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Metacognitive Awareness of 21st Century Teachers and its Effectiveness of Critical Thinking at University Level

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Abstract

This study intended to investigate the correlation between 21st century teachers, their metacognitive awareness and its effectiveness in promoting students' critical thinking at university level. This study followed correlational study. The sample size of 531 was extracted through Raosoft sample size calculator using proportional sample techniques constituted 190 teachers(male and female) and 341 students(male and female). Modified form of Schraw and Dennis (1994) metacognitive awareness inventory was developed for data collection. Validity and reliability for the teachers and students were found .953 and .858 respectively through pilot testing. The results showed that most of the teachers at University level were having the knowledge of metacognitive awareness and they were practicing it for promoting the critical thinking skills of their students, These results have shown that, teachers' metacognitive awareness about declarative, procedural, conditional knowledge, planning and management skills and evaluation skill have a positive association with the development of students higher order thinking competencies including: social abilities and management skills, appraisal and reasoning abilities, exploratory and self-acting abilities and the transformation of students critical thinking skills.

Keywords: Meta-cognitive Awareness, Critical Thinking Skills, 21st Century Teachers

Introduction

In all educational contexts, it is essential for every teacher to have the knowledge and experience about those plans of actions and procedures which play a crucial role in the refinement and upgrading of education if successfully implemented in the domain of classroom dynamics. Accordingly, it is noticed that, the ability of a person to recognize his/her own strengths and deficiencies and enhances his/her own understanding, plans of actions as well as to have full knowledge and control about how, when and why to use such plans of actions is known as metacognitive awareness (Harrison and Vallin, 2018; Schraw and Dennison, 1994). For more effective teaching at higher level, a teacher should have the knowledge and ability about how to plan, present, evaluate and manage the teaching situations because such teacher has the ability to arrange a good lesson plan, develop a best plan of action for his/her teaching, and also know about how to evaluate the different procedures which are used to help in good classroom management (Kauchak and Eggen, 2008).

The research has shown that, majority of the instructors are still using the old traditional way of teaching and have no concentration to motivate their students which is considering an essential part in making the educational process more fruitful and beneficial if implemented correctly. (Brookfield, 2011). In reference to this, the teaching learning process of the 21st century also gives emphasis on making individuals more metacognitive persons. Metacognition is considering a general word which is used to comprehend other frequently used words such as self-operating learning, cognitive abilities and learning to learn (Ozturk, 2017). Furthermore (Rivers, 2021; Sun and Zhang, 2023; Sun, Zhang, and Carter, 2021) have explained that, metacognition is the ideas or awareness of an individual and the regular use of his/her own understanding, experiences and feelings. According to Vandergrift and Goh (2012) metacognitive awareness is a state of the awareness of our ideas which keeps full concentration on specific cognitive or learning circumstances (Balcikanli, 2011 and Ozcan, 2007).

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According to (Amin, Corebima, Zubaidah, and Mahanal, 2020; Jaewoo and Woonsun, 2014) metacognitive awareness among the teachers has a close relation with educational achievements of the students, therefore, the teachers need to create a metacognitive environment in the classrooms which has a vital impact in raising good thinking skills, problem solving skills and long life learning skills among the students. In addition, the proper use of different plans of actions in the classroom can show a close relationship between metacognitive awareness and critical thinking skills. Therefore, teachers and demonstrators are expected to use and implement an active constructivist plan of action during teaching learning process. Research has shown that, the knowledge of metacognitive awareness is considering a key indicator of a person's critical thinking skills which are taken to be the most important learning skills at higher level of education. These skills help the students to solve their different complex problems in the modern age of science and technology (Wahidin and Romli, 2020).

Critical thinking skills can be defined as, a logical and thoughtful action of the mind which is used to assess difference of opinions or arguments to decide about an action to be taken. In addition, critical thinking skills is a mental awareness and plan of action which is used to accelerate the possibility of the desired results proposed logical and higher reachable thinking to resolve problems, to draw out deductions, to evaluate feasibility and to make conclusions(Paul and Elder, 2013).

Furthermore, the applications of evaluating debates, forecasting possible outcomes, developing authentic plans of actions, detecting different and convenient ways to manage the situations and making conclusions are called critical thinking skills (Alsaleh, 2020 and Lai, 2011).Critical thinking skills are the special skills which are working as a guideline which helps to enhance the learning capacity of the students (Alsaleh, 2020). It is also thought to be the most essential and fundamental consequence that students must embrace in order to successfully satisfy all demands on both a personal and social level in the modern world of science and technology, as it is one of the higher order thinking skill. Zubaida (2011) has described a close relationship between critical thinking skills and metacognitive awareness.

