ASSESSING THE RELATIONSHIP BETWEEN STUDENTS' LEARNING STYLES AND MATHEMATICS CRITICAL THINKING ABILITY IN A 'CLUSTER SCHOOL'

Salimah Ahmad, Asyura Abd Nassir, Nor Habibah Tarmuji, Khairul Firhan Yusob and Nor Azizah Yacob

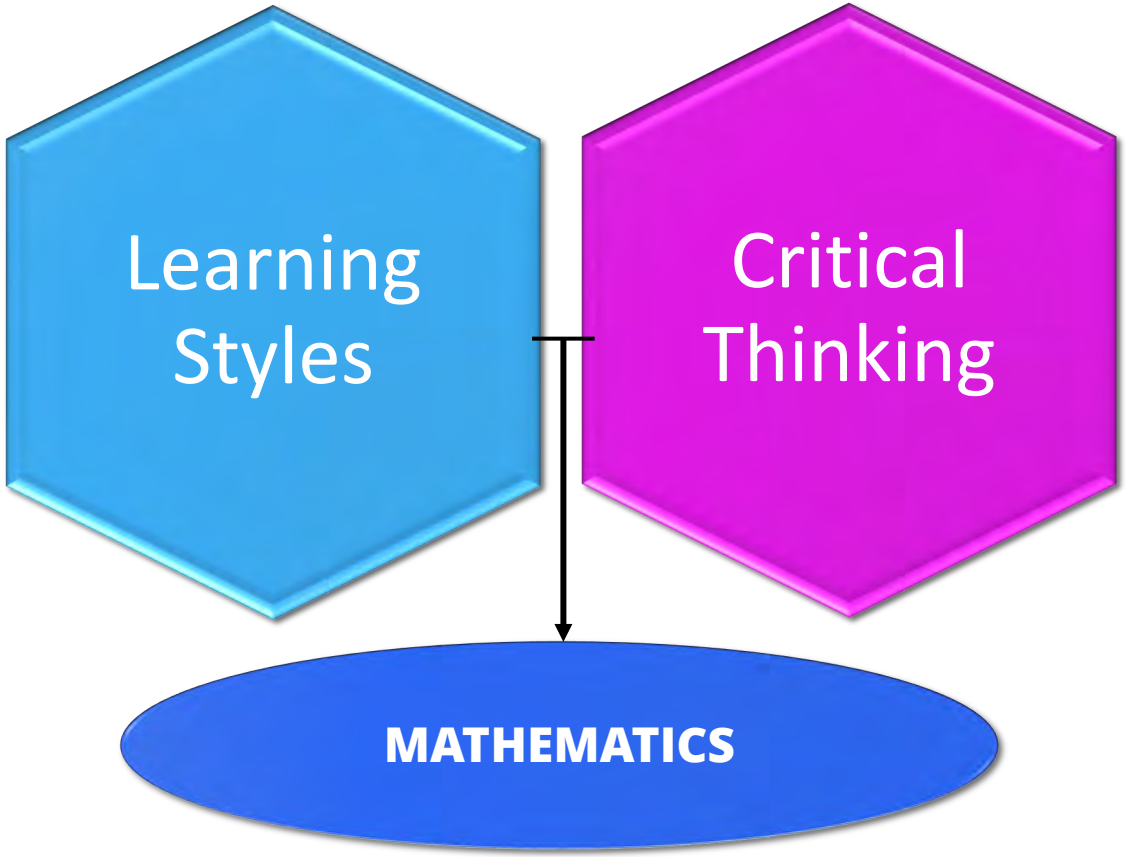
PRESENTER: ASYURA ABD NASSIR

UNIVERSITI TEKNOLOGI MARA PAHANG

4 - 5 AUGUST 2021

CONTENTS

Introduction



Introduction

Learning styles refer to how a person acquires, retains, and **retrieves knowledge**. It also refers to individual behavioral action as **managing information methods**, starting with arranging, synthesizing, analyzing, and keeping information (Andreou et al., 2014).

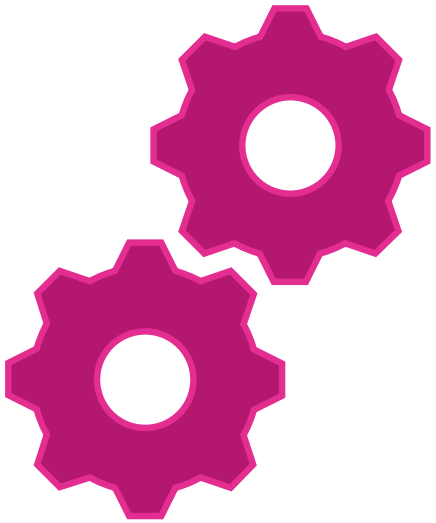
Critical thinking is a **rational reflection** that refers to individual abilities to **interpret given information**, recognize issues, assume and analyze evidence (Andreou et al., 2014).

