Effect of Mindfulness Interventions on Metacognition and Social Competence among Senior Secondary School Students

Ekta Anand
Assistant Professor
Brahmrishi College of Education, Pinjore, Panchkula

Dr. Rajinder Kaur Gill
Associate Professor
Rayat College of Education, S.B.S. Nagar, Ropar

Abstract- **Education is not considered merely as a means to earn a thing nor is it only a nursery of thoughts or a school for citizenship. It is an initiation into the life of spirit, a training of human souls in the pursuit of truth and the practice of virtue. And this can be achieved with greater precision and ease by synthesizing yoga and mindfulness practices with modern education. School-based yoga and mindfulness programs have become widespread over the last decade and are a promising approach to improving child and adolescent health and various skills. Relatively short mindfulness curricula have been demonstrated to improve teacher ratings of student classroom learning and identified strong results in improving cognitive performance and resilience to social skills among participating children.**

Keywords: Mindfulness practices, Cognitive performance, Resilience to Social Skills

MINDFULNESS

Mindfulness can be defined as living fully in the present moment, with intention and without judgment. It involves the acknowledgement and immediate release of thoughts, emotions, and sensations, enabling a more level headed means of reacting and responding to the world. It has Buddhist roots, and the term "mindfulness" is related to the Pali word sati, meaning "awareness," but mindfulness has become more than a strictly spiritual practice.

It is a state of mind in which we observe the thoughts and feelings, body sensations and physical surroundings as they are without having any judgement regarding that. It means be in the present moment without suppressing your feelings. It results in one's belief about himself and world around him. Mindful people are more energetic, enthusiastic, attentive, active and alive. Mindful people affect and maintain their positive emotions.

Singh et al. (2007) defined Mindfulness is the awareness and non-judgmental acceptance by a clear, calm mind of one's moment-to-moment experience without either pursuing the experience or pushing it away. Chiesa and Malinowski (2011) stated the goal of mindfulness

Weare (2013) stated that Mindfulness teaches us to pay attention in the present moment, not the past, not the future, but where you are right now. It allows us to respond more skill fully, more appropriately to what is actually happening. Germer Siegel and Fulton (2013) defined Mindfulness is simply about being aware of where your mind is from one moment to the next, with gentle acceptance. Greater Good Science Center (2014) stated Mindfulness also involves acceptance, meaning that we pay attention to our thoughts and feelings without judging them, without believing, for instance, that there's a right or wrong way to think or feel in a given moment. When we practice mindfulness, our thoughts tune into what we're sensing in the present moment rather than rehashing the past or imagining the future. Wells (2016) defined Mindfulness is the deliberate, conscious awareness of what is happening.

What is Meta-Cognition?

The term meta-cognition is derived from two words Meta and cognition, where Meta is a prefix from Greek meaning beyond or behind; and cognition refers to the mental result of perception, learning and reasoning. Thus the term meta-cognition means what lies behind the ways of thinking that result in perception and reasoning'. It is like thinking beyond thinking, or thinking about thinking- a notion that disguises much more complicated concepts that have kept scientists, philosophers, and educators puzzled for hundreds of years.

Meta cognition refers to higher order thinking that involve active control over the thinking processes involved in learning. Activities such as planning how to approach a given learning task, monitoring comprehension and evaluating progress towards the completion of a task are metacognitive in nature. It plays a critical role in successful learning and it is important for both students and teachers. Metacognition is often referred to as "thinking about thinking" and can be used to help students "learn how to learn".

According to Flavell's early research on students' meta-cognitive knowledge about cognitive strategies, young children demonstrated improved memory performance after being coached on a type of meta-cognitive knowledge using mnemonic strategies (Flavell, 1979). Meta-cognition is the awareness of the psychological processes involved in perception, memory, thinking and learning (Bostrom & Lassen, 2006).

Social Competence

Social Competence is a complex, multidimensional concept consisting of social, emotional, cognitive and behavioral skills, as well as motivational and expectancy sets needed for successful social adaption. Social competence is an important element of modern civilization. It is the essential attribute of the members of a progressive onward moving society. The cultural purity and societal variety of India offer enough chances to Indian children for the acquisition of high order social competence, through rich and varied and interpersonal interactions.