Metacognitive awareness of teachers are correlated with skills of critical thinking (Arslan, 2018). The cultivation and practice of metacognitive awareness in everyday teaching learning process has a positive effect in increasing the critical thinking skills of the students and making them the independent persons of the society. Therefore, the teachers of all the levels are encouraged to equip their students with the knowledge of metacognitive awareness. By doing this, they can make their students more competitive and motivated persons who can face successfully every challenge belong to their academic or social life in the modern age of 21stcentury(Amin et al., 2020).

As Malahayati et al., (2015) described that metacognitive awareness and critical thinking skills are interrelated and depend on each other. For to learn the skills of critical thinking, a person should have full command over the skills of metacognitive awareness because learning and practicing of metacognitive awareness make him/ her able to be a good critical thinker, as metacognitive awareness required to think deeply, which is a positive sign showing the presence of critical thinking skills in the mind of a person. The skills of critical thinking are a mental activity to analyze, synthesize, and evaluate something. So, if a student learns and memorize the essential elements of metacognitive awareness, then he/she can easily choose and find out the different plans of actions and well understand about a topic under study and solve different problems to get elevated conceptual academic achievements.

Statement of the Problem

With the advancement of the digital world, the teaching and learning process become more complex and challengeable; therefore, meta-cognitive awareness of teachers is considered the most important factor towards critical thinking of students. Students having the knowledge of metacognitive awareness become good critical thinkers, who can solve different problems successfully, become able to handle the difficulties and also gain the ability to regulate their emotions (Wicaksono, 2014).

Teachers' roles in the rapidly changing 21st century educational landscape have now extend beyond traditional instruction to include supporting critical thinking and adaptive learning. According to the National Educational Policy (2009), in Pakistan, one of the basic goals of education is to introduce and advance the skills of critical thinking in educational sectors. To effectively guide students' development in these areas, educators must possess the critical talent of metacognitive awareness, which is the understanding and regulation of one's own cognitive processes. Despite its importance, little empirical studies have been investigated on how metacognitive awareness affects

university-level instructors' capacity to develop students' critical thinking abilities. Further, due to the gap in literature related to the association between these variables, this study was focused on metacognitive awareness of 21stcentury teachers and critical thinking of undergraduate students at university level.

Objectives of the Study

Following were the targets concentrated in the study.

1. To explore 21st century teachers' metacognitive awareness at university level
2. To investigate critical thinking skills among the students at university level
3. To investigate the relationship between metacognitive awareness of 21st century teachers and critical thinking of students at university level

Research Questions

The following research questions were formulated.

1. What is metacognitive awareness of 21st century teachers at university level?
2. What is the critical thinking skill among the students at university level?
3. What is the relationship between 21st century teachers' metacognitive awareness and students critical thinking skills at university level?

Significance of the Study

The present study was helpful to different groups in several key areas:

The study has provided a deep insight about the presence of metacognitive awareness among university teachers, which plays a crucial role in fostering and promoting critical thinking skills of the students. This study was also informative for key stakeholders to review and analyze policy frameworks and instructional practices, identifying areas where policy and practice diverge. Furthermore, this study was also valuable for several university-based teachers training initiatives, focusing on teaching approaches and techniques in different subjects and ensuring students receive diverse learning materials that go beyond academic knowledge.

Literature Review

According to (Potgieter and van der Walt, 2022) Flavel (1979) was the first who divided the knowledge of metacognitive awareness in to the following three components which are highly used in educational circumstances and are working as a base in teaching learning process. They are the declarative knowledge, procedural knowledge and conditional knowledge which are taken to be the essential categories of the metacognitive awareness of teachers. Declarative knowledge highlights the understanding of an individual about himself/herself as learner, his/her logical ability and also about his/her different fragilities. Conversely, as the name suggests, procedural knowledge reflects the method of teaching, and the plans of actions used by teachers for teaching learning process in the classrooms. Conditional knowledge picks up and controls the previous understanding about an activity. Put differently, it unites declarative and procedural knowledge and uses it for different purposes to achieve the desired goals (Potgieter and van der Walt, 2022).

Metacognitive Awareness of Teachers

According to Balcikanli (2011), the incorporation of metacognitive awareness in teaching makes the teaching process dynamic and more purposeful as well as plays a crucial role to increase the teaching competency and also make the academic achievements of students more successful (Balcikanli, 2011).

