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An Interaction Effect of Learning Style, Social Competence and School Environment on Academic Achievement of Secondary School Students

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Abstract:
In various circumstances, quite diverse social competencies are appreciated and demanded. It is possible for behaviors that are acceptable and problematic in one setting to be both in another. A person who is socially competent can choose and regulate which behaviors to exhibit and which to repress in any given situation in order to accomplish goals that they have set for themselves or those others have prescribed through thinking and feeling. The school environment can be considered to play a dominant role in the accomplishment of school pupils. The school has a special responsibility to impart and assist children in the development of scholastic abilities of the numerous aspects influencing academic achievement. It has been discovered that kids who attend schools with appropriate environments put forth more effort to excel academically.

Keyword: Learning Style, Social Competencies, School Environment, Academic Achievement, Secondary School Students

INTRODUCTION

Human development is greatly influenced by education. An instinctual being becomes a rational being through education. In its truest sense, education serves to humanize people and elevates their standard of living by fostering culture and civilization. Education is the process by which a person develops all the skills necessary to take control of his surroundings. More than anything else, education makes a person a better social being and helps them live a better life. Education facilitates the development of habits, abilities, and knowledge while also changing behavior. The goal of education is the holistic development of the individual, which includes moral, social, emotional, intellectual, and physical growth. Man is culturally made by society; in fact, society is the source of all that man learns. Education is the process through which a group of people's values, beliefs, abilities, and habits are passed down from one generation to the next.

Objectives of the study

The present research was undertaken with the following general objectives in view.

1. To study and assess the academic achievement in social science, Learning style, Social competencies, and School environment among secondary school students.
2. To analyze and identify the differences in demographic characteristics in relation to academic achievement in social science, Learning style, Social competencies, and School environment among secondary school students.
3. To explore and evaluate the relationships between Learning style, Social competencies, and School environment with the academic achievement in social science of secondary school students.
4. To investigate and evaluate the combined impact of Learning style, Social competencies, and School environment on the academic achievement in social science of secondary school students.
5. To find and assess the direct and indirect effects of Learning style, Social competencies, and School environment on the academic achievement in social science of secondary school students.

Hypotheses of the Study

1. There is no significant difference between boy and girl students of secondary schools with respect to academic achievement in social science scores.
2. There is no significant difference between boy and girl students of secondary schools with respect to scores of Learning style, Social competencies and School environment.
3. There is no significant difference between students of rural and urban secondary schools with respect to academic achievement in Social Science.
4. There is no significant difference between students of rural and urban secondary schools with respect to scores of Learning style, Social competencies and School environment.
5. There is no significant difference between students of government and private secondary schools with respect to academic achievement in Social Science
6. There is no significant difference between students of government and private secondary schools with respect to scores of Learning style, Social competencies and School environment.

Significance of the Study

This study provides valuable insight into how internal (learning styles, social competence) and external (school environment) factors interact to influence academic outcomes. The findings may guide curriculum planners, teachers, and policymakers to adopt inclusive teaching strategies. Promote social skills training and improve school infrastructure and environment.

Research Methodology

This study investigates the interaction effect of three psychological and environmental variables, learning style, social competence, and school environment, on the academic achievement of secondary school students. It uses a factorial research design to understand how these factors, individually and interactively, influence students' academic performance. A descriptive survey and causal-comparative design (ex post facto) with a factorial design (2×2×2 or similar, depending on categorization) was adopted. This design is suitable for identifying relationships and interaction effects among variables.

Variables Considered in the Study

The variables included in the study are;

Dependent variables

The academic achievement in social science of secondary school students is considered as dependent variable

Independent variable

- Learning style
- Social competencies
- School environment

Moderator Variables

- Gender (boys and girls)
- Location (rural and urban),
- Type of school management (government and private),

Sampling of the study

A sample of 824 secondary school students has randomly selected from various secondary schools, representing male and female from urban and rural areas, and encompassing government and unaided secondary schools of Kalburagi district.

Tools for the study

1. Learning Style: Developed by Karuna Shankar Misra
2. Social competencies: Developed by Dr. V.P Sharma, Dr. Prabha Shukla and Dr. Kiran Shukla
3. School Environment: Developed by Dr. Karuna Shankar Misra
4. Academic Achievement: Final exam marks in the selected subject, social science.

