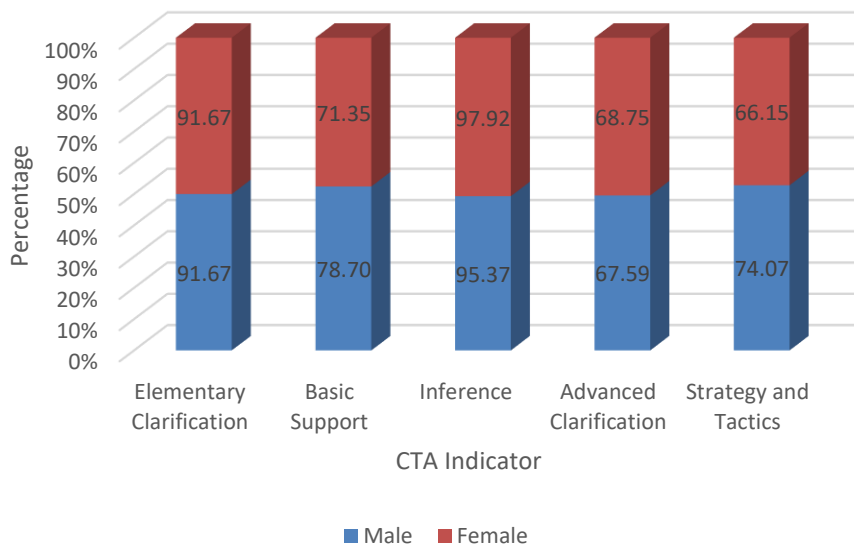

Figure 7. Differences in CTA of Students Indicators Based on Gender

Data on each indicator's CTA for students in both genders are shown in the image above. Both male and female students scored the same proportion (91.67%) on the

Elementary Clarification indication. In the basic support indicators, male students get a percentage of 78.70% and female students are 71.35%. The inference indicator for female students is 97.92% and male students are 95.37%. Figure 7 also shows that the advanced classification indicator gets a percentage score of 68.75% for female students and 67.59% for male students, while in the strategy and tractics indicator male students get a percentage of 74.07% and female students 66.15%.

3.2. Judging from learning style

In the following, data analysis results related to students' necessary thinking skills are presented in terms of learning styles in Islamic Religious Education for seventh-grade junior high school students.

```
MEASURE                                            Person - MAP - Item
                                                        <more>|<rare>
   4           31K 33V 36V 37K 50K 51K 53A 54A 58A  +
                                                     |
                                                     |
                             59V 60V 61K 68V 69K T|
                                                     |
   3                                                +
        06K 11V 32V 56A 63V 64V 65K 66K 67K 70V 73V 74V 75K  |
                                                    S|
                             02V 15A 30K 49K 52K    |T
   2                                                +
                         09A 24K 38K 39K 62V 71K 72K  |
                                                    M|
        01A 05A 10A 12A 22A 23V 27V 29K 35A 44V 46K 47A 57K  |
                    16V 18V 20V 28A 34V 40K 43K 48K  |S
   1                                                +        Q4        Q5
              03A 08V 13V 14A 19V 21A 26K 41A 45V S|
                                                     |        Q2
                          04V 07A 17K 25A 42K        |
                                                     |
                                                     |
   0                                         55K T+M
                                                     |