Huseyin (2014) as cited by Suruchi Sahoo (2020 in (Metacognitive Awareness on Teaching and Teaching Competence of Secondary Prospective Teachers)), conducted a study on metacognitive awareness of English teachers and academic achievement with a sample of 134 Turkish teachers. He found a close relationship among metacognitive awareness of teachers, its results and mean scores(Sahoo, Behera, & Sahu, 2021). Another study conducted by Choudhury and Chowdhury (2015) on metacognitive awareness level of well experienced teachers related to their teaching proficiency skill on a sample of 170 expert teachers. It was found that there was a wide gap between male and female expert teachers on the side of male experts' teachers(Choudhury and Chowdhury, 2015).

In the same way, Bars and Oral (2016) also explored metacognitive awareness of perspective teachers regarding several variables such as communal, algebraic group, and arts of design. It was found that the level of algebraic group was higher as compare to the other two, although, female

perspective teacher's metacognitive awareness level was found higher than male's teachers(Bars and Oral, 2017).

Critical Thinking Skills of Undergraduate University Students

A cautious and reasonable ability of a student that he /she use for to get knowledge about a problem, to explain it and to solve it successfully is called critical thinking skill. In addition, critical thinking skills are the logical and mental behaviors of a student by which he/she knows about how to describe, inspect, evaluate, decide , and answer a problem on the basis of confirmation he/she presented (Facione, 2011). It is the main goal of the 21st century education to Promote critical thinking skills among the learners from the very early stage of education up to higher level of their educational career because, these skills are working as a base for to enhance some other skills among them like communication, reasoning and problem-solving skills and make them the autonomous persons of the society.

Tuzlukova et al., (2017), have demonstrated that critical thinking skills have got an important position in the field of education because, these skills are using as creative, persuading and also as logical activities in promoting the teaching learning process. Therefore, all the teachers and instructors are encouraged to have more knowledge about critical thinking skills, because these skills help them to enhance their teaching experience for to make their students more successful in their learning (Tuzlukova, Al Busaidi, & Burns, 2017).The researchers have reported that, the students of the 21st century not only need theoretical experience, but they also need to know about the importance of critical thinking in education, because these skills are considering very helpful in developing their academic and social life (Lindsey, Shroyer, Pashler, & Mozer, 2014; Townley, 2018).

Therefore, all the educational experts and teachers are highly encouraged to give more emphasis in the classrooms about to increase the ability of critical thinking among their students which will help the students to enhance their other necessary skills relating to their academic and community life(Strauss, 2016).According to the research, most educational experts and policy makers are agreed on the role of critical thinking skills in promoting the academic performance of university students. In illustration of this, an assessment was arranged under the supervision of Association of American Colleges and Universities (2011) in about500 different higher educational institutes to find out how critical thinking skills play a crucial role in developing the academic level of the students as well as in increasing the learning outcomes of university students. It was observe red that 95 percent different teachers were agreed on taking critical thinking skills as the most essential intellectual skill in increasing the academic performance of the students as well as more than 80 percent educational experts were on the view to give more importance about the use and practice of critical thinking skills in the classrooms of higher educational institutions (Colleges and Universities, 2011).

In the situations of Pakistan, the development of critical thing among the university students has become a challenge(Ahmad, Ali, Khan, and Khan, 2014). In recent times, in most of the Pakistani universities, education was considered only transfer of knowledge. No special attention was given to the improvement of critical thinking skills among the students as these skills play an important role in the development of academic, intellectual and communal life of the students (Al Fadhel, Aljalahma, Almuhanadi, Asad, & Sheikh, 2022).

Taking in consideration the above statement, recently, most of higher educational institutions in Pakistan have given more importance about the use of critical thinking skills in teaching learning process because, these skills help in making the students more vigorous, and powerful for to solve their social and academic problems in an easy way in a very short period of time as well as make the students most useful individuals of the community (Asim, Vaz, Ahmed, & Sadiq, 2021).

Keeping in view the above discussion,(Khalid and Khan, 2006; Seibert, 2021) have argued that presently, the concept about the use of critical thinking skills are mostly acknowledged at every level of education because these skills empower the students to identify, notice, investigate and assess easily their different educational and social issues.

