A Study On Multiple Intelligence And Meta –Cognitive Skill In Relation To Academic Performance Among Secondary School Girls' Students

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I.   Introduction:

The greater development of the intellectual capacity of children is a key objective for any region since it allows a possible future economic development of the country. In essence metacognitive knowledge is associated is associated with knowledge about cognition in general, which involves strategies that learners use to improve learning process. According to Pintrich, metacongitive knowledge can be categorized into three types, namely strategic knowledge, knowledge about cognitive tasks, and self-knowledge. Collectively these types of knowledge are summoned through appropriate metacongitive process that helps improve strategies used in solving problems.

Theoretical Background:
Multiple Intelligence: Refers to the idea that individuals possess different types of intelligence, such as linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, and naturalistic intelligence (Gardner, 1983).

Metacognitive Skills: Refers to the awareness and control of cognitive process, including planning, monitoring, evaluating, and adjusting learning strategies (Flavell, 1979).

Academic Performance: Refers to the achievement of secondary school students in various subjects, such as mathematics, language arts, science, and social studies.

Empirical evidences regarding Multiple intelligence, Meta cognitive skills and Academic Performance
Detterman, D. K. (2002). Theories of Intelligence. Findings: Multiple intelligences are positively correlated with academic performance.
Chen, P. P. (2002). Exploring the Relationship between Multiple Intelligences and Metacognition. Findings: Multiple intelligences and metacognition are positively correlated with academic performance.
Baker, L. (2008). Metacognition in Learning and Instruction. Findings: Metacognition is essential for academic success.
Taylor, R. (2010). Metacognition and Learning. Findings: Metacognition is a critical component of academic success.
Bembenutty, H. (2011). The Last Word: Metacognition and Student Success. Findings: Metacognition is a strong predictor of academic performance.
Agubondo (2016) found that Multiple intelligence and metacongitive skills relatively influence positively on learning outcomes among school learning female children.
Chiang (2017) found that multiple intelligence influence significantly more on learning performance of female students than male counterparts.
Armstrong, T. (2019). Multiple Intelligences in the Classroom. Findings: Multiple intelligences are positively correlated with academic performance.

General Objectives of the Study
1. To study the Influence of Multiple intelligence Meta cognitive skills on academic achievement among Secondary School Girl Students.

Hypothesis of the study:
1. Interaction effects of Multiple intelligence X Meta cognitive skills of Girls, differ significantly in terms of their influence on Academic performance.

II. Methodology

Variables
Independent Variables (Predictor) to be considered in the study :
i. Multiple intelligence
ii. Meta cognitive skills

Dependent Variable (Response)to be considered in the study:
i. Academic Performance

Design of the Study
  The present study is the descriptive study where a survey will be undertaken to measure the scores on Multiple intelligence, Meta cognitive skills of students of IX standard of Vijayapura District with regard to their interaction effect on Secondary school Girl Students Academic Achievement.

Tools Used in the Study
To test the hypotheses formulated for the study, data is collected with the help of following tools :

Multiple intelligence:
  In order to measure this variable Multiple intelligence scale (MIS-ASPS) by Surubhi Agarwal and Suraksha Pal Shall be used.

Meta – Cognitive skills:
  In order to measure this variable the Meta Cognitive skills Scale (MCSS-GMS) by Madhu Gupta and Suman shall be used.

Secondary school Students Academic Achievement
  In the present study Secondary School Students Academic Achievement, which is a dependent variable, shall be measured by considering their previous year's academic scores

Relevance of the proposed study:
  In the modern society today, one of the greatest compliments that can be paid to a person is to call him 'intelligent'. Intelligence refers to Capacity to learn with speed and accuracy. Capacity to solve problems. Capacity to adjust in the society. Identifying an effective instructional strategy, such as this of multiple intelligence based differentiated instruction to teach metacongitive reading comprehension is a goal for educators. Metacognition is defined as one's own awareness of the thought process specifically it concern the ability to regulate the cognitive process of the learners in their learning. Similarly multiple intelligence covers the capacity to reason figure and handle logical thinking. Therefore, it must be seen more as the "Output" function of information intake, learning, skills and ability.

