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Relationship between Meta-Cognitive Abilities and Responses to E-Learning in Terms of Achievement: An Exploration

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Abstract: ***The corona-virus (COVID-19) pandemic had devastating impacts on not only the health and socio-economic conditions but also on the education sector in various countries. Consequently, the world of education entered a new era of learning i. e. E-learning. The management of classrooms is completely different in e-learning from the traditional learning. In traditional learning teachers has maximum control on all the classroom activities where as in E-Learning, learners should be self-disciplined and accountable for their own learning. Meta-Cognition allows people to take charge of their own learning. It involves awareness of how people learn, an evaluation of their learning needs, generating strategies to meet these needs and then implementing the strategies. Many theorists and practitioners claimed that applying meta-cognition in daily routine enhances the learning process and achievement of students. Therefore, the present paper makes an attempt to look at prospective teachers' responses to E-learning in form of their achievement in relation to their meta-cognitive abilities. It is a descriptive study consisting sample of 40 prospective teachers from central university of Jammu selected by purposive sampling technique. For collection of data, Meta-Cognition inventory by Dr. Punita Govil (2003) and achievement scores in learning system was used. Mean, standard deviation and correlation have been used to analyze data obtained. It was found that there is significant positive relationship between responses to E-learning and meta-cognitive abilities of prospective teachers. The findings suggest that E-learning system may excel if encouragement is provided to students to use their Meta-Cognitive Abilities.***

Keywords: Meta-Cognitive Abilities, E-Learning, Prospective Teachers.

1. Introduction

Education is the utmost important part of our life without it we cannot imagine a civilized being. Educational institutions have the responsibility to educate the children formally and are responsible to inculcating manners, values, and how to study, to plan and organize their learning. But due to emergence of COVID-19 pandemic teachers and students get distanced from the educational institutions and to continue their teaching learning process teachers adopted e-learning as better option. But is online learning a better option to inculcate values in country like India? In a longitudinal study investigator measured the effects of metacognitive training on the attribution styles where investigators measure the attribution styles before and after the intervention of metacognitive and attributive programme. In 1976 Flavell introduced the term metacognition to refer to the ability to recognize and take into consideration one's own cognition processes and tactics (Flavell, 1979). It points out to our unique capability to be self-reflective, to not just think and know, but also to think about our own thinking and knowing.

According to Brown (1987), "Metacognition refers to understanding of knowledge, an understanding that can be reflected in either effective use or overt description of the knowledge in question". Metacognition comprised of two components metacognitive knowledge and metacognitive control.

2. Categorization of Metacognition

Metacognitive knowledge (to know about cognition)

Metacognitive control processes (how to use cognitive knowledge).

Knowledge of Cognition means to "what individuals know about their own cognition or about cognition in general. It usually includes three different kinds of metacognitive awareness: declarative, procedural, and conditional knowledge (Brown, Jacobs and Paris, 1987)".

Declarative Knowledge – it constitutes how an individual perceives herself/himself as learner and what are the factors that influence one's performance. Research investigation shows that Meta memory indicates that adolescents have better knowledge than kids about the processes associated with memory cognition. In the same way, a learner who have more understanding about their own memory are stronger learners and are more likely than poor learners to use what they do know (Garner, 1987; Schneider and Pressley, 1989).

Procedural knowledge – it means to focus approximately the implementation of practice competencies. The ones who have a high diploma of procedural information use these abilities extra repeatedly and use qualitatively one-of-a-kind methods to clear up issues (Glaser and Chi, 1988).

Conditional Knowledge – the knowledge of when and why to apply various cognitive actions constitutes conditional knowledge. and it continually develop at the middle childhood. Skilled learners possess declarative procedural conditional knowledge of their cognition.

3. Regulation of Cognition

Cognitive regulation refers to metacognitive activities that help to control thinking and learning.

Many regulatory skills are documented, but three key skills: planning, monitoring, and evaluation are unique to every account.

Planning: A strategic plan impacts performance by choosing the precise techniques and allocating the right quantity of resources. You could make predictions earlier than studying, sequence strategies, or allocate time or interest selectively before beginning a task, among other matters. humans with extra studying experience have an in-intensity understanding of cognition and manipulate their getting to know based on that knowledge earlier than mission a venture

Monitoring: An individual's ability to monitor his or her own comprehension and performance is called monitoring. The ability to test yourself periodically while learning is a good example. Studies indicated that ability to monitor widen gradually and is quite poor in children. Numerous new research, however, have discovered a connection with both metacognitive knowledge and monitoring accuracy. The monitor and control computer problem solving group solved more tough issues in very little time than either of the other groups.