Metacognitive Awareness of 21st Century Teachers and Critical Thinking of Undergraduate Students at University Level

Research has shown that the presence of metacognitive awareness among 21st century teachers have a key role in raising students' awareness in learning, arranging, and controlling their different pedagogical scenarios. It also helps in reviving the critical thinking skills of the students by which they can judge their own positive results and also they can evaluate their abilities and weaknesses in

doing their different educational activities (Bahri & Corebima, 2015; Corebima, 2009). Research has shown that, Critical thinking skills and metacognitive awareness are correlated to each other. For learning and practicing critical thinking skills a person needs to have an analytical thinking and productive conclusion to explain a problem or to reach a special task. In addition, to use critical thinking skills more productively, a person needs to have a specific limit of mental awareness and its regular practice (Saiz and Rivas, 2011).

In the context of Pakistan, in most educational institution, students get education just to complete and obtain their degrees. As a result, these students have no proper ability to translate, explore, present and add their own recommendations in the situations of their real life. In addition, such students have no understanding about the basic skills of life which are helping them in to face the different challenges coming in their real and practical life (Hoodbhoy, 2009).

(Sultana and Zaki, 2015) have also conducted a study in which they have observed that, some of the teachers here in Pakistan give emphasis on just to teach and complete the course syllabus of the students. They give no importance to establish a metacognitive and meaningful learning situation in the classroom, because they are bound to complete their course contents in time. In addition, classroom instructions and discussion are playing a key role in developing the problems solving skills among the students. Unluckily, no such teaching methods and environments are provided in the classrooms which are helping in promoting sensible and analytical skills among the students(Sultana and Zaki, 2015).

As Pakistan is a developing country, therefore more need is felt here to produce many educationists in the field of natural and social sciences. Keeping in view the above discussion it can be concluded that evolution of teacher's metacognitive awareness and critical thinking of students are the sectors of more concentration for the development of the whole nation as already explored in the National Education Policy (2009) official paper. In nutshell, it becomes the responsibility of the government and policy makers to provide the opportunities of conducting different trainings related with the awareness of teachers to inspect and assess national curriculum based on teacher's metacognitive awareness and critical thinking of students at higher level of education. To fill this gape, the present study was aimed to investigate metacognitive awareness among the university teachers, their effects on the student's learning ability and critical thinking among the students through a co relational study. It can also be ensured that the findings of this study with the help of related literature have unfold the co relational study on metacognitive awareness of teachers and critical thing of students at university level which was more fruitful for both teachers and students' performance.

Gap within the Literature

The literature has provided studies from a number of field areas such as psychology, science, and the tertiary instructional surroundings which are more particular. The study has highlighted the shortage of studies addressing the connection between metacognitive awareness of twenty first century teachers and critical thinking of undergraduate students. Metacognitive awareness of twenty first century teachers and important thinking of undergraduate students shows a want for further research on this area.

The literature provided suggests that metacognition is a complicated cognitive and behavioral concept. Research conducted by Dinsmore et al. (2008) and Schunk (2008) shows that there are difficulties with definitions of metacognition. This makes it difficult to research. Cognitive psychology affords a framework for information the position of epistemic ideals, epistemic expertise and calibration in the system of metacognition, particularly the self-regulatory components of metacognition inside the position of the learner (Dinsmore et al. and Schunk (2008).

Ultimately, metacognition has been a topic of great diversion within the related literature, as it has provided the use of such techniques and skills that assist growth and recognition of person's mental self-awareness which are often visible to improve many factors, for example, language schooling strategies and comprehension when studying along critical thinking. Metacognitive capability reflects a cognitive method wherein an individual may possess a state of recognition for when concerning, controlling, examining and establishing the thinking process. Alongside, scientific reasoning, such mental activity and cognitive talent concerned the procedure of discovery, judgment, conclusion, and argumentation is the mixtures that may decide student proficiency for learning. As a result of this, the notion of the improving a learner critical thinking ability via cognitive processes can

be argued, however these components requires mental and cognitive skills, such as metacognition, from the decision making level in order to attain the ability of thinking critically. As a result, Ku and Ho(2010) have examined that how various metacognitive strategies have played a role amongst students who had similar cognitive skills and academic ability, but contrasting critical thinking skill. Result indicated that the students who were greater critical thinkers were also engaged in more metacognitive strategies such as high level evaluating and planning.

Theoretical and Conceptual Framework of the Study

Research about the knowledge of metacognition and its awareness among the individuals was started near 1960s, but it was only limited to theoretical basis. Flavel (1976) was the first who laid the foundation for metacognition research in education (Flavell, J. H. 1976). As per Flavel (1977) findings, metacognition is the capacity to monitor and evaluate one's own thinking (Flavell, J. H. 1977).

