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An Experimental Study on Students Concentration in Chart-Based Visual Analysis Tasks

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Abstract

Concentration is a fundamental cognitive ability that significantly influences students' academic performance, particularly in tasks requiring visual attention and analytical reasoning. This experimental study investigates the concentration levels of school students through a structured chart-analysis activity. A total of 43 students participated in a competition that required identifying specific elements within a numerical chart. The tasks varied in complexity, ranging from precise cell identification to broader visual scanning. The results demonstrate that students performed better in tasks involving general visual attention, while tasks demanding focused and systematic concentration showed lower success rates. The findings suggest that lack of sustained concentration on precise tasks is a major limiting factor in students' analytical performance. The study highlights the importance of incorporating targeted concentration-enhancing activities into classroom practices.

Keywords: Concentration, Visual Attention, Chart Analysis, Cognitive Skills, School Adolescents, Experimental Study

1. Introduction

Concentration is an essential component of learning and cognitive development. It enables students to process information accurately, follow instructions, and complete academic tasks effectively. In modern educational settings, students are frequently exposed to visual data such as charts, tables, graphs, and diagrams. The ability to interpret such visual information requires not only subject knowledge but also sustained attention and systematic scanning skills.

Despite adequate intelligence and learning opportunities, many students struggle with tasks that demand focused attention for short durations. Previous educational observations indicate that students often lose concentration when tasks require precision rather than general observation. Chart-based exercises provide an effective method to assess these cognitive abilities, as they require both attention and logical organization.

The present study aims to experimentally analyse students' concentration levels using a simple yet structured chart-analysis activity. By comparing performance across tasks of varying complexity, the study seeks to identify patterns in students' visual attention and concentration behaviour.

2. Objectives of the Study

The primary objectives of this study are:

1. To assess the concentration levels of students using chart-based visual tasks.
2. To compare student performance across tasks requiring precise attention and general visual scanning.
3. To identify whether lack of focused concentration is a limiting factor in analytical task performance.
4. To suggest educational strategies for improving concentration among school students.

3. Methodology

3.1 Research Design

The study follows an experimental and descriptive research design, focusing on direct observation of student performance in a controlled task environment.

3.2 Participants

A total of 43 students participated in the study. The participants were school-level students selected randomly during a chart-analysis competition conducted in an academic setting. All participants were given identical instructions and equal time to complete the task.

3.3 Experimental Material

The experimental material consisted of a numerical chart containing randomly arranged numbers. The chart was designed to require both fine attention and broad visual scanning.

3.4 Procedure

The students were instructed to carefully observe the chart and perform the following tasks:
Identify the first row–first column value Identify all values in the third column Identify all values in the last row Each task was explained clearly before the start of the activity. Students were asked to write their responses individually without external assistance.

3.5 Data Collection

The responses were collected immediately after the completion of the task. Students were categorized based on which task they successfully completed. The number of correct responses for each task was recorded for analysis.

3.6 Data Analysis Technique

The collected data were analyzed using simple frequency counts and percentage calculations. Concentration level was expressed as the percentage of students who successfully completed each task out of the total number of participants.