                                                     |
                                                     |
                                                     |        Q1
  -1                                                +
                                                    |S
                                                     |
                                                     |
                                                     |        Q3
  -2                                                +
                                              <less>|<freq>
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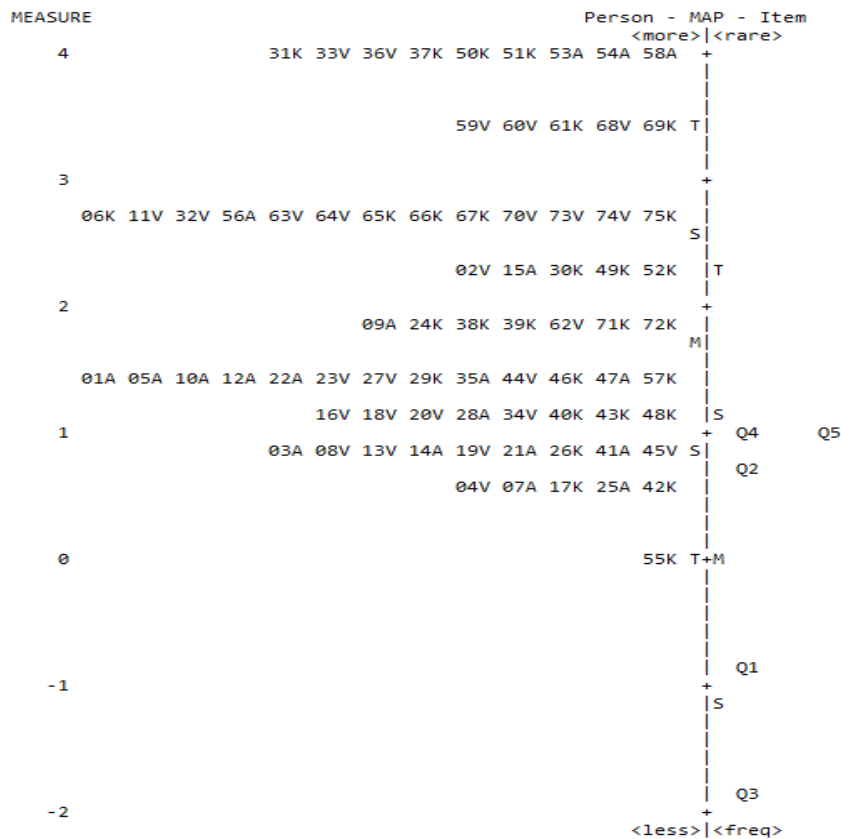
Figure 8. Wright Peta Map

Figure 8 shows the data on the student's CTA based on learning styles on the left and the items on the right (Q1–Q5). In the Wright Map on the left, which describes the students' abilities, there are nine students with the highest CTA, namely students with codes 31K, 33V, 36V, 37K, 50K, 51K, 53A, 54A and 58A. The logit value of these students is the same, namely +4.56. Meanwhile, students who have the lowest CTA are students with a 55K code, with a logit value equal to 0.00. The following is also presented a figure related to the person DIF of students' CTA based on the learning style of each item.

Person DIF plot (DIF=$S3W2)

Item

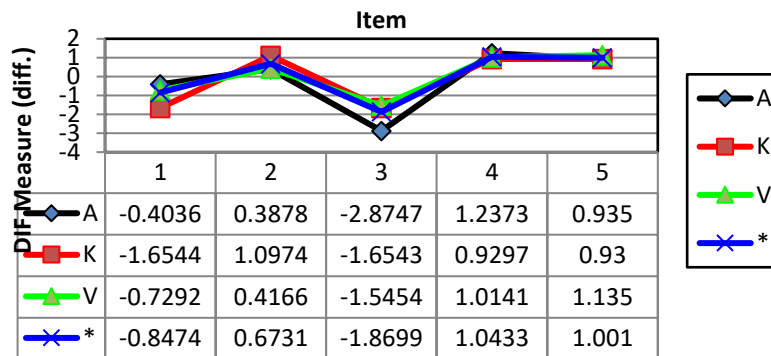|	1	2	3	4	5
A	-0.4036	0.3878	-2.8747	1.2373	0.935
K	-1.6544	1.0974	-1.6543	0.9297	0.93
V	-0.7292	0.4166	-1.5454	1.0141	1.135
*	-0.8474	0.6731	-1.8699	1.0433	1.001

Figure 9. Person DIF CTA Based on Learning Style

Figure 9 shows that the most challenging item is the Q3 sub-material diligently. This picture also shows almost no difference in students' CTA on Q5 items. The questions with the most manageable level of difficulty are Q2 items. In this case, the problem is more easily solved by students whose learning style is kinesthetic, followed by those whose learning style is Auditory. In the following, the differences in students' CTA are presented based on learning styles.
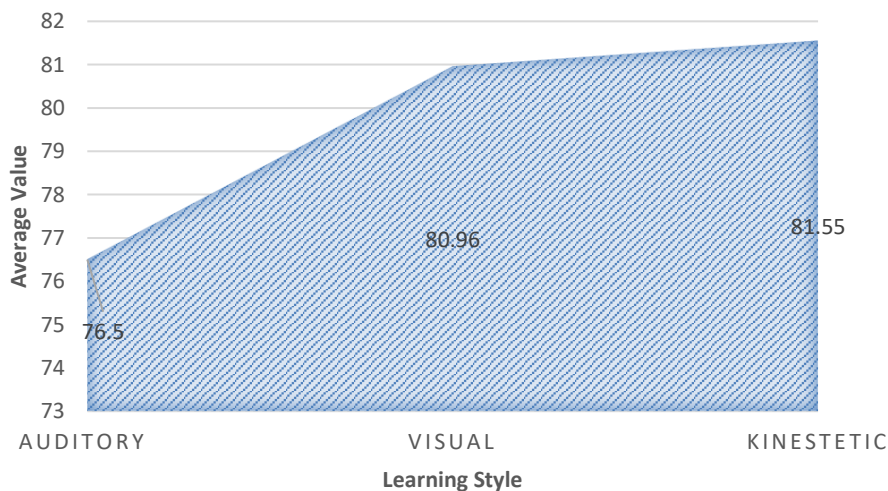
Figure 10. Differences in CTA in terms of Learning Style

Figure 10 informs differences in CTA in terms of learning style. The CTA of students whose learning style is Auditory gets a percentage of 76.5%, students with a Kinesthetic learning style of 81.55%, and students with a Visual learning style of 80.96%.