Social competence is defined as the ability to handle social interactions effectively. In other words, social competence refers to getting along well with others, being able to form and maintain close relationships, and responding in adaptive ways in social settings. Given the complexity of social interactions, social competence is the product of a wide range of cognitive abilities, emotional processes, behavioural skills, social awareness, and personal and cultural values related to interpersonal relationships. To further complicate the understanding of this concept, social competence is dependent on developmental characteristics (i.e., expectations of social competence vary by age of person), the specific social situation (i.e., people may be socially competent in one situation but not in another, or a child may appear more competent when interacting with a socially skilled partner than with a shy person), and cultural characteristics (i.e., specific acts of social competence are bound by cultural expectations

Welsh & Bierman, (1998) defined children having a wide repertoire of social skills, good social perception and awareness of society are likely to be socially competent. Osman (2001) stated social competence include both verbal and nonverbal behaviour that are socially valued, so social competence includes children's social skills, self-confidence, social awareness and it also refers to the abilities to understand others perception, emotions, feelings and attain the social cues, understand other people goals and motivation and complex situation and resolve the social conflicts. Orpinas and Horne (2006) defined social competence as "a person's age-appropriate knowledge and skills for functioning peacefully and creatively in his or her own community or social environment"

Mindfulness, Metacognition and Social Competence

Metacognition is monitoring and controlling one's own knowledge, emotions and actions, while social competence is consist of group member's monitoring and control of one another's knowledge, emotions and actions. Social Competence distributes metacognitive responsibilities across group members and improves individual cognitive processes. Metacognition and Social Competence are cognitive tools that shape us into better cognitive agents and more predictable, thereby enhancing our abilities at social coordination.

Mindfulness helps students in improving observing skills, greater emotional clarity, experience of less anxiety, and development in the domains of character and confidence, additional improvements in coping, communication and relationship building. Educators are increasingly using mindfulness-based programs to promote the social and emotional well-being along with metacognitive skills of students across the world. The ability to reflect upon their learning while it is happening can be cultivated through mindfulness training. Mindfulness fosters students understanding of how emotions such as stress and anxiety can impact their learning and social interactions and how mindfulness can also be used to help regulate these emotions and create emotional mind sets that are more conducive to learning and social competence.

OBJECTIVES OF THE STUDY

Objective 1: To study the differences in pre-test and post-test mean scores on Mindfulness, on Metacognition and on Social Competence of students in Control Group.

Objective 2: To study the differences in pre-test and post-test mean scores on Mindfulness, on Metacognition and on Social Competence of students in Experiment Group.

Objective 3: To study the effect of Mindfulness intervention on the level of Mindfulness, on Metacognition and on Social Competence of students (by comparing mean gain score differences of CG and EG).

HYPOTHESES

Following hypotheses were formulated for the present study:

Hypothesis 1: There exists no significant difference in the pre-test and post-test mean scores on Mindfulness, on Metacognition and on Social Competence of students in Control Group.

Hypothesis 2: There exists no significant difference in the pre-test and post-test mean scores on Mindfulness, on Metacognition and on Social Competence of students in Experiment Group.

Hypothesis 3. There exists no significant effect Mindfulness intervention on the level of Mindfulness, on Metacognition and on Social Competence of students

Sample

For the present study, government school situated in Kotala, Ludhiana district of Punjab was purposively selected to conduct the experiment by taking intervention online due to pandemic. Also, the principal of school allowed to conduct the experiment and gave assurance for uninterrupted environment and all possible support required for this study. Sampling frame for the present study consists of all 11th and 12th grade students enrolled in the selected school during the academic year 2021-22.

Variables Following types of variables were included in the present study:

Treatment Variable: It is an independent variable whose effect is to be studied. It is independent in nature and is also called predictor variable. Mindfulness intervention served as the treatment variable in the present study.

Dependent variables: These are the variables on which the effect of treatment/independent variable is to be studied. For the present study, the dependent variables were students' level of Mindfulness and Metacognition and social competence

Intervention Tool
- Mindfulness modules were developed by the investigator. Investigator conducted the modules as follow **Executing Breath Awareness Meditation**, **Followed by Acceptance of thoughts and feeling exercise, Conclude by Body scan meditation**

Assessment Tools
- Child and Adolescent Mindfulness Measure Questionnaire for School Students (MQSS) by Greco, Baer & Smith (2011)
- Meta-Cognition Questionnaire for School Children (MQSC) developed by Altindag & Senemoglu (2013)
- Adolescents Social Competence Scale by Devassy and John (2012)

Modules for Mindfulness Intervention Mindfulness intervention was provided to Experiment Group (N=20) to study its effect on meta-cognitive skills and on social competence of senior secondary school students. For this intervention, Mindfulness Modules were prepared by the investigator by keeping in view various dimensions of Mindfulness. The modules were designed for four weeks and were implemented on the students for six days a week for four weeks with each session of 35 minutes (i.e., 6x4x35 = 840 minutes approximately). Modules were prepared keeping in view the age-group and interest of the students. First few sessions were utilized in building rapport with the students. Various activities were conducted with the students to bring their attention to the present moment. Some of these activities included body scanning, different breathing techniques (OM chanting, 4-7-8 breathing technique etc.), mindful eating, sitting and walking, etc. The purpose of including these and many other such activities for mindfulness intervention was to target the domains such as inattention, unawareness of breath, body and self, judgmental attitude, lack of self-regulation and emotionality. Mindfulness intervention thus, emphasized on strengthening attention; awareness of breath, body and self; managing emotions; non-judgmental attitude and self-regulation

