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A Study of Metacognitive Awareness among B. Ed Trainees: A Comparative Analysis

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Abstract: *This study explores the meta-thinking abilities and abstract thought processes of B. Ed trainees, emphasizing their pivotal role in shaping student behaviour and educational outcomes. As future educators, B. Ed trainees have to hold the potential to cultivate self-esteem, self-confidence, and self-worth in learners. The research investigates how their cognitive strategies influence classroom practices and teaching methodologies. Focusing on trainees from Nalbari, Bongaigaon, Chirang and Kokrajhar districts of Assam, the study highlights the importance of assessing self-awareness and reflective thinking among teacher students. These districts, marked by diverse socio-cultural and economic profiles, offer a rich context for examining regional influences on education. The findings contribute valuable insights into teacher education, aiding efforts to enhance the quality of school-level education and informing educational policy and practice in Assam.*

Key Words: *Metacognition, B. Ed Trainees.*

1. INTRODUCTION:

Man has been creating a world of his own resources from the raw materials that lie around him. Everyone is unique and doesn't possess the same creative ability. Some of us endowed with high creative talents and contributes to the advancement in the field of literature, science, teaching and every sphere of activity. It is our responsibility to bring changes in social and cultural field by propounding new ideas with the help of cognitive ability which can be in the form of knowledge and its proper process and regulations. Cognition is a term that refers to the strategies that a learner used when engaged in academic task and metacognition involves knowledge of when and how to use learning strategies to actively plan, monitor and control one's own thinking process. Metacognition is higher-order thinking that involves active control over the cognitive processes engaged in learning (Livingston, 1997). Cognition is a thought process which is applicable in our daily life whereas, the word meta related to cognition gives another dimension that focused on higher order of thinking implying awareness and understanding of one's own level of thinking.

In simple term metacognition is "thinking about thinking". Metacognition involves awareness of how to learn, evaluate, generate strategies to implement the learning strategies (Hacker,2009). Studies on metacognition and its relation with academic achievement among college going students revealed that there was a positive correlation between metacognition and academic achievement (Nongtodu & Bhutia ,2017). Metacognition is the content of critical thinking that makes learning self-regulated. Learner's self-efficacy of learning developed the judgement power of their own style of learning and helps them to monitor the higher order of thinking. Teacher plays a crucial role to produce creativity among students and they are the backbone in educating students to attain excellent level of achievements. Therefore, a high level of metacognition may have positive influence on their students. In this study, metacognition is considered as the ability that enable a person not only to plan out, administer or regulate a task but also helps in when and which strategy is used for a task (Govil.P, 2003). In this backdrop, an attempt has been made to explore the level of metacognitive awareness among the B. ed Trainees and the problem of the study has been stated as-

Metacognitive Awareness among B. Ed Trainees: A Comparative Analysis.

1.1 Objectives of the Study

1. To study the level of metacognitive of the B. Ed trainees
   i. To study the differences in level of metacognition between the male and female B. Ed trainees
   ii. To study the differences in level of metacognition between the urban and rural B. Ed trainees.
   iii. To study the differences in level of metacognition between the government and private institution B. Ed trainees.
   iv. To study the differences in level of metacognition between the in-service and pre-service B. Ed trainees.

2. To study the dimension-wise significant differences in level of metacognition between the male and female B. Ed trainees.
3. To study the dimension-wise significant differences in level of metacognition of the B. Ed trainees from urban and rural background
4. To study the dimension-wise significant differences in level of metacognition between the private and government institution B. Ed trainees.
5. To study the dimension-wise significant differences in level of metacognition between the pre-service and in-service B. Ed trainees.

1.2 Hypotheses of the Study

The study is carried on to test the following hypotheses based on the objectives of the study-
Hypotheses related to objective no. 1
Ho1: There exist no significant mean score differences in metacognition between male and female B. Ed trainees.
Ho2: There exist no significant mean score differences in metacognition between urban and rural B. Ed trainees.
Ho3: There exist no significant mean score differences in metacognition between government and private institution B. Ed trainees.
Ho4: There exist no significant mean score differences in metacognition between pre-service and in-service B. Ed trainees.
Ho5: There exists no significant difference between male and female B.Ed trainees on the two dimensions of metacognition.
Ho6: There exists no significant difference between urban and rural locality B.Ed trainees on the two dimensions of metacognition.
Ho7: There exists no significant difference between private and government institution B.Ed trainees on the two dimensions of metacognition.
Ho8: There exists no significant difference between pre-service and in-service B.Ed trainees on the two dimensions of metacognition.