Statistical Techniques
  In pursuance of the objectives of the study as well as the research hypotheses, Descriptive statistics, correlation analysis the 2-way Analysis of Variance technique are used.

Selection of the Sample
  Using random sampling technique 250 Girl students are selected from IX standard studying in secondary schools of Vijayapura District

Collection of Data
  Required data relating to Multiple intelligence, Meta cognitive skills of the students will be obtained by administering Multiple intelligence and Meta cognitive scale tools for school students. The investigator collected the essential data by visiting different secondary schools from Vijayapura District. The sex, management and location of the school will be collected through a personal data Performa.
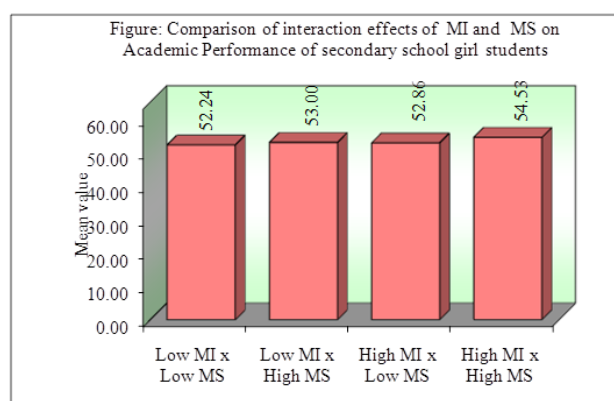
Table: Interaction effects of Multiple Intelligence (Low and high) and Meta cognitive skill (Low and high) on Academic Performance of Secondary school girl students

Interactions	Low MI x Low MS	Low MI x High MS	High MI x Low MS	High MI x High MS
Mean	52.24	53.00	52.86	54.53
SD	0.43	0.00	0.35	1.47
Low MI x Low MS	-			
Low MI x High MS	p=0.0001*	-		
High MI x Low MS	p=0.0013*	p=0.9362	-	
High MI x High MS	p=0.0001*	p=0.0001*	p=0.0001*	-

*$p<0.05$

From the results of the above table, it can be seen that,

- The girl students of secondary schools belongs to low Multiple Intelligence with low Meta cognitive skill and low Multiple Intelligence with high Meta cognitive skill differs significantly with respect to their Academic Performance scores at significance level of 5 percent. It means that, the girl students of secondary schools belongs to low Multiple Intelligence with high Meta cognitive skill have significant higher Academic Performance scores as compared to girl students of secondary schools belongs to low Multiple Intelligence with low Meta cognitive skill.
- The girl students of secondary schools belongs to low Multiple Intelligence with low Meta cognitive skill and high Multiple Intelligence with low Meta cognitive skill differs significantly with respect to their Academic Performance scores at significance level of 5 percent. It means that, the girl students of secondary schools belong to high Multiple Intelligence with low Meta cognitive skill have significant higher Academic Performance scores as compared to girl students of secondary schools belongs to low Multiple Intelligence with low Meta cognitive skill.
- The girl students of secondary schools belongs to low Multiple Intelligence with low Meta cognitive skill and high Multiple Intelligence with high Meta cognitive skill differs significantly with respect to their Academic Performance scores at significance level of 5 percent. It means that, the girl students of secondary schools belongs to high Multiple Intelligence with high Meta cognitive skill have significant higher Academic Performance scores as compared to girl students of secondary schools belongs to low Multiple Intelligence with low Meta cognitive skill.
- The girl students of secondary schools belongs to low Multiple Intelligence with high Meta cognitive skill and high Multiple Intelligence with low Meta cognitive skill do not differs significantly with respect to their Academic Performance scores at significance level of 5 percent. It means that, the girl students of secondary schools belongs to low Multiple Intelligence with high Meta cognitive skill and high Multiple Intelligence with low have similar Academic Performance scores.
- The girl students of secondary schools belongs to low Multiple Intelligence with high Meta cognitive skill and high Multiple Intelligence with high Meta cognitive skill differs significantly with respect to their Academic Performance scores at significance level of 5 percent. It means that, the girl students of secondary schools belongs to high Multiple Intelligence with high have significant higher Academic Performance scores as compared to girl students of secondary schools belongs to low Multiple Intelligence with high Meta cognitive skill.
- The girl students of secondary schools belongs to high Multiple Intelligence with low Meta cognitive skill and high Multiple Intelligence with high Meta cognitive skill differs significantly with respect to their Academic Performance scores at significance level of 5 percent. It means that, the girl students of secondary schools belongs to high Multiple Intelligence with high Meta cognitive skill have higher Academic Performance scores as compared to girl students of secondary schools belongs to high Multiple Intelligence with low Meta cognitive skill. The mean scores are also presented in the following figure.