Procedure of Data Collection
Phase I - Identification and grouping of students A sample of 40 students was identified from of 11th and 12th grades of school. These 40 students were then randomly assigned to two groups namely Control Group and Experiment Group, each having 20 students.
Phase II - Pre-testing In this phase, Mindfulness Questionnaire for School Students (MQSS) by child and adolescent Mindfulness Measure by Greco, Baer & Smith (2011) , Metacognitive Skills Scale Questionnaire i.e. Meta-Cognition Questionnaire for School Children (MQSC) and Adolescents Social Competence Scale by Devassy and John (2012) were administered on the two groups (CG and EG). These tests acted as the pre-test to obtain the initial set of scores on mindfulness and meta-cognition and social competences.
Phase III - Exposure to Intervention During this phase, Experiment Group was exposed to Mindfulness Intervention for four weeks under the guidance of a mindfulness trainer. There were six sessions every week and each session was of 35 minutes. In this phase, students in Experiment Group were engaged in various mindfulness based activities.
Phase IV - **Post-testing** After completion of the intervention, Child and Adolescent Mindfulness Measure Questionnaire for School Students (MQSS), Meta-Cognitive skills scale for School Children (MQSC) and Adolescents Social Competence Scale were re-administered on both the groups to get the post-test scores on mindfulness, meta-cognitive skills and social competence in order to find, if any, the effect of mindfulness intervention on the level of mindfulness, meta-cognitive skills and on social competence of students.

Statistical Techniques
Descriptive Statistics: Descriptive statistics like mean, median, mode, standard deviation, skewness and kurtosis were calculated to ascertain the nature of distribution of scores on assessment of mindfulness and meta-cognition.
Inferential Statistics: t-test for independent samples as well as for paired samples was employed to study and compare the effect of mindfulness intervention on the scores of mindfulness and meta-cognition and social competence of the students. Data in the present study was analysed using SPSS. The data have been presented using descriptive statistics like mean (M), standard deviation (SD) and graphical representations. For the inferential analysis and testing of hypotheses, t-test has been used. The results are discussed sequentially in reference to the objectives and hypotheses of the study. The details of the analysis are provided under following sections.

Descriptive Analysis Section
Descriptive Analysis This section deals with descriptive analysis where the scores are presented in terms of mean, standard deviation and graphical representations.
Descriptive Analysis for Assessment of Mindfulness, Metacognition and Social Competence Results:

Table A: Mean and Standard Deviation values on assessment of Mindfulness, Metacognition and Social Competence of students in EG and CG at the pre-test/ Post-test stage

Variable	Group	Mean (Pre/Post)	SD(Pre/Post)
Mindfulness	EG (N=20)	18.05/27.05	2.37/2.372
Mindfulness	CG (N=20)	18.10/18.20	2.48/2.30
Metacognition	EG (N=20)	85.20/101.50	6.993/7.970
Metacognition	CG (N=20)	84.20/87.35	6.669/4.923
Social Competence	EG (N=20)	106.45/120.300	4.702/4.702
Social Competence	CG (N=20)	105.25/104.650	4.727/4.727

Figure A.1: Mean and Standard Deviation values on assessment of Mindfulness, Metacognition and Social Competence of students in EG and CG at the pre-test stage