Thinking is a fundamental characteristic of humanity. Effective problem solving requires adaptable skills in diverse situations (Meyer, 2007). Greek philosophers like Plato, Aristotle, and Socrates were the firsts who introduced the ideas about critical thinking. Based on their beliefs, critical thinking is the skill of an individual which he/she use to ask questions about a phenomenon, analyze them and contemplate purposely(Wilgis & McConnell, 2008).

Developing cognitive skills among the individuals is a primary goal of educational systems. To enhance the learning capacity of the students, the teachers need to prepare their students for navigating the modern workforce(Atabaki, Keshtiaray, & Yarmohammadian, 2015).

As the present study aimed to explore the relationships, therefore, a detailed review was undertaken to construct the conceptual framework for this study. The review has highlighted metacognition, its prevalence among the 21st university teachers, its benefits for both teachers and students alike and its impacts on the overall learning environment. The review has also examined critical thinking of students, its influence on learning capacity and advantages for future academic and practical endeavors. Within the educational settings, metacognitive awareness of teachers is grounded in three fundamental sub constructs i.e., declarative knowledge, procedural knowledge and conditional knowledge. Declarative knowledge serves as practical expertise for teachers. This type of knowledge empowers the teachers with comprehensive understanding and mastery of subject matter. Procedural knowledge guides individuals on effective techniques and approaches to accomplish tasks. This knowledge enables teachers to develop exceptional critical thinking skills, optimizing their instructional practice sand student's feedback. Conditional knowledge enables the individuals to conceptualize and apply prior knowledge, identifying essential strategies for task completion and goals attainment. When the teachers integrates this knowledge in to their classroom practice, they can continually assess students' abilities and learning capacities and also enhancing the effectiveness of teaching-learning process

In classroom settings, critical thinking spans the following four key areas of understanding:

(1) Personal knowledge: this knowledge reflects students' capacity for analytical thinking, influencing their academic and personal growth.

(2) Interpersonal knowledge: this knowledge enables students to overcome inhibitions, foster empathy, develop collaborative skills and cultivate critical thinking.

(3) Contextual knowledge: This understanding foster deep learning, enabling students to absorb, retain, and apply knowledge effectively.

(4) Critical Knowledge: By acquiring this knowledge students learn to categories, evaluate, and create learning strategies, promoting cognitive development and effective learning.