Evaluation: Evaluation refers to the process of coordinating product evaluation and learning of oneself. A typical example is a reassessment of your goals and conclusions. Many studies have shown that knowledge of metacognition and regulatory skills such as planning are associated with assessment.

E – LEARNING

E-learning is the process of acquiring knowledge through the use of electronic technologies and media, also referred to as online learning and electronic education. In simple terms, e-learning is a method of enabling learning through the internet. Students typically access e-learning materials via the internet at anytime and anywhere. Courses, degrees, and programs offered online most often constitute E-Learning. E-learning is frequently delivered in the form of online degrees and courses, with the learner receiving an online certificate at the conclusion of the course. It is one of the most adaptable methods of learning, allowing students to learn from anywhere and at any time. The number of people using E-Learning sites and apps has increased significantly. As previously said, it is mostly due to the simplicity and flexibility that it brings to the table. There are numerous online educational apps and platforms that have simplified this way of learning.

Value of E-learning

Compared to traditional methods of learning, online learning has numerous advantages. In addition, students have the option to choose their learning environment and to work at their own pace. As an added benefit, e-learning removes the geographical barriers often associated with traditional education methods, making it both cost-effective and cost-efficient.

Characteristics of E-learning

We can derive the features of e-learning from the arrangement of the concept of e-learning:

- E-learning is a type of learning that is primarily centered on the internet.
- Information spreads along network courses.
- Learning resources are distributed and shared globally.
- A virtual learning environment.
- A variety of study methods.
- Studying flexibility (anytime, anywhere).

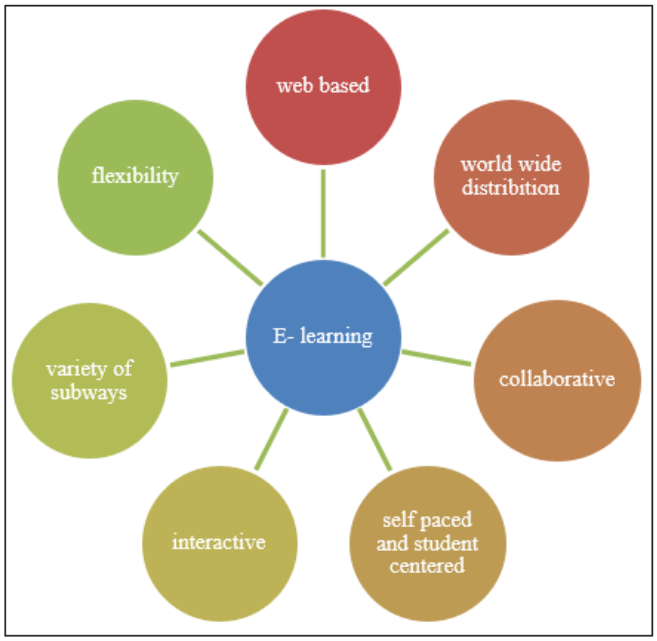

Figure 1: Depicting the Characteristics of E – learning

4. Need and Significance of Study

Metacognition plays an imperative role in learning in many ways, but a study on how metacognition impacts learning performance remains rudimentary.770 college IT students who had taken at the least one online direction were evaluated. adapted from more than one resources, a self-administered instrument used to gather statistics. route modeling evaluation changed into carried out using structural equation modeling to test 3 hypotheses. look at findings suggest that scholars who skillfully use metacognitive techniques to learn on-line are able to assessing their understanding of direction content, and that they are truly able to regulating their gaining knowledge of method. These findings may be beneficial for direction instructors and college students to set up practices concerning the way to maximize students' learning through the implementation of metacognitive strategies, as people who lack metacognition might also go through the consequences (Anthonysamy, 2021). There is positive