Statistical Techniques Used

The study employed a variety of statistical methods, including calculations of sample means and standard deviations, as well as an independent two-sample t-test to compare two distinct groups. To investigate significant differences in both the main effects and interaction effects of two independent variables on the dependent variable, a two-way ANOVA with interaction designs was conducted, followed by Tukey's post-hoc tests for further analysis. Correlation analysis was performed to explore relationships between variables, while multiple regression analysis assessed the combined effects of the independent variables on the dependent variable. Additionally, path analysis was utilized to evaluate both the direct and indirect effects of the independent variables i.e. Learning Style (LS), Social Competencies (SC), and School Environment (SE) on the dependent variable, Academic Achievement in Social Science (AA).

Data Analyses, Results and Interpretations

Data were initially collected through three pre-tested questionnaires featuring a Likert Scale and one pre-tested questionnaires featuring a multiple options. To ensure a thorough statistical evaluation,

appropriate weights were assigned to the responses, enabling the calculation of total scores. These scores were subsequently treated as quantitative variables for detailed and in-depth analysis.

Null hypothesis 01: There is no significant difference between boy and girl students of secondary schools with respect to academic achievement in social science scores.

To evaluate the above null hypothesis, an independent t-test was performed, and the results are presented in the table below.

Table 01: Summary of the independent t-test, including the mean, standard deviation (SD), standard error (SE), t-value, and p-value, comparing boys and girls in secondary schools regarding their academic achievement in Social Science.

Sex	n	Mean	SD	SE	|t|-value	P-value
Boys	412	73.95	9.40	0.46		
Girls	412	74.96	8.24	0.41	1.6282	0.1039,NS

The table results show that the calculated t-value of 1.6282 is less than the critical t-value of 1.96 with 822 degrees of freedom at the 5% significance level. Therefore, the null hypothesis is accepted, and the alternative hypothesis is rejected, indicating no significant difference in academic achievement in Social Science between boy and girl students of secondary schools ($p = 0.1039$). However, girl students demonstrated slightly higher academic achievement scores in Social Science (74.96 ± 8.24) compared to boy students (73.95 ± 9.40). The figure below illustrates the mean and standard deviation of academic achievement in Social Science for boy and girl students of secondary schools.

Figure 01: Comparison between boy and girl students of secondary schools with academic achievement in Social Science

Null hypothesis 02: There is no significant difference between boy and girl students of secondary schools with respect to scores of Learning style, Social competencies and School environment.

To evaluate the above null hypothesis, an independent t-test was performed, and the results are presented in the table below.

Table 02: Summary of the independent t-test, including the mean, standard deviation (SD), standard error (SE), t-value, and p-value, comparing boys and girls in secondary schools with learning style, social competencies and school environment scores.

Variable	Sex	n	Mean	SD	SE	|t|-value	P-value
Learning style	Boys	412	132.81	13.95	0.69		

	Girls	412	134.42	11.40	0.56	1.8188	0.0693,NS
Social competencies	Boys	412	175.78	12.50	0.62		
	Girls	412	175.46	14.34	0.71	0.3445	0.7305,NS
School environment	Boys	412	201.24	9.64	0.48		
	Girls	412	202.38	8.73	0.43	1.7684	0.0774,NS