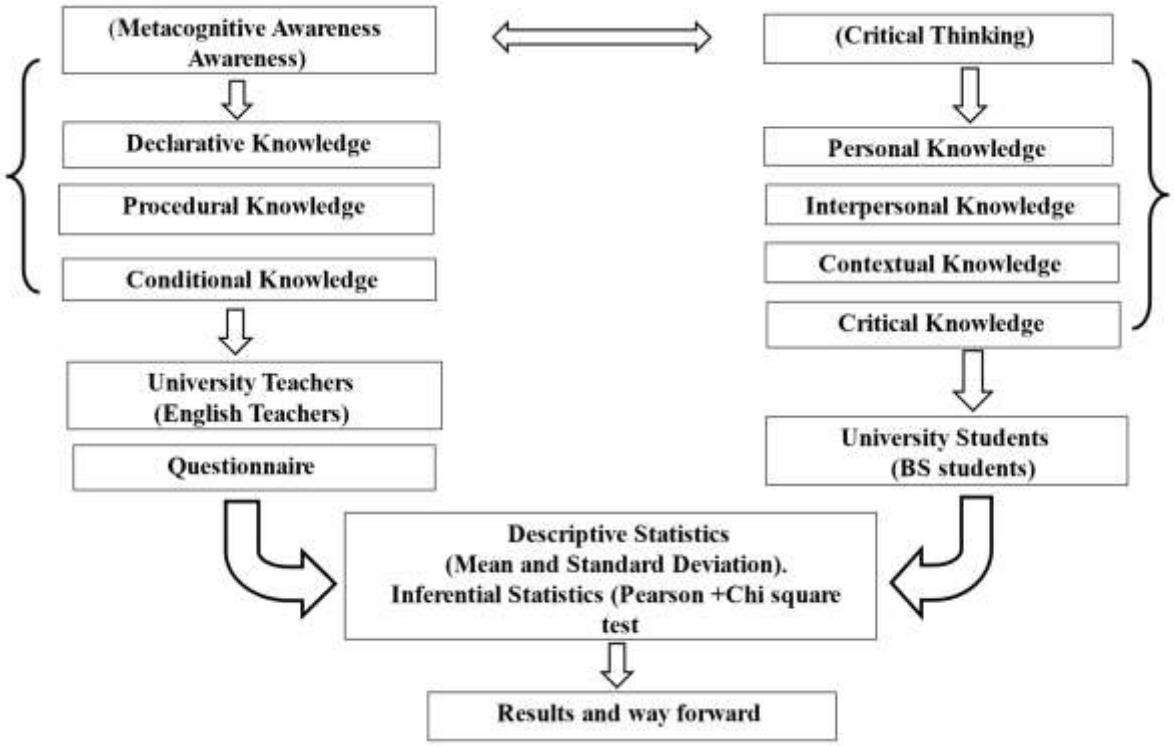

Figure 1.1 Diagram of Conceptual Framework on teachers' metacognitive awareness and critical thinking of undergraduate students

Materials and Methods

This study was quantitative correlational and descriptive in nature. A correlational study explores the connections or correlations between two or more variables without intervening or manipulating any variables (Asamoah, 2014; Queirós, Faria, & Almeida, 2017).Therefore, the researcher adopted quantitative data analysis mechanisms to present the results quantitatively following statistical models. For this purpose, the researchers adopted two separate questionnaires for both teachers and students with five Likert scales and were distributed among the teachers and students for data collection. Further, the study was delimited to teachers of English departments, and BS students of the same department in public sector Universities of Khyber Pakhtunkhwa. Therefore, the population was comprised of 4228(male and female teachers) and 85981(male and female students).The sample size of this study was determined through online sample size Raosoft calculator. Keeping in view the above report, a sample of 190(male and female) teachers, and a sample of 341(male and female) students were selected randomly.

The data for the present study was collected personally by the researcher in an organized method. Before collecting the data, the researcher visited the chairman of all the concerned Universities to take permission for data collection. For present study the researcher adopted Schraw and Dennis (1994) tool in which two separate questionnaires were developed for both teachers and students and which were based on five-point Likert type scale for the collection of concerned data from teachers and students at university level.

Statistical Technique used for Data Analysis and Tabulation

To find out metacognitive awareness of university teachers (male and female), to investigate critical thinking skills among university students (male and female) and also to find out the correlation between metacognitive awareness of teachers and critical thinking skills of students at university level, the researcher employed some statistical techniques such as percentage, frequencies, mean scores; standard deviation, chi square, and Pearson coefficient formula for the analysis and tabulation of collected data.

Table 1:

Meta-cognitive awareness of Teachers

Statements	Mean	Std	df	X^2	Sig
Declarative Knowledge	20.692	4.533	04	8.307 E5[a]	.000
Procedural Knowledge	16.81	3.638	04	7.111 E8[a]	.000

Conditional Knowledge	16.973	3.392	04	7.421 E8[a]	.000
Planning	20.584	4.6792	04	8.751 E1[a]	.000
Management	43.949	13.838	04	17.387 E7[a]	.000
Evaluative Strategies	28.674	6.5192	04	10.571 E5[a]	.000

Based on the results found in table 1 showed teachers' metacognitive awareness about all major constructs of metacognitive awareness. The mean scores 20.692 with the standard deviation value of 4.533 reflected that teachers have highly significant awareness about their declarative knowledge, which was verified by the chi square value of 8.307 E5[a]significant at .000.

The mean score 16.81 with S.D., 3.638 revealed that teachers are highly competent in using procedural knowledge. This result was endorsed to the chi square value 7.111 E8[a]which shows that teachers have high level of understanding on the use of procedural knowledge.

Similarly, the mean score 16.973 with SD 3.392 illustrated that teachers do understand and are aware about the conditional knowledge required for metacognitive awareness.

The results were further supported by the chi square value of 7.421 E8[a]which was found highly significant at .000 and revealed that teachers use conditional requirements.

Furthermore, teachers at universities were also found competent in planning as shown by the mean score of 20.584 and SD 4.6792. These results were signified by the chi square value of8.751 E1[a]which was highly significant.

Similarly, the mean score43.949 and SD 13.838 revealed that teachers were strongly agreed and satisfied on the management skills. The results were also confirmed by the chi square value17.387 E7[a]were signified at .000. As a significant element of teacher's life, they were also satisfied with their evaluative skills as shown by the mean score of28.674with SD value of 6.5192. The results of the chi square value showed that teachers frequently use evaluation skills at university level proficiently. In nutshell, teachers at university level are highly aware of their metacognitive knowledge and utilize it in classroom teaching learning process.