Objectives

To determine the potential **relationship** between **students learning style** and their **critical thinking** in **mathematics**.

Literature Review/Justifications

Purwanto et al. (2020)	the learning style of each student influences their ability to think critically in mathematics.
Mailisman et al. (2020)	critical thinking applied in mathematics helps students be more creative and increase their ability to solve problems in different situations.



Methodology

Methodology

Respondents:

- **62 students** of SMKJP (cluster school)
- Age 17 years old

Three domains of learning styles proposed by Beatrice (1995):

- **Visual** (V)
- **Auditory** (A)
- **Kinesthetic** (K)

Methodology

14 questions on Learning styles adapted from Beatrice (1995).

Example:

1) If I have to learn how to do something, I learn best when;
   a. I watch someone show me how (V)
   b. Hear someone tell me how (A)
   c. Try to do it myself (K)
2) If I had to remember a list of items, I would remember it best if;
   a. I wrote it down (V)
   b. Said them over and over to myself (A)
   c. Move around and used my fingers to name each item (K)

Methodology

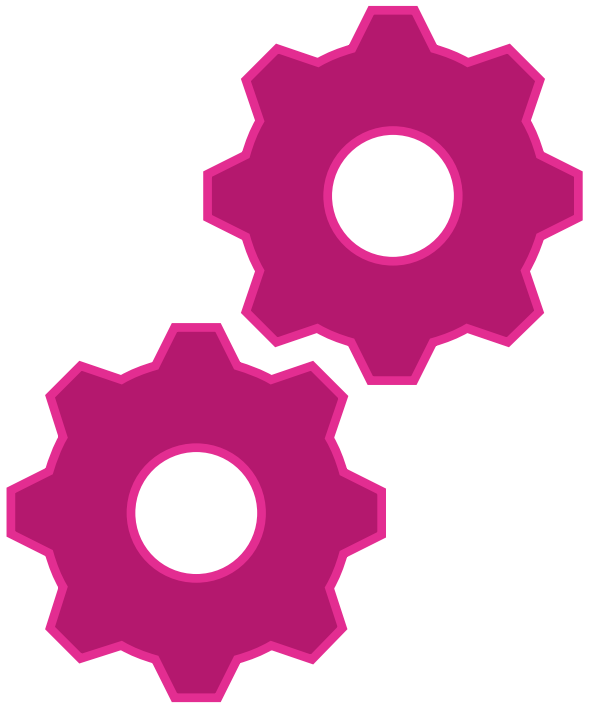
The sample questions on critical thinking in mathematics that were given to the students:

1) Choose the correct statement. a) 100 kg of iron is heavier than 100 kg of cotton. b) 100 kg of iron is lighter than 100 kg of cotton. c) 10 kg cotton is heavier than 1 kg iron.	2) How many bottles with capacity 250 millilitres can be filled with 400 litres of water a) 16 b) 160 c) 1600 d) 16000

Methodology

The quantitative data collected were analyzed using descriptive statistics, t-test, ANOVA, and Spearman's Rank Correlation Coefficient.

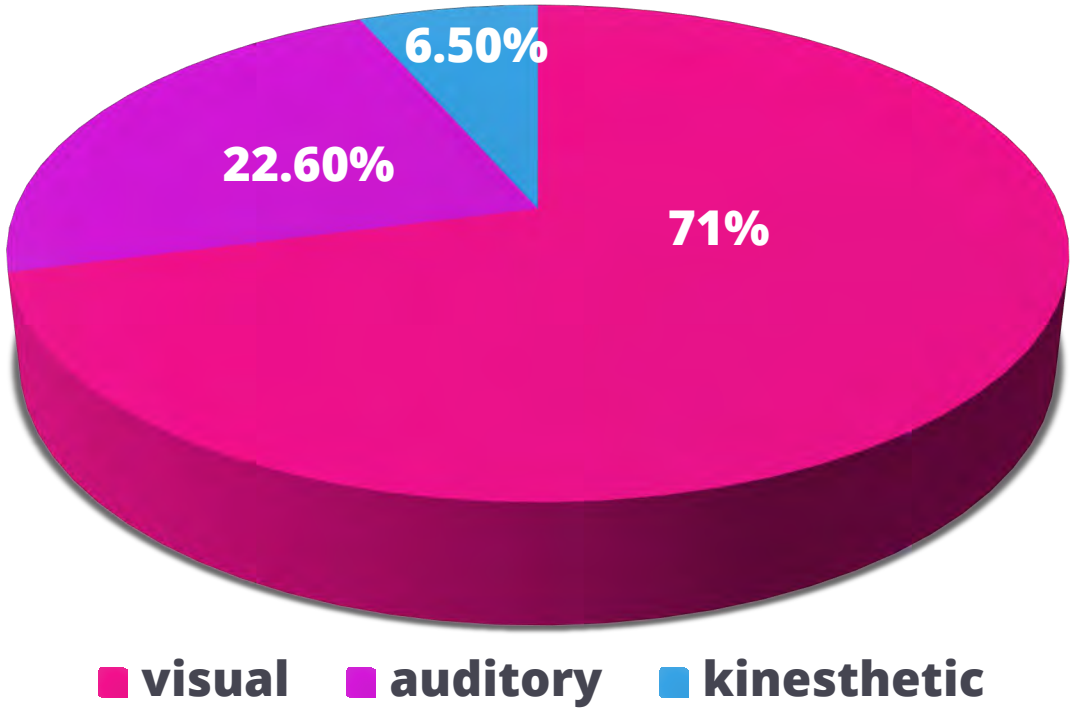
This study used six null hypotheses which were tested at a 5% level of significance.