impact of training on the trainees and it improves their attribution styles (Giovanna, Eugenia & Maddalena 2017). A confirmatory factor analysis was conducted on 126 respondents. The relationships between metacognition and three levels of learning interest were tested using structural equation modeling (i. e., liking, enjoyment, and engagement). Continuance intention to use MOOCs was positively correlated with the three levels of learning interest. In addition to increasing interest in MOOCs, these findings indicate that enhancing students' metacognition can reinforce the benefits of developing teacher training programs using MOOCs (Tsai et al., 2018). As a student develops an awareness of their learning processes, metacognitive strategies are used. The techniques outlined here can help students reflect on what they already know versus what they still need to learn, recognize thinking errors, and develop effective learning practices. The metacognitive activity is mediated partially media synchronicity, the social presence, and satisfaction, and utility (Johnson, Gueutal, Falbe 2009). There are a number of initiatives that exemplify the inventive ways to refine E-Learning by relating to four fundamental characteristics: 1) motivate children Produce engaging content for children; 2) It is essential to teach them how to construct their own learning paths based on information; 3) Promote collaborative classroom learning that facilitates cognitive and social development; 4) Children are encouraged to learn outside of the classroom through storytelling and entertainment features (Huffaker and Calvert 2003). The study involved 67 students of higher education from a university in Colombia. Two groups were examined and a posttest was conducted. One group of students participated in a metacognitive scaffolding process using an e-learning environment and another group work together with a standard learning environment. Results indicate that scaffolding contributes significantly to learning performance, meta-cognitive abilities, academic self-efficacy and students with various cognitive styles perform equally well on tests. Impact of a meta-cognitive scaffolding on self-efficacy, metacognition, and achievement in e-learning environments (Vallejo, vargas, Rodriguez 2019). An inquiry test of techniques, a meta-cognition questionnaire, and worksheets were used as data sources. The analysis indicated that the combination of meta-cognitive quick and cognitive prompts had impacted students' practices of inquiry a substantial impact on students' inquiry practices, particularly their scheduling and evaluating abilities. However, varied stimuli seemed to have a different consequence on students with poorer levels of meta-cognition, who improved significantly in their abilities of inquiry. During an inquiry cycle, a combination of cognitive and metacognitive cues was found to increase students' inquiry habits (Zang, hsu and wang 2015). Men and women do not show significant differences in metacognitive skills, as the first analysis concluded. Having a sense of metacognition is a crucial component of successful learning, and it provides an excellent basis for measuring academic performance. In the backdrop the present research paper explores the relationship between academic scores of e-learning and meta-cognitive abilities of pre-service teachers.

5. Objectives of the Study

1) To study the meta-cognitive abilities of prospective teachers
2) To find out the relationship between total meta-cognitive abilities and achievement scores of e learning of prospective teachers
3) To explore the relationship between KCP (knowledge of cognitive processes) and achievement scores of e learning of prospective teachers.
4) To analyze relationship between RCP (regulation of cognitive processes) and achievement scores of e learning of prospective teachers.
5) To study relationship between total meta-cognitive abilities and achievement scores of e learning of male prospective teachers.
6) To study relationship between KCP (knowledge of cognitive processes) and achievement scores of e learning of male prospective teachers
7) To study relationship between RCP (regulation of cognitive processes) and achievement scores of e learning of male prospective teachers.
8) To study relationship between total meta-cognitive abilities and achievement scores of e learning of female prospective teachers
9) To study relationship between KCP (knowledge of cognitive processes) and achievement scores of e learning of female prospective teachers.
10) To study relationship between RCP (regulation of cognitive processes) and achievement scores of e learning of female prospective teachers.

6. Hypothesis of the Study

1) There will be no significant relationship between total metacognitive abilities and achievement scores of e learning of prospective teachers.
2) There will be no significant relationship between KCP (knowledge of cognitive processes) and achievement scores of e learning of prospective teachers.
3) There will be no significant relationship between RCP (regulation of cognitive processes) and achievement scores of e learning of prospective teachers.
4) There will be no significant relationship between total metacognitive abilities and achievement scores of e learning of male prospective teachers.
5) There will be no significant relationship between KCP (knowledge of cognitive processes) and achievement scores of e learning of male prospective teachers.
6) There will be no significant relationship between RCP (regulation of cognitive processes) and achievement scores of e learning of male prospective teachers.
7) There will be no significant relationship between total metacognitive abilities and achievement scores of e learning of female prospective teachers.
8) There will be no significant relationship between KCP (knowledge of cognitive processes) and achievement scores of e-learning of female prospective teachers.
9) There will be no significant relationship between RCP (regulation of cognitive processes) and achievement scores of e learning of female prospective teachers.

7. Research Methodology

The present study aims to find out the relationship between meta-cognitive abilities and academic scores of e learning of prospective teachers of samba district. The descriptive method was used for the problem under investigation.

Sample of the study
Sample of the study constituted 40 prospective teachers from central university of Jammu.

Tools used in the study
Metacognitive Inventory by Punita Govil (2003) is used to collect data
Achievement scores of B. Ed. Students

8. Analysis and Interpretation

The investigator used Pearson product moment correlation method to analyze the data.