3.2. Discussion

In order to better understand how students acquire Islamic Religious Education utilizing Edmodo E-learning, this study looked at students' CTA (CTA) in terms of gender and learning style. Results from necessary CTA tests and the completion of learning style questionnaires were used to gather the research data. Prior to beginning the learning process, the practicality of the learning type questionnaire and the CTA test tool is examined.

The instrument test for CTA was carried out on students who had studied the material for commendable behaviour, so this trial was conducted in class VIII SMPN 1 Mataram. This trial is as the field trial which aims to analyze the quality of the items (Ibrahim et al., 2020). Indicator instruments that are said to be valid can be seen from the level of match items, detection of biased items and item reliability (Soeharto & Rosmaiyadi, 2018). The results of the item fit order output shown in Table 5 show that the items about CTA are in the range of fit values. The results of the output of the DIF class specification in Table 6 also show that there are no biased items about CTA. The reliability test output in Table 7 also informs that the items are reliable in the good category. This output indicate that the instrument about CTA developed is appropriate to be used to analyse students' CTA, both in terms of gender and learning style. Bahtiar (2021) which states that the CTA instrument used in the research of blended learning models is valid and feasible to be used in research.

The learning style instrument was also analysed for validity before being used. The learning style instrument was validated by three experts in their field. The validation analysis shown in Figure 1 show that the statement items on the learning style questionnaire are valid and suitable. This indicates that the developed learning style questionnaire instrument is suitable for this study. Siddiquei and Khalid (2021), states that the learning style questionnaire developed is suitable for research. After the questionnaire was declared valid by the validator, it was continued with the distribution. The results of the description analysis related to learning styles shown in Figure 3 show that students' learning styles are different. The auditory learning style is more dominated by male students than female students. Putra (2017), which states that male students dominate the Auditory learning style compared to female students, but Putra (2017) says that Visual and Kinesthetic learning styles are dominated by male students as well.

CTA are abilities that students must possess to analyse and examine related phenomena or problems given (Alsaleh, 2020; Bahtiar & Ibrahim, 2022; Mahdi et al., 2020). In learning Islamic Religious Education, students must analyse related problems faced in the school environment and family environment (Mansur et al., 2022). Students must be able to relate phenomena in everyday life to the material presented by the teacher at school. The material of commendable behaviour taught by the teacher, which consists of hard work, perseverance, tenacity and thoroughness, must be mastered and applied by students in everyday life. Students can do this if they have high CTA. The results based on Figure 4 which is the Wright Map shows that in general, the CTA of both male and female students is above the logit average of 0.00. The Person Item Map on the right explains the distribution of logit values on the item questions. Question items Q3 are items for the diligent sub-material with the lowest difficulty level (0.00).

The logit value of students' CTA of more than 0.00 indicates that the learning of Islamic Religious Education using Edmodo E-learning which teachers in learning apply, is successful. Edmodo is a learning platform that is safe to use learning process based on social media (Alqahtani, 2019). Through Edmodo, teachers and students can share notes and documents and continue online discussions (Manowong, 2016). Through one of the features of Edmodo, teachers can give students

assignments and set a deadline for submitting assignments. If new students submit assignments after the deadline, there will be an 'expired' sign (Ariani et al., 2017).

The students' CTA in terms of gender shows that there is no significant difference between male and female students. The results of the study shown in Figure 6 show that the average scores for the two gender groups were practically identical, 81.48 for male students and 79.17 for female students. Due to their engagement in Edmodo e-learning, both male and female students learned CTA on average at high levels. The learning activities were challenging and inspiring to both male and female pupils. The findings of this study are consistent with studies by Ramdani et al. (2021) which found that male students respond more quickly and confidently to problems requiring CTA than female students do. The findings of the study by (Fuad et al., 2017), which found that female students have better CTA than male students, are in direct opposition to those of this study. However, this difference is not very significant.