Results and Discussions

Results and Discussions

Students' Preferred Learning Styles



Results and Discussions

Influence of Gender in the Learning Style and Critical Thinking.

Variable	Gender	N	Mean	Std. Deviation	Mean difference	T-test statistics	p-value
V	f	31	8.61	1.498	0.613	1.286	0.205
	m	13	8.00	1.291			
A	f	10	6.70	0.949	0.950	1.870	0.086
	m	4	5.75	0.500			
K	f	2	6.5	0.707	0.500	1.000	0.423
	m	2	6.00	0.000			
Critical Thinking	f	43	8.84	4.64	1.268	1.195	0.238
	m	19	10.11	3.45			

*f: female, m: male, significant at the 0.05 level.

H1: There is no significant difference between the male and female learning styles **Supported**

H2: There is no significant difference between the male and female in the levels of critical thinking **Supported**

Results and Discussions

Result of ANOVA Test on Critical Thinking between Three Learning Styles.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	120.397	2	60.199	3.481	.037*
Within Groups	1020.442	59	17.296		
Total	1140.839	61			

* Significant at the 0.05 level.

Multiple Comparison Analysis Testing of each Type of Student's Learning Style.

Learning Style (I)	Learning Style (J)	Mean Difference (I-J)	Std. Error	Sig.
V	A	.370	1.276	.773
V	K	5.727*	2.172	.011*
A	K	5.357*	2.358	.027*

*Significant at the 0.05 level.

H3: There is no significant difference between visual and auditory learners in the critical thinking test score **Supported**

H4: There is no significant difference between visual and kinesthetic learners in the critical thinking test score **Not supported**

H5: There is no significant difference between auditory and kinesthetic learners in the critical thinking test score **Not supported**

Results and Discussions

Relationship between Students' Learning Style and their Critical Thinking Test Score.

		A	K	V
Critical Thinking	Pearson Correlation	-.050	.197	-.111
	Sig. (2-tailed)	.701	.125	.389
	N	62	62	62

H6: There is no relationship between learning style and critical thinking **Supported**

Conclusions

- The findings indicate that the most popular learning style is visual (71%), followed by auditory (22.6%) and kinesthetic (6.5%).
- Different learning style may influence the ability to think critically in mathematics.
- There are no differences between male & female in their learning styles and critical thinking ability in mathematics.
- There are differences in mathematical critical thinking ability between visual & kinesthetic and auditory & kinesthetic but not between visual & auditory.
- The preferred learning style and critical thinking are not significantly related.

Conclusions

- Identifying students learning styles in class can help teachers plan a strategy for adapting the best teaching method to help students understand better in their learning.

- Further research on learning styles in different disciplines and different social and cultural backgrounds.

THANK YOU

References

- Andreou, C., Papastavrou, E., and Merkouris, A. (2014). Learning styles and critical thinking relationship in baccalaureate nursing education: A systematic review. Nurse Education Today, 34(1):362 371.
- Beatrice, J. A. (1995). Learning to study through critical thinking. Chicago: Irwin Career Education Division.
- Mailisman, N., Ikhsan, M., and Hajidin. (2020). Mathematics problem-solving skills of vocational high school students related to the 21st-century education. IOP Conf. Series: Journal of Physics: Conf. Series, 1460:012014. IOP Publishing Ltd.
- Purwanto, W. R., and Waluya, S. B. (2020). Analysis of mathematical critical thinking ability in student learning style. Journal of Physics: Conference Series. 1511(1):012057.