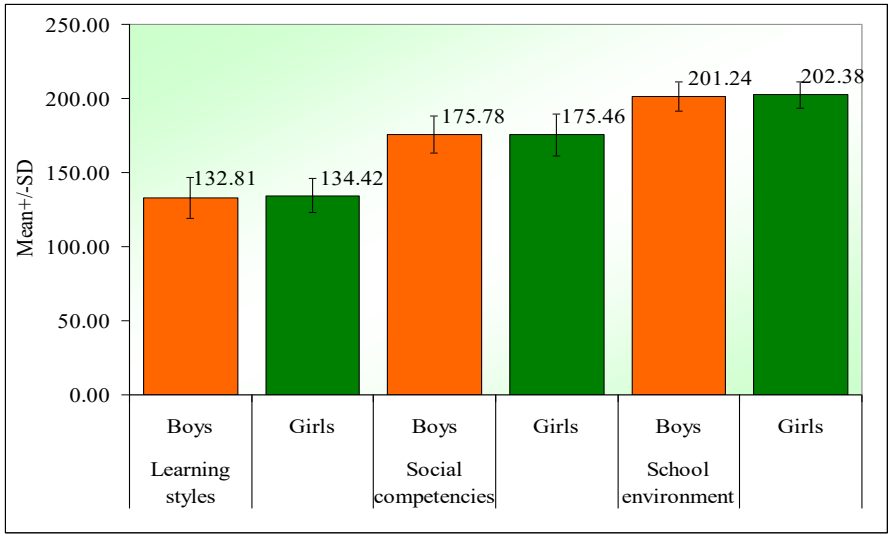
The table results indicate that

The comparison of learning style scores between boy and girl students of secondary schools revealed a calculated t-value of 1.8188, which is less than the critical t-value of 1.96 with 822 degrees of freedom at the 5% significance level. Consequently, the null hypothesis is accepted, and the alternative hypothesis is rejected, indicating no significant difference in learning style scores between boys and girls ($p = 0.0693$). However, it is worth noting that girl students exhibited slightly higher learning style scores (134.42 ± 11.40) compared to boy students (132.81 ± 13.95).

The comparison of social competencies scores between boy and girl students of secondary schools revealed a calculated t-value of 0.3445, which is less than the critical t-value of 1.96 with 822 degrees of freedom at the 5% significance level. As a result, the null hypothesis is accepted, and the alternative hypothesis is rejected, indicating no significant difference in social competencies scores between boys and girls ($p = 0.7305$). Specifically, girl students had similar social competencies scores (175.46 ± 14.34) compared to boy students (175.78 ± 12.50).

The comparison of social competencies scores between boy and girl students of secondary schools showed a calculated t-value of 1.7684, which is less than the critical t-value of 1.96 with 822 degrees of freedom at the 5% significance level. Therefore, the null hypothesis is accepted, and the alternative hypothesis is rejected, indicating no significant difference in social competencies scores between boys and girls ($p = 0.0774$). However, girl students exhibited slight higher social competencies scores (202.38 ± 8.73) compared to boy students (201.24 ± 9.64). The figure below illustrates the mean and standard deviation of Learning style, Social competencies and School environment scores for boy and girl students of secondary schools.

Figure 02: Comparison between boy and girl students of secondary schools with respect to learning style, social competencies and school environment scores.



Null hypothesis 03: There is no significant difference between students of rural and urban secondary schools with respect to academic achievement in Social Science.

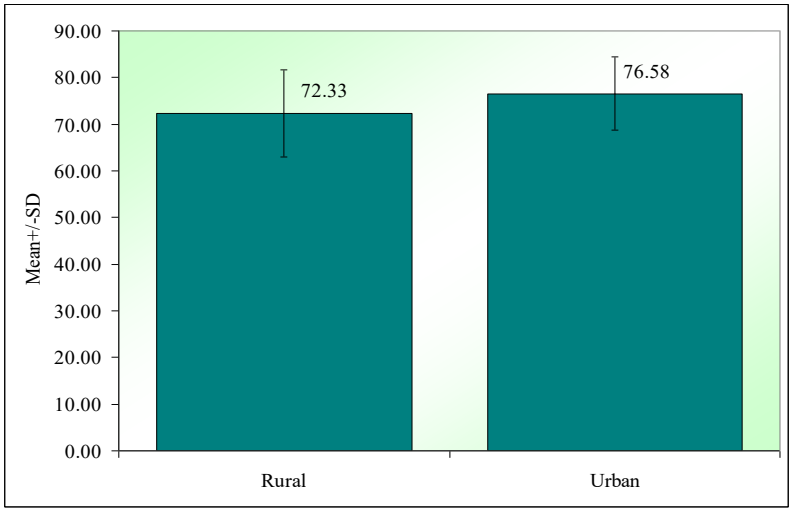
To evaluate the above null hypothesis, an independent t-test was performed, and the results are presented in the table below.

Table 03: Summary of the independent t-test, including the mean, standard deviation (SD), standard error (SE), t-value, and p-value, comparing students of rural and urban secondary schools with respect to academic achievement in Social Science.