The CTA of male and female students can also be seen from each CTA indicator used in this study. The results in Figure 7 show that the elementary classification indicator is the highest indicator obtained by male students and female students. This demonstrates that both male and female students can assess the justifications offered for the sub-material of hard effort. Basic Support is the next sign of CTA aptitude. The percentage of marks received by male and female students differs for this indicator. In terms of percentage, male students score higher than female students, with a score of 78.70% for male students and 71.35% for female students. This indicates that male students are better at giving reasons to the sub-material diligently than female students. In the Inference indicator, male and female students' CTA differ while processing questions in the industrious sub-material, with male students scoring 95.37% and female students scoring 97.92%. Female students are better at making inductions and considering the results of installations than male students. In the Advanced Classification indicator, the CTA of male and female students in the tenacious sub-material is almost the same, namely 67.59% for male students and 68.75% for female students. This can be seen from the percentage value obtained, namely 67.59% for male students and 68.75% for female students. In the Strategy and Tactics indicator, the ability of male students is higher than that of female students. This shows that male students can determine the course of action on a given problem compared to female students regarding the sub-material carefully.

Students' CTA can also be seen based on the learning style possessed by each student. Learning style is the way that each student uses to understand the material he is studying. Students have a variety of learning styles. Students often have a visual, auditory, and kinesthetic learning styles. The findings of Dilekli (2017) study indicate that students' CTA are influenced by their learning styles. Hasil penelitian yang ditunjukkan pada Gambar 8 dan 9 bahwa in general, the necessary thinking skills of both students whose learning styles are auditory, kinesthetic, and visual are above the logit average of 0.00. The Person Item Map on the right explains the distribution of logit values on the item questions. Question items Q3 are items for the diligent sub-material with the lowest difficulty level (0.00).

The Figure 10 also show that students' CTA are based on different learning styles. This can be seen from the average value obtained by students when solving Islamic Religious Education questions on commendable behaviour. Students with an Auditory learning style have lower CTA than those with visual and kinesthetic learning styles. Students with an Auditory learning style obtain an average score

of 76.5; students with a visual learning style get an average score of 80.96, and those with a kinesthetic learning style get an average score of 81.55. The high average score obtained by students with a kinesthetic learning style is due to the learning that is applied using e-learning-based Edmodo. Learning using Edmodo will involve students actively learning to analyse and provide direct arguments for the material being studied.

In contrast to students whose learning style is auditory, who do not look active in providing arguments or analysis of the material being studied. These students are more interested in the teacher who explains directly. This study's results align with research conducted by Hananto and Kusmayadi (2018), which states that the CTA of students whose learning style is kinesthetic is better than those whose learning styles are visual and audiotrial. However, the results of this study contradict the results of research conducted by Rini et al. (2020), which concluded that there was no effect of auditory, visual, and kinesthetic learning styles on students' CTA.

4. Conclusion and recommendation

4.1. Conclusion

It can be deduced from the previous description that there are not many differences between male and female students' CTA. The two gender groups obtained almost the same average score, namely 81.48 for male students and 79.17 for female students. According to students' ability to think critically, those with kinesthetic learning styles have stronger CTA than those with visual learning styles. Students that learn visually have stronger CTA than those who learn auditorily. This is evident from the average scores each group received, which were 76.5 for students with an auditory learning style, 81.55 for students with a kinesthetic learning style and 80.96 for students with a visual learning style.

The impact of this research in the world of education, especially Islamic Religious Education learning, is to provide new knowledge, insight and information about learning media, especially E-learning-based Edmodo that can be used in learning Islamic Religious Education. Based on the results of this study, it can also be used as a reference for teachers to pay attention to diversity in the division of male and female groups and learning styles. Some of the limitations of this study are that this study only analysed the instrument questions and learning style questionnaires using limited validation. In addition, the analysis of student's CTA is also still limited to post-test results without involving students' pretest results.

4.2. Recommendation

Based on the conclusions, there are several recommendations that the researcher would like to convey, the first for further researchers to be able to continue and develop this research by looking at the influence or relationship between the variables used. In addition, further researchers can also review students' CTA on other variables. Recommendation for teachers, so that the results of this study can be used as knowledge and information to determine and establish models/approaches/strategies by paying attention to gender and student learning styles.

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