Table 1: Showing Correlation between Metacognitive Abilities and Achievement Scores of Prospective Teacher Educators

N	Df	Computed value of 'r'	Table 'r' value	Level of significance
40	38	0.382	0.312	Significant at.05* level

Interpretation and Discussion
Table 1 depicts that the correlation between metacognition and achievement of prospective teacher educators came significant. The computed value of correlation is.382 where as the table value is.312 which is less than table value. It means that hypothesis stating "There will be no significant relationship between total meta-cognitive abilities and achievement scores of e learning of prospective teachers" was rejected. Therefore there is significant positive relationship between meta-cognitive abilities and achievement of prospective teachers. The findings of the study are in disagreement with (Gul and Shehzad, 2012). Meta-cognition and goal orientation had a moderate relationship with academic achievement, while meta-cognition and achievement had a weak relationship. A positive relationship between metacognitive awareness and academic achievement is found as it measured by their (GPA) for pre-service female teachers. And the above conclusion is also in agreement with the study where it seems the students who get a high (GPA) are better metacognitions measures (Abdellah, 2014).

Table 2: Depicting the correlation between KCP and achievement of prospective teacher

N	Df	Computed value of 'r'	Table 'r' value	Level of significance
40	38	.382	0.312	Not significant

From the above table it is clear that the correlation of Knowledge of cognitive process (KCP) and achievement scores of pupil teachers not came significant. The computed value of correlation is.382 which is less than the table value and depicted that the hypothesis 2 stating "There will be no significant relationship between KCP (knowledge of cognitive processes) and achievement scores of e learning of prospective teachers "was accepted. Therefore, it could be concluded that there is not significant relationship between KCP (Knowledge of cognitive process) and achievement of prospective teachers but the relationship is positive. The findings were in agreement with young and fry, 2008, that states that "There was a correlation between GPA and the knowledge of cognition factor and also between GPA and regulation of cognition factor".

Table 3: Showing Correlation between RCP (Regulation of Cognitive Processes) and Achievement Scores of Prospective Teachers

N	Df	Computed value of 'r'	Table 'r' value	Level of significance
40	38	0.6	0.403	Significant at.01* level

From the table 3 it was concluded that correlation between regulation of cognitive processes and achievement scores of prospective teachers came to be significant. The calculated value is 0.6 which is greater than the computed value of that table that is.403. Hence the hypothesis "There will be no significant relationship between RCP (regulation of cognitive processes) and achievement scores of e learning of prospective teachers" was rejected. Because results showed that there is positive significant relationship between RCP and achievement scores. As prospective teachers are would be teachers they have to teach the future of country about how to regulate their own learning and thinking so they must have strong KCP of their own. And it is also found that an individual who control their own thinking performs better in their academic activities.

Table 4: Depicting Correlation between Metacognitive Abilities and Achievement of Male Prospective Teachers

N	Df	Computed value of 'r'	Table 'r' value	Level of significance
17	15	0.486	0.382	Significant at.05* level

From the above calculated values it is crystal clear that the calculated value of correlation exceeds the significant table value. The calculated values is 0.486 and table value is 0.382 therefore there is positive correlation between the metacognitive abilities and achievement of male prospective teachers. Hence the hypothesis stating "There will be no significant relationship between total metacognitive abilities and achievement scores of e learning of male prospective teachers." was rejected and that is in associated with (Abdelrahman, 2020).

Table 5: Depicting Correlation between KCP and Achievement Scores of E Learning of Male Prospective Teachers

N	Df	Computed value of 'r'	Table 'r' value	Level of significance
17	15	0.05	0.382	Not significant

The above findings explicit that, there is positive correlation between KCP and achievement scores of male prospective teachers, but not significant because the table value is less than the computed value. Hence the hypothesis 5 "There will be no significant relationship between KCP (knowledge of cognitive processes) and achievement scores of e learning of male prospective teachers." was rejected.

Table 6: Showing Correlation Between RCP And Achievement Scores Of Male Prospective Teachers

N	Df	Computed value of 'r'	Table 'r' value	Level of significance
17	15	0.6033	.575	significant at.01 *level

The above table depicted that correlation between RCP and achievement scores of male prospective teachers came to be significant at.01 level. The calculated value of correlation is.6033 that is greater than the table value i. e. .575 therefore hypothesis 6 "There will be no significant relationship between RCP. (regulation of cognitive processes) and achievement scores of e learning of male prospective teachers" was rejected.

Table 7: Depicting Correlation between total meta-cognitive abilities and female prospective teachers

N	Df	Computed value of 'r'	Table 'r' value	Level of significance
23	21	0.22	0.396	Not significant

Table 7 depicted that the correlation between total metacognitive abilities and achievement of female prospective teachers is not significant. The calculated value was 0.22 which is less than the table value. Therefore the hypothesis "There will be no significant relationship between total meta-cognitive abilities and achievement scores of e learning of female prospective teachers" was rejected. The results of the study are in contrast with (Jaleel and Premchanderan, 2016) which state that there is no significant difference in the Meta-cognitive awareness of secondary school students based on Gender.