The outcomes of the study on students' critical thinking skills development indicated that, although students generally agreed that their teachers offer training, but they were unclear about the specific focus on critical thinking skills. The findings also revealed that, students concurred that their teachers regularly pose questions, involve them in critical thinking exercises, and motivate them to express their perspectives, which is essential for cultivating critical thinking skills. These results were supported by Lou (2018) who concluded that teachers' training for students critical thinking are productive as students do learn critical thinking with teachers' trainings(Lou, 2018). The same results were also supported by the studies of Fadhlullah and Ahmad (2017) and Lee, Wang, and Lim (2024). (Fadhlullah & Ahmad, 2017; Lee, Wang, & Lim, 2024).

Table 2

Critical Thinking Skills of University Students

Statements	**Mean Score**	**Std. Deviation**	**df**	X^2	**Sig**
Social Abilities and Inquiry Skills	26.947	7.984	04	11.615 E7[a]	.000
Appraisal and Reasoning Abilities	22.973	6.7719	04	10.0771 E1[a]	.000
Exploratory and Self-acting Abilities	22.867	6.9076	04	9.771 E3[a]	.000
Training for Critical Thinking	23.211	6.9845	04	9.463 E2[a]	.000

According to the data presented in table2, the critical thinking skills of the university students were revealed to be highly significant. The mean score 26.947 with SD 7.984 showed that students were satisfied from their social abilities and inquiry skills, that chi square value of 11.615 E7[a] which was highly significant revealed that students are aware of the social abilities and their inquiry skills.

Similarly, students were also satisfied with their appraisal and reasoning abilities as reflected by the mean score22.973 with SD value of 6.7719. The results were also significant as shown by the chi square value of 10.0771 E1[a], which illustrated that students use their appraisal and reasoning abilities frequently.

Further, the mean score 22.867 with SD value of 6.9076 showed that students were always using their exploratory and self-acting abilities at university level, which were signified by the results of the chi square value of 9.771 E3[a]. Students also believed that their teachers do trained them in the development of their critical thinking skills development as illustrated by the mean score 23.211 and SD value of 6.9845, the results were also signified by the chi square value of 9.463 E2[a] which were significant at .000.

The above results conclusively revealed that, students' critical thinking skills at university level are satisfactory and they always use these skills in teaching learning process and in their social lives.

Table 3

Relationship between Teachers Metacognitive awareness and Students Critical Thinking Skills

Statements	Mean Score	Std Deviation	Df	r	Sig
Metacognitive awareness of teachers	24.613	6.099	04	.33681	.00
Students Critical thinking Skills	23.999	7.165	04	.3681	.000

According to results in table 3,the association between teachers' metacognitive awareness and students critical thinking skills revealed a moderate relationship between the variables and the mean score value of teachers' metacognitive awareness which was 24.613 with SD value of 6.099 and students critical thinking skills mean score 23.999 with SD value of 7.165. The correlational value(r), .3681 reveals a significant but moderate relationship between teachers' metacognitive awareness and students critical thinking skills. These results show that, teachers' metacognitive awareness about declarative, procedural, conditional knowledge, planning, management skills and evaluation skills have a positive association with the development of the students' critical thinking skills, including social abilities and management skills, appraisal and reasoning abilities, exploratory and self-acting abilities and training for the development of critical thinking of students.

Conclusions

Teachers were highly aware of their metacognitive skills. They have high understanding of declarative, conditional, and procedural knowledge, and they also proficiently use planning, management and evaluation skills during their instructional process in the classrooms.

It was also revealed that, students' critical thinking skills were also high in practice. The results of the students revealed that, they were highly satisfied with their critical thinking skills.

The study also concluded that, there was a positive limited association between teacher's metacognitive awareness and students critical thinking skills. It also enables the researcher to conclude that, teacher's metacognitive awareness positively impacts student's critical thinking skills development.