Location	n	Mean	SD	SE	|t|-value	P-value
Rural	412	72.33	9.33	0.46		
Urban	412	76.58	7.78	0.38	7.0918	0.0001, S

The results show that the calculated t-value of 7.0918 exceeds the critical t-value of 1.96 with 822 degrees of freedom at a 5% significance level. As a result, we reject the null hypothesis and accept the alternative hypothesis, indicating a significant difference in academic achievement in Social Science between students from urban and rural secondary schools ($p = 0.0001$). Specifically, students from urban secondary schools had significantly higher academic scores (76.58±7.78) compared to their rural counterparts (72.33±9.33). The figure below illustrates the mean and standard deviation of academic achievement in Social Science for both groups of students.

Figure 03: Comparison between students of rural and urban secondary schools with respect to academic achievement in Social Science.



Null hypothesis 04: There is no significant difference between students of rural and urban secondary schools with respect to scores of Learning style, Social competencies and School environment.

To evaluate the above null hypothesis, an independent t-test was performed, and the results are presented in the table below.

Table 04: Summary of the independent t-test, including the mean, standard deviation (SD), standard error (SE), t-value, and p-value, comparing students of rural and urban secondary schools with learning style, social competencies and school environment scores

Variable	Location	n	Mean	SD	SE	t-value	P-value
Learning style	Rural	412	130.77	13.82	0.68		
	Urban	412	136.46	10.89	0.54	6.5549	0.0001,S

Social competencies	Rural	412	173.22	14.43	0.71		
	Urban	412	178.02	11.92	0.59	5.2101	0.0001,S
School environment	Rural	412	200.18	9.51	0.47		
	Urban	412	203.43	8.61	0.42	5.1416	0.0001,S

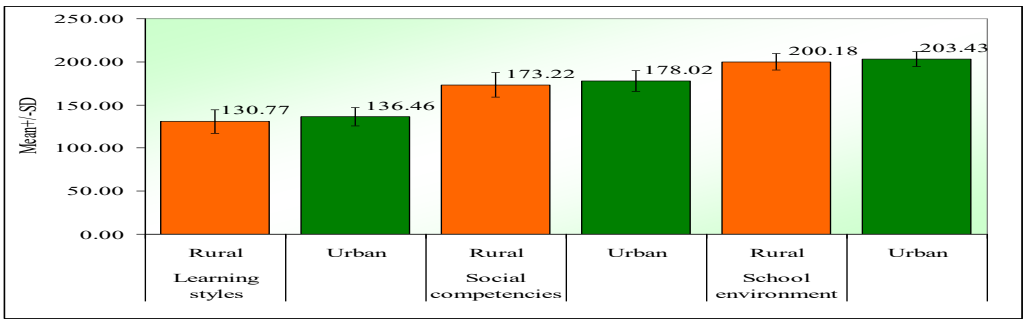
The table results indicate that

When comparing the learning style scores of students from rural and urban secondary schools, the calculated t-value of 6.5549 is greater than the critical t-value of 1.96 with 822 degrees of freedom at a 5% significance level. Therefore, we reject the null hypothesis and accept the alternative hypothesis, indicating a significant difference in learning style scores between students from rural and urban secondary schools (p = 0.0001). Specifically, students from urban secondary schools scored significantly higher on learning style (136.46±10.89) compared to their rural counterparts (130.77±13.82).

When comparing the social competencies scores of students from rural and urban secondary schools, the calculated t-value of 5.2101 is greater than the critical t-value of 1.96 with 822 degrees of freedom at a 5% significance level. Therefore, we reject the null hypothesis and accept the alternative hypothesis, indicating a significant difference in social competencies scores between students from rural and urban secondary schools (p = 0.0001). Specifically, students from urban secondary schools scored significantly higher on social competencies (178.02±11.92) compared to their rural counterparts (173.22±14.43).

When comparing the school environment scores of students from rural and urban secondary schools, the calculated t-value of 5.1416 exceeds the critical t-value of 1.96 with 822 degrees of freedom at a 5% significance level. Therefore, we reject the null hypothesis and accept the alternative hypothesis, indicating a significant difference in school environment scores between students from rural and urban secondary schools (p = 0.0001). Specifically, students from urban secondary schools scored significantly higher on school environment measures (203.43±8.61) compared to their rural counterparts (200.18±9.51). The figure below illustrates the mean and standard deviation of learning style, social competencies and school environment scores between students of rural and urban secondary schools.