Figure A.2: Mean and Standard Deviation values on assessment of Mindfulness, Metacognition and Social Competence of students in EG and CG at the post-test stage
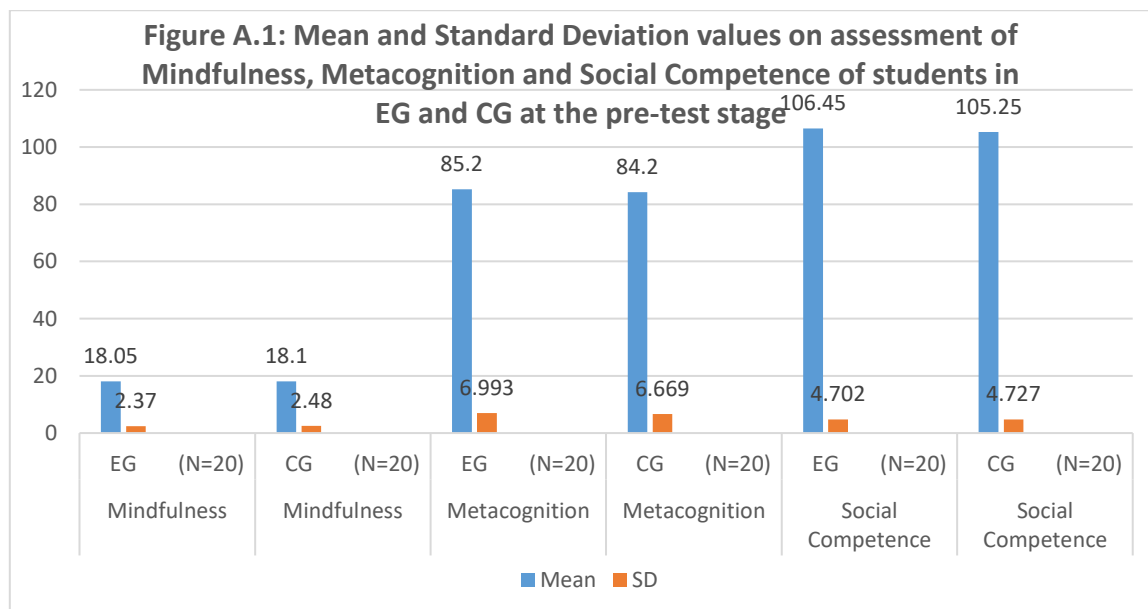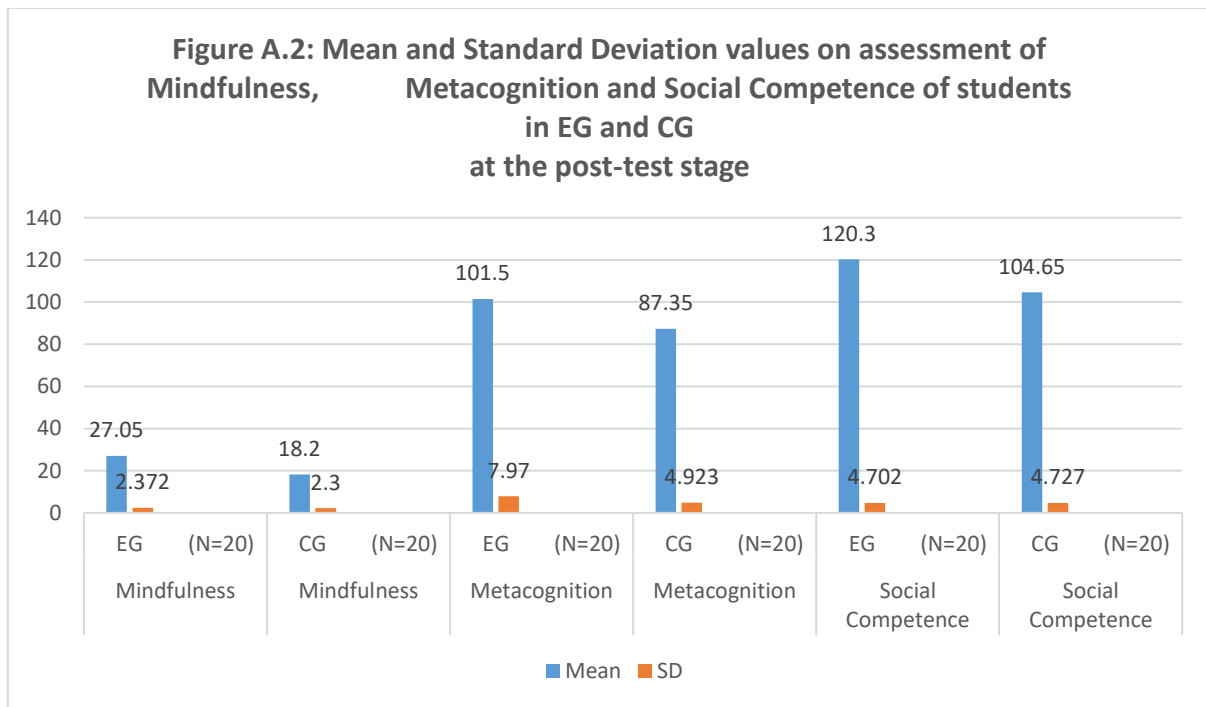
Inferential Analysis

Inferential statistics for the present study include t-test. This t-test is used to examine the differences in the paired and independent samples for the pre-test and post-test assessment of all the variables.

