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Relationship between Mindful Attention Awareness and Cognitive Flexibility among Pre-Service Teachers: A Regression Analysis

Abstract

The main purpose of this study is to explore the predictive ability of mindful attention awareness towards cognitive flexibility among pre-service teachers. A descriptive survey approach was employed. The purposive sample method is employed to collect data from 100 pre-service teachers pursuing a Bachelor of Education from the public university of Kurukshetra. The Cognitive Flexibility Inventory by Denis and Vander (2010) and the Mindful Attention Awareness scale by Brown and Ryan were used for data collection. Statistical analysis indicated (i) mindful attention awareness is significantly and positively correlated with cognitive flexibility (ii) mindful attention awareness explains 30.6% of the cognitive flexibility among pre-service teachers. Education implications are further discussed.

Keywords: *cognitive flexibility, mindful attention, awareness, pre-service teachers*

Introduction

The quality of education is directly proportional to the quality of teachers, which in turn depends upon the pre-service teacher education programme. Pre-service teachers of contemporary times must be competent enough to maintain harmony between diverse teaching elements, such as aims, curriculum, teaching methods, academic environment, teaching aids, students (living

souls) and individual differences among them. The dynamic nature of the classroom demands that pre-service teachers be able to adjust and transit between various tasks to meet the unique requirements of each student in the classroom that incorporates cognitive flexibility. Therefore, the ability to switch between two tasks and approach challenges from multiple angles is another skill the pre-service teachers need to navigate between various responsibilities of the dynamic educational landscape of the 21st century with clarity and attention. Cognitive flexibility is a higher-order cognitive function (Spensley & Taylor, 1999) and the individual exhibit fundamental forms of executive function in the early years of infancy (Carpenter et al., 1998). It refers to the mental ability to adapt to environmental changes by adjusting one's thinking and switching between tasks, responses, or strategies (Cools, 2015). It involves the capacity to shift cognitive processes and adapt to new information or different demands. In other words, it is one's ability to shift from irrelevant information in a previous task to focus on relevant information in a new task or context (Monsell, 2003). Therefore, cognitive flexibility is not a unitary construct, encompassing attention set-switching, task shifting and reversal learning (Dias et al., 1996). Cognitive flexibility is often associated with executive functions, which are higher-order cognitive processes that enable goal-directed behaviour and self-control. It plays a crucial role in tasks that require adjusting to new information, thinking creatively, and approaching challenges from different angles. It means that individuals with strong cognitive flexibility can seamlessly switch between different cognitive processes, strategies, or problem-solving approaches. Previous researches have shown that the ability to cognitive shifting constitutes an important component in language development (Jacques & Zelazo, 2005), development of mathematical skills (Bull & Scerif, 2001), self-efficacy (Martin & Anderson, 1998), problem-solving skills (Aygün, 2018), thinking out of box ability (Lin et al., 2014), self-efficacy (Kaptanbaş-Gurbuz & Sezgin-Nartgun, 2018) and developing positive attitude towards teaching (Onen & Kocak, 2015)

Mindfulness has become increasingly popular in recent years, and it has been modified and added to secular disciplines, such as stress management and psychotherapy (Laequddin et al., 2023). Though it is a key component of the Eightfold Path, one of the core teachings of Siddhartha Gautama, the Buddha, the concept of mindfulness has its roots in Buddhist thought. In Pali, the language of the Buddhist texts, mindfulness is frequently referred to as "sati" in the context of Buddhism. When Kabat-Zinn incorporated Buddhist mindfulness meditation into clinical and psychological practice in a stress reduction and relaxation programme in 1979, the psychological perspective on mindfulness

was born (Laequddin et al., 2023). It entails remaining objectively present in the present moment while being mindful of one's thoughts, feelings, physical sensations, and surroundings. Mindfulness attention awareness is characterised by pre-conceptual awareness, purposeful control of attention, non-judgmental acceptance of experience and present-focused orientation (Brown et al., 2007). Individuals in the state of mindfulness will be more aware of the present moment and perceive stimuli without passing judgment on them or giving them a particular meaning (Glomb et al., 2011). Previous studies have shown that mindfulness has a strong association with extraversion and agreeableness traits of personality, and students with higher mindfulness levels are found to have lower depression levels (Hepburn et al., 2021; Demir, 2017). Mindfulness positively correlates with ruminating thoughts (Karaoglu & Yalcin, 2020) and has no association with demographic characteristics like age, religion, gender and educational background (Ahmadi, 2014). It is theoretically documented that mindfulness helps enhance individuals' flexibility (Davis & Hayes, 2011). However, only a handful of empirical studies explore the relationship of cognitive flexibility with mindful attention awareness, specifically among Indian pre-service teachers. Moreover, the investigator is keen to disclose the predictive ability of mindful attention awareness towards cognitive flexibility to fill the existing gap in the body of literature.