1.3 Significance of the Study

Teacher education plays a vital role in shaping the future of a nation, and B. Ed trainees, as future educators, occupy a critical position in this process. Their cognitive development, particularly meta-thinking and abstract reasoning, greatly influences their ability to cultivate positive traits such as self-esteem, self-confidence, and self-worth in students. Since the thought processes of teachers directly impact their classroom practices, investigating these dimensions becomes essential to improving the quality of teaching and learning. The selection of B. Ed trainees as the study sample stems from their potential to reflect on and refine their own teaching strategies. By examining how they think and teach, this research aims to identify key skills and awareness levels that support effective pedagogy. Inclusion of Nalbari, Bongaigaon, Chirang and Kokrajhar districts of Assam provides a valuable regional lens, as these districts possess diverse socio-cultural and economic backgrounds. Studying trainee teachers from these areas addresses a significant gap in the literature related to education in Assam and offers insights into how regional and cultural variables intersect with teacher education outcomes. The findings of the study are expected to inform policy initiatives and curriculum development aimed at strengthening school-level education across the state.
Considering all the aspects discussed above, the present study seems justified to conduct.

Delimitation of the Study

This study is confined to B. Ed trainees enrolled in government and private teacher training colleges located in Nalbari, Bongaigaon, Chirang and Kokrajhar districts, which are affiliated with Gauhati University and Bodoland University. The scope is further narrowed to students from the 2023–2025 academic session.

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2. LITERATURE REVIEW: Shraw and Dennison (1994) emphasized that metacognitive processes like planning and monitoring enhance academic performance. Rao (2012) found that visual-verbal learning styles positively influence metacognition and academic achievement. Studies show metacognitive interventions effectively boost student outcomes. Dike et al. (2017) and Meher et al. (2024) reported improved academic performance using strategies like concept mapping and thinking aloud. Langdon et al. (2019) revealed a strong link between knowledge and regulation of cognition, though no interaction effects were noted. Besides, demographic and contextual factors are there that play a role in shaping metacognitive awareness. Sonowal and Kalita (2019) found regulation of cognition positively correlated with achievement, while Schunk and Swanson (2000) argued metacognitive ability remains unaffected by age. Sahoo et al. (2021) observed gender-based differences, with male teachers showing higher awareness. Sharma (2024) highlighted multiple influencing factors like school type and technology use.

Boro (2024) found a strong positive correlation ($r = 0.771$) between metacognition and academic performance among students in Kamrup. Components such as knowledge of cognition and regulation of cognition also showed significant associations with achievement.

However, a noticeable research gap exists concerning B.Ed. trainees in Assam, particularly in Nalbari, Chirang, Bongaigaon, and Kokrajhar.

3. RESEARCH METHOD: Research is a scientific study which helps to find the solution of any problem. According to Mouley (1964) A study cannot be evaluated unless its procedure is reported in sufficient details to make such an evaluation possible." Methodology is a way to systematically solve the research problem. Research methods may be understood as all those techniques that are used in research problem. The method of the study is Descriptive in nature and to find the differences among the selected demographic variables 't'-test has been used.

Population & Sample of the study

The study targeted a population of 700 B. Ed trainees from eight Colleges of Teacher Education in Nalbari, Chirang, Bongaigaon, and Kokrajhar districts under Gauhati and Bodoland Universities. A sample comprising 60% of the trainees was selected using stratified simple random sampling. The sample was drawn from three colleges in Nalbari, one in Chirang two in Bongaigaon, and two in Kokrajhar, with both government and private institutions included. A total of 420 sample has been selected considering the demographic representation that has been presented in the Table No. 1.

Table no.1: Distribution of sample selected

TOTAL POPULATION 700 FROM 8 COLLEGE OF TEACHER EDUCATION							
SAMPLE 420 (60%)							
GENDER		MANAGEMENT		LOCALITY		TYPE OF TRAINEES	
MALE	FEMALE	PRIVATE	GOVT	URBAN	RURAL	PRE-SERVICE	IN-SERVICE
180	240	300	120	150	270	252	168

To collect data for the study, two tools have been used- a Personal Data Sheet and the Metacognition Inventory by Dr. Punita Govil (2003), which consists of 30 items measuring two components—knowledge of cognition and regulation of cognition—with high reliability and expert-validated content. The Personal Data Sheet gathered demographic details such as gender, age, training type, and instructional medium. The study considered metacognition as the independent variable and demographic attribute - gender, area, management, and trainee type—as variables for comparison. Descriptive statistics (mean, median, SD) and the t-test were employed to analyse metacognitive levels and demographic differences among B. Ed trainees.