Discussion

Metacognitive awareness is a vital aspect of teachers teaching technique, granting them to plan, control and resolve complex problems by using their self-awareness. The incorporation of metacognitive awareness in the instructional process is considering vital for the development of the learners critical thinking abilities at the higher level of education. In the current era, critical thinking abilities of the students are taken as the most crucial things at university level, as; we are in an era of modernization, expansion and craftsmanship, where critical thinking serves as the key element. The findings indicated that, teachers recognize and concur that they have procedural knowledge, a key aspect of metacognitive awareness, facilitating intentional planning of classroom activities to optimize teaching and learning out comes. This idea was supported by the statement of (Räisänen, Postareff, & Lindblom-Ylänne, 2021; Tuononen, Parpala, & Lindblom-Ylänne, 2020) who discovered that, teachers' meta-cognitive awareness is grounded in the their procedural knowledge allowing them to develop and execute lesson plans, establish clear learning objectives, and clarify expectations for students learning. Further, the research has highlighted that, teachers exhibit profound declarative knowledge , demonstrated by their self-awareness of cognitive strengths and weaknesses, understanding of knowledge taxonomy, sensitivity to student's needs, and adept information management. These profiles bear resemblance to those discovered in earlier investigations by (Gamero, García-Ceberino, Ibáñez, & Feu, 2021), who revealed that, teachers utilize multiple approaches to enhance student's metacognitive skills development, leveraging sports activities as a catalyst. Furthermore, they observed that teachers exhibit a high degree of declarative knowledge and awareness which they deploy at varying intervals and for various objectives. these findings were further validated by the findings of (Saks, Ilves, & Noppel, 2021).The research has shown that teachers acknowledge that, they have conditional knowledge and awareness, as they employ flexible teaching methods to meet diverse learning needs, pay close attention to the chosen topics, and use their critical thinking skills to address students learning challenges do utilize multiple plans of action in classroom which ensures the learning of all types of learning style of students, they give full

attention to all the selected teaching themes/topics, use their conceptual abilities for errors correction of students learning and they know the positive impacts of their planning about students learning. As the teachers declared that they have a high level of awareness and conditional knowledge. These outcome were supported by the findings of Uzturk (2018) which demonstrated that, teachers typically possess conditional knowledge (Ozturk, 2018). Consisting results were also documented in investigation who asserted that, teachers' conditional knowledge is a key to successful planning and that they possess it(Saks et al., 2021).

The findings on students' critical thinking skills development showed that, while most students acknowledge that, their teachers provide guidance, but they were uncertain about the explicit focus on critical thinking skills. The findings also showed that students agreed that their teachers consistently ask questions, engage them in critical thinking endeavors, and inspire them to voice their opinions, which is necessary for fostering critical thinking skills. These outcomes were confirmed by(Lou, 2018) who demonstrated that teachers' training for students critical thinking are beneficial as students acquire critical thinking skills through teachers' trainings(Lou, 2018). The same results were also validated by the observations of (Fadhlullah and Ahmad, 2017; Lee et al., 2024).In terms of relationship between teachers' meta-cognitive awareness and students' critical thinking a faint connection was detected. The findings diverged from the research of (Diella and Ardiansyah, 2017) which revealed a substantial and moderate correlations between meta-cognitive awareness and students critical thinking in secondary education (Diella and Ardiansyah, 2017).Moreover, the study of (Dinçer and Çilek, 2022)also documents a substantial moderate positive correlation between metacognitive awareness and critical thinking of teachers candidates in university education faculties and pre-service education settings in Turkey (Dinçer and Çilek, 2022). Therefore, all the teachers and instructors need to equip their students with critical thinking skills and use them to make their students more expert and experienced persons on academic as well as in their social life. In addition, teacher education should have more attention towards student's critical thinking skills which can help in developing a peaceful and educated society (Aybek, Aslan, Dinçer, & Arısoy, 2015). Evens, the scholars are agreed that critical thinking skills help the students in enhancing their real life expertise and practical knowledge (Evens, Verburgh, & Elen, 2013). When s students become good critical thinkers, they can take well aimed decisions about different problems relating to their daily life (Kerdsomboon and Boonsathirakul, 2021), make better their speech and communication skills (Muhammadiyeva, Mahkamova, Valiyeva, & Tojiboyev, 2020), and inspect difficult situations thoroughly (Priambada and Suyitno, 2019)

Recommendations

Based on the conclusions and recommendations, it was recommended that, teachers may explicitly teach critical thinking skills to students via multiple group work activities, problem solving teaching methods, with the aim to further enhance students' critical thinking skills.

In-service professional development trainings were recommended for teachers to further enhance their metacognitive awareness through National Academy of Higher Education of HEC.

Seminars and workshops of senior BS students were also recommended on critical thinking skills at university level.

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