Objectives of the Study

1. To explore the relationship of mindful attention awareness with cognitive flexibility and its dimensions among pre-service teachers.
2. To study mindful attention awareness as a predictor of cognitive flexibility among pre-service teachers.

Hypotheses

1. There will be no significant relationship between mindful attention awareness and cognitive flexibility and its dimensions among pre-service teachers.
2. Mindful attention awareness does not significantly predict cognitive flexibility among pre-service teachers.

Research Methodology

Research Background

A descriptive survey approach was employed in this research paper. The study universe includes undergraduate students pursuing a Bachelor of Education in Indian teacher training institutions.

Sample

Purposive sampling is employed to collect the quantitative data from 100 pre-service teachers pursuing a Bachelor of Education (B.Ed.) degree from a public university in Kurukshetra. Participants were adequately informed about the purposes of the present study. They were assured about the confidentiality of the data and its usage for research purposes only. An informal consent was received from the participants for their participation in the research study. Research tools were distributed to the participants by creating Google forms with clearly defined instructions for filling the form. Table 1 provides the demographic characteristics of the sample.

Table 1. Demographic characteristics of the sample

Variables	Options	N	%
Gender	Male	16	16
	Female	84	84
Place of residence	Urban	29	29
	Rural	71	71
Nature of Family	Joint	33	33
	Nuclear	67	67
Marital Status	Single	94	94
	Married	6	6

Table 1 reveals that among the 100 pre-service teachers, 16 were male participants, whereas 84 were female. 29% of the respondents belong to urban locale, and 71% are rural dwellers. Regarding the nature of the respondents' families, 33% of the participants reside in nuclear families, whereas 67% reside in joint families. The demographic characteristics of the sample further display that 94% and 6% of the respondents are single and married, respectively.

Instruments & Procedures

1. Mindful Attention Awareness Scale (MAAS): The Mindful Attention Awareness Scale developed by Brown and Ryan (2003) is used to measure an individual's mindful attention awareness ability. MAAS is a 6-point Likert scale comprising 15 items ranging from 1 (almost always) to 6 (almost never). Cronbach Alpha for the internal consistency coefficient was found to be .80, and the test-retest reliability coefficient was .86. A higher score on the MAAS scale denotes the individual's high mindfulness.

2. Cognitive Flexibility Inventory (CFI): The Cognitive Flexibility Inventory (CFI), formulated by Dennis and Vander Wal (2010), comprises 20 items that will be used to measure individuals' ability to react adaptively to difficult life situations. It is a 5-point Likert scale ranging from 1 (not suitable) to 5 (completely suitable). The scores on this inventory range from 20 to 140. The higher the scores of the individual on the cognitive flexibility inventory, the higher the cognitive flexibility level of the individual. This inventory contains two subscales: alternative (the ability to generate alternative solutions) and control (the ability to perceive difficult situations as controllable).

Data Analysis

SPSS 22 software was used to analyse the collected data. Descriptive analysis, correlation and regression analysis were computed for the statistical treatment of the data. The analysis of the data is described in different sections under (i) Descriptive analysis, (ii) Correlation Analysis, and (iii) Linear Regression Analysis.

(I) **Descriptive Analysis of the data:** The mean and standard deviation of the sample are tabulated in Table 2.

Table 2. Descriptive Analysis of the data

Variables	Mean	S.D.
Cognitive Flexibility	96.00	11.91
Alternative dimension of Cognitive flexibility	68.45	9.06
Control dimension of cognitive flexibility	27.55	6.30
Mindful attention awareness	57.91	10.59

Variables	Mean	S.D.
Cognitive flexibility	Maximum score = 122	Minimum score = 69
Mindful Attention Awareness	Maximum score = 77	Minimum score = 32

The mean for cognitive flexibility, alternative and control dimensions was 96.00, 68.45, and 27.55, respectively. The standard deviation for cognitive flexibility, alternative and control dimensions was 11.91, 9.06, and 6.30, respectively. The mean and standard deviation for mindful attention awareness is 57.91 and 10.59, respectively.

(II) Correlation Analysis of the Data

Pearson product-moment correlation was used to compute the correlation coefficient between mindful attention awareness and cognitive flexibility among pre-service teachers. Table 3 represents the coefficient of correlation values between mindful attention awareness and cognitive flexibility, along with its alternative and control dimensions among pre-service teachers.