Table 1 t-test for paired samples on Mindfulness scores, on Metacognition scores and on Social Competence scores of students in Control Group.
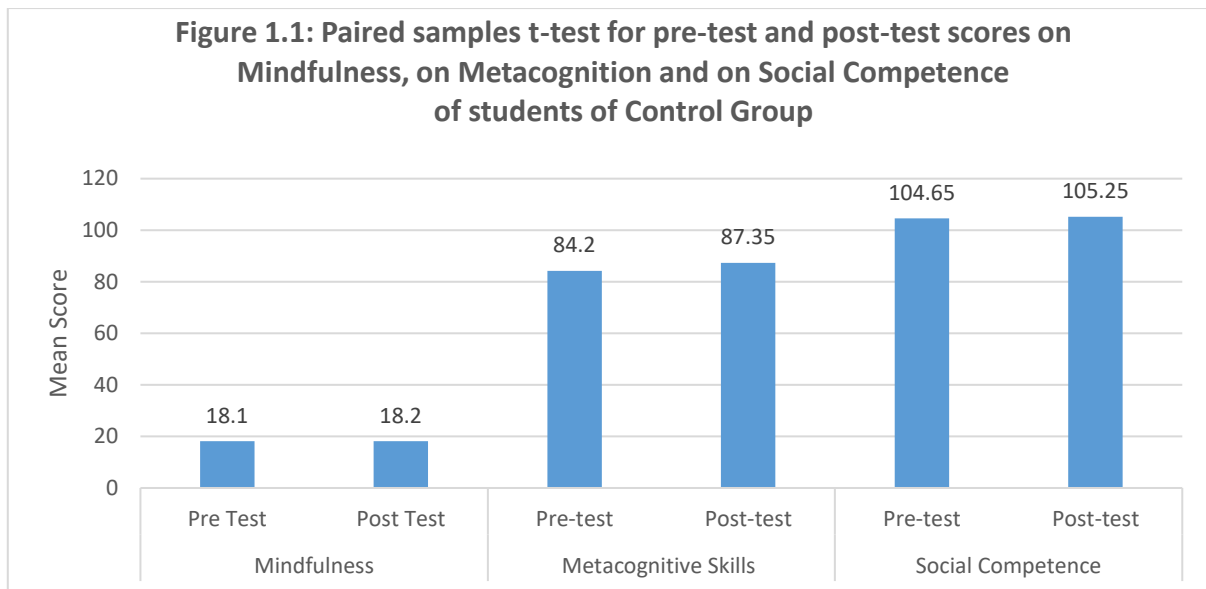
Objective 1: To study the differences in pre-test and post-test mean scores on Mindfulness, on Metacognition and On Social Competence of students in Control Group.

Hypothesis 1: There will be no significant difference in the pre-test and post-test mean scores on Mindfulness, on Metacognition and on Social Competence of students in Control Group.

Results:

Table 1.1: Paired samples t-test for pre-test and post-test scores on Mindfulness, on Metacognition and on Social Competence of students of Control Group (N=20)

Variables	Stage	Mean	SD	SEd	Df	Difference in means (post-pre)	t-Value	Remarks
Mindfulness Total	Pre Test	18.100	2.489	.55678	19	0.10000	0.809 (p=.428)	Not Significant
	Post Test	18.200	2.307	.51606				
Metacognitive Skills Total	Pre-test	84.200	6.669	1.491	19	3.1500	3.308 (p= .004)	Not Significant
	Post-test	87.3500	4.923	1.100				
Social Competence	Post-test	105.2500	5.35945	1.19841	19	.600	1.189 (p=.249)	Not Significant
Total	Pre-test	104.650	4.7270					

Figure 1.1: Paired samples t-test for pre-test and post-test scores on Mindfulness, on Metacognition and on Social Competence of students of Control Group

As presented in Table 1.1 and Figure 1.1 a difference in the pre-test and post-test mean scores on Mindfulness of students in Control Group was found to be 1.0. The t-value for it was found to be t= 0.809 which is not significant at 0.05 level of significance. Hence the null hypothesis stating "There will be no significant difference in the pre-test and post-test mean scores on Mindfulness of students in Control Group" stands accepted, it implies significant gain in the mean scores from pre-test to post-test i.e. from 18.100 to 18.200 indicating that the mindfulness score of the students in the Control Group has not changed significantly.

As presented in Table 1.1 and Figure 1.1 a, the difference in the pre-test and post-test scores on metacognition of students in Control Group was found to be 3.1500. It was found to be not significant (t= 3.308, p< 0.01) , hence the null hypothesis stating "There will be no significant difference in the pre-test and post-test mean scores on metacognition of students in Control Group" stands accepted. It implies there does not exists any significant difference in the pre-test and post-test mean scores on of students of Control Group, which further implies that metacognition of the students has not significantly inclined over a period of time.