Figure 04: Comparison between students of rural and urban secondary schools with respect to Learning style, Social competencies and School environment scores.



Null hypothesis 05: There is no significant difference between students of government and private secondary schools with respect to academic achievement in Social Science

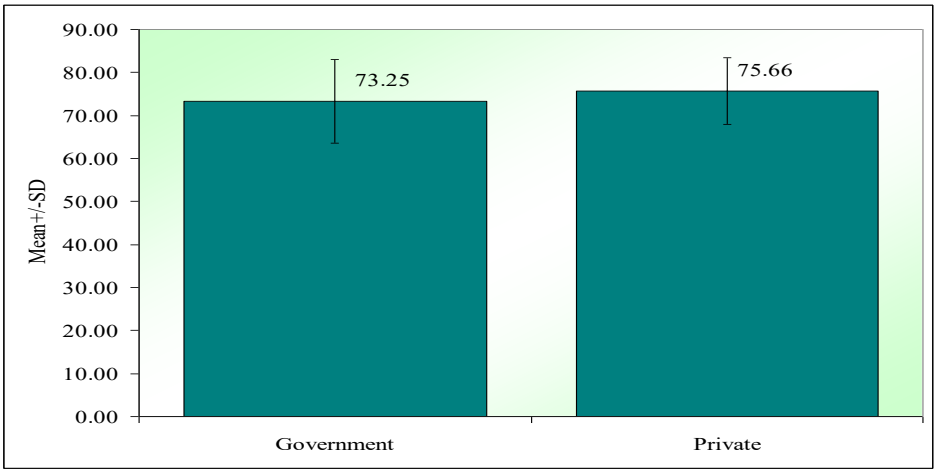
To evaluate the above null hypothesis, an independent t-test was performed, and the results are presented in the table below.

Table 05: Summary of the independent t-test, including the mean, standard deviation (SD), standard error (SE), t-value, and p-value, comparing students of government and private secondary schools with respect to academic achievement in Social Science

Management	n	Mean	SD	SE	|t|-value	P-value
Government	412	73.25	9.70	0.48		
Private	412	75.66	7.73	0.38	3.9373	0.0001, S

The results from the table show that the calculated t-value of 3.9373 exceeds the critical t-value of 1.96 with 822 degrees of freedom at a 5% significance level. As a result, we reject the null hypothesis and accept the alternative hypothesis, indicating a significant difference in academic achievement in Social Science between students from private and government secondary schools ($p = 0.0001$). Specifically, students from private secondary schools achieved significantly higher scores in Social Science (75.66±7.73) compared to students from government secondary schools (73.25±9.70). The figure below illustrates the mean and standard deviation of academic achievement in Social Science for students from both private and government secondary schools.

Figure 05: Comparison between students of government and private secondary schools with respect to academic achievement in Social Science



Null hypothesis 06: There is no significant difference between students of government and private secondary schools with respect to scores of Learning style, Social competencies and School environment.

To evaluate the above null hypothesis, an independent t-test was performed, and the results are presented in the table below.

Table 06: Summary of the independent t-test, including the mean, standard deviation (SD), standard error (SE), t-value, and p-value, comparing students of government and private secondary schools with learning style, social competencies and school environment scores.

Variable	Management	n	Mean	SD	SE	t-value	P-value
Learning style	Government	412	130.12	15.55	0.77		
	Private	412	137.11	7.71	0.38	8.1716	0.0001,S
Social competencies	Government	412	169.38	13.54	0.67		
	Private	412	181.86	10.02	0.49	15.0444	0.0001,S
School environment	Government	412	200.40	9.68	0.48		