Table 3. Inter Correlation of Mindful attention awareness, cognitive flexibility; alternative and control dimension of cognitive flexibility among pre-service teachers (N=100)

Variables	Cognitive Flexibility	Alternative Dimension	Control Dimension
Mindful attention awareness	0.559**	0.353**	0.550**

** significant at 0.01 level of significance

It may be observed from Table 3 that mindful attention awareness is positively and significantly correlated with mindful attention awareness ($r = 0.559$, $p < 0.01$ level) among pre-service teachers. The correlation coefficient between the alternative dimension and mindful attention awareness was 0.353, which is significant at 0.01 level. The control dimension positively correlates with mindful attention awareness with a 0.550 correlation coefficient value, which is significant at a 0.01 significance level among pre-service teachers. It reveals that with an increase in cognitive flexibility among pre-service teachers, their mindful attention awareness also increases. Similarly, mindful attention awareness also increases with an increase in the level of alternative and control dimensions. Therefore, the hypothesis, "There will be no significant relationship of mind-

ful attention awareness with cognitive flexibility and its dimensions among pre-service teachers”, stands rejected.

(III) Regression Analysis of the Data

Before the linear regression analysis commenced, the required assumptions to conduct it were examined. The investigation of scatter plots checked the assumption of homoscedasticity, and the obtained rectangular shapes (Tabachnick & Fidell, 2015) ensure the fulfilment of this assumption. In the present study, Durbin Watson values were within the limits of 1.5 and 2.5, ensuring no auto-correlation (Tabachnick & Fidell, 2015) that satisfies the other assumption of linear regression analysis.

Table 4. Simple Linear Regression analysis results of Mindful Attention Awareness Levels of pre-service teachers predicting cognitive flexibility (N = 100)

Independent Variant	Non-standardised Beta Coefficient	Standard Error	Standardised Coefficient Beta	t	P
Constant	59.554	5.547		10.74	.000
Mindful attention awareness	0.629	0.094	0.559	6.679	.000
R = .559, R ² = .313, Adjusted R ² = .306 F(1,98) = 44.61, p = 0.000					

Table 4 shows that mindful attention awareness emerged as the significant predictor of cognitive flexibility among pre-service teachers ($R = .559$, $R^2 = .313$, Adjusted $R^2 = .306$ $F(1,98) = 44.61$, $p < 0.01$ level). Mindful attention awareness explains 30.6% of the variance in cognitive flexibility among pre-service teachers. Therefore, the hypothesis, “Mindful attention awareness is not a significant predictor of cognitive flexibility among pre-service teachers” stands rejected.

Results and Discussion

Female pre-service teachers constitute the major part of the sample in the present research study. Correlation analysis disclosed that mindful attention awareness positively affects cognitive flexibility among pre-service teachers. Additionally, control and alternative dimensions of cognitive flexibility positively relate to mindful attention awareness. In simpler terms, with an increase in mindful attention awareness, the cognitive flexibility level also increases. Regression analysis

disclosed that mindful attention awareness predicted 30.6% of the variance in cognitive flexibility among pre-service teachers. These results are supported by the investigations by Gulpinar and Ikiz (2022) and Lee and Orsillo (2013). On the contrary, it is documented in the literature that meditation retreats (Hartkamp & Thornton, 2017) and 10-day Vipassana retreats (Chambers et al., 2008) have no improvement in the participants' cognitive flexibility. The present study result implies that individuals with higher mindfulness levels are more adaptable and responsive to different situations. They can navigate challenges and changes more flexibly, adjusting their responses based on the present circumstances. In 2007, Siegel rightly remarked that individuals who engage in mindfulness meditation may cultivate the skill of self-observation and enhance their ability to see the situation non-reactively (Davidson et al., 2003) to integrate present-moment input in a novel and flexible manner. Instead of being rigid, non-judgmental acceptance promotes cognitive flexibility, allowing individuals to adapt their thinking patterns more easily. Therefore, being attentive and aware in the present moment, often referred to as mindfulness, can indeed assist individuals to have the clarity of thought needed to generate a functional and broader range of solutions by considering the necessities of the situation.

The study findings will be useful for policymakers, academic counsellors and educationists to acquaint themselves with the role of mindful attention awareness in enhancing cognitive flexibility among pre-service teachers. The findings suggest tailoring the learning environment of teacher training institutions by incorporating a substantial number of mindful-related activities, i.e., meditation camps and workshops, to make pre-service teachers flexible enough to generate functional solutions while addressing diverse classroom situations. The curricula of the teacher training programmes must be altered to include topics related to the importance of mindful attention awareness in enhancing cognitive flexibility among pre-service teachers for many-fold purposes. Firstly, to make teacher educators sensitised towards the prominent role of two constructs, i.e., mindful attention awareness and cognitive flexibility, in preparing teachers for the 21st century. Consequently, it will inspire teacher educators to create a culture of mindfulness in teacher training institutions by introducing activities like yogic and physical exercises and mindfulness camps, etc., which will assist in developing mindful teachers with improved cognitive flexibility.

Conclusions

The present study explored the relationship between mindful attention awareness and cognitive flexibility. It disclosed that with the increase in cognitive

flexibility among pre-service teachers, their level of mindful attention awareness also increases. Mindful attention awareness significantly predicts cognitive flexibility among pre-service teachers. The research suggests that a culture of mindfulness in education institutions will improve the flexibility level among pre-service teachers.

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