Table 8: Showing Correlation between KCP and achievement scores of female prospective teachers

N	Df	Computed value of 'r'	Table 'r' value	Level of significance
23	21	0.4528	0.396	Significant at.05 level

Table 8 depicted that the calculated value of coefficient of correlation is 0.4528 that is greater than the table value i. e. .396. It means there is positive and significant correlation between Knowledge of cognition and achievement scores of e-learning of female prospective teachers. Therefore hypothesis "There will be no significant relationship between KCP (knowledge of cognitive processes) and achievement scores of e learning of female prospective teachers."

Table 9: Represents Correlation between RCP and Achievement Scores of Female Prospective Teachers

N	Df	Computed value of 'r'	Table 'r' value	Level of significance
23	21	0.82	.505	Significant at.01 level

Table 9 depicted that the calculated value is 0.82 which is greater than table value.505. There is positive and significant relationship at.01 level between RCP and achievement scores of female prospective teachers. Therefore the hypothesis stating "There will be no significant relationship between RCP (regulation of cognitive processes) and achievement scores of e learning of female prospective teachers" was rejected.

9. Discussions and Conclusions

Following conclusions arrived at after investigating the data with regard to pre service teachers is summarized below.

It may be concluded that there is positive and significant relationship between the total meta-cognitive abilities and achievement scores of E-learning of pre service teachers. Because after the completion of their B. Ed course, the pre service teachers have to use these meta-cognitive skills as a teachers to encourage their students to use these skills collaboratively. To score good marks in any course learners have to plan, regulate and evaluate the whole process of learning and this can only possible if an individual use better metacognitive strategies in their learning process.

The correlation between knowledge of cognition and achievement scores of pre service teachers came to be insignificant but positive. It means prospective teachers did not use their cognitive knowledge in their learning process. In the study conducted it was predicted that both pre service and in service teachers failed to predict the advantage of testing spacing as learning strategies. Their knowledge of learning strategies failed to increase with teaching experience (Halamish, 2018).

The relationship between regulation of cognitive processes and achievement scores of e learning came significant at. o1 level. It means more use of three important skills planning, monitoring, evaluation in learning leads to higher achievement scores in e learning. they are better problem solvers and regulate their learning process in a better way. In other research it was found that there is significant relationship between the metacognitive awareness and technology usage among pre service teachers (Josphine and Albina, 2020). Results indicated that GPAs of pre service teachers increases their planning and monitoring processes. (Sendurur et al.2011).

Meta-cognitive abilities of male prospective teachers were significantly correlated with the academic scores of e-learning whereas female teacher's meta-cognitive abilities had no significant correlation with achievement scores. This may be due to the fact that male have knowledge of cognition as well have they regulate their cognition in better way. The KCP of females had significant correlation with achievement scores whereas male prospective teachers had positive but not significant correlation between knowledge of cognitive process and achievement. RCP of both male and female prospective teachers had positive and significant relationship it means they regulate their cognitive processes in better way. This may be due to fact that they don't know about the meta-cognitive strategeis but unknowingly applied in their learning process that's why applied meta-cognitive strategies in their learning improves their achievement scores. The most differences seem to firstly emerge on total meta-cognitive abilities. In this study male pre-service teachers have positive correlation between meta-cognitive knowledge and achievement scores as compared to female pre-service teachers this may be due to the fact that males are doing the more thinking than females. As females have a lot of responsibilities on their shoulder they have to look about their career, profession and also home. But males have

to focus on the single aspect so he has better knowledge of cognition.

10. Educational Implications

The problem of cognitive incapacity among individuals is perceived as something that can be treated only by psychiatrists for a long time. Flavell coined the term metamemory in 1971 to describe the ability of an individual to manage and monitor the input, storage, search, and retrieval of information from his own memory.

In order to develop good learning habits and perform well on examinations, meta-cognitive abilities must be developed.

Insufficient metacognitive abilities result in an inability to use a wide range of skills such as reading, oral skills, writing, language acquisition, memory, attention, social interactions, self-education, and personality development, affecting the achievement of life's goals.

At different levels, students develop their metacognitive abilities differently. It follows a sequential order, so a teacher should give their students different assignments that will help them to succeed.

The teacher educators need to have better metacognitive competencies in order that they follow techniques to enhance the metacognitive talents of pre-service teachers via using extraordinary task.

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