	Private	412	203.22	8.49	0.42	4.4404	0.0001,S

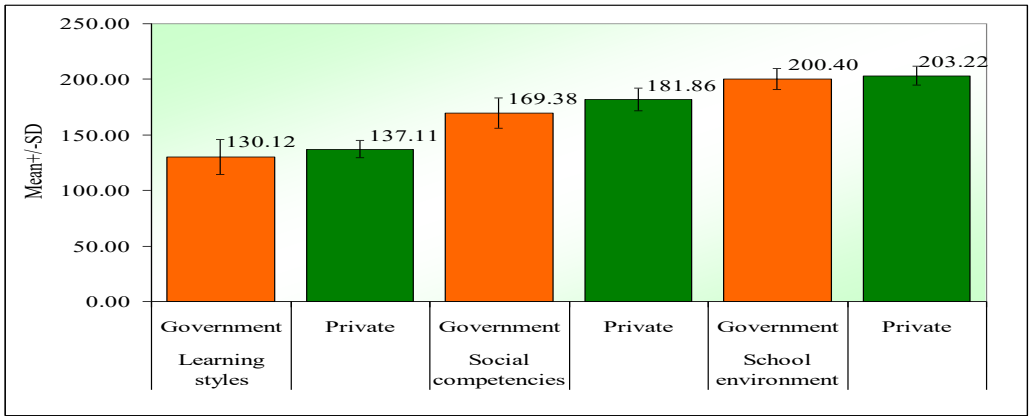
The table results indicate that

When comparing the learning style scores of students from government and private secondary schools, the calculated t-value of 8.1716 exceeds the critical t-value of 1.96 with 822 degrees of freedom at a 5% significance level. Therefore, we reject the null hypothesis and accept the alternative hypothesis, indicating a significant difference in learning style scores between students from government and private secondary schools ($p = 0.0001$). Specifically, students from private secondary schools scored significantly higher on learning style (137.11±7.71) compared to students from government secondary schools (130.12±15.55).

When comparing the social competencies scores of students from government and private secondary schools, the calculated t-value of 15.0444 exceeds the critical t-value of 1.96 with 822 degrees of freedom at a 5% significance level. Therefore, we reject the null hypothesis and accept the alternative hypothesis, indicating a significant difference in social competencies scores between students from government and private secondary schools ($p = 0.0001$). Specifically, students from private secondary schools scored significantly higher on social competencies (181.86±10.02) compared to students from government secondary schools (169.38±13.54).

When comparing the school environment scores of students from government and private secondary schools, the calculated t-value of 4.4404 exceeds the critical t-value of 1.96 with 822 degrees of freedom at a 5% significance level. Therefore, we reject the null hypothesis and accept the alternative hypothesis, indicating a significant difference in school environment scores between students from government and private secondary schools ($p = 0.0001$). Specifically, students from private secondary schools scored significantly higher on school environment measures (203.22±8.49) compared to students from government secondary schools (200.40±9.68). The figure below illustrates the mean and standard deviation of learning style, social competencies and school environment scores between students of government and private secondary schools.

Figure 06: Comparison between students of government and private secondary schools with respect to learning style, social competencies and school environment scores.



Delimitations of the Study

1. Limited to students of class 9th standard
2. In this study only three variables were considered (learning style, social competence, and school environment).
3. Academic achievement measured by marks in selected subject of social science.

4. Study restricted to selected schools in Kalburagi districts.

Conclusion

Girl students demonstrated slightly higher academic achievement scores in Social Science (74.96 ± 8.24) compared to boy students (73.95 ± 9.40). Girl students exhibited slightly higher learning style scores (134.42 ± 11.40) compared to boy students (132.81 ± 13.95). Girl students had similar social competencies scores (175.46 ± 14.34) compared to boy students (175.78 ± 12.50). Girl students exhibited slight higher social competencies scores (202.38 ± 8.73) compared to boy students (201.24 ± 9.64). Students from urban secondary schools had significantly higher academic scores (76.58±7.78) compared to their rural counterparts (72.33±9.33). Students from urban secondary schools scored significantly higher on learning style (136.46±10.89) compared to their rural counterparts (130.77±13.82). Students from urban secondary schools scored significantly higher on social competencies (178.02±11.92) compared to their rural counterparts (173.22±14.43). Students from urban secondary schools scored significantly higher on school environment measures (203.43±8.61) compared to their rural counterparts (200.18±9.51). Students from private secondary schools achieved significantly higher scores in Social Science (75.66±7.73) compared to students from government secondary schools (73.25±9.70). Students from private secondary schools scored significantly higher on learning style (137.11±7.71) compared to students from government secondary schools (130.12±15.55). Students from private secondary schools scored significantly higher on social competencies (181.86±10.02) compared to students from government secondary schools (169.38±13.54). Students from private secondary schools scored significantly higher on school environment measures (203.22±8.49) compared to students from government secondary schools (200.40±9.68).

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