As presented in Table 1.3 and Figure 1.3 , the difference in the pre-test and post-test mean score of social competence of students in Control Group was found to be 0.600 and it was found to be insignificant (t= 1.189, p> 0.05). Hence the null hypothesis stating "There will be no significant difference in the pre-test and post-test mean scores on social competence of students in Control Group" is accepted.
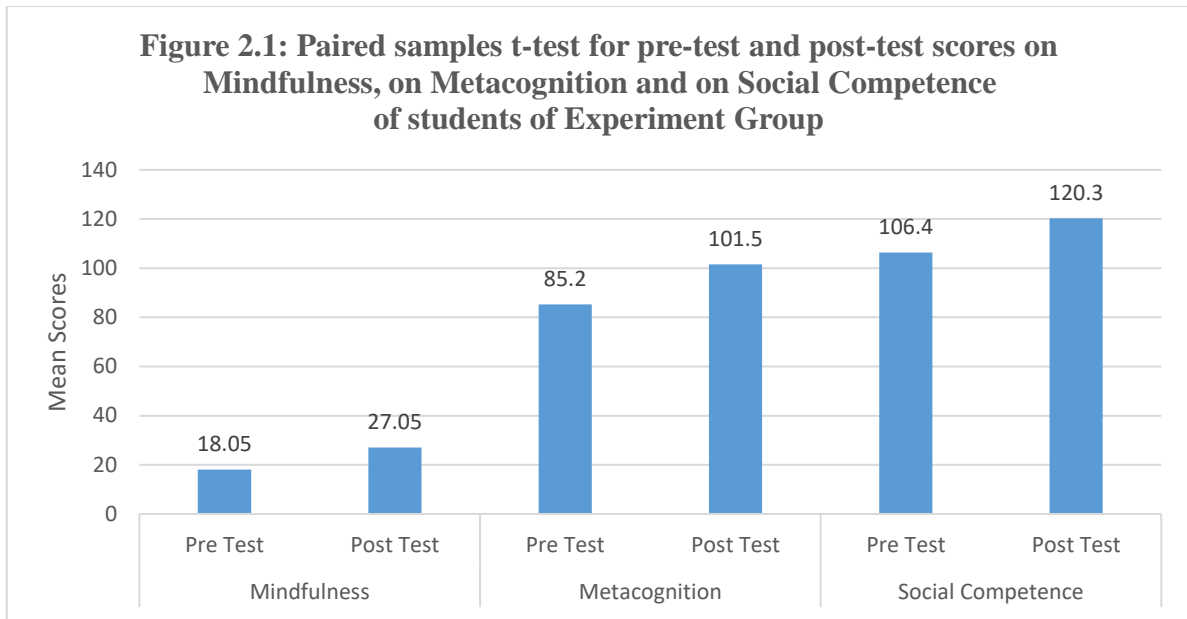
t-test for paired samples on Mindfulness scores, on Metacognition scores and on Social Competence scores of students in Experiment Group.

Objective 2: To study the differences in pre-test and post-test mean scores on Mindfulness, on Metacognition and on Social Competence of students in Experiment Group.

Hypothesis 2: There will be no significant difference in the pre-test and post-test mean scores on Mindfulness, on Metacognition and on Social Competence of students in Experiment Group.

Table 2.1: Paired samples t-test for pre-test and post-test scores on Mindfulness, on Metacognition and on Social Competence of students of Experiment Group (N=20)

Variable	Stage	Mean	SD	SEd	Df	Difference in means (post-pre)	t-value	Remarks
Mindfulness	Pre Test	18.05	2.372	.530	19	9.000	12.596	.000 Significant
	Post Test	27.05	2.372	.530				
Metacognition	Pre	85.20	6.993	1.563	19	16.300	12.219	.000 Significant
	Post	101.5	7.970	1.782				
Social Competence	Pre Test	106.4	4.914	1.098	19	13.850	17.859	.000 Significant
	Post Test	120.3	4.702	1.051				

Figure 2.1: Paired samples t-test for pre-test and post-test scores on Mindfulness, on Metacognition and on Social Competence of students of Experiment Group

As presented in Table 2.1 and Figure 2.1 a, the difference in the pre-test and post-test mean scores on Mindfulness of students in the Experiment Group was found to be 9.000 and it was found to be significant (t= 12.596 , p< 0.01). Hence the null hypothesis stating "There will be no significant difference in the pre-test and post-test mean scores on Mindfulness of students in Experiment Group" stands rejected.

As presented in Table 2.1 and Figure 2.1 a, the difference in the pre-test and post-test mean scores on Metacognition of students in the Experiment Group was found to be 16.300 and it was found to be significant (t= 12.219 , p< 0.01). Hence the null hypothesis stating "There will be no significant difference in the pre-test and post-test mean scores on Metacognition of students in Experiment Group" stands rejected.