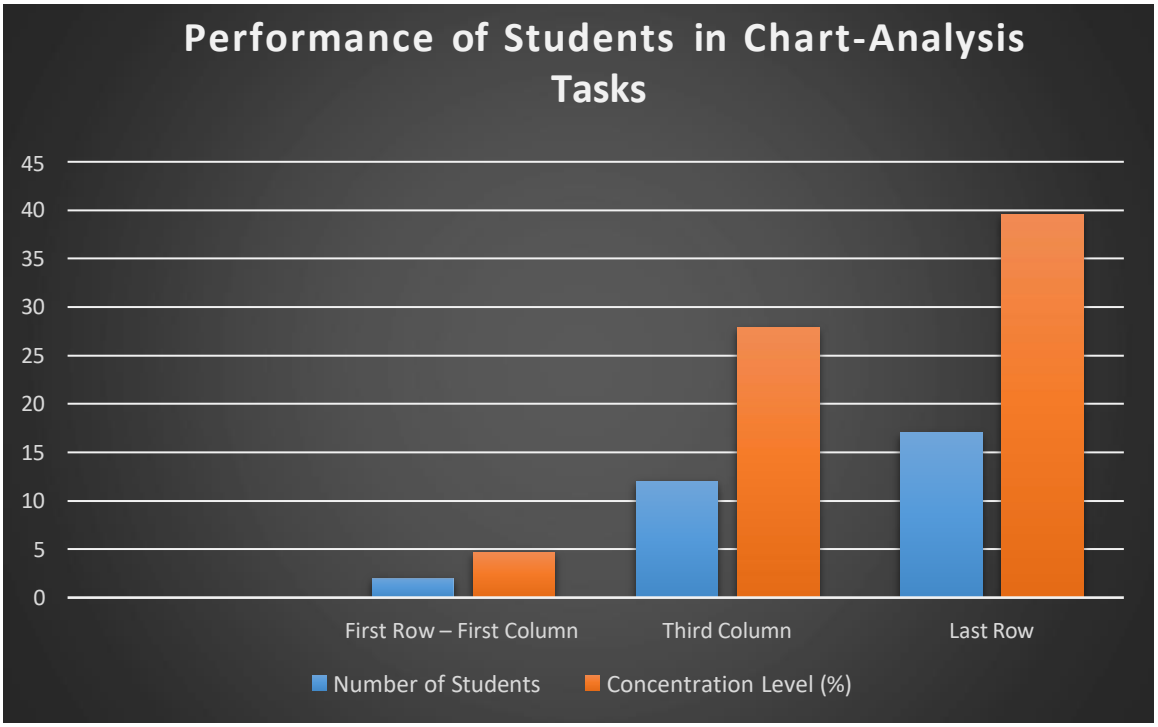
	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	COLUMN 10
ROW 1	22	81	40	7	97	66	62	15	44	85
ROW 2	55	86	12	92	50	29	53	96	70	99
ROW 3	4	32	77	36	75	26	19	58	6	23
ROW 4	98	64	18	94	78	41	1	35	69	74
ROW 5	28	49	71	9	46	43	83	31	11	59
ROW 6	37	68	60	88	56	80	30	47	27	16
ROW 7	13	93	33	65	21	5	51	10	89	63
ROW 8	42	48	2	76	61	100	14	20	38	52
ROW 9	72	54	45	82	8	24	67	57	3	84
ROW 10	95	17	87	25	91	73	34	79	90	39

4. Results.

The results of the study are summarized in Table 1.

Table 1: Performance of Students in Chart-Analysis Tasks

Task Analyzed	Number of Students	Concentration Level (%)
First Row – First Column	2	4.65
Third Column	12	27.91
Last Row	17	39.53



The results indicate a clear variation in performance across different tasks. The highest concentration level was observed in the task involving identification of the last row, while the lowest concentration level was found in the task requiring identification of the first row–first column value.

5. Discussion

The findings of the study reveal significant insights into students' concentration behavior. Tasks involving the last row of the chart required general visual scanning, allowing students to rely on broader attention rather than precise focus. As a result, a larger number of students successfully completed this task.

In contrast, identifying the first row–first column value required systematic scanning and precise attention, which proved challenging for most students. The extremely low success rate for this task suggests that students struggle with activities demanding focused concentration, even when the task itself is not conceptually difficult.

The moderate performance observed in the third-column task indicates partial concentration ability. Students were able to follow a vertical scanning pattern but lacked consistency and sustained focus.

These results support the hypothesis that lack of concentration on specific analytical tasks is a major cognitive limitation among school adolescents, rather than lack of understanding or intelligence.

6. Conclusion

The experimental study concludes that students demonstrate stronger performance in tasks involving general observation compared to tasks requiring precise and focused attention. The inability of a majority of students to accurately identify specific chart positions highlights a significant gap in concentration and analytical skills.

The findings emphasize that lack of sustained concentration, rather than lack of knowledge, is a key factor affecting students' performance in analytical activities. Addressing this issue through structured cognitive training can significantly enhance academic outcomes.

7. Educational Implications

The results of this study have important implications for classroom teaching and learning practices:
Teachers should incorporate regular concentration-enhancing activities such as chart reading, puzzles, and attention-based games.
Structured visual scanning exercises can help students develop systematic observation skills.
Short, focused analytical tasks should be gradually introduced to improve attention span.
Early identification of concentration difficulties can help in designing personalized learning strategies.

8. Limitations of the Study

The sample size was limited to 43 students.
The study focused on a single type of visual task.
Time constraints may have influenced student performance.

9. Scope for Future Research

Future studies may involve larger sample sizes, different age groups, and varied analytical tasks. The impact of concentration-training interventions can also be experimentally evaluated to measure improvement over time.