Figure: Comparison of interaction effects of MI and MS on Academic Performance of secondary school girl students

III. Research Discussion:

Multiple Intelligence, Metacognitive Skills, and Academic Performance:
a. Studies have shown that individuals with higher levels of multiple intelligence tend to perform better academically (Gardner, 1983).
b. Metacognitive skills, such as self-awareness and self-regulation, are strong predictors of academic success (Flavell, 1979).
c. Research suggests that multiple intelligence and metacognitive skills interact to influence academic performance (Sternberg, 1985).
d. Students with high levels of linguistic and logical-mathematical intelligence tend to perform well in traditional academic subjects (Gardner, 1983).
e. Students with high levels of spatial and bodily-kinesthetic intelligence tend to excel in hands-on, practical subjects (Gardner, 1983).
f. Metacognitive skills help students to effectively use their intelligence to achieve academic goals (Flavell, 1979).
g. Teachers can use multiple intelligence theory to design instruction that caters to different learning styles (Gardner, 1983).
h. Metacognitive training programs can improve academic performance by enhancing self-awareness and self-regulation (Flavell, 1979).

Educational implications for multiple intelligence:
1. Provide visual aids and multimedia resources to support learning
2. Offer extra time for reading and writing tasks.
3. Encourage oral presentations and group discussions
4. Use concrete objects and real world examples to explain mathematical concepts.
5. Provide Step-by-step instructions and break problems into Smaller parts.
6. Offer extra support and practice with mathematical calculations.
7. Use verbal descriptions and written instructions to supplement visual information
8. Provide hands on activities and experiments to enhance learning.
9. Offer extra time for spatially – demanding tasks.

Educational Implications of Metacognitive Skills:
1. Improved Learning Outcomes: Metacognitive skills help students to better understand and control their learning, leading to improved academic performance.
2. Enhanced Self-Awareness: Metacognitive skills enable students to recognize their strengths, weakness, and learning styles, promoting self-awareness and self-regulation.
3. Effective Learning Strategies: Metacognitive skills help students to select and apply appropriate learning strategies, leading to more efficient and effective learning.
4. Increased Independence: Metacognitive skills enable students to take ownership of their learning, becoming more independent and self-directed.
5. Better Time Management: Metacognitive skills help students to plan, prioritize, and manage their time more effectively.
6. Enhanced Transfer of Learning: Metacognitive skills facilitate the transfer of learning to new situations and contexts.
7. Improved Critical Thinking: Metacognitive skills promote critical thinking, analysis, and problem-solving.
8. Support for Diverse Learners: Metacognitive skills can be adapted to support learners with diverse needs, abilities, and learning styles.
9. Teacher Support: Teachers can use Metacognitive skills to support students' learning, providing scaffolding and feedback.
10. Assessment and Evaluation: Metacognitive skills can be used to asses and evaluate student learning, providing valuable insights into student understanding.

By incorporating metacognitive skills into education, educators can empower students to become more effective, independent, and self-directed learners, leading to improved academic performance and lifelong learning.

IV. Conclusion:

The research suggests that multiple intelligence and metacognitive skills are important factors in academic performance. By understanding individual differences in intelligence and metacognitive abilities, educators can design more effective instruction and support strategies to enhance academic achievement.

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