As presented in Table 2.1 and Figure 2.1 a, the difference in the pre-test and post-test mean scores on Social Competence of students in the Experiment Group was found to be 13.850 and it was found to be significant (t= 17.859 , p< 0.01). Hence the null hypothesis stating "There will be no significant difference in the pre-test and post-test mean scores on Social Competence of students in Experiment Group" stands rejected.

t-test for independent samples (between Experiment Group and Control Group) on Mindfulness, on Metacognition and on Social Competence.
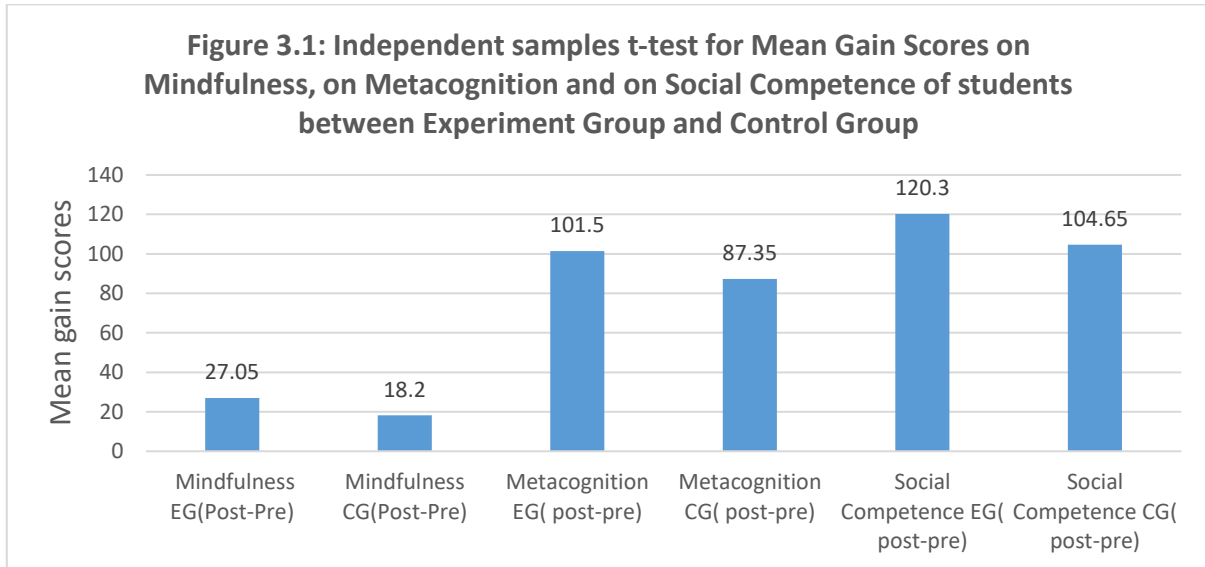
Objective 3: To study the effect of Mindfulness intervention on Mindfulness, on Metacognition and on Social Competence of students (mean gain scores differences of CG and EG).

Hypothesis 3: There will be no significant effect of Mindfulness intervention on Mindfulness, on Metacognition and on Social competence of students.

Table 3.1: Independent samples t-test for Mean Gain Scores (pre-test and post-test scores) on Mindfulness, on Metacognition and on Social Competence of students between Experiment Group (N=20) and Control Group (N=20)

Variable & Group	Mean gain scores	SD	SEm	Df	t-value	Difference in means	Remarks
Mindfulness EG(Post-Pre)	27.05	2.373	.531	38	8.850	11.958	Significant
Mindfulness CG(Post-Pre)	18.20	2.308	.516				
Metacognition EG(post-pre)	101.50	7.970	1.782	38	6.755	14.150	Significant
Metacognition CG(post-pre)	87.35	4.923	1.101				

Social Competence EG(post-pre)	120.30	4.703	1.052	38	15.650	10.496	Significant
Social Competence CG(post-pre)	104.65	4.727	1.057				

Figure 3.1: Independent samples t-test for Mean Gain Scores on Mindfulness, on Metacognition and on Social Competence of students between Experiment Group and Control Group

As shown in Table 3.1 and Figure 3.1 a, the mean gain scores on Mindfulness of students in the Experiment Group and Control Group were found to be 27.05 and 18.20 respectively. The t-value was found to be significant (t=11.958, p< 0.01). Hence the null hypothesis stating "There will be no significant effect of Mindfulness intervention on Mindfulness of students" stands rejected. Significant mean gain score differences further indicate that Mindfulness intervention has significantly improved in Mindfulness of students in Experiment Group.

