

PRACTISING CRITICAL THINKING SKILLS WITH SIEVE OF ERATOSTHENES ANALYSIS OF THE NUMBERS IN MATHEMATICS CLASSES

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<https://doi.org/10.5281/zenodo.15671689>

Abstract: This thesis depicts that implementing “sieve of Eratosthenes” approach can be highly effective for fostering critical thinking skills of the language learners. In mathematics, the sieve of Eratosthenes is an ancient algorithm for finding all prime numbers up to any given limit.

Keywords: sieve of Eratosthenes, Critical thinking, math analysis, Math classes,” Socratic questions”, approach, JASP.

While fluency and accuracy are indeed crucial aspects of math, it is also essential to foster higher-order thinking skills (HOTS) in the mathematics classroom. By promoting critical thinking and encouraging students to engage in meaningful communication, we can help them become more proficient math users in a variety of contexts.

When students activate their critical thinking skills in the mathematics learning process, they go beyond rote memorization and passive comprehension. They learn to analyze, evaluate, and synthesize information in the target ideas, enabling them to use it effectively and creatively. Two groups were involved for the pilot study as treatment group and comparison group. All the calculations were transformed to special statistical program for further descriptions.

Paired Samples T-Test

Measure 1	Measure 2	t	df	p	Cohen's d
simple prime numbers analysis	- analysis Soc questions_	100	37	23	37%

Note. For all tests, the alternative hypothesis specifies that simple prime numbers analysis_CT is greater than gr analysis Soc questions_CT.

Note. Student's t-test.

Assumption Checks

Test of Normality (Shapiro-Wilk)

	W	p
simple prime numbers analysis_CT - gr analysis Soc questions_CT	38%	62%

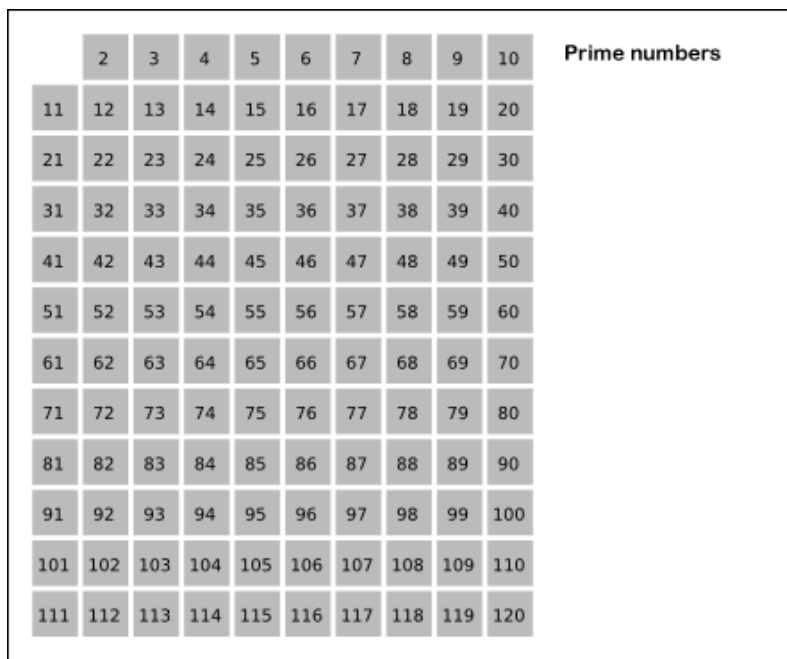
Note. Significant results suggest a deviation from normality.

Descriptives

	N	SD	SE	Coefficient of variation
simple prime numbers analysis_CT	100	38	62	0.38
gr analysis Soc questions_CT	100	39	61	0.39

Descriptives Plots

simple prime number analysis_CT - gr analysis Soc questions_CT



Prime

numbers

are

2,3,5,7,11,13,17,19,23,29,31,37,41,43,47,53,59,61,67,71,73,79,83,89,97,

Example 2

To find all the prime numbers less than or equal to 30, proceed as follows.

First, generate a list of integers from 2 to 30:

2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Density Plot

As shown in figures, in density plot bell curve was formed which emphasizes that the tasks were normally distributed. The treatment group outperformed the comparison group in the sieve of Eratosthenes analysis tasks. The treatment group showed a mean score of 3,9 whereas the comparison group had a mean score of 2,6. The independent samples *t*-test revealed that there is a statistically significant difference between the two groups.

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