4. ANALYSIS: In the present study, after preparation of the tools of Data collection, required permission for Data collection from the concerned training institutions were accessed and Data was collected from a sample of 420 B. Ed trainees. The collected Data were analysed and presented here in the following way -

Level of Metacognition of B. Ed trainees

Table No. 2: Level of Metacognition

Metacognition	Level	Range	No. of students	Percentage
N=420	Very low	69 and below	60	14.28%
	Low	70-81	44	10.47%
	Average	82-94	130	30.95%
	High	95-106	77	18.33%
	Very high	107 and above	109	25.95%

From the table no.2, it can be observed that the 130 (30.95%) B. Ed trainees are at average level of metacognition whereas 109 (25.95%) B. Ed trainees are at very high level. Also, 60 (14.28%) B. Ed trainees and 44 (10.47%) B. Ed trainees found to be at very low and low level of metacognition respectively.

The level of metacognition of the B. Ed trainees has also been calculated using mean and Standard Deviation that is presented in the table No.3

Table no.3: level of metacognition through mean and SD of B.Ed trainees

Variable	N	MEAN	SD
Metacognition	420	94.14	20.21

The calculated mean and SD score of metacognitions among B. Ed trainees is 94.14 and 20.21 which is greater than the standardized value i.e. 81.56 and 10.48. Therefore, it indicates that, the level of metacognition among B. Ed trainees is of found more than average.

Ho1 objective no. 1(i): There is no significant differences in level of metacognition between male and female B. Ed trainees.

Table no.4: level of metacognition between demographic variables

Variable	Gender	N	Mean	SD	df	't'-value
Gender	Male	180	95.53	19.69	418	2.77
	Female	240	89.95	21.42		
Locality	Urban	150	96.52	19.49	418	3.33
	Rural	270	89.67	21.37		
Management	Private	300	92.81	20.66	418	2.27
	Govt.	120	97.44	18.09		
Types of training	Pre-service	252	95.52	18.69	418	3.68
	In-service	168	87.67	23.09		

The study compared metacognition levels among various groups of B. Ed trainees. Between male and female trainees, females had a slightly higher mean score (95.53 vs 89.95), where the t-value of 2.77 showed statistically significant difference. Thus, the hypothesis of no difference between genders was rejected. Similarly, urban trainees scored slightly higher (96.52) than their rural counterparts (89.67), though the t-value of 3.33 indicated significant difference in metacognition levels based on locality. The hypothesis of significant difference between urban and rural trainees was rejected. Trainees from government institutions showed a higher average metacognition score (97.44) compared to private trainees (92.81). However, the t-value of 2.77 support a statistically significant difference, leading to rejection of the hypothesis regarding institutional type. Lastly, pre-service trainees scored marginally higher (95.52) than in-service trainees (87.67) and the t-value of 3.68 confirmed significant difference. Therefore, the hypothesis of no difference between in-service and pre-service trainees was rejected.

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Significance of difference between male and female B. Ed trainees on the two dimensions of metacognition.

Table no.5: Mean, SD, 't'-value of male and female B. Ed trainees on each dimension of metacognition

DIMENSION	GENDER	MEAN	SD	't'-value	Level of significant
Regulation of cognition process	Male	54.13	14.46	0.27	Not significant
	Female	53.75	14.11		
Knowledge of cognition process	Male	41.26	9.26	4.26	Significant
	Female	37.26	9.87		

In Table no.5, the mean score and standard deviation on the dimension **regulation of cognition** of metacognition in male is found to be 54.13 and 14.46 and female is 53.75 and 14.11. Comparing the mean score, it shows that female have high regulation of cognition level than male. The calculated t-value is found 0.27, is indicating no significant differences in the mean scores of regulations of cognition between the male and female teacher trainees. Therefore, the hypothesis of no significance difference in the level of regulation of cognition is accepted.

Again, the mean score and standard deviation on the dimension **knowledge of cognition** of metacognition in male is found to be 41.26 and 9.26 and female is 37.26 and 9.87. Comparing the mean score, it shows that male have high knowledge of cognition level than male. The calculated t-value is found 4.26, is indicating significant differences in the mean scores of knowledge of cognition between the male and female teacher trainees. Therefore, the hypothesis of no significance difference in the level of knowledge of cognition is rejected.

Significance of difference between rural and urban B. Ed trainees on the two dimensions of metacognition.