As shown in Table 3.1 and Figure 3.1 a, the mean gain scores on metacognition of students in the Experiment Group and Control Group were found to be 101.50 and 87.35 respectively. The t-value was found to be significant (t=6.755, p< 0.01). Hence the null hypothesis stating "There will be no significant effect of Mindfulness intervention on Metacognition of students" stands rejected. Significant mean gain score indicate that Mindfulness intervention has significantly increase in Metacognition of students in Experiment Group.

As shown in Table 3.1 and Figure 4.1 the mean gain scores on Social Competence of students in the Experiment Group and Control Group were found to be 120.30 and 104.65 respectively. The t-value was found to be significant (t=10.496, p< 0.01). Hence the null hypothesis stating "There will be no significant effect of Mindfulness intervention on Social Competence of students" stands rejected. Significant mean gain score differences further indicate that Mindfulness intervention has significantly increase in Social Competence of students in Experiment Group.

FINDINGS AND CONCLUSIONS
The findings of the present study are summarized as follows:
1. There exists below average level of Mindfulness among students in Control Group as well as in Experiment Group.
2. There exists no significant difference in the pre-test and post-test mean scores on the level of Mindfulness, Meta cognition and Social Competence of students in Control Group.
3. There exists a significant difference in the pre-test and post-test mean scores on the level of Mindfulness, Meta Cognition and Social Competence of students exposed to Mindfulness Intervention.
4. There exist significant mean gain score differences on the level of mindfulness, Metacognition and Social Competence of students exposed to Mindfulness Intervention i.e. Experiment Group and Control Group. This result indicates that Mindfulness Intervention is an effective technique to improve the level of mindfulness, Metacognition and Social Competence of students.

REFERENCES:
1. Alidina, S. (2014). Mindfulness for dummies. John Wiley & Sons. Retrieved from https://tinyurl.com/y8dnbtya on October 15, 2020.
2. Austin, J. H. (1998). *Zen and the Brain: Toward an understanding of meditation and consciousness*. Cambridge, MA: MIT Press.
3. Chiesa, A., & Malinowski, P. (2011). Mindfulness- based approaches: are they all the same? *Journal of clinical Psychology, 67*(4), 404-424.

4. Durkheim, (1938). "Rules for Distinguishing between the Normal and the Pathological." 47 – 75 in *Durkheim: The Rules of Sociological Methods*, edited by George E. G. Catlin. Chicago: University of Chicago Press.

5. Flook, L., Smalley, S., Kitil, M., Galla, B., Kaiser-Greenland, S., Locke, J., et al. (2010). Effects of mindful awareness practices on executive functions in elementary school children. *J. Appl. Sch. Psychol.* 26, 70–95.

6. Garland, E. L. (2007). The meaning of mindfulness: A second-order cybernetics of stress, metacognition, and coping. *Complementary Health Practice Review*, *12*(1), 15-30.

7. Germer, C. K., Siegel, R. D., & Fulton, P. R. (2013). *Mindfulness and psychotherapy*. Guilford press.

8. Greater Good Science center (2014). What is mindfulness? Greater Good: The science of a meaningful life, University of California, Berkeley.

9. Guralnick, M. J. (1990). Social competence and early intervention. *Journal of early intervention*, *14*(1), 3-14.

10. Miners, R. (2008). Collected and connected: Mindfulness and the early adolescent. Dissertations Abstracts International: Section B: The Sciences and Engineering, 68(9-B), 6362..

11. Orpinas, P., & Horne, A. M. (2006). Bullying prevention: Creating a positive school climate and developing social competence. *American Psychological Association*.

12. Osman, B. (2001). Nurturing social competence in a child with learning disabilities. *Learning Disabilities, 4*(2), 56-67.

13. Schunk, D. & Schunk, D. H., & Zimmerman, B. J. (1998). *Self-Regulated Learning: From Teaching to Self- Reflective Practice.* New York: Guilford Press.

14. Thomas, G. P. (2006). Metaphor, students' conceptions of learning and teaching, and metacognition. In *Metaphor and analogy in science education*, 105-117.

15. Upchurch, D. M., Gill, M., Jiang, L., Prelip, M., & Slusser, W. (2018). Use of Mind– Body Therapies among Young Adults Aged 18–24 Years: Findings from the 2012 National Health Interview Survey. *Journal of Adolescent Health, 63*(2), 227-232.

16. Vos, H. (2001). *Metacognition in higher education*. Enschede: Twente University Press.

17. Wallace, B. A. (2006). Contemplative science: where Buddhism and neuroscience converge. New York: Columbia University Press.

18. Wells, C. (2016). *Mindfulness: How school leaders can reduce stress and thrive on the job*. Rowman & LIttlefield.

19. Wong, B. (1994). Instructional parameters promoting transfer of learned strategies in students with learning disabilities. *Learning Disability Quarterly, 17*(2), 110-121.