Table no.6: mean, SD, 't'-value of urban and rural locality B. Ed trainees on each dimension of metacognition

DIMENSION	LOCALITY	MEAN	SD	't'-value	Level of significant (at 1% and 5%)
Regulation of cognition process	Urban	53.66	13.17	3.74	Significant
	Rural	48.32	15.47		
Knowledge of cognition process	Urban	42.79	8.25	1.74	Not significant

The study compared urban and rural B. Ed trainees on two dimensions of metacognition: regulation of cognition and knowledge of cognition. For **regulation of cognition**, urban trainees had a slightly higher mean score (53.66) than rural trainees (48.32), where the difference was statistically significant (t = 3.74), leading to the rejection of the hypothesis that no significant difference exists. Similarly, for **knowledge of cognition**, urban trainees again scored higher (mean = 42.79) compared to rural trainees (mean = 41.63), this difference was found to be statistically insignificant (t = 1.74). Therefore, the hypothesis that there is no significant difference in the level of knowledge of cognition between urban and rural trainees was accepted.

Significance of difference between private & Govt. B. Ed trainees on the two dimensions of metacognition.

Table no.7: mean, SD, 't'-value of private and government B. Ed trainees on each dimension of Metacognition

DIMENSION	MANAGEMENT	MEAN	SD	't'-value	Level of significance (at 1% and 5%)
Regulation of cognition	Private	51.19	14.61	2.72	Significant
	Government	54.85	11.50		
Knowledge of cognition	Private	41.63	8.36	1.31	Not significant
	Government	42.81	8.30		

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The study examined differences in metacognitive dimensions—regulation of cognition and knowledge of cognition between private and government B. Ed trainees. On the **regulation of cognition**, government trainees had a slightly higher mean score (54.85) than private trainees (51.19), where the difference was statistically significant (t = 2.72), not supporting the hypothesis of no significant difference. In the dimension of **knowledge of cognition**, government trainees scored slightly higher (42.81) than private trainees (41.63), the difference was not significant (t = 1.31). Thus, hypothesis asserting no significant differences in knowledge of cognition between private and government trainees was accepted.

Significance of difference between pre-service and Inservice B. Ed trainees on the two dimensions of metacognition.

Table no.8: mean, SD, 't'-value of pre-service and Inservice B. Ed trainees on each dimension of metacognition

DIMENSION	TYPES OF TRAINEES	MEAN	SD	't'-value	Level of significance (at 1% and 5%)
Regulation of cognition	Pre-Service	52.27	13.65	3.99	Significant
	In-Service	46.38	16.36		
Knowledge of cognition	Pre-Service	43.02	8.54	2.59	Significant
	In-Service	40.82	9.15		

The analysis compared pre-service and in-service B. Ed trainees on the metacognitive dimensions of regulation and knowledge of cognition. Pre-service trainees showed slightly higher mean scores in regulation of cognition (52.27vs 46.38) and knowledge of cognition (43.02 vs 40.82) than the in-service counterparts. However, the t-value for both the dimensions regulation of cognition (=3.99) and knowledge of cognition (=2.59), is indicating significant differences in the mean score between pre-service and in-service trainees. Therefore, the null hypothesis is rejected.

The overall level of metacognition among B. Ed trainees is found to be above average, with a mean score of 94.14 and SD of 20.21, surpassing the standardized reference values. Across various demographic and institutional comparisons—gender, locality, type of institution and professional status, both significant and no significant differences in metacognitive scores were observed, as indicated by the respective t-values. Although slight variations were noted, such as females showing higher regulation of cognition and males' higher knowledge of cognition, or rural and government trainees scoring marginally higher in certain dimensions.

5. Educational Implications

i. Enhance academic achievement.
ii. Encourage self-regulated learning.
iii. Develop critical thinking ability.
iv. Encourage reflective teaching.
v. Buildup self-confidence and self-esteem.
vi. Develop instructional strategies.

6. Suggestions and Conclusion

i. Include activities that promote reflection, such as learning diaries or post-task review.
ii. Encourage students to use digital tools as their supportive materials of studies.
iii. Teacher should promote constructivism activities inside and out-side the class-room.
iv. Teacher should understand their own teaching style and techniques to cope up with the innovative classroom environment.

Metacognition awareness plays a critical role in enhancing academic achievement and lifelong learning skills. It enables learners to understand, control, and optimize their learning strategies. Increasing awareness and application of metacognitive skills leads to improved problem-solving, self-regulation, and independent thinking. Therefore, promoting metacognition through targeted interventions, reflective practices, and teacher involvement is essential for cultivating more self-aware, strategic, and effective learners. As education increasingly emphasizes higher-order thinking, metacognition stands as a cornerstone of 21st-century learning.

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